SAINT LOUIS UNIVERSITY.

Program-Level Assessment: Annual Report

Program Name (no acronyms): Aeronautics – Flight Science	Department: Oliver L. Parks Department of Aviation Science
Degree or Certificate Level: B.S.	College/School: School of Science and Engineering
Date (Month/Year): June 2023	Assessment Contact: Stephen Magoc

In what year was the data upon which this report is based collected? Fall 2022 and Spring 2023

In what year was the program's assessment plan most recently reviewed/updated? June 2022

Is this program accredited by an external program/disciplinary/specialized accrediting organization? Aviation Accreditation Board International (AABI)

1. Student Learning Outcomes

Which of the program's student learning outcomes were assessed in this annual assessment cycle? (Please list the full, complete learning outcome statements and not just numbers, e.g., Outcomes 1 and 2.)

Student Learning Outcome 2 - Describe historical trends, current issues, and emerging opportunities in aviation.

2. Assessment Methods: Artifacts of Student Learning

Which artifacts of student learning were used to determine if students achieved the outcome(s)? Please describe the artifacts in detail and identify the course(s) in which they were collected. Clarify if any such courses were offered a) online, b) at the Madrid campus, or c) at any other off-campus location.

The artifacts of student learning used included selected quiz/exam questions, final presentations, LOFT Scenarios, flight course module Knowledge Exams, and flight course module Final Stage Checks of the following courses:

- ASCI 3070 Flight Crew Fundamentals
- ASCI 4012 Introduction to Flight Crew Operations
- ASCI 4013 Introduction to Flight Crew Operations Laboratory
- ASCI 4022 Advanced Flight Crew Operations
- ASCI 4023 Advanced Flight Crew Operations Laboratory
- FSCI 2250 Instrument Flight Foundations
- FSCI 2550 Flight 4
- FSCI 2650 Navigation Foundations
- FSCI 3550 Flight 5

None of the courses above were taught online or in Madrid.

3. Assessment Methods: Evaluation Process

What process was used to evaluate the artifacts of student learning, and by whom? Please identify the tools(s) (e.g., a rubric) used in the process and **include them in/with this report document** (please do not just refer to the assessment plan).

The faculty of the Department of Aviation Science met to assess the student learning outcome. Performance indicator rubrics prepared by the faculty were used to determine if student and graduates were able to meet the requirements of the student learning outcome being assessed. The rubric used to determine if students and graduates met the student learning outcome, and the course performance indicator rubrics used in this assessment are found in Appendix A of this assessment report.

4. Data/Results

What were the results of the assessment of the learning outcome(s)? Please be specific. Does achievement differ by teaching modality (e.g., online vs. face-to-face) or on-ground location (e.g., STL campus, Madrid campus, other off-campus site)?

The result of the assessment of the student learning outcome is that students and graduates do meet the student learning outcome requirements. There was no difference in the courses taught in the online modality therefore there is no difference in achievement to note.

5. Findings: Interpretations & Conclusions

What have you learned from these results? What does the data tell you?

The data tells the faculty of the department that its students and graduates currently have the ability to describe historical trends, current issues, and emerging opportunities in aviation.

6. Closing the Loop: Dissemination and Use of Current Assessment Findings

A. When and how did your program faculty share and discuss these results and findings from this cycle of assessment?

All faculty in the department met on 05/24/2023 to assess the student learning outcome, therefore all faculty are aware of the results and findings of this assessment cycle.

B. How specifically have you decided to use these findings to improve teaching and learning in your program? For example, perhaps you've initiated one or more of the following:

Changes to the Curriculum or Pedagogies

- Course content
- Teaching techniques
- Improvements in technology
- Prerequisites
- Course sequence
- New courses
- Deletion of courses
- Changes in frequency or scheduling of course offerings

Changes to the Assessment Plan

- Student learning outcomes
- Artifacts of student learning
- Evaluation process
- Evaluation tools (e.g., rubrics)
- Data collection methods
- Frequency of data collection

Please describe the actions you are taking as a result of these findings.

The faculty agreed to take certain actions/make changes to course content so as to better enable students to perform at higher level when working to achievement of the requirements of the student learning outcome. These changes are as follows:

Course	**Action Item**
ASCI 1850 Safety Management Systems	Develop a rubric for grading course assignments.
ASCI 4035 Team Resource Management	In addition to group assignments, will require individual assignments.

ASCI 4050 Human Factors	As a means of continuous improvement, will require all assignments to be mandatory and assign a more rigorous grading scheme.
FSCI 3700 Flight Instruction Preparation	Introduce lesson planning and delivery earlier in the course to increase depth of knowledge and use of learner centric pedagogy.

If no changes are being made, please explain why.

7. Closing the Loop: Review of Previous Assessment Findings and Changes

A. What is at least one change your program has implemented in recent years as a result of assessment data?

In the 4050 Human Factors course, more specific measures for all performance measures were to be implemented.

B. How has this change/have these changes been assessed?

ASCI 4050 Human Factors – the course instructor created specific assignments for professional and ethical components of human factors, problem identification and problem solving in high consequence environments, and individual differences/diversity in multi-disciplinary teams.

C. What were the findings of the assessment?

ASCI 4050 Human Factors – the instructor reported the following:

- Individual student performance was assessed in a more detailed manner.
- Student performance increased with an average score on all three assignments exceeding 90%.

D. How do you plan to (continue to) use this information moving forward?

The department will determine the changes, if any, and assess the change's effect on the student learning outcome.

IMPORTANT: Please submit any assessment tools (e.g., artifact prompts, rubrics) with this report as separate attachments or copied and pasted into this Word document. Please do not just refer to the assessment plan; the report should serve as a stand-alone document.

Assessment of B.S. in Aeronautics – Flight Science Student Learning Outcomes

Student Learning Outcome #2: Describe historical trends, current issues, and emerging opportunities in aviation.

Date of this assessment: May 30, 2022

The following assessment is based on coursework of students and surveys of graduates.

Performance Indicator Assessed	Do not Meet	Meet
Students and graduates engage in and recognize the need for life-long learning.		X
Students and graduates are capable of assessing contemporary issues.		X
Students and graduates are capable of using the techniques, skills, and modern technology necessary for professional practice.		X
Students and graduates are capable of using the techniques, skills, and modern technology necessary for professional practice.		X
Students and graduates are capable of applying pertinent knowledge in identifying and solving problems.		X
Students and graduates are capable of applying knowledge of business sustainability to aviation issues.		X

List any prior change(s) made to the curriculum to aid graduates in meeting this student learning outcome:

- In the ASCI 4050 Human Factors course, develop specific measures to use to determine if the course performance indicators are being met.

Describe the effect of any change(s) made to the curriculum:

- In the ASCI 4050 Human Factors course, develop specific measures to use to determine if the course performance indicators are being met.

List recommendation(s) for changes to be made to the curriculum as a result of this assessment:

- ASCI 1850 Safety Management Systems – develop a rubric for grading course assignments.
- ASCI 4035 Team Resource Management – in addition to group assignments, will require individual assignments.

- ASCI 4050 Human Factors – as a means of continuous improvement, will require all assignments to be mandatory and assign a more rigorous grading scheme.
- FSCI 3700 Flight Instruction Preparation – the course instructor will introduce lesson planning and delivery earlier in the course to increase depth of knowledge and use of learner centric pedagogy.

Department of Aviation Science

B.S. in Aeronautics Concentration – Flight Science

Program Assessment

Continuous Improvement Items

06-23-2022

Course	Student Learning Outcome	Action Item
ASCI 1850 Safety Management Systems	SLO #2	Develop a rubric for grading course assignments.
ASCI 4035 Team Resource Management	SLO #2	In addition to group assignments, will require individual assignments.
ASCI 4050 Human Factors	SLO #2	As a means of continuous improvement, will require all assignments to be mandatory and assign a more rigorous grading scheme.
FSCI 3700 Flight Instruction Preparation	SLO #2	Introduce lesson planning and delivery earlier in the course and continue to develop the service learning content of the course.

Assessment of AABI Section 3.1 – 3.9 Baccalaureate Degree Requirements Date of this Assessment: May 30, 2023					
AABI Goals	**Performance Indicator Assessed**	**Meets**	**Does Not Meet**	**Previous Recommendation(s)/Results**	**Current Recommendation(s)**
Students	Students can assess decisions and can make ethical and professional decisions.	X		None.	None.
	Admission requirements for the aviation programs are adequate to meet the requirements of the concentration.	X		None.	None.
Program Mission and Educational Goals	Students demonstrate knowledge of aviation business practices and principles and their application to the aviation industry.	X		None.	None.
	Students understand and appreciate the financial and economic aspects of the aviation industry.	X		None.	None.
	Students have knowledge of the business structure, management and administrative aspects of airlines, corporate flight operations and airport operations.	X		None.	None.

Student Learning Outcomes	Students are adequately prepared for a career in the student's chosen profession.	X		None.	None.
Curriculum	The curriculum prepares the students to conduct aviation operations in a safe and efficient manner.	X		None.	None.
Faculty	Enough qualified faculty and staff with industry credentials and/or an active research agenda are utilized and retained in the program (where applicable.)	X		Recommendation: Advise Saint Louis University administration of the need to hire a minimum of two additional faculty to better meet the needs of the department. Result: Saint Louis University administration determined not to hire additional faculty at this time.	Advise Saint Louis University administration of the need to hire a minimum of four additional faculty to better meet the needs of the department.
Facilities, Equipment, and Services	The department facilities remain adequate for the aviation department's academic training activities.	X		None.	None.
	Saint Louis University will continue to support the aviation department to operate the aviation academic and flight training activities.		X	Recommendation: Advise Saint Louis University administration of the need to replace aging aircraft and simulators on a set schedule. Result: Saint Louis University administration determined not to replace aging aircraft at this time.	Advise Saint Louis University administration of the need to replace aging aircraft and simulators on a set schedule.
Aviation Safety Culture and Program	Students, staff, and faculty are aware of the PEDALS reporting system and can use it to	X		None.	None.

	report safety issues.				
	Students, staff, and faculty attend the Safety Standdown sessions held each semester.	X			Continue to stress the importance of attendance at the Safety Standdown sessions to students, staff, and faculty.
Relations with Industry	The department's Industry Advisory Board is utilized in providing guidance to the department.	X		Recommendation: The Industry Advisory Board recommended revising the program curriculum to include additional business and management courses in place of the Approved Emphasis Area electives found in the current concentration's curriculum. Result: The department revised the concentration's curriculum and approvals were obtained to begin the revised curriculum in the fall 2022 semester.	Begin assessment of the business and management content in the revised curriculum of the concentration.

In the overall assessment of Student Learning Outcome 1, is this Student Learning Outcome Met? Yes **X** No

Date of this assessment: 05-30-2023

AABI 3.10 Criteria: Students

(Flight Science Concentration)

Dates of this assessment:
- January 2023 and May 2023.

Do the students of the Aviation Management concentration meet the Students criteria as listed in the Comprehensive Assessment Plan?
- Yes. The evidence collected and assessed shows that the students meet SLO 2 and the Students' goals.
- See the data collected and assessed in Appendix A of this document.
- It is important to note that standardized test scores were not required by the Office of Admission during the assessment period.

Closing the Loop:

Were any changes recommended at the last assessment of the Students criteria.
- Yes, changes were recommended as a result of the 2021-2022 assessment.

State the purpose of the recommended change and whether the change met its intended purpose.

- ASCI 4050 Human Factors – the instructor reported the following:
    - Individual student performance was assessed in a more detailed manner.
    - Student performance increased with an average score on all three assignments exceeding 90%.

As a result of today's assessment of the Students criteria, are any changes recommended at this time? List any recommended change(s) to be assessed at the next assessment of the Students criteria.
- ASCI 1850 Safety Management Systems - develop a rubric for grading course assignments.
- ASCI 4035 Team Resource Management – in addition to group assignments, will require individual assignments.
- ASCI 4050 Human Factors – as a means of continuous improvement, will require all assignments to be mandatory and assign a more rigorous grading scheme.
- FSCI 3700 Flight Instruction Preparation – introduce lesson planning and delivery earlier in the course and continue to develop the service learning content of the course.

AABI 3.10 Criteria: Program Mission and Educational Goals

(Flight Science Concentration)

Dates of this assessment:
- January 2023 and May 2023

Do the Program Mission and Educational Goals of the Aviation Management and concentration meet the Program Mission and Educational Goals criteria as listed in the Comprehensive Assessment Plan?
- Yes. The evidence collected and assessed shows that the students meet SLO 2 and the Program Mission and Educational goals.
- See the data collected and assessed in Appendix A of this document.

Closing the Loop:

Were any changes recommended at the last assessment of the Program Mission and Educational Goals criteria as listed in the Comprehensive Assessment Plan?
- There were no recommendations made as a result of the June 2022 assessment.

If yes, state the purpose of the recommended change and whether the change met its intended purpose.
- N/A

As a result of the assessment of the Program Mission and Educational Goals criteria, are any changes recommended at this time? List any recommended change(s) to be assessed at the next assessment of the Program Mission and Educational Goals criteria.
- There are no recommendations being made at this time.

AABI 3.10 Criteria: Student Learning Outcomes

(Flight Science Concentration)

Dates of this assessment:

- January 2023 and May 2023

Do the Student Learning Outcomes of the Aviation Management concentration meet the Student Learning Outcomes criteria as listed in the Comprehensive Assessment Plan?

- Yes. The evidence collected and assessed shows that the students meet SLO 2 and the Student Learning Outcomes goals.
- See the data collected and assessed in Appendix A of this document.

Closing the Loop:

Were any changes recommended at the last assessment of the Student Learning Outcomes criteria?

- No changes were recommended for the 2021-2022 assessment.

State the purpose of the recommended change and whether the change met its intended purpose.

- N/A

As a result of today's assessment of the Student Learning Outcomes criteria, are any changes recommended at this time? List any recommended change(s) to be assessed at the next assessment of the Student Learning Outcomes criteria.

- There are no recommendations being made at this time.

AABI 3.10 Criteria: Curriculum

(Flight Science Concentration)

Dates of this assessment:

- January 2023 and May 2023.

Does the Curriculum of the Aviation Management concentration meet the Curriculum criteria as listed in the Comprehensive Plan?

- Yes. The evidence collected and assessed shows that the students meet SLO 1 and the Curriculum goals.
- See the data collected and assessed in Appendix A of this document.

Closing the Loop:

Were any changes recommended at the last assessment of the Curriculum criteria?

- Yes, the department used input from its Industry Advisory Board and modified the Aviation Management curriculum.
- Yes, the department modified the curriculum to meet the University Core Curriculum requirement.

State the purpose of the recommended change and whether the change met its intended purpose.

- The department is required to modify the Flight Science curriculum to include the University required Common Core. This modification became effective with the fall 2022 semester. It is too early to determine if the revision meets its intended purpose.

As a result of today's assessment of the Curriculum criteria, are any changes recommended at this time? List any recommended change(s) to be assessed at the next assessment of the Curriculum criteria.

- The department made the change to put the ASCI 1010 Professional Orientation course back into the curriculum as it sees the need to introduce course topics back into the curriculum.
- The department made the change to remove the FSCI 3750 Flight 6 (CFI) course as a required course and offer the course as an elective

AABI 3.10 Criteria: Faculty and Staff

(Flight Science Concentration)

Date of this assessment:
- January 2022 and May 2022.

Do the Faculty and Staff of the Aviation Management concentration meet the Faculty and Staff criteria as listed in the Comprehensive Assessment Plan?
- Yes. The evidence collected and assessed shows that the students meet SLO 1 and the Program Mission and Educational goals.
- See the data collected and assessed in Appendix A of this document.

Closing the Loop:

Were any changes recommended at the last assessment of the Faculty and Staff criteria?
- The department propose to the Dean and Provost that the department requires an additional four faculty.

State the purpose of the recommended change and whether the change met its intended purpose.
- The department needs additional faculty to accommodate the increase in both undergraduate and graduate programs and to strengthen its research agenda. No additional hiring of faculty is being considered by SLU administrators as part of the proposal.
- The department was approved to hire a non-tenure track faculty by being awarded one of the faculty positions to be hired as part of the Taylor Geospatial Institute Hiring Initiative

As a result of today's assessment of the Faculty and Staff criteria, are any changes recommended at this time? List any recommended change(s) to be assessed at the next assessment of the Faculty and Staff criteria.
- The department recommends the hiring of at least two full-time tenured faculty members to teach the undergraduate and graduate student populations, and to help grow the research agenda of the department.

AABI 3.10 Criteria: Facilities, Equipment and Services

(Flight Science Concentration)

Dates of this assessment:
- January 2023 and May 2023

Do the Facilities, Equipment and Services of the Aviation Management concentration meet the Facilities, Equipment and Services criteria as listed in the Comprehensive Assessment Plan?
- No. The evidence collected and assessed show that the Program Mission and Educational goals are not being met.
- Facilities, Equipment, and Services do not meet the goals listed in the Comprehensive Assessment Plan.

Facilities
- The McDonnell Douglas Hall facility remains adequate for the current level of staff and faculty.
- The Center for Aviation Science facility continues to leak in different areas when it rains and needs continual roof repairs. This facility is due for the resumption of the phased renovations in the 3rd or 4th quarter of 2023.

Equipment
- Equipment used in McDonnell Douglas Hall is generally in adequate condition except for the CRJ 700 flight simulator used by the department. The CRJ 700 flight simulator is due for replacement during the summer 2023. The replacement unit will be a Boeing 737 MAX AATD manufactured by Flightdeck Solutions (FDS).
- Equipment at the Center for Aviation Science is becoming aged. The aircraft continue to be maintained in an airworthy condition, but it is becoming increasingly expensive to maintain them in such a condition. The Diamond DA20 aircraft were manufactured in 2008 and the Piper Seminole aircraft were manufactured in 2001 and overdue for replacement, based on the department's seven-year replacement cycle.
- The 2018 aircraft simulators are operating adequately and are within the seven-year replacement cycle.
- The 1996 ground support truck used by the department needs replacement and is becoming increasingly difficult to use in support of snow removal from the hangar ramp areas.
- The forklift vehicle used by the department needs replacement or overhaul.
- The aircraft oil storage shed is in an unusable, unsafe condition and requires replacement.

Services
- The services at McDonnell Douglas Hall are adequate.
- The services at the Center for Aviation Science are barely adequate as the facility continues to deteriorate, the roof leaks, several doors require replacement, the HVAC in the simulator room requires adjusting, there is a lack of SLU branding on the exterior and in the interior of the facility, Site 41 aircraft ramp drainage pipe is clogged and does not sufficiently drain, causing a large, long-standing pool of water on the ramp (large area of ice

in the winter), etc.

Closing the Loop:

Were any changes recommended at the last assessment of the Facilities, Equipment and Services criteria?

- Yes, the replacement of the Diamond DA20 and Piper Seminoles was recommended by the department.
- Yes, the CRJ 700 Advanced Aircraft Training Device (AATD) was recommended to be replaced.

State the purpose of the recommended change and whether the change met its intended purpose.

- The purpose of the recommended changes was to modernize the flight training aircraft and was not implemented by the University.
- Replacing the CRJ 700 simulator is necessary due to no support from the manufacturer (no longer in business) and increased delays in student training caused by software and hardware issues. The CRJ 700 is being replaced in the 3rd quarter of 2023 with a Boeing 737 MAX unit manufactured by Flightdeck Solutions.
- Replacement of the ground support truck was not approved by the University.

As a result of today's assessment of the Facilities, Equipment and Services criteria, are any changes recommended at this time? List any recommended change(s) to be assessed at the next assessment of the Facilities, Equipment and Services criteria.

The department recommends replacement/repair of the following items of equipment:

- The nine Diamond DA20 aircraft with 10-12 Piper Pilot 100i aircraft.
- The two Piper Seminoles with two or three new Piper Seminoles.
- The ground support vehicle which is being used by the Center for Aviation Science.
- Replacement/overhaul of the forklift which is being used by the Center for Aviation Science.
- Replacement of the oil storage shed which is being used by the Center for Aviation Science.
- Repairs of the hangar facility.
- Repair the Site 41 clogged drainage issue.

Further, the department recommends the hiring of a custodian who can be dedicated to a schedule which allows for daily cleaning/servicing at the Center for Aviation Science.

AABI 3.10 Criteria: Aviation Safety Culture and Program

(Flight Science Concentration)

Date of this assessment:

- January 2023 and May 2023.

Does the Aviation Safety Culture and Program of the Flight Science concentration meet the Aviation Safety Culture and Program criteria as listed in the Comprehensive Assessment Plan?

- Yes. The evidence collected and assessed show that the students meet SLO 1, and the Aviation Safety Culture and Program goals.
- See the data collected and assessed in Appendix A of this document.

Closing the Loop:

Were any changes recommended at the last assessment of the Aviation Safety Culture and Program criteria.

- Yes, the implementation of a safety survey to be sent to the University's aviation community.
- The Center for Aviation Science administrators were advised to begin developing safety goals for the flight operations.

State the purpose of the recommended change and whether the change met its intended purpose.

- The survey is used to determine how knowledgeable the aviation community is of the Aviation Safety Culture and Program utilized by the department.

State the purpose of the recommended change and whether the change met its intended purpose.

- The survey is used to determine how knowledgeable the aviation community is of the Aviation Safety Culture and Program utilized by the department.
- The flight operations needed to become a participating partner in the safety culture of the department.

As a result of today's assessment of the Aviation Safety Culture and Program criteria, are any changes recommended at this time? List any recommended change(s) to be assessed at the next assessment of the Aviation Safety Culture and Program criteria.

- There are no recommendations being made at this time.

AABI 3.10 Criteria: Relations with Industry

(Flight Science Concentration)

Date2of this assessment:

- January 2023 and May 2023.

Do the Relations with Industry of the concentration meet the Relations with Industry criteria as listed in the Comprehensive Assessment Plan?

- Yes. The evidence collected and assessed show that the students meet the Relations with Industry goals.
- See the data collected and assessed in Appendix A of this document.

Closing the Loop:

Were any changes recommended at the last assessment of the Relations with Industry criteria?

- There were no recommendations made at the last assessment.

State the purpose of the recommended change and whether the change met its intended purpose.

- N/A.

As a result of today's assessment of the Relations with Industry criteria, are any changes recommended at this time? List any recommended change(s) to be assessed at the next assessment of the Relations with Industry criteria.

- There are no recommendations being made at this time.

SAINT LOUIS UNIVERSITY

OLIVER L. PARKS DEPARTMENT
OF AVIATION SCIENCE

Appendix A

Data and Course Evidence Collected to Support the Assessment of the Program Goals and SLO 2 for the Flight Science Concentration

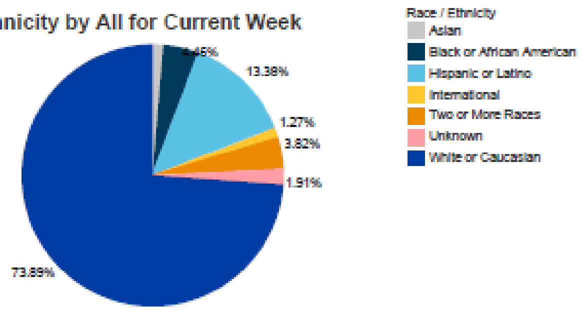
June 2023

Appendix A Table of Contents

Appendix A Table of Contents

Flight Science – Data Collected in Support of Student Goals and SLO 2

Race/Ethnicity by All for Current Week



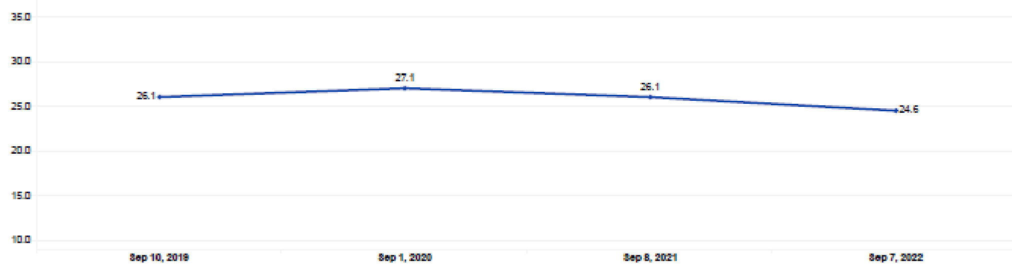
Gender by All for Current Week

	September 10, 2019		September 1, 2020		September 8, 2021		September 7, 2022	
ACT Groups	Female	Male	Female	Male	Female	Male	Female	Male
34 - 36						5.26%		
30 - 33		12.82%	42.86%	25.00%			20.00%	6.45%
27 - 29	50.00%	30.77%	14.29%	25.00%		13.16%		12.90%
24 - 26	50.00%	28.21%	28.57%	35.71%		2.63%	20.00%	9.68%
18 - 23		28.21%	14.29%	14.29%	33.33%	5.26%	40.00%	19.35%
12 - 17						2.63%		3.23%
Not Reported					66.67%	71.05%	20.00%	48.39%
Grand Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Student Count
by Race/Ethnicity: All and by Gender: All

	Sep 10, 2019	Sep 1, 2020	Sep 8, 2021	Sep 7, 2022
Student Count (All)	45	35	41	36
Student Count w/Test Scores	45	35	12	20

ACT Scores (includes Concordant SAT)
Race/Ethnicity: All - Gender: All - Status: Registered - FTPT: All



Performance Indicator Rubric

Course: ASCI 1850 Safety Management Systems   Course Instructor: Terrence Kelly

Semester Taught: Spring 2023   Number of Students in Course: 43

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	Homework Assignment #1 – Safety and Professionalism Average - 97% 96.2% of students achieved a score of 70% or higher	Benchmark Achieved
SLO 2: Describe historical trends, current issues, and emerging opportunities in aviation.	Homework Assignment #2 – SMS Fundamentals Average – 97% 100% of students achieved a score 70% or higher	Benchmark Achieved
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	Homework Assignment #3 – Risk Matrices Average 95% of students achieved a 70% or higher	Benchmark Achieved

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

SLO 1 - The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

Homework #1 was created specifically to speak to the importance conducting flight operations (and other high-consequence activities) in a professional, safe, and efficient manner. Student scores were quite strong for this assignment and overall, I am satisfied with performance. I do not anticipate any changes to the assignment itself. The course reaffirms the safety and professionalism components of the SLO continuously throughout the course. While efficiency is emphasized, the course is careful to avoid prioritizing "shortcuts" for efficiency's sake at the expense of increased risk.

SLO 2 – Homework #2 seeks to emphasis regulatory paradigms surrounding safety prior to the creation and requirements surrounding SMS (in Part 121 operations). In terms of current issues, the course seeks to help students better understand the tension that may exist between safety and business performance. Emerging opportunities are discussed in the context of SMS as a requirement for certificate holders other than Part 121 carriers. I am satisfied with student performance surrounding SLO 2, although the grading associated with the assignment is fairly generous.

SLO 3 – For SLO #3, I use a risk matrix to help students begin to understand how hazards are assessed in terms of their potential severity and likelihood. A key component (pillar) of SMS is the Safety Risk Management (SRM) process in determining what hazards need to be avoided or mitigated. Once again, I was satisfied with the class performance. I do not foresee changes to this assignment as developing risk analysis skills is critical in performing aviation related task in a safe manner.

Assignment Details

ASCI 1850 - Homework Assignment 1 - Name ____________________________________

Please respond to the following four questions. (AABI B & D)

1. Describe the importance of making both professional and ethical decisions as an aviation

professional. (300 words minimum)

2. How are professional ethics and safety related? (300 words minimum)

3. Describe the relationship between hazards, risks and safety. (300 words minimum)

4. Risk is determined by assessing the product of hazard probability and hazard severity. Discuss whether you would prefer qualitative or quantitative data. (300 word minimum)

ASCI 1850 Safety Management Systems – Homework # 2 Name:

Safety Management Systems Fundamentals

Please review the video linked below. The video is over a decade old but still provides good information.

Once you have reviewed the video, please respond to the following questions. This assignment should

be uploaded here no later than Friday, February 24th by the end of the day. The video is 35 minutes long

so watching the video and answering the question below will cover the two classes I will miss.

Here is a link to the video:

Safety Management Systems (SMS) Fundamentals: Basics - YouTube

Here are the questions:

1. What is meant by SMS not being a substitute for compliance?

2. What is ATOS/NPG as described in the video?

3. Briefly describe the model created by Dr. Malcolm Sparrow and discussed in the video.

4. Briefly describe system safety as described in the video.

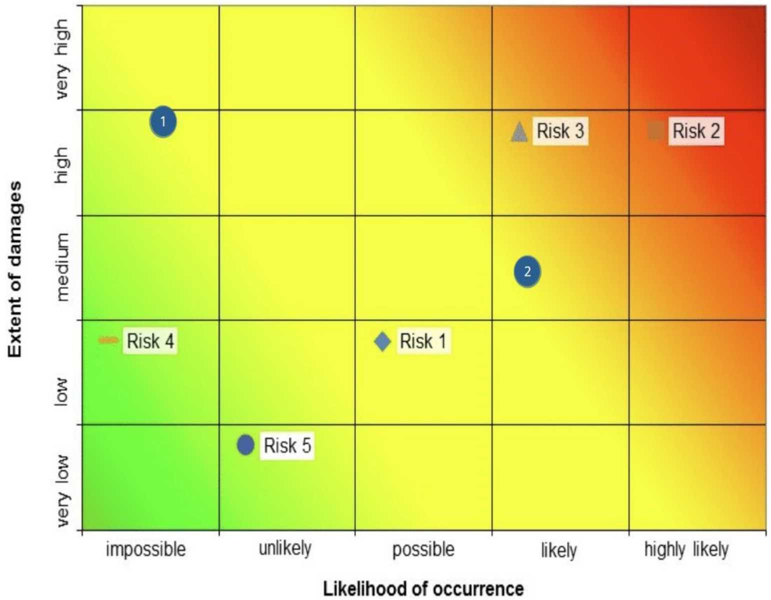
5. Differentiate between AVS SMS and AFS/Flight Standards and Service Provider SMS.

6. Briefly describe how FAA oversight has changed with the creation of SMS programs.

7. Describe the meaning of Title 49 USC 44702 as discussed in the video.

8. Briefly describe the four components of an “informed culture” as discussed in the video.

ASCI 1850 Risk Matrix Assignment Name: ______________________________
Please respond to the five questions located below the risk matrix.



1. Explain the meaning of the terms used on the X-Axis
2. Explain the meaning of the terms on the Y-Axis.
3. Explain the changing color gradient used in the risk matrix.
4. Briefly describe the risks associated with the following data points in the risk matrix

Risk 1
Risk 2
Risk 3
Risk 4

Risk 5
5. Evaluating the two risks (the 1 & 2 inside the circles on the risk matrix), which presents less risk.
Provide a detailed explanation on why.

<u>Assignment Examples</u>
<u>Homework #1</u>

ASCI 1850 - Homework Assignment 1 - Name Redacted

Please respond to the following four questions. (AABI B & D)

1. Describe the importance of making both professional and ethical decisions as an aviation professional. (300 words minimum)

It is crucial that everybody in the aviation industry maintains a level of professionalism and a healthy ethical mindset when conducting their work. Professionalism is extremely important to pilots because of the many standardized procedures and flows that they follow. If pilots decide to cut corners, only do some of the required procedures, or do not take it seriously, this could result in an incident that would harm more than just the pilot. Professionalism in aviation managers and other staff is important as it will allow safety and oversight on the aspects of safety that the pilots cannot control, such as the maintenance of these aircraft. A professional environment leads to a safer safety culture within the operation. Proactive hazard identification is essential and should be part of the professional atmosphere within an operation in order to make sure the operation is as safe as reasonably possible. Professionalism may be hard to follow for an individual if there is no safety culture as there is social pressure to conform to the norm. That is why the norm in an operation should remain as professional as possible in order to prevent this. Ethical decisions are important in order to make sure the risks are as low as reasonably possible within the operation. If one is not in the right mental mindset or prioritizes personal gain over safety, this could cause the hazards to rise which leads to more risks in the operation. For example, a pilot that suffers from mental illness may not have the capacity to fly the aircraft as their ethics may be distorted causing harm to not only the operation but to themselves. Since most operations are businesses and need to make money, the managers of the operation have to make sure to have the safest operation possible even if that means that the revenue of the operation will decrease.

2. How are professional ethics and safety related? (300 words minimum)

Professional ethics and safety are related because of the strict procedures that many operations have staff comply with. Professional ethics differs from personal ethics because in personal ethics, one person may believe that they want to conduct the safest operation as possible, but a professional ethics will make sure that everybody in the operation conducts the safest operation as possible. An aviation professional that does not have a set of professional ethics and does not take their professional life as seriously as they can cause more hazards to the entire operation. This is important because every person in the operation has to maintain professional ethical values or else it will make it hard to effectively complete the mission. Professional ethics includes the initiative of a company to include sources of identification hazards. These can include internal evaluation programs, safety occurrence trend analysis, information exchange amongst operators and service providers, line operator safety audits, and many more systems that create a better safety culture and ensure that professional ethics are maintained. This culture and professional ethics can be embedded in the aviation professionals of the operation through recruitment and training of new workers. Training is an essential part of maintaining professional ethics because it'll ensure everyone in the operation understands the companies' unique policies and procedures that allow for a professional ethical culture to emerge. When everybody understands the professional ethics involved, it sets a standard of safety that is followed by everybody, meaning that they all have a high standard of safety and of what type of risks are acceptable and hazards that may occur. If there is not a standard professional ethical culture, aviation professional may not know what risks are acceptable for the operation and may cause more hazards. It also will cause a more laid back environment which is not appropriate for an aviation operation where the lives of people are at risk.

3. Describe the relationship between hazards, risks and safety. (300 words minimum)

There is no such thing as an operation to be perfectly safe. Within an operation, there are bound to be hazards no matter the circumstance because there are hazards that the personnel are not even aware of. These hazards present risks to the operation. Trained aviation professionals within an operation determine whether these hazards are acceptable, mitigated, or rejected, depending on the severity of the hazards and if the experience of the personnel handling these hazards. This can be done through multiple steps starting with understanding the system, understanding the hazard, assessing the degree of risk involved, and finally determining the acceptability or intervention to these risks. By identifying and combating these hazards, we limit the number of risks in an operation which improves overall safety. The safety culture of an operation means that the hazards are identified and dealt with in the appropriate manner which ultimately lowers the risks. The safety culture can be improved through hazard scopes which include design factors, better procedures and practices, organizational factors, enforcing the regulations, etc. This shows how many opportunities there are to improve the safety of an operation but also shows how many hazards and potential hazards could arise.

4. Risk is determined by assessing the product of hazard probability and hazard severity. Discuss whether you would prefer qualitative or quantitative data. (300 word minimum)

I believe both qualitative and quantitative are essential in determining the hazard probability and hazard severity. Quantitative data would allow for data that would show us numerical data and allow aviation professionals to come to their own conclusions about this data. Quantitative data can be clear, such as how much pressure is allowed to be applied on the landing gear and how much is actually applied, but it may not be so obvious on how to apply this data in lowering the amount of risks in an operation. Quantitative data alone cannot be the only way to determine hazard identification because some factors cannot be written down numerically. The main thing that makes qualitative data triumph quantitative data is the ability to understand what the crew members were doing, which may be hard to translate numerically. An example of this is the cockpit voice recorder which allows for all the audio the pilots say to be played back when analyzing an incident. The dialogue between the crew can only be analyzed by other humans and can give valuable information about the risks and hazards that arose in that situation that may be impossible to spot in quantitative data. However, if I had to choose between the two I would choose quantitative data to lower the hazard probability because I believe it is easier to lower the risks of quantitative data because most mechanical issues can be found with quantitative data which I believe is an easier fix than for example a human factors hazard which may be harder to come up with a solution to.

ASCI 1850 - Homework Assignment 1 - Name Redacted

Please respond to the following four questions. (AABI B & D)

1. Describe the importance of making both professional and ethical decisions as an aviation professional. (300 words minimum)

Professional and ethical decisions are important for aviation professionals because the outcome of their decisions can affect a large number of people. Professional decisions or decisions that follow industry standards, laws, and regulations have such a large scope due to the nature of the aviation industry. For pilots the decisions they make while flying have an impact on hundreds of people who occupy the aircraft the pilots are flying. It is important in these circumstances to make professional decisions because the standards that government these decisions have been created to provide the best outcome and ultimately are best not only for the pilot but also the passengers and crew. Rogue decisions that circumvent these rules are often destructive in nature and should only be used in special circumstances that may require the pilot to deviate from the rules to ensure safety. In general aviation professionals are not judged by their ability to come up with new ideas and procedures on the spot but by their ability to trust other professionals' judgement which in essence is professional decision making. In addition to professional decisions, ethical decision which are based on respect for every individual is equally important. These decisions are like professional decisions in that they have a large scope. Often professional and ethical decisions are nearly identical because often the standards that judge professional decision are designed to be ethical in nature. However, this is not always the case, and in cases where ethical standards do not match professionals' ones, pilots must refer to the ethical standards. For instance, if a certain rule or regulation would put the pilot and passengers at an undue risk and breaking that rule would be objectively better and perhaps safer than the pilot should break that rule. This deferment to ethics must be done with caution and only done when absolutely necessary because this type of decision relies heavily on the soundness of a pilot's judgement.

2. How are professional ethics and safety related? (300 words minimum)

Professional ethics and safety are related heavily which is primarily because professional ethics largely determines the safety of any aviation operation. If an operator abides by professional ethics, then this means generally through their operation they will be promoting safety. For management, this can be applied by making company policies ethical. For example, this might mean that management should prioritize safety over most other things including flights being on time or even making money. Management should ensure that their policies value the lives of the people their company's aircraft are carrying. This could potentially be applied by not allowing flights to depart in certain weather conditions or delaying flights, so pilots have enough rest. While this might hurt the company financially in some respect it is the ethical thing to do because it does not compromise the safety of the crew or passengers. Additionally, when determining the how to spend company funds on safety companies might not choose certain "safety items" if the benefit of them does correspond with the price. An example of this might be a new technology that could be equipped on a plane to marginally improve the safety during flight. However, this technology would come at significant cost and would force the company to raise ticket prices. This might mean that people would choose fewer safe forms of travel and ultimately the decision to invest in this type of safety was not ethical. For pilots, the relation of professional ethics and safety is similar to that of management. For them it is critical that pilots be ethical in not deviating from the set rules and procedures unless absolutely necessary. It would be unethical for a pilot to do so without proper cause because deviating from procedures would also be deviating from the safest practice. This would ultimately unnecessarily endanger the passengers and as a result would be unethical to do.

3. Describe the relationship between hazards, risks and safety. (300 words minimum)

Hazard, risk, and safety all share a close relationship because these three concepts are interconnected in several ways. Hazard is the base term of the three and acts as a foundation for the definitions of the other two concepts. A hazard is essentially some condition that could lead to or contribute to an unplanned undesirable outcome. All hazards have two characteristics that are associated with them. The first is the probability that the hazard with operationalize or occur. The second characteristic is the severity of the hazard or what threat it would pose should it operationalize. Both of these characteristics can range from being high to low. Risk combines both the characteristics together and determines the future impact the hazard may pose. Risk is a hazards probability multiplied by the severity or magnitude of the hazard. This allows a better understanding of hazards as the risk they pose is more important than their severity or probability alone. For example, a hazard might be extremely probable, but the severity of that hazard might be so low that the overall risk is insignificant. Another example may be a hazard with very high severity but such a low probability that the overall risk is negligible.. The final concept safety is simply defined as the condition of being safe which means there are no hazards and thus no risk. However, this definition does not truly apply to the real world so ultimately safety is having risk being as low as reasonably possible. This ultimately means that in any operation the goal should be to eliminate all hazards that are present or if it not possible to eliminate them then to mitigate the hazards to an acceptable level. Some mitigation might not be realistically possible, but some risk is still allowable as long as any further mitigation would not make sense.

4. Risk is determined by assessing the product of hazard probability and hazard severity. Discuss whether you would prefer qualitative or quantitative data. (300 word minimum)

Describing risk is terms of hazard probability and hazard severity requires the use of both qualitative and quantitative data. Using only one method for both would not yield effective results in being able to truly understand what risk is acceptable and what is not. For hazard probability quantitative data works best to describe it. To properly be able to determine the likelihood of an event happening it is best to put it in terms of numbers rather than explaining through less concrete terms. Numbers for probability are completely objective and only have one meaning to them. While what level of risk may still be debated the value of each probability cannot be. This would not be the same for using qualitative data to describe probability. Words unlike numbers can be subjective in the definition and also connotation which is not helpful when trying to determine the likelihood of a hazard. Not only would the level of acceptable risk be debated but also the value of each probability would be too. Quantitative data is best for probability, but the same type of data would not be best for understanding a hazard severity. Quantitative would work to describe monetary damages as money lost can be best described by numbers, but money being lost is not the only or most important thing at risk. Human life and safety are much more important a number of moneys lost or gained. When attempting to describe the severity of a hazard on human life it is best not to use numbers. Numbers are objectifying which is excellent for describing probability or money but for human injuries or death describing severity through numbers is dehumanizing. Ultimately this approach does not value each person individually which is why qualitative data works best for severity. Combined together risk determination is then based on both types of data which allows a better decision to be made about the risk.

ASCI 1850 - Homework Assignment 1 - Name Redacted

Please respond to the following four questions. (AABI B & D)

1. Describe the importance of making both professional and ethical decisions as an aviation professional. (300 words minimum)

Making both ethical and professional decisions are important in the field of aviation. For anyone that works in the aviation industry, there are many rules and regulations set by the government. Along with government rules, many times there are limitations or standards that an aviation company (like an airline) may set just to be extra careful. There will be many times when an aviation professional must make decisions that abide with both government and industry criteria but must also align with their own ethical and moral principles. Any decision in the aviation industry can have very extensive consequences. Any decision can affect the safety of others as well as hurt the reputation of the company they work for.

Professional decisions are decisions that prioritize the security and safety of all crew, passengers as well as the aircraft itself. An instance of making a professional decision could be when a pilot must make a “go” or “no go” decision to proceed with a flight. A decision like this can happen because of a system on a plane not working properly or because of weather conditions possibly jeopardizing the flight operations. Another example of a professional decision having to be made could be when a pilot in an aircraft gives the safety briefing to all passengers in the aircraft before a flight. This is important because it is the flight crew’s responsibility to ensure that themselves as well as the aircraft and the passengers inside the aircraft are safe and secure. This goes for flight crews of all parts of aviation from general aviation all the way to the airlines.

Ethical decisions are decisions that have to do with how morals play into a decision. Ethical decisions are important because they have to do with your personal values. Some of these values can include being honest about your qualifications as a member of the flight crew, a pilot’s fitness to fly, being on time as well as just flat out being respectful to those you may encounter. An example of an ethical decision needing to be made could be when a flight instructor asks a mechanic to sign off on a plane being airworthy to fly when it is due for an inspection and realistically should be thoroughly inspected. The risk of the mechanic just signing off on the airworthiness of the plane could be that the plane is not airworthy and that there is something wrong with it that could endanger the safety of the flight instructor and their student.

2. How are professional ethics and safety related? (300 words minimum)

Professional ethics and safety are related because they both are significant parts of ensuring that any operation in the aviation industry occurs at a standard that is up to par with what is legally acceptable to the FAA. Professional ethics is basically a set of values that one sets for a business or themselves to base all their decisions off of. Safety is the concept of ensuring that all operations are performed with measures in place to prevent injury and harm to those who participate in said operations.

I would say that professional ethics is critical in guaranteeing that employees at a company are responsible and honest people that make decisions that display whatever company they may work for in a good light. Another quality that one should have at any company could be that they show common decency to both their colleagues as well as the people they will come across while they are working. With respect to companies in aviation, I would say that it is imperative that employees at these companies follow whatever rules are in place because it helps to maintain a good rapport between the public and the company. I feel that if an employee at an airline were to go against what the code of conduct stated, it would hurt the safety culture that their company is trying to promote.

I would say that safety is important because it is what maintains an aviation company's reputation and relationship with the public. Safety is the concept of mitigating the chance of accidents, injuries, and/or illnesses. I feel that professional ethics is part of safety because it helps in making sure that the concept of safety is applied and carried out into the companies' everyday operations. If the concepts of professional ethics and safety is not upheld to a proper standard, then major consequences can occur ranging from small insignificant accidents to serious catastrophes that can even include death.

3. Describe the relationship between hazards, risks, and safety. (300 words minimum)

Hazards, risks, and safety are all related to each other, and it is especially important that one understands how they each work and coincide with each other. A hazard is anything with the potential to cause harm or damage. Furthermore, a hazard is any condition, event, or circumstance that could prompt an accident. A hazard in aviation could be one of many things, ranging from weather related to human related. One example of a hazard in aviation could be that a plane is not properly grounded while it is being refueled which could lead to unintentional ignition of the fuel in the plane and an explosion occurring. A hazard becomes a risk when it is noticed but not mitigated.

Risk is the future impact of an unmitigated hazard. Risk refers to the probability/likelihood and severity that a person may be harmed or suffer adverse health effects because of exposure to an unmitigated hazard. Risk can also be seen as pure uncertainty. There are many levels of risk. Risk in aviation is a big deal because there are many factors involved ranging from human input to uncontrollable outside occurrences like weather. One good thing about risk in aviation is that since it can be measured by relating it to its hazards it is often able to be mitigated. Since the concept of risk can be mitigated, the concept of safety can come into play.

Safety is the state or the ability to mitigate harm, danger, or injury. Safety is basically the concept of noticing hazards and understanding their risks to a point where they can be mitigated. One way to promote safety in aviation is to make sure that people are trained and properly educated on how to mitigate risk. It is important to understand that with anything, and this includes the aviation industry, there is never really any true level of safety where one is totally protected from all harm. There will always be some form of risk when it comes to anything we do in life, especially when it comes to aviation.

4. Risk is determined by assessing the product of hazard probability and hazard severity. Discuss whether you would prefer qualitative or quantitative data. (300 word minimum)

Qualitative and quantitative data analysis are two types of data that a pilot or aviation professional would factor into a decision they could be making. These two types of data are types of risk assessments which is an important thing in aviation because if a pilot were to not assess the risks associated with whatever flight they wanted to go on, they could be putting both themselves and others on their flight in harm's way.

Qualitative data analysis is based off the judgement and opinions of people like subject matter experts and industry professionals to determine the likelihood and consequences of a hazard. Qualitative data is normally used when there is limited data available to someone. It gives someone a basic understanding of the risks and hazards associated with certain operations in the aviation industry. Normally it is to be used along with limited data to make the best and most informed possible.

Quantitative data analysis is based off the usage of numerical data to determine the possibility and consequences of a hazard. Quantitative data analysis is typically seen as a more accurate and precise way of measuring hazards and risks in industries like aviation. I feel that because quantitative data often includes a bigger abundance of information, it would be the preferred source for making decisions in the aviation industry specifically.

If I had to choose between quantitative and qualitative data, I would use quantitative data. The reason for this is because quantitative data seems to be more abundant, and it also seems to have a more impartial and more accurate pool of data. I feel that if I were to go to a person like a subject matter expert, then I would be getting a relatively reliable opinion that could still be a bit skewed. I feel that because quantitative data

ASCI 1850 - Homework Assignment 1 – Name: Redacted

Please respond to the following four questions. (AABI B & D)

1. Describe the importance of making both professional and ethical decisions as an aviation professional. (300 words minimum)

The process of making ethical and professional decisions is crucial for any professional working in the aviation industry. The safety of travelers, crew members, and everyone else associated with the aviation business are impacted by these choices. Without both of these processes together, flying together in team would not be nearly as efficient and people would lose trust in pilots and the industry. Professional choices ensure the well-organized and proficient operation of the aircraft, whether it is in operation in the air or on the ground. This is the pursuit of quality flight through discipline of making the right choices and continuous improvement of everyone in the crew without a demeaning or negative attitude. Aviation is what it is today because of people striving to always learn and adapt to every situation. Decisions like this keep morale boosted and have an instant impact on aviation safety. While making ethical choices show the careful thought process and the regard to make the right decision for the betterment of everyone involved. Following these procedures makes sure that safety of life is the number one priority in all of their operations as well as minimizing risk to all humans and the environment around them. Some of these ethical decisions could be honesty, fairness, privacy, or responsibility. These are a necessity to keep an authentic system that meets the regulations, avoids harming people, and being responsible for what they are needing to do. The combination of these traits is what makes an aviation professional credible as well as responsible when tasked with an assignment or duty. The high standards that are set for professional and ethical actions are required from every single person involved in aviation, from the plane creators to the pilots. That is why they create many processes and checklists to make sure the plane, pilots, and all the components that go into it are sufficient for flight.

2. How are professional ethics and safety related? (300 words minimum)

The relation of professional ethics and safety is intertwined in every aspect of aviation. These concepts are considered the most important features that determine quality air travel as well as the safety of the passengers, the crew, and the surrounding area.

In the aviation field, professional ethics are the moral guidelines that shape and drive the behavior in the cockpit as well as on the ground. This ensures that all personal behave in such a way that is respectful, honest, accountable, and in an uplifting manner towards passengers and their fellow peers. They ensure they always follow the specified regulations in each and every situation that may arise while in the plane. In order to maximize the protection of everyone on board they complete their designated task with efficiency.

The concept of safety is the ideal minimization of risks, or the freedom from the exposure of danger. In aviation, there is no such thing as being completely safe from all the risks that could arise. Therefore, it is all about risk management and being as close as you can to the impossible margin of complete safety. This is the primary concern of all the aviation professionals, as they are obligated to prioritize safety over all other aspects, such as efficiency or time management.

Therefore, any conduct done by an aviation professional, if its good or bad, has an impact on the safety of the operation of their aircraft. Someone who is not professional or responsible while doing a task or process, not only puts themselves in danger but everyone around them. So, for someone to be as safe as reasonably possible they need to be very attentive and coherent. With the help of their team on the ground and in the air, they are able to ensure safety by observing what to come and keeping a strong understanding of their instruments and regulations.

3. Describe the relationship between hazards, risks, and safety. (300 words minimum)

Aviation will never be free from hazards and their associated risks. A hazard is often defined as a source of danger, weather it is considered real or perceived. It is also known as anything with the potential to cause harm to someone, the environment, or equipment. These types of problems include anything from technical malfunctions, weather conditions, human error, or natural disasters and a mix of everything in between. It is essential to look past the immediate conditions and anticipate what could be in the future. The recognition of a hazard is crucial in the risk management process.

A risk is the future impact of an unmitigated hazard. It refers to an uncertainty that was created by the hazard at hand. This is the result of the combination of the overall probability of the occurrence produced by a hazard and the severity of that effect. Once someone recognizes a hazard and its effect, they must begin their risk management process. Where they will either decide to accept, mitigate, or eliminate the hazard with deductive reasoning. An individual must know that their suitable level of risks corresponds with their limitations and capabilities.

Hazards and risks are constantly evaluated in order to obtain the highest level of safety that is possible for aviation processes. Safety is defined as the optimal minimization of risks, and there is no such thing as being completely safe in aviation or general life. Once hazards are identified and recognized, then they are assessed to determine what the risk is and where it will affect. After those are figured out, they can then decide the appropriate safety procedures to reduce the risks or evade them entirely. Aviation professionals and airlines repeat this process to ensure the safety of their flight operations, human life, and the environment around them.

4. Risk is determined by assessing the product of hazard probability and hazard severity. Discuss whether you would prefer qualitative or quantitative data. (300 word minimum)

I prefer the results of quantitative data as it relies on the numerical and measurable data that is produced from machinery. In my opinion, there are many benefits of quantitative data over qualitative data, such as the immediate recording once it happens and no personal bias or interpretation. Quantitative data is always collected in larger sample sizes, making it ideal to figure out issues in a system or multiple systems. Being able to compare data samples from other sources of technology gives it a much more applicable and relevant use. The data is also collected in large quantities, and it is consistent and standardized. This makes it much easier to analyze or associate with other data samples and systems. Another way it has more benefits than qualitative data, is it collects very precise and pristine data. Once collected it can then be measured with a very high degree of accuracy. This can give people and or businesses with the precise data an ability to make accurate predictions and conclusions. As well as using it for certain techniques, such as recognizing various data patterns or connections within the sample. After you consider all of these benefits that quantitative gives companies or ordinary analyzers, there is no shock as to why data is an important part of the future. It is a very advanced way to make strong and accurate evidence-based decisions. These decisions are especially useful in data rich environment such as aviation, where they save a set of data for every single input that a pilot makes. Whether it relates to the overall control of the airplane or the opening of a certain compartment. Since they collect all of this data, they are able to solve problems and get a lot of answers from it if an accident does occur.

<u>Assignment Examples</u>

<u>Homework #2</u>

ASCI 1850 Safety Management Systems – Homework # 2 Name: Dalton Brand

Safety Management Systems Fundamentals

Please review the video linked below. The video is over a decade old but still provides good information. Once you have reviewed the video, please respond to the following questions. This assignment should be uploaded here no later than Friday, February 24th by the end of the day. The video is 35 minutes long so watching the video and answering the question below will cover the two classes I will miss.

Here is a link to the video:

Safety Management Systems (SMS) Fundamentals: Basics - YouTube

Here are the questions:

1. What is meant by SMS not being a substitute for compliance?

When it is stated that SMS is not a substitute for compliance it means that SMS is not supposed to take the place or usurp any of the Federal Aviation Regulations or policies. SMS also calls for regulatory compliance to be woven into safety management structure.

2. What is ATOS/NPG as described in the video?
ATOS and NPG are the FAA's oversight system. ATOS stands for Air Transportation Oversight System and NPG stands for The National Work Program Guidelines and both use a risk assessment process to determine the safety assurance objectives and are used to meet regulator responsibilities.
3. Briefly describe the model created by Dr. Malcolm Sparrow and discussed in the video.
The model created by Dr. Malcolm Sparrow uses regulation-based thinking and a Venn diagram to separate things that are regulatory and if violated become illegal and things that are non-regulatory but can cause harm. The overlap in the middle of the Venn diagram are things that are both regulatory and can cause harm.
4. Briefly describe system safety as described in the video.
System Safety is the application of special technical and managerial skills in a systematic, forward looking manner to identify and control hazards throughout the life cycle of a project, program, or activity. SMS adds an emphasis on management elements.
5. Differentiate between AVS SMS and AFS/Flight Standards and Service Provider SMS.
AVS SMS is a state safety program and applies SMS to the FAA's own internal process and is known as the "internal" SMS. AFS/Flight Standards is what is applied to service providers in the form of a SMS rule and is called the "external" SMS. Service providers SMS manages their own risks and monitors their own risk controls.
6. Briefly describe how FAA oversight has changed with the creation of SMS programs
The FAA's oversight has changed with the creation of SMS programs and has oversight processes to accomplish oversight. Currently the FAA uses NPG and ATOS and in the future will use the safety assurance system. Previously the FAA accomplished oversight by way of numerous direct inspections. Now the service operators increase their role in responsibly in managing their own risk.
7. Describe the meaning of Title 49 USC 44702 as discussed in the video.
Title 49 USC 44702 states that the duty of an air carrier is to provide service at the highest level of safety in the public interest, and also holds management accountable for doing so. Companies have an obligation to provide a useful and safe product or service to the public.
8. Briefly describe the four components of an "informed culture" as discussed in the video.
The four components of an "informed culture" are reporting, just, learning, and flexible. Reporting is defined as all personnel freely share critical safety information. Just states all employees must know what acceptable and unacceptable behavior is. Learning says that the company learns from mistakes and staff are updated on safety issues by management. Flexible states organizational willingness to change.
ASCI 1850 Safety Management Systems – Homework # 2 Name:

Safety Management Systems Fundamentals
Please review the video linked below. The video is over a decade old but still provides good information. Once you have reviewed the video, please respond to the following questions. This assignment should be uploaded here no later than Friday, February 24th by the end of the day. The video is 35 minutes long so watching the video and answering the question below will cover the two classes I will miss.
Here is a link to the video:
Safety Management Systems (SMS) Fundamentals: Basics - YouTube
Here are the questions:

1. What is meant by SMS not being a substitute for compliance?

SMS not being a substitute for compliance means that the SMS is not meant to override any of the already in place regulations surrounding aviation. This essentially means that all policy in an SMS system must be not violate any federal regulations. Any example of this could be a what amount of time of crew rest is acceptable it would not be able to make a rule for anything less than the already establish regulation.

2. What is ATOS/NPG as described in the video?

ATOS/NPG is the FAA's system of oversight to ensure that all operators who fall under the FAA's regulations are following the regulations. ATOA uses a risk assessment process to determine that what is being done or what equipment is being used by the operator falls in accordance with the regulations. Part of this is accomplished through test to ensure equipment meets regulatory safety minimums.

3. Briefly describe the model created by Dr. Malcolm Sparrow and discussed in the video.

Dr. Malcolm Sparrow's model for safety analyzes the FAA's historic approach to safety. The FAA previously had been mainly concerned with enforcing all of the rules that it imposes. However, Dr. Sparrow's model shows that not everything that is illegal is unsafe and causes harm and not everything that is unsafe or causes harm is illegal. Therefore in order to ensure that operations are safe, the aviation industry need to do more than just enforce regulation.

4. Briefly describe system safety as described in the video.

System safety is the application of management techniques and technical skills to identify hazards that may operationalize in a system and mitigate them. This is not just done once but is done throughout the entirety of the operation. In addition, system safety would also look at how the different system interface with each other to determine where hazards may arise. System safety also relies on management being reliable for safety so there is some responsibility in the operation when it comes to safety

5. Differentiate between AVS SMS and AFS/Flight Standards and Service Provider SMS.

AVS SMS is safety management system for the FAA itself. This is a system to manage safety for all the ways in which the FAA operates and all their internal processes. This also acts as an overarching model to be applied externally to other operators. This application from the FAA externally to service provide is the AFS/Flight Standards. The service providers SMS is not involved by the FAA and is the operator's own way of managing their own safety.

6. Briefly describe how FAA oversight has changed with the creation of SMS programs.

The FAA's oversight has changed with the creation of SMS because now the federal regulations are not the only thing nor the main thing that is managing safety for the aviation operations. While there is still some oversight in the form of "trust but verify," a larger part of the oversight of the operation is done by the operators safety management system. Now the FAA largely oversees the SMS of a operation primarily rather than focusing on the operation.

7. Describe the meaning of Title 49 USC 44702 as discussed in the video.

Title 49 USC 44702 state that an air carrier must provide their services with the highest level of safety as it is in the public interest. The duty of an air carrier is to provide a service but also do so safely. This causes the business to be forced to integrate safety into their business model as it essential to their businesses success and making a profit. The hope is to create a balance between the production and protection which means there should be an equal focus on providing a quality service and also a safe one.

8. Briefly describe the four components of an "informed culture" as discussed in the video.

The four components of an informed culture are reporting, just, learning, and flexible. The reporting culture encourage employees to report hazards and freely share critical safety information. Just culture is employees knowing what types of behaviors acceptable and what types of behaviors are are unacceptable. In addition, there is an understand of what happens when those rules are violated. Learning culture stresses learning from de stakes that were made instead of issuing punishment for them. A flexible culture is one that is able to change to meet demands of the safety.
ASCI 1850 Safety Management Systems – Homework # 2 Name: Sehwan Park
Safety Management Systems Fundamentals
Please review the video linked below. The video is over a decade old but still provides good information. Once you have reviewed the video, please respond to the following questions. This assignment should be uploaded here no later than Friday, February 24th by the end of the day. The video is 35 minutes long so watching the video and answering the question below will cover the two classes I will miss.
Here is a link to the video:
Safety Management Systems (SMS) Fundamentals: Basics - YouTube
Here are the questions:
1. What is meant by SMS not being a substitute for compliance?
- In the video, “SMS not being a substitute for compliance” means that implementing a Safety Management System (SMS) in an organization does not automatically guarantee compliance with safety regulations and standards. Likewise, a safety management structure is created with regulatory compliance by SMS calls.
2. What is ATOS/NPG as described in the video?
- ATOS is the abbreviation for Air Transportation Oversight System and is a framework for regulatory oversight of aviation safety. ATOS’s purpose is to monitor and assess the safety performance of aviation organizations; also, it has processes for safety policy, safety risk management, safety assurance, and safety promotion.
- NPG comes from National Program Guidance, and it provides guidance on how to develop and implement a safety management system. By following the guidelines provided by NPG, aviation organizations can improve their safety performance and ensure compliance with safety regulations.
3. Briefly describe the model created by Dr. Malcolm Sparrow and discussed in the video.
- In August 2009, Dr. Malcolm Sparrow presented his model for safety management systems to the FAA managers’ meeting. His model challenged the traditional regulatory-based approach to safety management. This approach involved identifying both regulatory and non-regulatory sources of harm, such as negative organizational culture or departmental conflicts. The overlap between regulatory and non-regulatory sources of harm indicated where the FAA and operators historically focused their resources to have safety objectives since it is regulatory and simultaneously can cause harm. By adopting an SMS approach that incorporates these principles, organizations can work to proactively identify and mitigate potential sources of harm, rather than simply responding to regulatory violations.
4. Briefly describe system safety as described in the video.
- The video explains that the term safety can be found within the consistent relationship between risk and practical definitions. In 1980, the US Supreme Court announced, “Safety is not the equivalent of risk-free.” The definition of safety is how well human beings are able to have freedom from harm, injury, detriment, damage, or degradation. As controlling both risk severity and likelihood, making risk lower can provide us practical definition in the aspect of safety. Therefore, safety represents the effectiveness of risk management, which is one of the core processes of a safety

management system. In other words, system safety is an important component of safety management systems, providing a structured and proactive approach to managing safety risks in organizations.

5. Differentiate between AVS SMS and AFS/Flight Standards and Service Provider SMS.

- AVS SMS is included in aviation safety. Under the FAA aviation safety organization, AVS SMS applies SMS to the FAA zone, and it is also known as the internal SMS. It also works on safety oversight and regulatory compliance.
- AFS/Flight Standards refers to safety management systems used by aviation service providers, also called the external SMS. Moreover, it helps to work on safety performance, risk management, and continuous improvement within the organization.
- Service provider SMS is designed to be an integrated and systematic approach to managing safety risks within aviation service providers, and it is a key tool for ensuring safety in the aviation industry.

6. Briefly describe how FAA oversight has changed with the creation of SMS programs.

- SMS programs and service providers help to increase their responsibility for safety assurance by having risk controls. Relating to the SMS program, the video explains that as numerous service providers processes are developed, FAA oversight has changed a lot. In addition to changing FAA oversight, the video mentions that human beings are currently using ATOS/NPG, but in the future, Safety Assurance System (SAS) will be prevalent, including our own internal SMS processes. The implementation of SMS programs has resulted in a more comprehensive and proactive approach to safety management and has led to changes in the way the FAA oversees the aviation industry.

7. Describe the meaning of Title 49 USC 44702 as discussed in the video.

- The video explains that title 49 USC 44702 is important for the development and implementation of safety management systems in the aviation industry. They provide the legal obligation under public and provide service with the highest possible degree of safety in the public interest. Overall, title 49 USC 44702 is regarded as a key piece of legislation that integrates safety into business decisions and management for SMS.

8. Briefly describe the four components of an "informed culture" as discussed in the video.

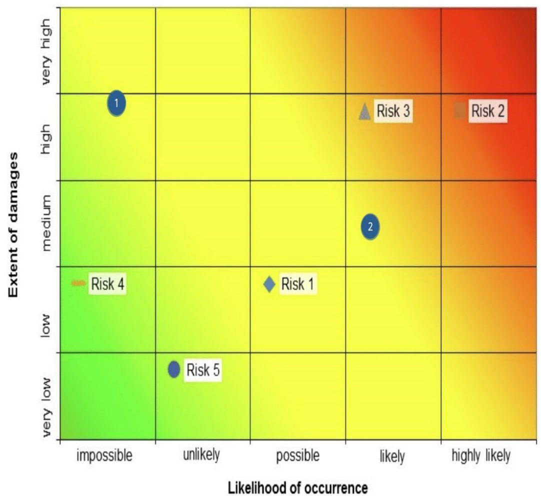
- 1) Reporting culture: the video points out, "all personnel freely share critical safety information." and the reporting culture encourages employees to report hazards, incidents, and near misses, which can help identify potential safety risks before they face the actual risk.
- 2) Just culture: "employees must know what is acceptable & unacceptable behavior." Just culture requires human beings to realize the organization like what can be acceptable and unacceptable; therefore, this culture informs that accidents and incidents can occur even when individuals are following established safety protocols.
- 3) Learning culture: the video explains that mistakes can make companies grow and staff can maintain safety by having management. Learning culture means using safety data to learn from past incidents and improve safety practices, rather than simply assigning blame or punishment.
- 4) Flexible culture: this culture respects human beings' willingness to change. With the belief that willingness would influence all the reporting from analysis and organization on becoming more detailed or useless, flexible culture exists to adapt changeable willingness.

<u>Assignment Examples</u>

<u>Homework #3</u>

ASCI 1850 Risk Matrix Assignment Name: Redacted

Please respond to the five questions located below the risk matrix.



1. **Explain the meaning of the terms used on the X-Axis**

The terms on the X axis are talking about how likely an event is to occur. The frequency, so impossible means it is nearly impossible, or close to zero chances of an occurrence to happen. It goes up to unlikely (a low probability of it occurring), possible (a near 50/50 chance), likely and highly likely (high probability of occurrence).

2. **Explain the meaning of the terms on the Y-Axis.**

Extent of damage shows us the magnitude of a risk/event/occurrence. Very low damage shows us that not much destruction, harm or injury will occur in an event. Low and medium will have a slightly greater chance at harming someone or thing. High and very high means that risks will be harmful and at a great rate.

3. **Explain the changing color gradient used in the risk matrix.**

The color gradient is to show a more visual idea about the likelihood and magnitude of an event. The color is green, yellow, and red. Following the idea that events in the green area show a safer event due to being in a near impossible and minimal damaging event than when compared to an even in the red color gradient, signifying a much more dire risk. It moves from low risk to high risk.

4. **Briefly describe the risks associated with the following data points in the risk matrix**

Risk 1 – This risk is possible but has a low extent of damage. So, there is a good probability of the risk occurring but has a low magnitude. A low-risk danger that could happen somewhat frequently.

Risk 2 – Risk 2 has a very high likelihood of occurring, with a high extent of damage. The severity of the risk mixed with the high likely hood means there would be more importance placed on this risk due to the constant occurring danger.

Risk 3 – Risk 3 is a likely occurrence with a high extent of damage. It is not likely to appear 100% of the time, but there is a high probability of it occurring, with some severe damage.

Risk 4 – Risk 4 poses very little danger, in the sense that it is nearly impossible for the risk to occur, with a low extent of damage. Showing how even if it were to occur the actual magnitude or damage that would come from this event does not really exist.

Risk 5 – Risk 5 is an unlikely occurrence with very low extent of damage. It would pose no to little amounts of threat with an occurrence that has a low chance of happening. Being in the green showing how there is a higher chance of it occurring, the severity of the risk would be not too serious.

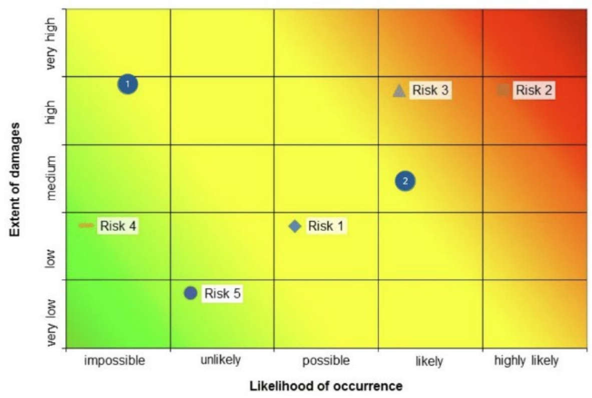
5. **Evaluating the two risks (the 1 & 2 inside the circles on the risk matrix), which presents less risk. Provide a detailed explanation on why.**

1 would present less risk because it would be impossible to occur. While there is a high severity regarding the damage this risk would have, if the chances are near 0 to ever occurring that when compared to risk 2, risk 1 is less of a risk. Risk 2 is much more likely to occur, with just slightly less extent of damage. Risk 2 has the probability of becoming a severe risk due to it possible becoming a highly likely hazards, with very severe consequences. This could be a person dyeing or becoming fatally injured, or a giant loss regarding machinery. Risk 1 just needs some policy work and consideration that could help it become an impossible risk with not damage if able to be avoided or controlled. Risk 2 seems to need more work and more consideration to ensure no one is harmed, making risk 2 more of a risk.

Risk 1 seems more like the example of a meteor hitting you in the street, it is a near impossible event that has some very drastic consequences. While risk 2 seems to be a crash happening on the interstate due to traffic. While there is a very high chance of that happening, but, if going at a slower velocity, does not hold too much risk of damage, besides a crushed hood and some minor injury. Risk 2 (car accident) is more of a risk than risk 1 (meteor strike).

ASCI 1850 Risk Matrix Assignment Name: Redacted

Please respond to the five questions located below the risk matrix.



1. Explain the meaning of the terms used on the X-Axis

The X-Axis represents the likelihood of a risk occurring. Another way of describing it would be the frequency, or how often, which ranges on this matrix from impossible to highly likely, with three in between. These are risks a pilot may face while they are flying. This particular matrix has impossible as a category, but in aviation, nothing is impossible.

2. Explain the meaning of the terms on the Y-Axis.

The Y-Axis represents how much damage, or severity, a risk could cause the environment and/or the aircraft, if it occurs. The categories are set at very low up to very high with three in between. Safety incidents can cost the company millions of dollars and loss of their passengers and crew.

3. Explain the changing color gradient used in the risk matrix.

The lower left corner of the matrix is green, which shows a risk to be impossible and causing very low damage if it were to occur. As points move to the right on the X-Axis and up on the Y-Axis, green fades to yellow showing the frequency and severity of a risk happening increases. When moving towards the ends of the Axes, the yellow fades to orange and red, the risk will be highly likely to occur and cause an extreme amount of damage. When a risk is falls in the green, it is considered acceptable and does not need review but are documented. The yellow/orange are risks undesirable and need to be assessed by appropriate management, mitigated to an acceptable level and documented. The red are severe and are unacceptable risks where operations need to stop.

4. Briefly describe the risks associated with the following data points in the risk matrix

   Risk 1- This risk is in the yellow being at possible frequency with a low severity of damage. It will require mitigation because it could cause minor injury, illness, loss, or damage.

   Risk 2- This risk is in the red category, so it is a “no go”! It is highly likely to occur and cause a catastrophic injury, illness, damage to the plane and surrounding areas, and loss of life.

   Risk 3- This risk is in the orange range, meaning it will likely occur causing a high amount of damage. Service providers will have to mitigate it to a certain acceptable level so that it will not affect safety.

   Risk 4- The data point is in the green, it will not have to be mitigated, is a “go” and the operations can continue. But the likelihood of this risk is impossible according to the matrix. In aviation we have learned that nothing is impossible. The aviation industry can lower risks to a certain level that will increase safety, but we cannot get rid of hazards/risks entirely.

   Risk 5- This risk is acceptable low risk and unlikely to occur and cause very low damage since it falls in the green. It does not need to be mitigated and is not restricted or limited and operations can continue as normal.

5. Evaluating the two risks (the 1 & 2 inside the circles on the risk matrix), which presents less risk. Provide a detailed explanation on why.

After evaluating the two risks, #1 presents less risk than #2. Risk #1 is in the yellow (barley past the green) and risk #2 is also yellow but almost to the red in the color gradient on the matrix, making it a higher risk. Risk #1 falls in the box categorized as impossible likelihood and high extent of damage. But if the likelihood is impossible, the amount of damage does not matter. I don’t think in aviation that anything is impossible, there is always risk, so the term on the X-Axis should be labeled highly unlikely.

Performance Indicator Rubric

Course: ASCI 4050 Human Factors Course Instructor: Terrence Kelly

Semester Taught: Fall 2022 Number of Students in Course: 35

AVIATION MANAGEMENT CONCENTRATION

Student Learning Outcome Assessed	**Assessment Results: (Indicate what % of class achieved a minimum 70%)**	**Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")**
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	Written Assignment #1 Average 77.5% - 27 of 35 (77.14%) scored above 70% Written Assignment #2 Average 76.4% 27 of 35 (77.14%) scored above a 70%	Benchmark Achieved
SLO 3: Apply effective oral and written communication skills to function effectively in the aviation environment.	Homework #3 Average 96.7% - 34 of 35 (97.1%) scored above a 70% Written Paper Average 91.3% - 35 of 35 scored above a 70%	Benchmark Achieved
SLO 5: Apply knowledge of business principles in aviation-related areas.	Test #1 Composite Questions Question 26 – 24 of 35 (69%) students answered correctly Question 28 – 29 of 35 (83%) students answered correctly Question 29 – 11 of 35 (31%) students answered correctly Question 30 – 30 of 35 (86%) students answered correctly Question 31 – 26 of 35 (74%) students answered correctly Overall average 68.6% (scores divided by # of questions)	Benchmark Not Achieved

* I have rounded the values used in this assessment		

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.
Written Assignment #1 required students to respond to questions surrounding both ethical and professional considerations surrounding the human factors discipline. Appropriate decision making is fundamental to the professional, efficient, and safe operation of aircraft. 27 of 35 students (77.4%) scored above a 70%, consequently the benchmark was achieved. Written Assignment #2 required students to respond to questions aimed at identifying and solving problems in the high-consequence environment. Like Assignment #1, 27 of 35 students (77.4%) scored above a 70%; consequently, the benchmark was achieved. While I am pleased with the overall performance on these assignments, it should be noted they were optional (makeup when I was on travel). Many of the students who did not achieve a 70% score on the assignment, did not submit any work. Additionally, the grading for the assignment was not particularly rigorous. As a means of continuous improvement, I plan to make all assignments mandatory and assign a more rigorous grading scheme.

SLO 3: Apply effective oral and written communication skills to function effectively in the aviation environment.
Homework #3 required students to respond to questions on how to work and communicate effectively (in both oral and written form) in the context of induvial differences/human factors, while working on diverse teams.34 of 35 students scored above a 70% on the homework, consequently the benchmark was achieved. Students were required to participate in a written paper assignment detailing the importance of some physiological aspects of human performance. The written paper was a group assignment. 35 of 35 students scored above a 70% on the written paper assignment. Historically, I have not included an oral presentation in the ASCI 4050 course. I used the Homework #3 assignment to reinforce effective oral communication and the written paper to reinforce effective written communication. The scores supporting the paper and homework assignment were strong, however I am not sure I am meeting the spirit of the “effective oral” communications skills with an assignment that requires students to discuss oral communication. I look forward to discussing the topic with my colleagues. As a means of continuous improvement, I am considering whether to assign the paper individually, rather than as a group project. As part of the final exam, I ask students to rate the performance of teammates (on the paper) to help me better understand the level of participation. In some cases, it was clear that individuals contributed at different levels. Consequently, I felt the assessment was not sufficiently granular. In the future, I plan to assign the paper individually as a means better assessing individual performance.

SLO 5: Apply knowledge of business principles in aviation-related areas.

I assessed SLO 5 using a composite of questions from test #1. The questions included in the assessment were not particularly well suited for assess students' knowledge of business principles in aviation. I do not generally include business fundamentals in the ASCI 4050 Human Factors course. Nevertheless, I have attempted to make an assessment for the Fall 2022 semester with a plan to discuss removing SLO 5 (Aviation Management) from being tracked in this course. The questions assessed relate to the Tenerife accident, the Bhopal Disaster and the International Air Transport Associated (a representative group for commercial aviation). The assessment was conducted using a composite of five questions from test #1.The benchmark was not achieved as only 68.6% (24 of 35 students) answered the questions correctly. As a means of continuous improvement, I plan to accomplish one of two things. My preferred choice it to remove SLO 5 (for Aviation Management students) from the ASCI 4050 course. My second choice would be to add a new element to the course that provides a more-sophisticated approach to business principles in aviation-related areas as they relate to human factors. Removing SLO 5 from ASCI 4050 is preferred simply because the course (ASSCI 4050) is already short on time for covering the topics critical to understanding human factors. Adding a module on business principles would require the elimination of something more closely associated with the human performance. A case can be made to include a module on business principles in human factors, but the such an addition would be best addressed in a two course human factors course sequence.

Performance Indicator Rubric

Course: ASCI 4050 Human Factors Course Instructor: Terrence Kelly

Semester Taught: Fall 2022 Number of Students in Course: 35

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	Written Assignment #1 Average 77.5% - 27 of 35 (77.14%) scored above 70% Written Assignment #2 Average 76.4% 27 of 35 (77.14%) scored above a 70%	Benchmark Achieved
SLO 2: Describe historical trends, current issues, and emerging opportunities in aviation.	Test #1 Composite Questions Question 16 – 26 of 35 (74%) students answered correctly	Benchmark Achieved

	Question 17 – 35 of 25 (100%) students answered correctly Question 22 – 20 of 35 (57%) students answered correctly Question 23 – 22 of 35 (63%) students answered correctly Question 24 – 22 of 35 (63%) students answered correctly Question 25 – 24 of 35 (69%) students answered correctly Overall average 71% (scores divided by # of questions) Test #4 Composite Questions Question 20 - 32 of 35 (91%) students answered correctly Question 21 - 31 of 35 (89%) students answered correctly Question 25 - 32 of 35 (91%) students answered correctly Question 26 - 26 of 35 (74%) students answered correctly Question 29 - 35 of 35 (100%) students answered correctly Overall Average 89% (scores divided by # of questions)	
SLO 4: Articulate the value of integrity, lifelong learning, and building diverse teams in serving and leading others.	Written Assignment #1 Average 77.5% - 27 of 35 (77.14%) scored above 70% Homework Assignment #3 Average 96.7% 34 of 35 students (94%) scored above a 70% Test #1 Composite Questions Question 1 - 25 of 35 (71%) students answered correctly	

	Question 2 - 27 of 35 (77%) students answered correctly Question 3 - 27 of 35 (77%) students answered correctly Question 4 - 34 of 35 (97%) students answered correctly Question 5 – 33 of 35 (94%) students answered correctly Overall Average 83% (scores divided by # of questions)	
* I have rounded the values used in this assessment.		

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.
Written Assignment #1 required students to respond to questions surrounding both ethical and professional considerations surrounding the human factors discipline. Appropriate decision making is fundamental to the professional, efficient, and safe operation of aircraft. 27 of 35 students (77.4%) scored above a 70%, consequently the benchmark was achieved. Written Assignment #2 required students to respond to questions aimed at identifying and solving problems in the high-consequence environment. Like Assignment #1, 27 of 35 students (77.4%) scored above a 70%; consequently, the benchmark was achieved. While I am pleased with the overall performance on these assignments, it should be noted they were optional (makeup when I was on travel). Most of the students who did not achieve a 70% score on the assignment, did not submit the work. Additionally, the grading for the assignment was not particularly rigorous. As a means of continuous improvement, I plan to make all assignments mandatory and assign a more rigorous grading scheme.

SLO 2: Describe historical trends, current issues, and emerging opportunities in aviation.
To assess SLO 2, I used a composite of test questions (from test #1 and test #4) that spoke to the history of human factors, some current issues in human factors and how understanding and insight on how human factors mitigation strategies might be applied to negative human factors situations in the future. The scores from test #1 are not particularly impressive. On average, 71% of students correctly answered across the six questions presented. While technically meeting the 70% criteria set by the department, the scores are lower that I would have expected. The scores from test #2 are better. On average, 89% of students correctly answered across the five questions. I do not believe the use of a composite of test questions is the best way to assess SLO 2. Effectively, the use of these questions is an indirect measure while a direct assessment might be more effective. As

a means of continuous improvement, I plan to create an assignment (required) that more-specifically and directly addresses the elements of SLO 2. The assignment will likely take the form of a homework assignment given toward the end of the semester.

SLO 4: Articulate the value of integrity, lifelong learning, and building diverse teams in serving and leading others.
SLO 4 the aggregate of three distinct elements including integrity, lifelong learning, and the building of diverse teams. Written Assignment 1 required students to respond to questions on both professional and ethical consideration in the context of human factors. Professional and ethical decision making is consistent with the practice of integrity. Homework #3 requires students to respond to questions that inquire about how to build and communicate in the context of multi-disciplinary diverse teams . Composite questions from Test #1 were evaluated as an assessment of the importance of life-long learning. These questions focused on the so-called Tenerife accident that occurred in 1977. My hope in reviewing the accident was to demonstrate to students the importance of learning lessons from the paste and applying those lessons in the present. The results of the assessment were good. The results of the written assignment 1 indicated an average score of 77.5% with 77.1% of (27 of 35) students scoring above a 70%. Results from homework #3 indicated an average score of 96.7% with 97% of students (34 of 35) scoring above a 70%. The composite questions evaluated from test # 1 indicated 83% of students (29 of 35) answered the questions correctly. While I am marginally pleased with student performance on SLO 4 I believe changes to the way I assess it will provide a better indication of whether students are achieving the outcome. As a means of continuous improvement, I plan to roll the multiple elements currently used to assess SLO 4 into a single, mandatory assignment that addresses the importance of integrity, lifelong learning and the building and sustaining of diverse teams.

Evidence is presented starting on the next page.

SLO 1: Conduct aviation operations in a professional, safe, and efficient manner assessment evidence.

ASCI 4050 Human Factors Assignment 1 Name:______________________

Hi everyone,

As a reminder, I am traveling on university business next Monday, October 31st and Wednesday, November 2nd. Consequently, we will not have class.

Rather than having class, I have placed two assignments in the Modules folder in Canvas. One to cover Monday's class and the second to cover Wednesday's class. Rather than contributing to the homework average, each assignment has the potential to add 5-points to a test grade (for a total of 10-points).

The questions are purposefully vague as I want you to think about your own capabilities and limitations.

Please respond to the following questions

1. Describe a few ethical considerations surrounding the human factors discipline (300 word minimum)

2. Describe a few professional considerations surrounding human factors. (300 word minimum)

ASCI 4050 Human Factors Assignment 2 Name:_______________________

Hi everyone,

As a reminder, I am traveling on university business next Monday, October 31st and Wednesday, November 2nd. Consequently, we will not have class.

Rather than having class, I have placed two assignments in the Modules folder in Canvas. One to cover Monday's class and the second to cover Wednesday's class. Rather than contributing to the homework average, each assignment has the potential to add 5-points to a test grade (for a total of 10-points).

The questions are purposefully vague as I want you to think about your own capabilities and limitations.

Please respond to the following questions

1. Describe how an understanding of human performance (human factors) will help you better identify problems in the high-consequence environment. (300 word minimum)

2. Describe how an understanding of human performance (human factors) will help you better solve problems in the high-consequence environment. (300 word minimum)

Assignment 1 Examples

1. Describe a few ethical considerations surrounding the human factors discipline (300 word minimum)

1- The ethical considerations that the discipline of human factors consists of the right and wrong that humans are ought to do, in terms of rights, respect for people, beneficence, justice and fairness. To ensure that the human factor discipline meet those ethics standards, it must provide privacy and safety for those who are affected by the system. In addition, loyalty, compassion, and honesty are among the other moral values that are encouraged by ethical standards. Additionally, ethical standards cover rights such as privacy, the right to be free from harm, and the right to life. These standards are suitable ethical standards since they are based on consistent and solid justifications. Therefore, a human factors specialist should not possess any issues with normative ethics such as obligations, rights, injury prevention, privacy. However, what about when those ethical standers merge, in case of an injury and privacy are at odds with one another. For example, if a pilot suffers from mental problems such as depression and they are pressured to hide it from their employer and colleagues because it might risk losing their job. Thus, given the circumstances, the pilot might be aware that they are unsuitable to fly, but they are not obligated to say anything that would risk losing their job, and if the employer allowed them to fly with medications, it would risk the safety of flight. This example raises many questions regarding the ethical standards in human factors, such as would the human factors specialists create a system that notifies the employers if the pilot is visiting a psychiatrist or if there are any decline in their performance or their attitude with their coworkers. Those circumstances force the industry to create a system that would break the ethical code and invade the pilots' privacy which would add more pressure and stress to their work life.

1. Describe a few ethical considerations surrounding the human factors discipline (300 word minimum)

This question is very open ended which caused me to ponder it and consider different ways to interpret it. I started by googling the words "human factors" "discipline" and "ethics", from which I read a few articles. In human factors we study how the human body can affect our ability to conduct safe flight. In some circumstances pilots may make potentially unethical piloting decisions due to constraints whether they be deadlines set by the employer or flying while fatigued.

Pilots have a responsibility and a moral duty to uphold safe flying habits and procedures relating to human factors and aviation in general. In my training at Parks College I learned to follow the IM SAFE checklist which helps pilots know if they are fit to fly on a personal level before they even preflight the aircraft.

Ilness- Am I feeling sick?

Mediation- have I taken medicine for the first time today?

Stress- is your personal life stressing you out?

Alcohol- Am I hungover? It is prohibited to drink within 8 hours of a flight

Fatigue- am I exhausted?

Emotion- emotionally stressed?

All these six personal evaluations will influence pilots to make the right on a go /nogo decision on a private or commercial level.

Another ethical consideration in human factors that happens every day is tight flight schedules. Commercial Pilots would not want to cancel a flight too often and put their career and income on the line. This means that the IM SAFE checklist may not be properly adhered to, or corners could be cut on procedures in order to make departure or arrival times. This is a ethical consideration that is a everyday risk. Pilots should always self-evaluate before a flight

Assignment 1 Examples (cont.)

1. Describe a few ethical considerations surrounding human factors discipline (300 word minimum) When it comes to ethical factors in the context of human factors, I think the best way to begin is with the IMSAFE checklist. While it is always tempting to fly (because we all love flying) and especially for airline pilots who rely on their salary to support themselves and/or their families, we must not put the safety of our passengers in jeopardy if we, pilots, are unfit to operate an aircraft. It is essential that we systematically complete the IMSAFE checklist before making any further decisions about traveling airborne. Perhaps the most important element of this checklist is the last letter "E", which stands for external pressures. As I mentioned earlier in the response, Pilots may feel pressured into flying for several reasons ranging from angry passengers (for commercial pilots) to get thereitis as we sometimes call it around Parks. We must understand that it is dangerous and far too risky to neglect any factor that could impact our performance while operating an aircraft. The IMSAFE checklist serves to provide pilots with a methodical way of analyzing their own human factors. As mental health has become a much more relevant issue in recent years, it is important to know that this applies to everyone including pilots. There is an absolute plethora of things that could impact any human's mental health, which may be family-related or something external like being given bad news from a friend. Any of these things could severely impact the pilot's ability to proficiently operate the aircraft, and every pilot should be very conscious of the many factors that could affect their mental health. Every time I fly, I brief my copilot about limiting distractions especially during taxi, takeoff, and landing. Factors that affect your mental health are distractions and should be treated as so. Along with completing the IMSAFE checklist each pilot should complete a personal mental health analysis prior to flight as well.	**Describe a few ethical considerations surrounding the human factors discipline** When faced with ethics in aviation, the first consideration that comes to mind is centered around aspects of ethics that may prevent us from making the right decision. A large part of ethics involves making a choice that will preserve the safety of those around you as well as to maintain a respectful aviation environment. A few moral principles that may govern whether we make the right or wrong choice as pilots is fear, guilt, and self-interest/ convenience to oneself. When we find ourselves in a difficult situation as pilots, perhaps the weather is below our own personal minimums and ethically we know that the right thing to do to preserve our own safety and even our instructor's safety is to cancel the flight, fear of inconveniencing others may prevent us from acting ethically and remaining honest with ourselves and others. We may fear that our choice to make what we know is the right decision could potentially jeopardize the way others view us as pilots or result in negative consequences to us a pilot canceling a flight. Similarly, guilt may prevent us from making the ethically right decision. Perhaps we have already canceled two flights this week, and by canceling a third flight, a feeling of guilt arises. This feeling might consist of embarrassment or negative feelings toward ourselves for having lower personal minimums than other pilots. This guilt may result in comparison and we may begin to doubt our decision making skills. Finally, Self- interest and convenience may prevent pilots from acting ethically, particularly on solo flights. When flying alone on a VFR cross country, the student pilot is aware of the regulations and understands the importance of following them to maintain a safe environment for everyone in the air. When enroute this cross country, the pilot comes across a few clouds that they must descend away from in order to avoid them horizontally. The pilot knows they aren't allowed to fly within 2,000 feet horizontal distance from clouds in VFR flight, however the clouds are so few, they will only pass through them for roughly 10 seconds, and they will not affect the pilots line of sight. As pilots, there are many times where we are faced with situations where we have the option to break a small rule that nobody will ever find out about to cater to our own convenience. In these situations, it is important to maintain honesty and integrity in order to not let our own self-interest govern our ethical decision making skills. When in the air, it is important to remain honest and fair for the sake of our own safety, but also for the safety of others. When it comes to ethics, there is nothing more important than making it a habit to practice safe and fair flying by following the regulations put in place for us.

Assignment 2 Examples

Describe a few professional considerations surrounding human factors

In my time in aviation, I have come to learn that those who work in the field are some of the most respectful and professional individuals I have met. Pilots, whether on the ground or in the air, are oftentimes always courteous toward one another and maintain a professional environment. Many times, in order to maintain safety and integrity in the aircraft, we rely on personal minimums, FAA regulations, and patience with ourselves and other pilots.

A large aspect of deciding whether or not to fly on a given day is centered around personal minimums and conditions that we are comfortable or not comfortable flying in. Going hand in hand with ethics, it is important to take other pilots' personal minimums into consideration and remain respectful and professional toward them and what they are personally comfortable in to aid in eliminating those feelings of fear or guilt when faced with a difficult decision to make surrounding flying. Remaining professional and respectful toward others' boundaries aids in maintaining those aviation ethics and in maintaining a safe environment where pilots can make the best decision for themselves and their crew without fear of judgment or fear of making the wrong decision.

Aviation is filled with rules and regulations, and from early on in our training we understand the importance of following them for our safety and for the safety of every person around us. Not only is it essential that we follow these rules in a professional manner that upholds the high standards set for pilots, but it is also essential that we respect the time needed for others' to follow these rules. There are many times where there may be an aircraft in front of you who is taking a longer time to get through their engine runup and go through their checklists to ensure that they are comfortable and ready for takeoff. Practicing patience is critical in aviation because when we are patient with other pilots, we are showing them our respect and that we care for their safety. When another pilot takes the time that they need to be comfortable with their aircraft, they will be safe,have the ability to make ethically correct decisions, which in turn allows us to be safe and make smart choices in the air.

2. Describe a few professional considerations surrounding human factors. (300 word minimum)

One professional consideration is avoiding stereotypes and assumptions about a person. Not only is it not professional to treat and communicate with someone who may have an intellectual disability, a person who uses a wheelchair, or treating a person differently because they are a female for example. This is regarding not only pilots but also those who work with the pilots and human factors specialists, like mechanics, the aerospace engineers, even the management, marketing, and other sides of the industry. Simply treating people with respect since this is a field that deals with people all the time, from various lifestyles, beginnings, and each person has gone through a different life with various cultures. This is a field that looks at how we, as humans, are similar to each other but also vastly different. You are meant to benefit the client or company you are working with while also doing good for the general populace and humanity.

Another professional consideration is you should know plenty and more than whoever you are working for or your client. Though using that knowledge and information to make the right decision, for example if asked to speak in court you provide credible data/research while being able to tell the value and limitations of it and your own capabilities. This also coincides with not misleading clients, organizations, and any business. For example a new researcher is looking at the UX design of a new flight simulator, while communicating with pilots you would treat each one with respect, understanding their capabilities and accurately applying your own capabilities while doing research and knowing when to ask for their recommendations with your own observations. This is even related to confidentiality, when taking down research doing so with the agreement of the participant. Unless it is public behavior, the pilots need to explicitly agree to the recording of any data. In the previous question there was mention of where the line of confidentiality for adapting technology to the user, like pilot to plane, user to phone, and so forth. Yet when in the preliminary development phase confidentiality is very important but what about after that.

Assignment 2 Examples (cont.)

2. Describe a few professional considerations surrounding human factors. (300 word minimum) I believe that professional and ethical overlap quite a lot in aviation, in particular the concepts of fairness, honesty, and remaining non-biased. But professionalism in human factors goes beyond just behaving ethically, it also branches into the ideas of procedure, obligation, and legality. The simplest of all of those ideas is legality, to be a professional in anything requires that we follow the law, even when we disagree with it we must follow the law, though this does play a seemingly small role in human factors investigations it still vital that we follow them to the ledger to get the most out of the investigation. Obligation is where professionalism gets complicated, above all else we must be obligated to the truth and the continued safety of air travel. Human Factors plays a massive role in the world of aviation in the end human beings are running and monitoring the systems in place to ensure safe, quick, and effective functioning of both general and professional aviation. As pilots we are obligated to many things, but as humans we are obligated to our human factors to monitoring our fellow pilots, ourselves, and to above all else the truth of our flaws. To ignore those obligations to the human factors involved in aviation would be to open ourselves and our passengers up to considerable risk some of which by the time we sense a problem it may be too late. This why our obligation to human factors is a constant in aviation one that only can be upheld in the system if all persons in the system are vigilant for the variety of symptoms that can display no matter how seemingly insignificant.	2. Describe a few professional considerations surrounding human factors. (300 word minimum) Professionalism is an essential part of the global air transportation industry not only in regard to customer service, but decision making as well. Across the industry, professionalism includes doing everything correctly and procedurally, in turn, relating to human factors. Human factors directly correlate to the professional considerations within aviation because decision making is essential not only in the cockpit, but across multiple disciplines that go into making scheduled airlines service successful. Specifically, one professional consideration that surrounds human factors would be decision making, including, the pilot deciding whether they can safely complete the flight. I think that this question can closely relate to the previous because professional and ethical considerations can go hand in hand within the human factors discipline. This dilemma can tie into both ethical and professional considerations because as a pilot, you should know the limitations of yourself to conduct a flight, and as the pilot, if you know that you are not in a good position to fly, the safety of the passengers in influenced, therefore becoming an ethical situation. Continuing with this idea, not necessarily related to commercial aviation, but as student pilots, a consideration when flying in the IFR environment can be personal minimums. As a new instrument pilot, would you want to go fly on a low IFR day where you would break out on an approach at minimums as prescribed in the approach chart? A big part of professional considerations, relating to human factors, revolves around the idea of limitations as pilots. As a pilot, being a professional involves knowing the limitations of yourself and the aircraft that you are flying, and it comes down to decision making which influences the human factors chain, ultimately increasing the chances of an accident derived from human error. In all, professional considerations and ethical dilemmas in human factors are very closely related. In an essential industry such as air transport, it is essential to understand how you as the pilot function in the human factors tree in order to make both professional and ethical decisions.

SLO 3: Apply effective oral and written communication skills to function effectively in the aviation environment assessment evidence.

ASCI 4050 Human Factors Assignment 3 Name:_______________________

Hi everyone,

As a reminder, I am traveling on an accreditation visit next Monday, November 14th. Consequently, we will not have class. Rather than having class, I am giving this assignment in place of class. This assignment will contribute to your homework grade (15% of your total grade). This assignment must be uploaded to Canvas no later than Wednesday, November 16th by the end of the day.

In class, we discussed the notion of Individual Differences. In high-consequences operations we will engage people of diverse experience, backgrounds, and cultures. People are different and that difference is a strength. Diversity provides a distinct advantage to the team as diversity allows individuals to bring a different perspective and skillset to a problem.

Question 1. In the context of Individual Differences, what strategies will you employ to work effectively on multi-disciplinary and diverse teams? (300 word minimum)

Question 2. In the context of Individual Differences, how will you ensure effective communication (both written and oral communication) with teammates from diverse expertise/disciplines and backgrounds? (300 word minimum)

ASCI 4050 – Human Factors
Paper Assignment
Fall 2022

As a group of 3 (or 2), please prepare a paper indicating your collective thoughts on why an understanding of Human Factors is important in the aviation environment. Include a discussion of a few respiratory, visual, and hearing issues that are likely to influence human error and performance in both pilots and aviation managers.

The paper should be formatted in APA style and include:

- A minimum of five inline citations
- A minimum of five references
- Appropriate spelling, grammar and sentence mechanics
- A cover page (APA style) (1-page)
- An abstract (very short) (1-page)
- 5 -6 pages of content
- One reference page (1-page)
- Total length approximately 8-9 pages

The purpose of the assignment is to demonstrate your familiarity with several Human Factors hazards while utilizing the APA writing style (APA) and practicing parsimonious writing skills.

Here is a very basic rubric I will use to evaluate your papers.

Characteristics	**More points** --**Less points**		
Length	8 to 9 Pages	6 to 7 pages	Less than 6 pages
APA	Good use of APA	Some use of APA	No use of APA
Citations	5 or more inline citations	Less than 5 inline citations	Less than 3 inline citations
Reference	5 or more references	Less than 5 references	Less than 3 references
Spelling Grammar & Sentence Mechanics	Strong use	Some use	Minimal use
Cover Page	Included and formatted properly	Included but not formatted properly	No cover page
Abstract	Concise but informative	Long or uninformative	No abstract
Essay Content	5 – 6 pages, strong content	Less than 5 or more than 6 pages or poor content	Less than 4 or more 7 pages of poor content
Essay Quality	Informative	Less than informative	Incoherent
Writing	Technical/university level	Weak university level	Not university level
Topic Appropriateness	Appropriate and comprehensive topics	Less than comprehensive or less than appropriate content	Weak content and/or inappropriate
Reference Page Formatting	All references are properly formatted (APA)	Some references are properly formatted (APA)	Few references are properly formatted (APA)

Papers must be saved in Microsoft Word and uploaded to Canvas no later than December 9th, 2022 at midnight.

Homework 3 Examples

Question 1. In the context of Individual Differences, what strategies will you employ to work effectively on multi-disciplinary and diverse teams? (300 word minimum) The first strategy I will employ is being open to all disciplines and cultures and their differences. People work better when they feel their similarities and differences are accepted, respected, and valued. It will be crucial to me that I embrace all the cultures and values of the diverse and multi-disciplinary teams and make an effort to make people feel comfortable and learn about their way of life for improved interactions. Another strategy I will use to reduce differences between multi-disciplinary and diverse teams for effective work is having good communication skills. Any team works better when there is open and honest communication. How everyone in the group communicates with each other will influence how well they work together and the team's productivity. There needs to be open communication across diverse and multi-disciplinary teams. This way, people can talk about difficult and complicated situations and issues. It is vital that team members are encouraged to communicate effectively and respectfully, as everyone needs to feel like their voice is being heard. Minimizing miscommunication will ensure that there is reduced conflict across the team. To achieve effective communication, people will need to learn how to listen attentively and seek clarification in case of any issue or misunderstanding. Different cultures and disciplines also have different communication styles, so I will accept, understand and respect how diverse people communicate to have an effective team. Further, I will try to avoid stereotyping and prejudice to work effectively with multi-disciplinary and diverse teams. When people are unfairly divided into groups and assigned unfair characteristics, it can affect how they work and interact with others. Therefore, I will accept that diverse people have different and unique working styles and preferences, which does not make them less important or productive. To work effectively, I will improve my conflict management skills. I will consider conflict management training for myself and the rest of the team. With good conflict management, the team will be able to work effectively.	Question 2. In the context of Individual Differences, how will you ensure effective communication (both written and oral communication) with teammates from diverse expertise/disciplines and backgrounds? (300 word minimum) Despite belonging to diverse expertise, disciplines, and backgrounds, teammates need to feel like they are part of the group or community. To achieve effective communication in a diverse group, I should be able to share and exchange ideas respectfully so that everyone can understand each other. I will be open and inclusive to other cultures to ensure effective communication. Every team member's language and communication culture must be respected. Communication needs to accommodate everyone's needs and not just the needs of those in the majority language. Openness and inclusivity in communication will help create trustworthy relationships where people feel comfortable enough to share their ideas with the rest of the team. To appreciate diversity, especially in communication, I will learn about the unique communication styles of diverse groups to promote effective communication. I will use clear and concise language to communicate effectively with people from diverse backgrounds. Keeping my language clear and straightforward ensures that no meaning is lost in interpretation and that my audience can receive the message exactly how I intended it to be received. Paraphrasing my words and asking the team if they understand my message will ensure the communication is clear and effective. Repeating the message help improve communication as I can clarify what I am saying and therefore eliminate misunderstandings. Body language is also very important in oral communication; therefore, I will make an effort to understand the differences in body language for each diverse group. Feedback is critical in ensuring effective communication. Providing and receiving constructive and honest feedback will be critical in my communication. Feedback will make people be sure that their voice is heard and respected and will therefore encourage people to communicate more openly. Most importantly, it can be challenging to know exactly how to communicate with people who are different from you in one way or the other. I will therefore take diversity training which will ensure that a diverse team can communicate effectively with each other

Homework 3 Examples (cont.)

Question 1. In the context of Individual Differences, what strategies will you employ to work effectively on multi-disciplinary and diverse teams? (300 word minimum)

The importance of understanding individual differences within any environment, yet alone a high consequence one, is paramount when seeking to further know how a team functions as a whole. In looking at how to address the individuality of each member involved, I believe the most effective strategy in helping coordinate such forces would be communication. In many environments, co-workers will often work alongside each other, not only on their own projects but on one major task as a goal. For example, myself and my fellow interns at Garmin (a pretty small gap diversely) all have our separate functions whilst focusing on the same geographic area and working on the same geographic file. While we each have our own separate responsibilities regarding such, we all have to remain in clear communication with each other and other folks in the department to make sure that we are effectively doing our assigned work without overlapping or stepping onto anyone else's toes. In doing so, we help to promote a work environment that enables us each to assist each other when we have any issues or questions that may arise. This includes a larger portion of people, not only within our own offices, but that of Garmin's Corporate offices, as well as any remote employees as well. Our work environment is filled with hundreds of thousands of very diverse groups and skill sets that come together to help develop products in the name of a greater goal. It helps in managing any Human Resource issues(should they arise) and establishes a better understanding of who we are within a larger workforce. Communication is also paramount in highly-diverse things when everything is going right. Teams that communicate well with each other will not only improve productivity in the office, but it also stands to make a work environment more pleasant for everyone involved. In having a well-functioning team communicate, a door opens to a safer, friendlier, and more productive work environment.

Question 2. In the context of Individual Differences, how will you ensure effective communication (both written and oral communication) with teammates from diverse expertise/disciplines and backgrounds? (300 word minimum)

Effective communication is paramount to a high-functioning team. Ensuring the development and implementation of this process is something that numerous companies have used worldwide in order to help the cohesive teamwork abound in their fields of work. Effective communication must first begin with respect, from co-worker to co-worker, and even from CEO to the lowest new-hires of an establishment. In garnering and fostering respect for one's peers (especially within a work environment) a person gains better understanding in how their co-workers might function differently from them. For example, in my previous field of work (largely customer service), my ability to understand how each of my managers (I was under four managers, two of which owned and operated the waterpark/campground) approached a situation in which a customer was being difficult. For some of my team-members, they largely avoided conflict in the way that they would place blame on another department, another worker, etc. (IE "BLANK didn't properly charge the golf-cart," etc. etc.) whilst others would directly place the blame on themselves (even if it was not directly related to them) so they could resolve an issue with a customer without interference. After having to work with a difficult employee, then, each of these individuals would gather to speak on the issue they were presented with, and (depending upon what type of mishap took place that day) would gather multiple departments as a whole to discuss new ways to prevent similar situations from happening again. In doing so, they fostered a relationship with their employees that would not only call out issues in the system, but also attempt to resolve them. How does this, then, relate to the individuality of each person involved? It gives everyone across departments, each with our own experience and backgrounds in numerous fields (technology, lifeguarding, customer service, food service, etc) an equal voice when speaking to our bosses. The respect established in each member of a team leads to a team that is highly communicative, and thus, a much more high-functioning one.

Question 1. In the context of Individual Differences, what strategies will you employ to work effectively on multi-disciplinary and diverse teams? (300 word minimum)

There are a lot of strategies that I think I can employ to work effectively on a multi-disciplinary and diverse team. A couple of the strategies that I can implement is know your role in the company, be open minded, and be able to work as a team.

Starting with the first strategy of knowing your role in the company. This is important for one main reason the first being, so you don't fail in a project and not to waste any precious resources. This is most prominent in the aviation industry when things are being done by the proper people in the flight deck or on the ground. A perfect example would be in the Tenerife accident when the KLM pilot was doing the pre-checks and because the captain being that he was a higher up in the company he didn't know the proper flows and glanced and forgot crucial steps in the checklist that should have been done by the First Officer.

The second strategy that I can employ to work is to be open minded. This is self-explanatory but listen and be respectful of other people ideas. Being able to have meetings, discussions and brainstorming are key aspects to success. This can be found in aviation a lot of the time in flight training, but really any point in your pilot career. Humans aren't perfect so we are going to make mistakes and there is going to be someone there to critique your work so being able to be open to what they are teaching you is crucial so you can become a successful aviator.

The third strategy relates back to the first two strategies that I have briefed on and that is being able to work on a team. Working on a team is so crucial in aviation, no matter what side of aviation you are working on. In the airplane you need to be able to rely on your first officer or captain or flight instructor to help you fly the plane. In commercial aviation you can't do it all yourself you need someone flying the plane and then another person helping monitor and work the radios to allow your flights to be successful and more importantly safe for the passengers.

Question 2. In the context of Individual Differences, how will you ensure effective communication (both written and oral communication) with teammates from diverse expertise/disciplines and backgrounds? (300 word minimum)

In diverse teams, with members who have different levels of capabilities, knowledge, expertise, and backgrounds, I will keep in mind of these differences in my peers to ensure effective communication. I will express my ideas clearly and consciously so all members of the team are on the same page as me, and can understand the task at hand, and how I feel. I will advocate for myself and my ideas in team meetings through verbal communication, additionally, other modes of communication can be used like emails and professional messaging sites. I will consistently send out emails of important tasks or goals that I would like the team to meet as a whole. By using these written communication methods, I will enhance my verbal communication by having my ideas and goals known and able to look back on, them so I can keep myself accountable for them. I will ensure that the members of my team understand what I am trying to say by asking to follow-up questions and interacting with my peers. Since I might be discussing information that requires background knowledge, this is crucial to ensure that all members, no matter their skill set, understand what I am trying to communicate. Another part of communication is listening. Effective listening is very important in any team, and with diverse members, listening can help share ideas and enhance the team dynamic. Body language is another important factor for effective communication, and I will make sure my body language aligns with what I am trying to communicate. I want to be sure that I make proper eye contact and other appropriate body language so I convey the right message to the team member, in whom I am talking with. In conclusion, I will utilize effective communication techniques so that the diverse members of my team can understand me and feel heard.

Paper Examples

Human Factors in the Aviation Environment

Savannah Baker, Noah Hanson, Mallory Machala

Department of Aviation Science, Saint Louis University

ASCI 4050: Human Factors

Professor Terrance Kelly

December 9, 2022

2

While understanding the numerous factors that impact a person's performance within a Human Factors system, it is also essential that we address a flaw within the human condition, preventative issues. In discussing these flaws of the human body, we are able to locate and address the most main problem of the human factors system: the human. Within this paper, we address "real life" examples of these systems in action, causing us to not only further notice the impact of aeromedical factors within a complex system like the ones in the aviation field through the lens of the pilot, passenger, and aeromedical crew, but also so that we can utilize the knowledge gathered from these instances to prevent similar events from taking place in the future. We discuss the effects of bright lights and how they affect our eyes which include our rods and cones. The study by Tony Wright about our hearing and altitudes. Lastly, about gravity and the effects it has on our respiratory system. We go in depth about what we have been taught throughout this course about human factors and how we have understood what has been discussed.

When it comes to the aviation environment, understanding human factors is critical. In fact, according to Boeing, human error contributes to 80 percent of aircraft accidents (Rankin, 2008, p. 1). With this knowledge, we as individuals, as well as a society, can become better at identifying problems through improving our awareness. In turn, this betters our ability to solve issues that arise–an imperative goal in a high-consequence setting. To begin, in this environment, there is very little room for error. For example, a pilot's overarching goal is, put simply, to get a plane and its occupants from one place to another in a safe and efficient manner. This task is broken up into smaller tasks, such as pre-flighting the plane, talking to ATC, engaging the autopilot, landing, etc. In delving into these smaller tasks there is one common denominator: the individuals performing these duties. This creates an exponentially huge potential for disaster,

Terry Kelly
I don't really understand the sentence.

Terry Kelly
Leave words like "lastly" out, they tend to be trite. It's one of the differences between technical and creative writing.

Terry Kelly
Always include the year any resource was published.

Paper Examples (cont.)

should these individuals interact with their associated roles in a way that dampers their own progress as well as that of the overall flight. This is why it is tremendously important to understand Human Factors: it allows us to predict the "exponential disaster" that could result from any number of small mistakes. Additionally, using body language is another example of how understanding human factors can help discover problems before lives are immediately at stake. We may be flying with a copilot when we discover they are acting "different." They may be less responsive or complain they have a headache. Because we know how humans react to a lack of oxygen, we may realize that we are flying too high without supplemental oxygen. The performance of our colleague asks as a sign and warning in this case to help us possibly identify hypoxia before it is too late. These are two examples that help prove how crucial and helpful understanding this discipline is when it comes to identifying problems. When it comes to human factors, it involves applying knowledge regarding human beings to their environments and jobs (ICAO, 2021, p. 16). This is made up of the limitations and capabilities of such people. Simply, if we can understand these, we can better identify problems. This is because it allows us to map out the factors and events that result from the human factors that eventually lead to certain problems.

Identifying these components leads to an increased ability to solve complications that arise. This is because human factors need to be understood in order to create adaptable and practice risk management (Britton, 2021, p. 1). Not only does this allow the ability to mitigate, but we are able to predict how solutions we create will interact with humans. Therefore, understanding human factors also allows us to better resolve issues in the aviation environment. If a pilot falls ill, it impacts their ability to properly communicate to ATC, operate the plane, and ultimately slows down the operation. Their fatigue not only causes a delay in the efficiency in

Terry Kelly
The word "tremendously" is trite in this use

Terry Kelly
In a technical report, when you quote something you must include a citation and reference.

Terry Kelly
This is an incomplete sentence

the flight, but also impacts the passenger's moods. This extends to the gate agent's workload, the other crew members' stress, and many other components. In order to prevent situations like this, then, the human factors discipline attempts to eradicate the problem before its creation. For example, it places duty limits on pilots and crew members of the flight to help prevent fatigue and performance issues (Clemente-Fuentes, 2022, p. 1). Moving on, we also know that humans learn a great deal through experience. But early on, we make mistakes. If we allow new pilots for an airline to fly by themselves with a new co-pilot, the lack of experience may increase the odds of the passengers dying if something were to happen. Knowing this about how humans are with something new, we can help solve and mitigate a problem before it arises. Therefore, they are paired with a training captain who has lots of experience and expertise. We understand not only how humans would respond to this because we investigate human factors, but we are able to solve the problem using a more realistic response. Because we understand human factors and performance, we can better track steps backwards. This aids us in finding the root of a problem and solving issues faster and more efficiently when they occur. For these reasons, the importance of understanding human factors in an aviation environment is evident.

As a pilot, vision is very important. There are so many different scenarios we can lose our vision just for even a second. At night, bright lights can cause our vision to be impared for a short period of time. "When intense light rays reach your eye, the iris responds by constricting the pupil, thus protecting the retina and helping it process the incoming image better. The opposite occurs in low light when the iris dilates the pupil to allow as much light in as possible"(Gerstein). This causes either a black dot on your eye when you try to look at something or it to be blurry.

Terry Kelly
I am inclined to agree, but he of any data supporting this conjecture?

Terry Kelly
Consider using a transition when you change to a new topic

Paper Examples (cont.)

At night, many pilots use certain flashlights so their eyes do not get messed up. Most flashlights that are used have a red light on it. A red light is non glaring and doesn't affect how we see. They are in some cockpits as well. It makes it possible to read maps and charts. There are also dimmer yellow lights that are not as bright as a strong white light. The FAA informs us that we should not look directly at a bright light. "After the eyes are adapted to the darkness, avoid exposing them for more than one second to any bright white light as that causes temporary blindness"(FAA 10-2). This affects many pilots and can cause pilots to crash or fly off course leading to many other challenges. Our vision can be affected in many other ways. We all have different types of vision and how our eyes work, but with these effects, we all experience them. Our vision is so important. Vision is also affected when we directly enter darkness from a bright room called "dark adaptation"(Cooper). When a pilot is going to preflight and get ready to fly, they have to make sure their vision is adjusted so they see everything correctly and don't miss a step. Vision plays a huge role for pilots, because any error can cause a fatal accident.

In inspecting the numerous factors that affect a person's performance within a Human Factors system, it is also essential that we address a permanent imperfection within the human condition: medical complications. In discussing these imperative facets of the human body, we are able to identify and address the most central facet of the human factors system: the human. Within this paper, we address"real life" examples of these systems in action, causing us to not only further dissect the impact of aeromedical factors within a complex system (such as the ones found in these aeronautical settings) through the lens of pilot, passenger, and aeromedical crew, but also so that we can utilize the knowledge gathered from these instances to prevent similar events from taking place in the future.

Terry Kelly
"messed up" is a bit casual for a technical report

Terry Kelly
As well as what?

Terry Kelly
What does "and how our eyes work" mean in this context?

Terry Kelly
The word "huge" in this context is a bit informal for a technical report

Terry Kelly
Imperative facets?

From large-scale productions of "Top Gun" to those actually serving in the United States Armed Forces, military aviation has been a long-standing fascination of the American general public. Whether on-screen or in real life, military aviators have faced nearly impeccable odds: stress, high-performance expectations, numerous (and often extreme) levels of danger, and even the physical complications involved with piloting some of the fastest, deadliest, and overall most aerodynamic planes throughout history.

So, how does a human body adjust to the high-intensity environment within the cockpit of an F-15? From the moment every fighter pilot (or person in general) is born, we are faced with one persistent force: gravity. In flight, however, this force is largely accelerated. In an effect known as "pulling G's" (named for the gravity-like force imposed on the human body throughout high-speed acrobatic flight), pilots are able to make extreme acceleration and decelerations in flight that are much more excessive than the 1G their bodies are accustomed to on the ground.

So what physiological impact does this have on a fighter pilot, or, more specifically, their lungs. Depending on the type of G-force the pilot is experiencing, the heart and cardiovascular system are required to respond quickly and efficiently to keep blood flowing to the brain in order to maintain consciousness. ("Acceleration in Aviation; G Force", Faa.gov). In specifically addressing the lungs, a fighter pilot has to train so that the force of the weight does not stop them from breathing and receiving that mandatory blood-oxygen flow to their brain. The pilot must also be sure to have the property recovery time between pulling an appropriate amount of G's, as the lungs also have a necessary "recovery rate" in order to help redirect the body into maintaining a once-again homeostatic environment. There have also been numerous advances in

Terry Kelly
What do you mean by "impeccable" in this context

Terry Kelly
It may be accelerated.

Terry Kelly
Faa should be FAA. Include the year of any publication in the citation.

Paper Examples (cont.)

7

technology such as the "G-suit" that are often worn by modern pilots in acrobatic and military operations.

On top of having to handle these aeromedical factors in mind in the air, many fighter pilots are also subjected to a series of physical exams that test their ability to perform in such a high-stress (both physically and mentally) environment. Overall, It is the combination of these factors that secure a fighter pilot's place in the cockpit, and give them the ability to overcome the physical transgression that gravity can impose upon them.

In looking further into the complexities of an aeronautical system, it is also important to focus on the most common form of aviation we know: the commercialized travel system. In being able to inspect this final facet of the overall Human Factors system from the perspective of the passenger, we are then able to fully understand one of the biggest independent factors within the airplane — the people buckled into the passenger seat. However, for numerous people, air travel has proven to be especially difficult, as medical factors regarding the vestibular portions of the human body are said to have changed.

In commercialized flight, airplanes often cruise at altitudes higher than 30,000 feet. As these great metal flying tubes hurl their way through the sky, then, it is only expected that a human being experiences changes in air pressure regarding such. In looking at the vestibular system (The outer, inner, and middle portions of the air), a highly dynamic and intricate series of workings, it is easy then to discover how this change in pressure can cause medical concerns in the ear. In a study done by Tony Wright, he systematically tried to address the pain and discomfort people feel in air travel. Overall, he contributes the painful sensation felt in flight by passengers to the stretching of the eardrums inward by the closing of the Eustachian tube. He

"in mind" probably doesn't need to be in the sentence

Terry Kelly

"It" should not be capitalized in this use

Terry Kelly

Commercial aviation?

Terry Kelly

You need a citation and reference for statements like these.

Terry Kelly

commercial

Terry Kelly

To casual for a technical report

Terry Kelly

states specifically that it is the "critical closing pressure" ("Middle Ear Pain and Trauma During Air Travel, Tony Wright) in the eardrum that causes such pain.

Overall, Professor Wright found that this pain can not be avoided completely, however, most individuals, after a few different experiences with air travel, are able to better accommodate for it through FDA-approved medicine. This part of the human factors system, while not as critical to the flight as the physiology of the pilot, is an extremely important facet of the overall ecosystem of the flight world.

In discussing these factors, we hope to not only have summarized and presented examples of Human Factors (including the niche of aeromedical portions of human factors) but to have also utilized and expressed this knowledge so as to emphasize the importance of every individual as well as their roles in the Human Factors system.

Paper Examples (cont.)

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Paper Examples (cont.)

Human Factors Short Paper

Parks College of engineering, aviation, and technology

Sebastian Conklin, Marisa Warren, and Jack Liu

ASCI 4050: Human Factors

Dr. Terry Kelly

December 9, 2022

2

Abstract

As we have learned in this class, about 80% of aircraft accidents are a result of human factors. It is a fact that as humans, we are not perfect and make mistakes. Flying, however, is a high-consequence environment, making it essential to understand our personal limitations as pilots, perhaps even more so than understanding the limitations of our aircraft. By diving deeply into aircraft systems during flight training, we can prepare for an emergency, should one occur. In many cases, we must make an emergency landing or divert to another airport due to a malfunction with our aircraft. It is less natural to think that our bodies could malfunction in the same way a machine does, this is the reason we learn human factors - to understand how our bodies work and are able to identify any bodily malfunctions.

Throughout this course, we focused on the respiratory, visual, and vestibular systems. We dove deeply into the respiratory system learning the biological process of breathing in detail, gathered a thorough understanding of how the human eyes work, and studied the vestibular system to understand the biological foundation of spatial disorientation. Each of these human factors issues that we discussed can confuse the pilot in command; each of these issues can lead to a fatal aircraft accident despite a perfectly functioning aircraft. Without an understanding of human factors, we become very vulnerable to pilot error as a result of our own misperceptions. It is essential for pilots to understand how our ability to perceive can be misled or deceived, and that knowledge can only come from understanding the biological processes that lead us to it. In understanding the respiratory system, we learn what causes hypoxia and how to detect its presence in experiencing symptoms. We learn about the human eye to understand visual illusions, the blind spot, and other misperceptions. Lastly, understanding the vestibular system teaches us the causes of spatial disorientation.

Terry Kelly
Excellent opening

Terry Kelly
I hope it's not too many

The first system I would like to discuss is the respiratory system. The respiratory system enables the exchange of gases between the air and our blood bringing oxygen to our blood cells, which are then carried to all parts of the body. In greater detail, air is drawn into the lungs in order to extract oxygen from the air. Oxygen travels through tiny blood vessels in the lungs called alveoli. The alveoli allow oxygen molecules to enter the blood. The oxygen molecules are then distributed to all the cells in the body. When oxygen is metabolized by the body, carbon dioxide is released into the blood. Carbon dioxide waste is carried back to the lungs, where it is exhaled back into the air.

The biggest human factors issue that stems from our respiratory system is hypoxia. According to the Federal Aviation Administration (FAA), "hypoxia is just one of the physiological problems that can impair pilots if they are not aware of the effects of decreased oxygen pressure at altitude" (Boshers, 2015). There are many different kinds of hypoxia. Hypoxic hypoxia is a result of a lack of sufficient oxygen in the air for humans. When there is a lack of oxygen, humans begin to experience hypoxic hypoxia, which is recognized through a variety of symptoms. Simply put, hypoxic hypoxia occurs when the cabin altitude is too high for humans to breathe. In this case, it is an example of a human limitation that occurs when the aircraft can still operate normally. Although a human might experience hypoxia at a high altitude, the plane should be able to fly as it always does (assuming the altitude is below the maximum ceiling and there is ample fuel). This is true for almost all human factors issues we have studied, as well as for all other kinds of hypoxia. If a person loses circulation in a limb (stagnant hypoxia), if their body is physically unable to absorb enough oxygen (histotoxic hypoxia), or if their body cannot carry the oxygen throughout the body (anemic hypoxia), the aircraft should still operate normally. Nonetheless, an unconscious pilot could unintentionally fly

Terry Kelly

When writing a technical report, try to write in the third person

Terry Kelly

Good details, well-written

Terry Kelly

Good use of the quote

the aircraft into the ground, resulting in a horribly tragic event. It is essential to recognize that human limitations can lead to such tragedies, just as aircraft limitations can. Looking beyond our general aviation capabilities, military pilots especially have to be aware of respiratory human factors. Due to the excessive stress they experience when pulling high G-forces, they are trained to master the correct methods of pressurized breathing and anti-stress movements. This requires an even further in-depth understanding of the respiratory system than we have learned this semester but proves why all pilots must have a thorough understanding of human factors.

The two main functions of the ear are hearing and balance. There are three main parts of our ear: first is the outer ear, which is the visible part consisting of ridged cartilage and skin. Secondly, the middle ear, which transfers sound vibrations from your eardrum to the inner ear via three tiny bones, which are called the ossicles. Also, this section of the ear aids in equalizing the air pressure in our ears. The last section is the inner ear. Within the inner ear, there are two parts: the cochlea and the semicircular canal. They are responsible for sending sound and balance information to the brain through electrical impulses, respectively.

Humans perceive sound when sound waves enter the ear canal and vibrate the eardrum. The vibration passes from the eardrum to the ossicles in the middle ear and reaches the inner ear where the vibrations are turned into neural signals. The nerve fibers in our brain translate that into sound. In regards to balance, there are fluid and hair-like sensors in our semicircular canals. The fluid moves around as we change our orientation and the hairs deliver that information to our brains.

Being around operating airplanes and helicopters is extremely noisy. There are a magnitude of effects on the ear due to noise exposure, one being noise-induced hearing loss (NIHL). The FAA noted that "unprotected exposure to loud, steady noise over 90 dB for a short

Terry Kelly

Nice job discussing different forms of hypoxia

Terry Kelly

Try to write a transition when moving to a new section the horizontal plate of the headrest. The angular velocity rotates to the left and right at a constant speed, while the subject continuously swings his head left and right, once every 2 seconds stopping after 1.5 minutes of rotation. Learning to control muscle contraction and movement, coupled with actions such as turning, crawling, sitting, standing, and running, can all improve the stability of the vestibular system. If the Eustachian tube cannot be adjusted and opened quickly during the dive, jump, and rapid descent, the pressure inside and outside the tympanic cavity will not be balanced. This is especially true for military pilots who are often performing wild aerobatic stunts. Positive and negative air pressure will cause congestion and edema of the mucous membrane in the middle ear cavity, and tinnitus and tingling are still trivial matters. In severe cases, it may even be accompanied by a torn eardrum, which will not only affect the hearing of the flight crew and directly threaten flight safety.

Lastly, I would like to talk about vision. Humans are able to perceive sight because of photons traveling through the atmosphere. For further context, photons are essentially light. The light reflects off of other objects and is then directed to our eyes where it enters through our pupils. The Iris, the part of your eye that gives it color, dilates the pupil depending on the amount of light it is receiving. If the eye is receiving too much light the pupil will become smaller and if there is a little amount of light the pupil becomes bigger. All of the light that enters the eye is reflected off of the retina, which is located on the interior perimeter of the eye. The light in the retina is eventually directed to the optic nerve where the perception of vision is transmitted to the brain through neural signals.

As we have already discussed, are senses are not perfect. Alicja from flight time explains it perfectly explaining that "we are governed by the messages our body is sending to our brain" (Alicja, 2013). There are many illusions that may occur while acting as a pilot in command,

Terry Kelly

Again, well written.

Terry Kelly

Try to write in third person in a technical report runway illusions, altitude illusions, and a blind spot in your eye all contribute to deceiving your perception. When approaching a runway on final, the runway could appear further beneath the plane than it truly is (wider runway), or closer to the plane than it truly is (narrower runway). Respectively, the same illusions apply to upsloping and downsloping runways. The pilot must be entirely aware of runway illusions when attempting any landing. If the pilot is deceived by his/her perception and believes they are lower than they truly are they could flare too early stalling the plane not far above the runway; and if they believe they higher than they truly are they may not flare at all, which could cause a prop strike. While these examples provide dangers during landing, there are also altitude illusions pilots may experience when spotting another plane in the sky. As we discussed in class, you could accidentally perceive an aircraft at an altitude above you even though you are flying at the same altitude, and as both planes fly closer to each other the plane will appear to descend from its higher altitude to your altitude. Falling victim to an illusion like this could result in a deadly crash, or (if you are lucky) a frightening near miss. While these human factors examples result from a misperception, another human factors problem that comes from the biological construction of the human eye is the blind spot. Due to an area in your field of vision that corresponds to a part of your retina that is blocked by the optic nerve, your eye creates a blind spot by using surrounding details to interpolate what exists in that blind spot. Your eye working along with your brain essentially tries to fill in the blank to match what the surrounding environment looks like.

This paper would be incomplete without mentioning spatial disorientation. Spatial disorientation comes from a lack of visual references confusing the pilot into thinking he is in some other position attitude than he is. In order to avoid spatial disorientation, the pilot must rely on the indications he receives from the instruments inside the cockpit. However, it is not always that easy to do when your senses are telling you something different than what you actually feel. 37% of general aviation accidents are due to spatial disorientation and 80% of those accidents are fatal. These accidents are the epitome of human limitations resulting in the destruction of a normally operating aircraft potentially accompanied by the loss of life. According to the SKYbrary, spatial disorientation is a result of a "normally functioning vestibular system" (SKYbrary). Differing from other human factors issues discussed in this paper, spatial disorientation can cause an accident when both the plane and the pilot are operating normally, not just the plane. The vestibular system has 3 semicircular canals, which are all filled with fluid. The purpose of these canals is to determine pitch, yaw, and roll movements which are perceived as the fluid moves throughout each canal. Spatial disorientation from a biological view occurs when the plane is in one motion for an elongated period of time. The fluid remains in a constant position in the canal tricking the pilot into thinking he has returned to equilibrium. For example, if a plane is in a turn for a period of about 7 seconds or longer, the equilibrium feeling will return despite remaining in a turn.

All of these issues that we have learned in class and discussed in this paper are human malfunctions that can cause a plane to crash. By studying these issues, we learn how to identify our own bodily malfunctions and control them to prevent any accidents or mishaps. It is best to say that we must understand our bodies in the same way we understand our aircraft. Without an understanding of human factors we lose the ability to prevent 80% of aircraft accidents.

Terry Kelly

Make sure to include the year in any citation

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Flight Science Assessment Evidence

SLO 1: Conduct aviation operations in a professional, safe, and efficient manner assessment evidence.

ASCI 4050 Human Factors Assignment 1 Name:______________________

Hi everyone,

As a reminder, I am traveling on university business next Monday, October 31st and Wednesday, November 2nd. Consequently, we will not have class.

Rather than having class, I have placed two assignments in the Modules folder in Canvas. One to cover Monday's class and the second to cover Wednesday's class. Rather than contributing to the homework average, each assignment has the potential to add 5-points to a test grade (for a total of 10-points).

The questions are purposefully vague as I want you to think about your own capabilities and limitations.

Please respond to the following questions

1. Describe a few ethical considerations surrounding the human factors discipline (300 word minimum)

2. Describe a few professional considerations surrounding human factors. (300 word minimum)

ASCI 4050 Human Factors Assignment 2 Name:______________________

Hi everyone,

As a reminder, I am traveling on university business next Monday, October 31st and Wednesday, November 2nd. Consequently, we will not have class.

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The questions are purposefully vague as I want you to think about your own capabilities and limitations.

Please respond to the following questions

1. Describe how an understanding of human performance (human factors) will help you better identify problems in the high-consequence environment. (300 word minimum)

2. Describe how an understanding of human performance (human factors) will help you better solve problems in the high-consequence environment. (300 word minimum)

Assignment 1 Examples

1. Describe a few ethical considerations surrounding the human factors discipline (300 word minimum)

1- The ethical considerations that the discipline of human factors consists of the right and wrong that humans are ought to do, in terms of rights, respect for people, beneficence, justice and fairness. To ensure that the human factor discipline meet those ethics standards, it must provide privacy and safety for those who are affected by the system. In addition, loyalty, compassion, and honesty are among the other moral values that are encouraged by ethical standards. Additionally, ethical standards cover rights such as privacy, the right to be free from harm, and the right to life. These standards are suitable ethical standards since they are based on consistent and solid justifications. Therefore, a human factors specialist should not possess any issues with normative ethics such as obligations, rights, injury prevention, privacy. However, what about when those ethical standers merge, in case of an injury and privacy are at odds with one another. For example, if a pilot suffers from mental problems such as depression and they are pressured to hide it from their employer and colleagues because it might risk losing their job. Thus, given the circumstances, the pilot might be aware that they are unsuitable to fly, but they are not obligated to say anything that would risk losing their job, and if the employer allowed them to fly with medications, it would risk the safety of flight. This example raises many questions regarding the ethical standards in human factors, such as would the human factors specialists create a system that notifies the employers if the pilot is visiting a psychiatrist or if there are any decline in their performance or their attitude with their coworkers. Those circumstances force the industry to create a system that would break the ethical code and invade the pilots' privacy which would add more pressure and stress to their work life.

1. Describe a few ethical considerations surrounding the human factors discipline (300 word minimum)

This question is very open ended which caused me to ponder it and consider different ways to interpret it. I started by googling the words "human factors" "discipline" and "ethics", from which I read a few articles. In human factors we study how the human body can affect our ability to conduct safe flight. In some circumstances pilots may make potentially unethical piloting decisions due to constraints whether they be deadlines set by the employer or flying while fatigued.

Pilots have a responsibility and a moral duty to uphold safe flying habits and procedures relating to human factors and aviation in general. In my training at Parks College I learned to follow the IM SAFE checklist which helps pilots know if they are fit to fly on a personal level before they even preflight the aircraft.

Ilness- Am I feeling sick?

Mediation- have I taken medicine for the first time today?

Stress- is your personal life stressing you out?

Alcohol- Am I hungover? It is prohibited to drink within 8 hours of a flight

Fatigue- am I exhausted?

Emotion- emotionally stressed?

All these six personal evaluations will influence pilots to make the right on a go /nogo decision on a private or commercial level.

Another ethical consideration in human factors that happens every day is tight flight schedules. Commercial Pilots would not want to cancel a flight too often and put their career and income on the line. This means that the IM SAFE checklist may not be properly adhered to, or corners could be cut on procedures in order to make departure or arrival times. This is a ethical consideration that is a everyday risk. Pilots should always self-evaluate before a flight

Assignment 1 Examples (cont.)

1. Describe a few ethical considerations surrounding human factors discipline (300 word minimum) When it comes to ethical factors in the context of human factors, I think the best way to begin is with the IMSAFE checklist. While it is always tempting to fly (because we all love flying) and especially for airline pilots who rely on their salary to support themselves and/or their families, we must not put the safety of our passengers in jeopardy if we, pilots, are unfit to operate an aircraft. It is essential that we systematically complete the IMSAFE checklist before making any further decisions about traveling airborne. Perhaps the most important element of this checklist is the last letter "E", which stands for external pressures. As I mentioned earlier in the response, Pilots may feel pressured into flying for several reasons ranging from angry passengers (for commercial pilots) to get thereitis as we sometimes call it around Parks. We must understand that it is dangerous and far too risky to neglect any factor that could impact our performance while operating an aircraft. The IMSAFE checklist serves to provide pilots with a methodical way of analyzing their own human factors. As mental health has become a much more relevant issue in recent years, it is important to know that this applies to everyone including pilots. There is an absolute plethora of things that could impact any human's mental health, which may be family-related or something external like being given bad news from a friend. Any of these things could severely impact the pilot's ability to proficiently operate the aircraft, and every pilot should be very conscious of the many factors that could affect their mental health. Every time I fly, I brief my copilot about limiting distractions especially during taxi, takeoff, and landing. Factors that affect your mental health are distractions and should be treated as so. Along with completing the IMSAFE checklist each pilot should complete a personal mental health analysis prior to flight as well.	**Describe a few ethical considerations surrounding the human factors discipline** When faced with ethics in aviation, the first consideration that comes to mind is centered around aspects of ethics that may prevent us from making the right decision. A large part of ethics involves making a choice that will preserve the safety of those around you as well as to maintain a respectful aviation environment. A few moral principles that may govern whether we make the right or wrong choice as pilots is fear, guilt, and self-interest/ convenience to oneself. When we find ourselves in a difficult situation as pilots, perhaps the weather is below our own personal minimums and ethically we know that the right thing to do to preserve our own safety and even our instructor's safety is to cancel the flight, fear of inconveniencing others may prevent us from acting ethically and remaining honest with ourselves and others. We may fear that our choice to make what we know is the right decision could potentially jeopardize the way others view us as pilots or result in negative consequences to us a pilot canceling a flight. Similarly, guilt may prevent us from making the ethically right decision. Perhaps we have already canceled two flights this week, and by canceling a third flight, a feeling of guilt arises. This feeling might consist of embarrassment or negative feelings toward ourselves for having lower personal minimums than other pilots. This guilt may result in comparison and we may begin to doubt our decision making skills. Finally, Self- interest and convenience may prevent pilots from acting ethically, particularly on solo flights. When flying alone on a VFR cross country, the student pilot is aware of the regulations and understands the importance of following them to maintain a safe environment for everyone in the air. When enroute this cross country, the pilot comes across a few clouds that they must descend away from in order to avoid them horizontally. The pilot knows they aren't allowed to fly within 2,000 feet horizontal distance from clouds in VFR flight, however the clouds are so few, they will only pass through them for roughly 10 seconds, and they will not affect the pilots line of sight. As pilots, there are many times where we are faced with situations where we have the option to break a small rule that nobody will ever find out about to cater to our own convenience. In these situations, it is important to maintain honesty and integrity in order to not let our own self-interest govern our ethical decision making skills. When in the air, it is important to remain honest and fair for the sake of our own safety, but also for the safety of others. When it comes to ethics, there is nothing more important than making it a habit to practice safe and fair flying by following the regulations put in place for us.

Assignment 2 Examples

Describe a few professional considerations surrounding human factors In my time in aviation, I have come to learn that those who work in the field are some of the most respectful and professional individuals I have met. Pilots, whether on the ground or in the air, are oftentimes always courteous toward one another and maintain a professional environment. Many times, in order to maintain safety and integrity in the aircraft, we rely on personal minimums, FAA regulations, and patience with ourselves and other pilots. A large aspect of deciding whether or not to fly on a given day is centered around personal minimums and conditions that we are comfortable or not comfortable flying in. Going hand in hand with ethics, it is important to take other pilots' personal minimums into consideration and remain respectful and professional toward them and what they are personally comfortable in to aid in eliminating those feelings of fear or guilt when faced with a difficult decision to make surrounding flying. Remaining professional and respectful toward others' boundaries aids in maintaining those aviation ethics and in maintaining a safe environment where pilots can make the best decision for themselves and their crew without fear of judgment or fear of making the wrong decision. Aviation is filled with rules and regulations, and from early on in our training we understand the importance of following them for our safety and for the safety of every person around us. Not only is it essential that we follow these rules in a professional manner that upholds the high standards set for pilots, but it is also essential that we respect the time needed for others' to follow these rules. There are many times where there may be an aircraft in front of you who is taking a longer time to get through their engine runup and go through their checklists to ensure that they are comfortable and ready for takeoff. Practicing patience is critical in aviation because when we are patient with other pilots, we are showing them our respect and that we care for their safety. When another pilot takes the time that they need to be comfortable with their aircraft, they will be safe,have the ability to make ethically correct decisions, which in turn allows us to be safe and make smart choices in the air.	2. Describe a few professional considerations surrounding human factors. (300 word minimum) One professional consideration is avoiding stereotypes and assumptions about a person. Not only is it not professional to treat and communicate with someone who may have an intellectual disability, a person who uses a wheelchair, or treating a person differently because they are a female for example. This is regarding not only pilots but also those who work with the pilots and human factors specialists, like mechanics, the aerospace engineers, even the management, marketing, and other sides of the industry. Simply treating people with respect since this is a field that deals with people all the time, from various lifestyles, beginnings, and each person has gone through a different life with various cultures. This is a field that looks at how we, as humans, are similar to each other but also vastly different. You are meant to benefit the client or company you are working with while also doing good for the general populace and humanity. Another professional consideration is you should know plenty and more than whoever you are working for or your client. Though using that knowledge and information to make the right decision, for example if asked to speak in court you provide credible data/research while being able to tell the value and limitations of it and your own capabilities. This also coincides with not misleading clients, organizations, and any business. For example a new researcher is looking at the UX design of a new flight simulator, while communicating with pilots you would treat each one with respect, understanding their capabilities and accurately applying your own capabilities while doing research and knowing when to ask for their recommendations with your own observations. This is even related to confidentiality, when taking down research doing so with the agreement of the participant. Unless it is public behavior, the pilots need to explicitly agree to the recording of any data. In the previous question there was mention of where the line of confidentiality for adapting technology to the user, like pilot to plane, user to phone, and so forth. Yet when in the preliminary development phase confidentiality is very important but what about after that.

Assignment 2 Examples (cont.)

2. Describe a few professional considerations surrounding human factors. (300 word minimum) I believe that professional and ethical overlap quite a lot in aviation, in particular the concepts of fairness, honesty, and remaining non-biased. But professionalism in human factors goes beyond just behaving ethically, it also branches into the ideas of procedure, obligation, and legality. The simplest of all of those ideas is legality, to be a professional in anything requires that we follow the law, even when we disagree with it we must follow the law, though this does play a seemingly small role in human factors investigations it still vital that we follow them to the ledger to get the most out of the investigation. Obligation is where professionalism gets complicated, above all else we must be obligated to the truth and the continued safety of air travel. Human Factors plays a massive role in the world of aviation in the end human beings are running and monitoring the systems in place to ensure safe, quick, and effective functioning of both general and professional aviation. As pilots we are obligated to many things, but as humans we are obligated to our human factors to monitoring our fellow pilots, ourselves, and to above all else the truth of our flaws. To ignore those obligations to the human factors involved in aviation would be to open ourselves and our passengers up to considerable risk some of which by the time we sense a problem it may be too late. This why our obligation to human factors is a constant in aviation one that only can be upheld in the system if all persons in the system are vigilant for the variety of symptoms that can display no matter how seemingly insignificant.	2. Describe a few professional considerations surrounding human factors. (300 word minimum) Professionalism is an essential part of the global air transportation industry not only in regard to customer service, but decision making as well. Across the industry, professionalism includes doing everything correctly and procedurally, in turn, relating to human factors. Human factors directly correlate to the professional considerations within aviation because decision making is essential not only in the cockpit, but across multiple disciplines that go into making scheduled airlines service successful. Specifically, one professional consideration that surrounds human factors would be decision making, including, the pilot deciding whether they can safely complete the flight. I think that this question can closely relate to the previous because professional and ethical considerations can go hand in hand within the human factors discipline. This dilemma can tie into both ethical and professional considerations because as a pilot, you should know the limitations of yourself to conduct a flight, and as the pilot, if you know that you are not in a good position to fly, the safety of the passengers in influenced, therefore becoming an ethical situation. Continuing with this idea, not necessarily related to commercial aviation, but as student pilots, a consideration when flying in the IFR environment can be personal minimums. As a new instrument pilot, would you want to go fly on a low IFR day where you would break out on an approach at minimums as prescribed in the approach chart? A big part of professional considerations, relating to human factors, revolves around the idea of limitations as pilots. As a pilot, being a professional involves knowing the limitations of yourself and the aircraft that you are flying, and it comes down to decision making which influences the human factors chain, ultimately increasing the chances of an accident derived from human error. In all, professional considerations and ethical dilemmas in human factors are very closely related. In an essential industry such as air transport, it is essential to understand how you as the pilot function in the human factors tree in order to make both professional and ethical decisions.

SLO 2: Describe historical trends, current issues, and emerging opportunities in aviation.

SLO 2 Test 1 Questions

16 Multiple Choice 3 points

Data suggests that over ____ of aviation accidents are attributable to adverse human factors events (human error)

- (selected) 70%
- 80%
- 85%
- 90%

17 True or False 3 points

By its very nature, the study of human factors is multidisciplinary.

- (selected) True
- False

22 Multiple Choice 3 points

______________ was/were human factors pioneer(s) who studied intellectual differences

- (selected) Galton
- Cattell
- Taylor
- The Gilbreths

23 Multiple Choice 3 points

______________ was/were human factors pioneer(s) who studied sensory and motor functions

- Galton
- (selected) Cattell
- Taylor
- The Gilbreths

24 Multiple Choice 3 points

______________ was/were human factors pioneer(s) who studied scientific management of job tasks

- Galton
- Cattell
- (selected) Taylor
- The Gilbreths

25 Multiple Choice 3 points

_____________ was/were human factors pioneer(s) who conducted motion studies in the operating room

- Galton
- Cattell
- Taylor
- The Gilbreths

SLO 2 Test 4 Questions

20 Multiple Choice 1 point

Generally speaking, _____________ aircraft produce a higher frequency

- Small gas turbine engines
- Large gas turbine engines
- Small piston engines
- Large pistone engines

21 Multiple Choice 1 point

Conductive deafness is most closely associated with?

- Eardrum perforation
- Loud noises
- Age

25 True or False 1 point

Spatial disorientation is exacerbated by fatigue.

- True
- False

26 Multiple Choice 1 point

Somtogravic illusions are generally associated with?

- The semi-circular canals
- The otolith organ

29 Multiple Choice 1 point

Somatogravic illusions generally involve?

- Turning operations
- Linear operations

SLO 4: Articulate the value of integrity, lifelong learning, and building diverse teams in serving and leading others.

SLO 4 Assignment 1 Evidence

ASCI 4050 Human Factors Assignment 1 Name:_______________________

Hi everyone,

As a reminder, I am traveling on university business next Monday, October 31st and Wednesday, November 2nd. Consequently, we will not have class.

Rather than having class, I have placed two assignments in the Modules folder in Canvas. One to cover Monday's class and the second to cover Wednesday's class. Rather than contributing to the homework average, each assignment has the potential to add 5-points to a test grade (for a total of 10-points).

The questions are purposefully vague as I want you to think about your own capabilities and limitations.

Please respond to the following questions

1. Describe a few ethical considerations surrounding the human factors discipline (300 word minimum)

2. Describe a few professional considerations surrounding human factors. (300 word minimum)

ASCI 4050 Human Factors Assignment 3 Name:______________________

Hi everyone,

As a reminder, I am traveling on an accreditation visit next Monday, November 14th. Consequently, we will not have class. Rather than having class, I am giving this assignment in place of class. This assignment will contribute to your homework grade (15% of your total grade). This assignment must be uploaded to Canvas no later than Wednesday, November 16th by the end of the day.

In class, we discussed the notion of Individual Differences. In high-consequences operations we will engage people of diverse experience, backgrounds, and cultures. People are different and that difference is a strength. Diversity provides a distinct advantage to the team as diversity allows individuals to bring a different perspective and skillset to a problem.

Question 1. In the context of Individual Differences, what strategies will you employ to work effectively on multi-disciplinary and diverse teams? (300 word minimum)

Question 2. In the context of Individual Differences, how will you ensure effective communication (both written and oral communication) with teammates from diverse expertise/disciplines and backgrounds? (300 word minimum)

SLO 4 Assignment 1 Examples (cont.)

1. Describe a few ethical considerations surrounding the human factors discipline (300 word minimum)

1- The ethical considerations that the discipline of human factors consists of the right and wrong that humans are ought to do, in terms of rights, respect for people, beneficence, justice and fairness. To ensure that the human factor discipline meet those ethics standards, it must provide privacy and safety for those who are affected by the system. In addition, loyalty, compassion, and honesty are among the other moral values that are encouraged by ethical standards. Additionally, ethical standards cover rights such as privacy, the right to be free from harm, and the right to life. These standards are suitable ethical standards since they are based on consistent and solid justifications. Therefore, a human factors specialist should not possess any issues with normative ethics such as obligations, rights, injury prevention, privacy. However, what about when those ethical standers merge, in case of an injury and privacy are at odds with one another. For example, if a pilot suffers from mental problems such as depression and they are pressured to hide it from their employer and colleagues because it might risk losing their job. Thus, given the circumstances, the pilot might be aware that they are unsuitable to fly, but they are not obligated to say anything that would risk losing their job, and if the employer allowed them to fly with medications, it would risk the safety of flight. This example raises many questions regarding the ethical standards in human factors, such as would the human factors specialists create a system that notifies the employers if the pilot is visiting a psychiatrist or if there are any decline in their performance or their attitude with their coworkers. Those circumstances force the industry to create a system that would break the ethical code and invade the pilots' privacy which would add more pressure and stress to their work life.

1. Describe a few ethical considerations surrounding the human factors discipline (300 word minimum)

This question is very open ended which caused me to ponder it and consider different ways to interpret it. I started by googling the words "human factors" "discipline" and "ethics", from which I read a few articles. In human factors we study how the human body can affect our ability to conduct safe flight. In some circumstances pilots may make potentially unethical piloting decisions due to constraints whether they be deadlines set by the employer or flying while fatigued.

Pilots have a responsibility and a moral duty to uphold safe flying habits and procedures relating to human factors and aviation in general. In my training at Parks College I learned to follow the IM SAFE checklist which helps pilots know if they are fit to fly on a personal level before they even preflight the aircraft.

Ilness- Am I feeling sick?

Mediation- have I taken medicine for the first time today?

Stress- is your personal life stressing you out?

Alcohol- Am I hungover? It is prohibited to drink within 8 hours of a flight

Fatigue- am I exhausted?

Emotion- emotionally stressed?

All these six personal evaluations will influence pilots to make the right on a go /nogo decision on a private or commercial level.

Another ethical consideration in human factors that happens every day is tight flight schedules. Commercial Pilots would not want to cancel a flight too often and put their career and income on the line. This means that the IM SAFE checklist may not be properly adhered to, or corners could be cut on procedures in order to make departure or arrival times. This is a ethical consideration that is a everyday risk. Pilots should always self-evaluate before a flight

1. Describe a few ethical considerations surrounding human factors discipline (300 word minimum) When it comes to ethical factors in the context of human factors, I think the best way to begin is with the IMSAFE checklist. While it is always tempting to fly (because we all love flying) and especially for airline pilots who rely on their salary to support themselves and/or their families, we must not put the safety of our passengers in jeopardy if we, pilots, are unfit to operate an aircraft. It is essential that we systematically complete the IMSAFE checklist before making any further decisions about traveling airborne. Perhaps the most important element of this checklist is the last letter "E", which stands for external pressures. As I mentioned earlier in the response, Pilots may feel pressured into flying for several reasons ranging from angry passengers (for commercial pilots) to get thereitis as we sometimes call it around Parks. We must understand that it is dangerous and far too risky to neglect any factor that could impact our performance while operating an aircraft. The IMSAFE checklist serves to provide pilots with a methodical way of analyzing their own human factors. As mental health has become a much more relevant issue in recent years, it is important to know that this applies to everyone including pilots. There is an absolute plethora of things that could impact any human's mental health, which may be family-related or something external like being given bad news from a friend. Any of these things could severely impact the pilot's ability to proficiently operate the aircraft, and every pilot should be very conscious of the many factors that could affect their mental health. Every time I fly, I brief my copilot about limiting distractions especially during taxi, takeoff, and landing. Factors that affect your mental health are distractions and should be treated as so. Along with completing the IMSAFE checklist each pilot should complete a personal mental health analysis prior to flight as well.	**Describe a few ethical considerations surrounding the human factors discipline** When faced with ethics in aviation, the first consideration that comes to mind is centered around aspects of ethics that may prevent us from making the right decision. A large part of ethics involves making a choice that will preserve the safety of those around you as well as to maintain a respectful aviation environment. A few moral principles that may govern whether we make the right or wrong choice as pilots is fear, guilt, and self-interest/ convenience to oneself. When we find ourselves in a difficult situation as pilots, perhaps the weather is below our own personal minimums and ethically we know that the right thing to do to preserve our own safety and even our instructor's safety is to cancel the flight, fear of inconveniencing others may prevent us from acting ethically and remaining honest with ourselves and others. We may fear that our choice to make what we know is the right decision could potentially jeopardize the way others view us as pilots or result in negative consequences to us a pilot canceling a flight. Similarly, guilt may prevent us from making the ethically right decision. Perhaps we have already canceled two flights this week, and by canceling a third flight, a feeling of guilt arises. This feeling might consist of embarrassment or negative feelings toward ourselves for having lower personal minimums than other pilots. This guilt may result in comparison and we may begin to doubt our decision making skills. Finally, Self- interest and convenience may prevent pilots from acting ethically, particularly on solo flights. When flying alone on a VFR cross country, the student pilot is aware of the regulations and understands the importance of following them to maintain a safe environment for everyone in the air. When enroute this cross country, the pilot comes across a few clouds that they must descend away from in order to avoid them horizontally. The pilot knows they aren't allowed to fly within 2,000 feet horizontal distance from clouds in VFR flight, however the clouds are so few, they will only pass through them for roughly 10 seconds, and they will not affect the pilots line of sight. As pilots, there are many times where we are faced with situations where we have the option to break a small rule that nobody will ever find out about to cater to our own convenience. In these situations, it is important to maintain honesty and integrity in order to not let our own self-interest govern our ethical decision making skills. When in the air, it is important to remain honest and fair for the sake of our own safety, but also for the safety of others. When it comes to ethics, there is nothing more important than making it a habit to practice safe and fair flying by following the regulations put in place for us.

SLO 4 Homework 3 Examples

Question 1. In the context of Individual Differences, what strategies will you employ to work effectively on multi-disciplinary and diverse teams? (300 word minimum)

The first strategy I will employ is being open to all disciplines and cultures and their differences. People work better when they feel their similarities and differences are accepted, respected, and valued. It will be crucial to me that I embrace all the cultures and values of the diverse and multi-disciplinary teams and make an effort to make people feel comfortable and learn about their way of life for improved interactions. Another strategy I will use to reduce differences between multi-disciplinary and diverse teams for effective work is having good communication skills. Any team works better when there is open and honest communication. How everyone in the group communicates with each other will influence how well they work together and the team's productivity. There needs to be open communication across diverse and multi-disciplinary teams. This way, people can talk about difficult and complicated situations and issues. It is vital that team members are encouraged to communicate effectively and respectfully, as everyone needs to feel like their voice is being heard. Minimizing miscommunication will ensure that there is reduced conflict across the team. To achieve effective communication, people will need to learn how to listen attentively and seek clarification in case of any issue or misunderstanding. Different cultures and disciplines also have different communication styles, so I will accept, understand and respect how diverse people communicate to have an effective team. Further, I will try to avoid stereotyping and prejudice to work effectively with multi-disciplinary and diverse teams. When people are unfairly divided into groups and assigned unfair characteristics, it can affect how they work and interact with others. Therefore, I will accept that diverse people have different and unique working styles and preferences, which does not make them less important or productive. To work effectively, I will improve my conflict management skills. I will consider conflict management training for myself and the rest of the team. With good conflict management, the team will be able to work effectively.

Question 2. In the context of Individual Differences, how will you ensure effective communication (both written and oral communication) with teammates from diverse expertise/disciplines and backgrounds? (300 word minimum)

Despite belonging to diverse expertise, disciplines, and backgrounds, teammates need to feel like they are part of the group or community. To achieve effective communication in a diverse group, I should be able to share and exchange ideas respectfully so that everyone can understand each other. I will be open and inclusive to other cultures to ensure effective communication. Every team member's language and communication culture must be respected. Communication needs to accommodate everyone's needs and not just the needs of those in the majority language. Openness and inclusivity in communication will help create trustworthy relationships where people feel comfortable enough to share their ideas with the rest of the team. To appreciate diversity, especially in communication, I will learn about the unique communication styles of diverse groups to promote effective communication. I will use clear and concise language to communicate effectively with people from diverse backgrounds. Keeping my language clear and straightforward ensures that no meaning is lost in interpretation and that my audience can receive the message exactly how I intended it to be received. Paraphrasing my words and asking the team if they understand my message will ensure the communication is clear and effective. Repeating the message help improve communication as I can clarify what I am saying and therefore eliminate misunderstandings. Body language is also very important in oral communication; therefore, I will make an effort to understand the differences in body language for each diverse group. Feedback is critical in ensuring effective communication. Providing and receiving constructive and honest feedback will be critical in my communication. Feedback will make people be sure that their voice is heard and respected and will therefore encourage people to communicate more openly. Most importantly, it can be challenging to know exactly how to communicate with people who are different from you in one way or the other. I will therefore take diversity training which will ensure that a diverse team can communicate effectively with each other

Question 1. In the context of Individual Differences, what strategies will you employ to work effectively on multi-disciplinary and diverse teams? (300 word minimum)

The importance of understanding individual differences within any environment, yet alone a high consequence one, is paramount when seeking to further know how a team functions as a whole. In looking at how to address the individuality of each member involved, I believe the most effective strategy in helping coordinate such forces would be communication. In many environments, co-workers will often work alongside each other, not only on their own projects but on one major task as a goal. For example, myself and my fellow interns at Garmin (a pretty small gap diversely) all have our separate functions whilst focusing on the same geographic area and working on the same geographic file. While we each have our own separate responsibilities regarding such, we all have to remain in clear communication with each other and other folks in the department to make sure that we are effectively doing our assigned work without overlapping or stepping onto anyone else's toes. In doing so, we help to promote a work environment that enables us each to assist each other when we have any issues or questions that may arise. This includes a larger portion of people, not only within our own offices, but that of Garmin's Corporate offices, as well as any remote employees as well. Our work environment is filled with hundreds of thousands of very diverse groups and skill sets that come together to help develop products in the name of a greater goal. It helps in managing any Human Resource issues(should they arise) and establishes a better understanding of who we are within a larger workforce. Communication is also paramount in highly-diverse things when everything is going right. Teams that communicate well with each other will not only improve productivity in the office, but it also stands to make a work environment more pleasant for everyone involved. In having a well-functioning team communicate, a door opens to a safer, friendlier, and more productive work environment.

Question 2. In the context of Individual Differences, how will you ensure effective communication (both written and oral communication) with teammates from diverse expertise/disciplines and backgrounds? (300 word minimum)

Effective communication is paramount to a high-functioning team. Ensuring the development and implementation of this process is something that numerous companies have used worldwide in order to help the cohesive teamwork abound in their fields of work. Effective communication must first begin with respect, from co-worker to co-worker, and even from CEO to the lowest new-hires of an establishment. In garnering and fostering respect for one's peers (especially within a work environment) a person gains better understanding in how their co-workers might function differently from them. For example, in my previous field of work (largely customer service), my ability to understand how each of my managers (I was under four managers, two of which owned and operated the waterpark/campground) approached a situation in which a customer was being difficult. For some of my team-members, they largely avoided conflict in the way that they would place blame on another department, another worker, etc. (IE "BLANK didn't properly charge the golf-cart," etc. etc.) whilst others would directly place the blame on themselves (even if it was not directly related to them) so they could resolve an issue with a customer without interference. After having to work with a difficult employee, then, each of these individuals would gather to speak on the issue they were presented with, and (depending upon what type of mishap took place that day) would gather multiple departments as a whole to discuss new ways to prevent similar situations from happening again. In doing so, they fostered a relationship with their employees that would not only call out issues in the system, but also attempt to resolve them. How does this, then, relate to the individuality of each person involved? It gives everyone across departments, each with our own experience and backgrounds in numerous fields (technology, lifeguarding, customer service, food service, etc) an equal voice when speaking to our bosses. The respect established in each member of a team leads to a team that is highly communicative, and thus, a much more high-functioning one.

Question 1. In the context of Individual Differences, what strategies will you employ to work effectively on multi-disciplinary and diverse teams? (300 word minimum)	Question 2. In the context of Individual Differences, how will you ensure effective communication (both written and oral communication) with teammates from diverse expertise/disciplines and backgrounds? (300 word minimum)
There are a lot of strategies that I think I can employ to work effectively on a multi-disciplinary and diverse team. A couple of the strategies that I can implement is know your role in the company, be open minded, and be able to work as a team. Starting with the first strategy of knowing your role in the company. This is important for one main reason the first being, so you don't fail in a project and not to waste any precious resources. This is most prominent in the aviation industry when things are being done by the proper people in the flight deck or on the ground. A perfect example would be in the Tenerife accident when the KLM pilot was doing the pre-checks and because the captain being that he was a higher up in the company he didn't know the proper flows and glanced and forgot crucial steps in the checklist that should have been done by the First Officer. The second strategy that I can employ to work is to be open minded. This is self-explanatory but listen and be respectful of other people ideas. Being able to have meetings, discussions and brainstorming are key aspects to success. This can be found in aviation a lot of the time in flight training, but really any point in your pilot career. Humans aren't perfect so we are going to make mistakes and there is going to be someone there to critique your work so being able to be open to what they are teaching you is crucial so you can become a successful aviator. The third strategy relates back to the first two strategies that I have briefed on and that is being able to work on a team. Working on a team is so crucial in aviation, no matter what side of aviation you are working on. In the airplane you need to be able to rely on your first officer or captain or flight instructor to help you fly the plane. In commercial aviation you can't do it all yourself you need someone flying the plane and then another person helping monitor and work the radios to allow your flights to be successful and more importantly safe for the passengers.	In diverse teams, with members who have different levels of capabilities, knowledge, expertise, and backgrounds, I will keep in mind of these differences in my peers to ensure effective communication. I will express my ideas clearly and consciously so all members of the team are on the same page as me, and can understand the task at hand, and how I feel. I will advocate for myself and my ideas in team meetings through verbal communication, additionally, other modes of communication can be used like emails and professional messaging sites. I will consistently send out emails of important tasks or goals that I would like the team to meet as a whole. By using these written communication methods, I will enhance my verbal communication by having my ideas and goals known and able to look back on, them so I can keep myself accountable for them. I will ensure that the members of my team understand what I am trying to say by asking to follow-up questions and interacting with my peers. Since I might be discussing information that requires background knowledge, this is crucial to ensure that all members, no matter their skill set, understand what I am trying to communicate. Another part of communication is listening. Effective listening is very important in any team, and with diverse members, listening can help share ideas and enhance the team dynamic. Body language is another important factor for effective communication, and I will make sure my body language aligns with what I am trying to communicate. I want to be sure that I make proper eye contact and other appropriate body language so I convey the right message to the team member, in whom I am talking with. In conclusion, I will utilize effective communication techniques so that the diverse members of my team can understand me and feel heard.

SLO 4 Test #1 Questions

ASCI 4050 Test #1 Fall 2022

Instructions

Please select/provide the best answer

1 Multiple Choice 3 points

Which captain involved in the Tenerife accident had more total flight time?

- (selected) Captain Grubbs
- Captain van Zanten

2 Multiple Choice 3 points

Which captain involved in the Tenerife accident had more flight time in Boeing 747s?

- Captain Grubbs
- (selected) Captain van Zanten

3 Multiple Choice 3 points

Which crew involved in the Tenerife accident was experiencing a longer duty day (on the day of the accident)

- The KLM crew
- (selected) The Pan Am crew

4 Multiple Choice 3 points

Which captain involved in the Tenerife accident was part of management?

- ○ Captain Grubbs
- ◉ Captain van Zanten

5 Multiple Choice 3 points

What country had the more draconian punishments if duty-time was exceeded (context of the Tenerife accident)

- ○ The United States
- ◉ The Netherlands

Performance Indicator Rubric

Course: ASCI 4350 Team Resource Management   Course Instructor: Terrence Kelly

Semester Taught: Spring 2023   Number of Students in Course: 42

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	**Assessment Results: (Indicate what % of class achieved a minimum 70%)**	**Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")**
SLO 2: Describe historical trends, current issues, and emerging opportunities in aviation.	*Test #1 – Overall Test Avg. 87%* *Historical Trend Questions* Teamwork in history – 79% Military use of teams – 67% UAL Resource Management – 87% Tenerife Accident – 77% Overall Question Avg – 77.5% *Current Issue Questions*	Benchmark Achieved

	Cockpit to Crew Resource Management -92% Line Operations Flight Training (LOFT) – 79% Current Sector Failures – 87% Groupthink – 95% Overall Question Avg – 88.25% *Emerging Opportunity Questions* Importance of Diversity – 95% Crew to Team Resource Management – 95% Leveling Organizational Hierarchies – 85% Overall Question Avg – 91.6%	
SLO 3: Apply effective oral and written communication skills to function effectively in the aviation environment.	Overall Project Avg – 89.47% Overall Paper Avg – 89.2% Overall Poster Avg - 89.7% Overall Presentation Avg – 89.5%	Benchmark Achieved
SLO 4: Articulate the value of integrity, lifelong learning, and building diverse teams in serving and leading others.	Homework #1 Avg – 88.93%	Benchmark Achieved

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

SLO #2
SLO #2 was measured using questions from Test #1. Outcome 2 seeks to assess a student's ability to describe historical trends, current issues, and emerging opportunities in aviation. In order to measure SLO #2 I created three categories of test questions including historical trends, current issues and emerging opportunities. The benchmark of 70% was met in all three categories, consequently the overall SLO #2 benchmark was achieved. Next year, I plan to make a change in measuring SLO #2. I do not think multiple choice test question adequately assess the student's ability to "describe" the criteria in the SLO. While the test including some open-ended questions, a majority were multiple choice. Consequently, I plan to create a written assignment (which I do regularly) that is not limited to multiple [le choice responses and will allow students to create a narrative that provides a better mechanism for indicating their grasp on historical trends, current issues and emerging opportunities in aviation.

SLO #3

All students enrolled in Team Resource Management are required to participate in a team-based project. The project includes a paper, poster, and in-class presentation. Additionally, all teams were required to participate in the School of Science and Engineering Senior Showcase. The overall project average was 89.5% with paper averages at 89.2%, poster averages at 89.7%, and in-class presentations at 89.5%. The grading on the project was generous. As a means of continuous improvement, I plan to require more incremental deliverables throughout the semester rather than having everything due at the end of the semester. A growing concern is the use of artificial intelligence (AI) (i.e. Chat GPT) to assist in preparing some of the course materials. Using a web-based tool for determining the use of AI, the results came back as inconclusive. I plan to speak at length about the use of AI in course deliverables and include in the project guidance material a prohibition on its use. As another means of continuous improvement, I plan to do a better/more consistent job in grading the paper. I was inconsistent this semester in my grading of the submitted papers. In some cases I examined papers with an eye toward detail while in some other cases my review was less detailed.

SLO #4

The assessment of SLO #4 was accomplished using a homework assignment that explicitly asked students to reflect on the importance of integrity, lifelong learning, and building diverse teams. I was pleased with the results of the assignment. The average grade for the assignment was 88.93%.

Assignment Guidance
SLO #2 Test Questions from Test #1

The assessment of SLO #2 was accomplished with test questions.

Each student's perceptive on historical trends were assessed using the following questions:
The notion of team is fairly new, with teamwork essentially beginning in the 1600s.
The military began studying how to best use crews/teams in?
What United States airline started the first resource management program for pilots.
Of the following, which accident is not considered an antecedent to the start of resource management in commercial aviation.

Each student's perceptive on current issues in aviation were assessed using the following questions:
Differentiate between Cockpit resource Management and Crew resource Management.
Define the acronym LOFT used in simulator training.
Differentiate between Cockpit resource Management and Crew resource Management.
What sector of aviation has the highest percentage of accidents related to flight crew failures?

Each student's perceptive on emerging opportunities in aviation were assessed using the following questions:
Describe the importance of diversity in the context of high-consequence teams. 95%
Differentiate between Team Resource Management and Crew Resource Management. 95%
Good teamwork generally will level organizational hierarchies. 85%

SLO #3 Initial Project Guidance

ASCI 4350 Team Resource Management Research Project
Capstone Project – Poster, Presentation, and Paper

(Aspects of the presentation are subject to change)

Overview:

Successful completion of ASCI 4350 requires each student to participate in a research project that includes a comprehensive written report, accompanying academic poster and presentation. This assignment provides a significant contribution to the final grade in the course and everyone must participate. In addition to other requirements, each student must achieve a passing grade on the capstone project (including the written research report, the poster, and a presentation) in order to pass the course. Everyone must participate in the SSE Student Showcase scheduled for Wednesday, April 26, 2023, from 4:00 PM-6:00 PM. Please clear your schedules.

Purpose:

The purpose of Capstone project to highlight your undergraduate experience through a comprehensive research project aimed at a topic related to aviation. The project should showcase important findings from the research and/or analysis performed and provide clearly outlined recommendations. The poster and presentation will demonstrate the critical outcomes associated with your work

Process:

Each team will prepare a written report, poster and oral presentation based on an undergraduate research endeavor. Poster will be displayed in a public forum (SSE Student Showcase) and faculty (and others in the community) will be asked to provide feedback on the work.

A presentation session will be scheduled toward the end of the semester and all teams will present. All team members are expected to be present for the poster presentation and stay throughout the scheduled presentation time. The work will be peer-reviewed by our classmates and contribute to Dr. Kelly's final evaluation of your work. Posters will eventually be displayed in the Hallways of McDonnell Douglas Hall.

Teams will be visited by Faculty evaluators and asked to provide feedback on their project. The format of your oral presentation must be delivered by all team members, and Q&A will commence after presentations.

Selecting a Research Topic

Discussion of your groups aviation research topic should start immediately. The topic must fill a gap in the existing literature. Therefore, it should be sufficiently unique to address a topic that is not adequality discussed in the literature. The topic should be something the group can achieve consensus on with respect to being a) interesting; b) timely, and; c) researchable.

[Selecting a Topic - Purdue OWL]

Selecting a Research Topic (MIT)

The Research Report

The research report will include the following: Title Page

Abstract
Introduction Literature Review Results Discussion Conclusion References

Title Page (APA)
The title should reflect the phenomena under study. The title page should be consistent with APA formatting and include a) the name of the project; b) team member names; c) department name (Aviation Science); d) college and university name; d) course number and name

Setting up a Title Page

Abstract (from the American Psychological Association (APA))
The abstract addresses the following (usually 1–2 sentences per topic):

- Key aspects of the literature review
- Problem under investigation or research question(s)
- Clearly stated research questions (sub-questions) and any hypothesis or hypotheses
- Methods used (including brief descriptions of the study design, sample, and sample size)
- Study results
- Implications (i.e., why this study is important, applications of the results or findings)

Writing an Abstract

Introduction (University of Southern California)
The introduction leads the reader from a general subject area to a topic of inquiry. It establishes the scope, context, and significance of the research being conducted by summarizing current understanding and background information about the topic, stating the purpose of the work in the form of the research problem supported by a hypothesis or a set of questions, explaining briefly the methodological approach used to examine the research problem, highlighting the potential outcomes your study can reveal, and outlining the remaining structure and organization of the paper.

Writing an Introduction

Literature Review (Adapted from Purdue OWL)

A literature review requires the group perform extensive research on published work in the aviation field in order to explain how one's own work fits into the larger conversation regarding a topic. This task requires the writers to spend time reading, managing, and conveying information; the complexity of literature reviews can make this section one of the most challenging parts of writing about one's research.

Because literature reviews convey so much information in a condensed space, it is crucial to organize the review in a way that helps readers make sense of the studies be reported. Two common approaches to literature reviews are chronological—ordering studies from oldest to most recent—and topical— grouping studies by subject or theme.

Along with deliberately choosing an overarching structure that fits the writer's topic, the writer should assist readers by using headings, incorporating brief summaries throughout the review, and using language that explicitly names the scope of particular studies within the field of inquiry, the studies under review, and the domain of the writer's own research.

Writing a Literature Review

Methodology (USC)

The methods section describes actions to be taken to investigate a research problem and the rationale for the application of specific procedures or techniques used to identify, select, process, and analyze information applied to understanding the problem, thereby, allowing the reader to critically evaluate a study's overall validity and reliability.

The methodology section of a research paper answers two main questions: How was the data collected or generated? And, how was it analyzed? The writing should be direct and precise and always written in the past tense.

Writing a Methodology

Conclusions (UNC)

Just as your introduction acts as a bridge that transports your readers from their own lives into the "place" of your analysis, your conclusion can provide a bridge to help your readers make the transition back to their daily lives. Such a conclusion will help them see why all your analysis and information should matter to them after they put the paper down.

Your conclusion is your chance to have the last word on the subject. The conclusion allows you to have the final say on the issues you have raised in your paper, to synthesize your thoughts, to demonstrate the importance of your ideas, and to propel your reader to a new view of the subject. It is also your opportunity to make a good final impression and to end on a positive note.

Your conclusion can go beyond the confines of the assignment. The conclusion pushes beyond the boundaries of the prompt and allows you to consider broader issues, make new connections, and elaborate on the significance of your findings.

Your conclusion should make your readers glad they read your paper. Your conclusion gives your reader something to take away that will help them see things differently or appreciate your topic in personally relevant ways. It can suggest broader implications that will not only interest your reader, but also enrich your reader's life in some way. It is your gift to the reader.

[Writing a Conclusion]

Poster Requirements

The poster must include:

1. Project Title
   a. The title should reflect a clear and concise description of the project
2. Introduction Section
   a. Executive summary of the work performed
3. Scope Section
   a. The scope (breadth and depth) of the project should be detailed. Scope must include methodology and theoretical framework used in the research. The scope section should conclude with key deliverables associated with the project.
4. Research Results Section
   a. A description of the outcomes of the research
5. Recommendations Section
   a. A summary of the recommendations emerging from the research including suggestions on further research
6. Reference Section
   a. A reference section will be included detailing the literature contributing to the work Poster Observations & Suggestions:

- Space is limited in a poster - keep it simple and to the point. Think about conveying a message
- Be concise and factual in your writing, do not use overly complicated or technical terminology, and remember your Poster is used to supplement your oral presentation
- Avoid using italicized or fancy script-font – these are harder to read
- Ensure you bold, underline, or strategically use colors to highlight important information
- Avoid the use of entire paragraphs on the poster – That is what the paper is intended to demonstrate
- Utilize a consistent font throughout the poster (although consider using differing font sizes to highlight information)
- Avoid using all capital letters except for your title

- Pictures and graphs are expected in poster sessions. Think illustrations, flow charts, diagrams, graphs, etc. Make sure the originals are high quality and acceptable for scaling to a poster
- All pictures and graphics should include a label and properly attributed
- Your poster should be readable from up to 10-feet. Ensure your text and images are well- balanced, use your space wisely

Presentation

The presentation should effectively summarize your poster. The presentation will use PowerPoint and cover/discuss each element contained in your poster. The presentation should last (no more than) 15 minutes in length followed by questions from the class. Each member of the group must participate in the presentation.

The presentation will be peer-reviewed by our classmates.

A copy of the presentation will be emailed to Dr. Kelly in Adobe pdf format

SLO #4 Homework Assignment #1

ASCI 4350 - Homework Assignment 1 - Name ______________________________________

This assignment should be uploaded to Canvas no later than Wednesday, February 8th by the end of the day. Please respond to the following four questions. (SLO 4)

1. Describe the importance of a positive attitude toward lifelong learning when working in a high-consequence field. (300 word minimum)

2. Describe the importance of personal integrity when working in a high-consequence field. (300 word minimum)

3. Describe the importance of embracing diversity when serving on a high-consequence team. (300 word minimum)

4. Describe the importance of embracing diversity when leading a high-consequence team. (300 word minimum)

Work Examples

Test question examples from Test #1

Differentiate between Cockpit resource Management and Crew resource Management.

Crew Resource Management is an outgrowth of Cockpit Resource Management. Crew resource management (CRM) can be defined as utilizing effective communication, all resources (both human and automated cockpit) available to an individual, and including other factors (i.e. human factors) for deciding the best strategies to uphold safety within the aviation environment and ensuring that all individuals are on the "same page" as one another. Cockpit resource management can be defined as utiliziing only those resources in the cockpit and considering only a small number of outside impactful factors that may contribute to the overall safety of each flight, but may not include all of the available resources that are available to each crew member.

Cockpit resource management refers to how specifically the flight deck crew (typically captain and first officer) interacts with one another in the cockpit environment, whereas crew resource management zooms out a little bit and can include how everyone on the crew, pilots, flight attendants, etc. interacts and behaves with one another.

Crew Resource Management is an outgrowth of Cockpit Resource Management. Crew resource management (CRM) can be defined as utilizing effective communication, all resources (both human and automated cockpit) available to an individual, and including other factors (i.e. human factors) for deciding the best strategies to uphold safety within the aviation environment and ensuring that all individuals are on the "same page" as one another. Cockpit resource management can be defined as utilizing only those resources in the cockpit and considering only a small number of outside impactful factors that may contribute to the overall safety of each flight, but may not include all of the available resources that are available to each crew member.

Describe the importance of diversity in the context of high-consequence teams.

By emphasizing and maintaining diversity within the context of a high-consequence team, all team members - regardless of their race, sex, religious background, ideas, etc. - will continually feel welcomed by others and empowered to contribute their unique thoughts and opinions towards solving a particular problem. No one should feel excluded because they do not fit the narrative of a single individual's "preferred teammate." Rather, by dedicating time to get to know each team member and recognizing their strengths, the team can grow in a positive manner and utilize interdependency between all members so complex tasks can be better achieved.

Diversity is critical in a high-consequence team environment because it allows for a wide variety of ideas and opinions to be brought to the table. When you have a diverse group of people who all come from many different backgrounds and who all have many different experiences, one person may be able to contribute something that the person sitting next to them might not, but that person then might be able to contribute something else.

By emphasizing and maintaining diversity within the context of a high-consequence team, all team members - regardless of their race, sex, religious background, ideas, etc. - will continually feel welcomed by others and empowered to contribute their unique thoughts and opinions towards solving a particular problem. No one should feel excluded because they do not fit the narrative of a single individual's "preferred teammate." Rather, by dedicating time to get to know each team member and recognizing their strengths, the team can grow in a positive manner and utilize interdependency between all members so complex tasks can be better achieved.

Differentiate between Team Resource Management and Crew Resource Management.

Team Resource Management is an outgrowth of Crew Resource Management, and can be defined as utilizing each team member to hold each other accountable for given tasks, communicating effectively and efficiently with involved parties, and using all resources available to attain success within a high-consequence field like aviation. Crew Resource Management can be defined as incorporating other elements (i.e. human factors, advice and information from other individuals, etc.), besides automated cockpit resources, into the cockpit environment, and then using those elements to create the best possible strategy and outcome to maintain success and prevent catastrophic events from unfolding.

Team resource management is a general term that can be applied to all industries where team members work together, where crew resource management is a subset of team resource management that typically applies to high consequence environments, like aviation.

Team Resource Management is an outgrowth of Crew Resource Management, and can be defined as utilizing each team member to hold each other accountable for given tasks, communicating effectively and efficiently with involved parties, and using all resources available to attain success within a high-consequence field like aviation. Crew Resource Management can be defined as incorporating other elements (i.e. human factors, advice and information from other individuals, etc.), besides automated cockpit resources, into the cockpit environment, and then using those elements to create the best possible strategy and outcome to maintain success and prevent catastrophic events from unfolding.

<u>Work Examples - Project</u>

<u>Poster</u>

AIR CARRIER FATIGUE MITIGATION

Tyler Lambert, Jacob Flowers, Ashleigh Bick-Dawes, and Michael O'Donnell

ABSTRACT

This study aimed to better understand the factors related to the mitigation of fatigue in aviation. By reviewing and analyzing various sources, including two distinct pilot surveys, five key recommendations towards improving the mitigation of fatigue in aviation were identified.

INTRODUCTION

Fatigue is more than just a physiological state that results in a decreased capacity to perform. It does not exist without causation, and it is a complex product of many contributing factors. These factors "interact nonlinearly to produce changes in human alertness and cognitive performance over time" (Mallis et al., 2010, p. 402). Using this definition, this study aimed to review and better understand the effectiveness of regulatory duty/flight limitations, crew sleep, and pilot perspectives on fatigue. These key focus areas offer a comprehensive picture of the topic we were mainly interested in: environmental factors effecting fatigue.

METHODOLOGY & SCOPE

Our methodology consisted of aggregating data from sources that both analyzed the problem of fatigued flight crews and their performance, as well as different techniques organizations can use to improve flight crew performance and safety. Our project's focus was on understanding the factors that contribute to productive rest periods for flight crews and organizational strategies that can be implemented by air carriers to reduce fatigue. With our research, we aimed to find key areas in which fatigue risk management systems could be improved.

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SURVEY STUDY: GANDER ET AL. (2018)

Rotations: Identified percentage of pilots who exceeded their personal rotation limits. Highest percentage of pilots reporting exceedances was fleet type MD88/90 at 75.9%.

Layovers: On average, "43.8% of crewmembers rated their hotel sleep as a little worse than sleep at home and 23.2% rated it as much worse" (p. 891). 65% of the average pilot survey pool reported that their sleep was a little worse or much worse than sleep at home.

Fatigue culture: On average, less than 70% of pilots discussed fatigue in briefings. Under 40% felt their fatigue reports were being given proper responsiveness, and the average percent of pilots who felt their fatigue calls were responded to well was barely above 30%.

SURVEY STUDY: SIEBERICHS & KLUGES (2016)

Hypothesis 1: Subjective rating of poor sleep quality positively correlates with a high level of fatigue.

H1 correlation: Medium to high, **r=.68**

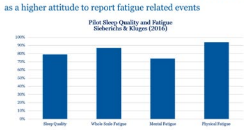
Hypothesis 2: A high level of fatigue correlates with a high intensity of acute symptoms.

H2 correlation: High, **r=.70**

Hypothesis 3: The perception of a positive safety climate correlates with a more positive attitude to reporting events.

H3 correlation: Medium to high, **r=.47**

Other findings: Pilots serving long-range flights tend to have higher values for fatigue and extent of acute symptoms as well as a higher attitude to report fatigue related events



RESULTS & PILOT SURVEY ANALYSIS

Effectiveness of duty/flight limitations: EASA and Australian-based pilot study suggests traditional duty/flight limitations may not be adequate in reducing pilot fatigue. 71.8% of EASA pilots and 77% of Australian Pilots reported high to severe levels of fatigue while only being assigned 57-62% of the legal limit of duty/flight hours (Venus & Holtforth, 2022, p. 7).

Crew sleep environment: Hotel rooms do not have the same level of standardization or guidance on levels of light and sound that in-flight crew rest areas have. Pilots may possibly be facing issues psychologically detaching from work due to associating hotel rooms as their work environment; however, no empirical study yet exists to prove this (Searle, 2012, p. 22-23).

Pilot perspectives on fatigue: The Sieberich & Kluges and Gander et al. study both expand upon the importance of fatigue reporting culture. Both studies concluded a strong fatigue reporting culture was imperative in identifying and mitigating the hazards and risks of fatigue.

RECOMMENDATIONS

1. Improve Fatigue Reporting Culture
2. Recognize Fatigue as a Hazard
3. Research Improvements For Crew Rest
4. Re-evaluate Flight and Duty Limitations
5. Understand Cross-Operational Fatigue

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Gander et al. (2018). Monitoring the Effectiveness of Fatigue Risk Management: A Survey of Pilots' Concerns. Aerospace Medicine and Human Performance, 89(10).
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Venus, M., & grosse Holtforth, M. (2022). Australian and EASA based pilots' duty schedules, stress, sleep difficulties, fatigue, wellbeing, symptoms of depression and anxiety. Transportation Research Interdisciplinary Perspectives, 13, 100529. https://doi.org/10.1016/j.trip.2021.100529

The Feasibility of Lowering Hiring Minimums in the United States

Group Member Names:

Logan Hine, Ahmad Lingga, Mince Mbisikubo, Patrick Waterman

Introduction:

- The goal of our research on the topic of whether the FAA's requirement of 1500 hours to receive an ATP certification should be reduced, with a focus on safety and its effects on flight instructors and the pilot training environment.
- The aim of the research is to investigate what would happen if the FAA were to lower the hiring requirements back to 250 hours, looking at whether there would still be enough certified flight instructors to teach students.
- The research will examine data from the US and other countries, historic information, and gather perspectives from flight instructors.

Scope

- In 2013, the FAA increased the minimum number of hours required for commercial pilots from 250 to 1500 hours after a Colgan Airlines crash that killed 50 people.
- This rule change led to worries among airlines and pilots about how to reach the new requirements and finding obscure ways to earn hours.
- After 9 years, airlines have been able to find pilots, but air travel growth has led to a shortage of pilots for different reasons.
- Airlines have been lobbying the FAA to reduce the hiring requirements back to 250 hours, citing safety concerns.

Methodology

- Team divided research paper into parts
- Obtained research from online sources, including scholarly journals and FAA regulations
- Initial step was to find information on current ATP minimums
- Looked for references on instances where required flight hours could be reduced
- Emphasized the importance of using credible sources, including qualified subject matter experts and the FAA
- Two group members sifted through sources to extract valuable information
- Divided references into primary and secondary sources to keep track of key sources and separate data from opinions and commentary.

Figure 1

Qualifications for Hiring Minimums of ATP

The United States	The FAA ATP Requirements: • Be at least 23 years of age • Must hold either: ○ A commercial pilot certificate with an instrument rating ○ Or, meet the military experience requirements to qualify for a commercial pilot certificate, and an instrument rating. ○ Or, a foreign airline transport pilot license with instrument privileges • Medical requirements: ○ Hold a 1st class medical certificate to act as Pilot-In-Command ○ Hold a 2nd class medical certificate to act as Second-In-Command • 1,500 hours of Total Flight Time • 500 hours of Cross-Country Flight Time • 250 hours as Pilot-In-Command (PIC) • 100 hours of Night Flight Time • 75 hours of Instrument Training • 50 hours of In Class of Rating Sought • Pass an ATP knowledge test • Complete and pass an ATP-CTP training program
Saudi Arabia	• Requires certificates up to multi-engine • 250 hours total flying time (25 of which in multi-engine) • 27 years old or less • Has to be a Saudi citizen
	FlyNas • Requires certificates up to multi-engine • 240 hours total flying time (25 of which in multi-engine) • Age between 19 and 35 • Has to be a Saudi citizen
Indonesia	Airline Transport Pilot License (ATPL) • 1000 hours of total flying experience - 200 command hours flying experience on type • Hold minimum 250 hours on aircraft (simulator time not included) for smaller aircraft. • Minimum of level 5 ICAO English proficiency test • ICAO Class 1 flight crew medical certificate (current), no restriction except for corrective glasses. • At least 18 years old to start your pilot training in Indonesia and at least 23 years old for ATP • Flight school graduate • Free of accident-incident verification report from authority. • Valid passport minimum 24 months left

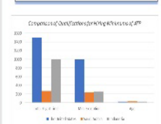
Figure 2

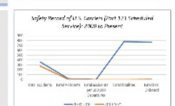
Safety Record of U.S. Carriers (Part 121 Scheduled Service): 2009 to Present

Year	Total accidents	Fatal Accidents	Fatal accidents per 100,000 Departures	Total fatalities	Fatalities: Onboard
2000-2010	357	17	0.122	777	766
2010-2021	277	2	0.021	2	2

Research Results

- Research questionnaire divided into three sections
- First section analyzes effects of Public Law 111-216 on hiring requirement for Air Transport Pilots, including data on accidents and comparison of hiring requirements
- Second section examines shortage of certified flight instructors (CFIs) and perspectives on impact of lowering minimum requirements
- Data compiled in analysis report
- Last section compares ATP hiring requirements in United States, Saudi Arabia, and Indonesia to assess feasibility of lowering minimum to 250 hours and potential pilot shortage
- Research findings may have implications for the aviation industry and policy decisions on ATP hiring requirements.





Recommendations

- Ultimately recommend that the FAA continue to maintain hiring standard and 1500 hour restricted ATP
- Potentially consider the development of new pilot hiring standards or pilot rating requirements.

References

1. Journal
- Pilot Source Study 2015: US Regional Airline Pilot Hiring Background Characteristics Changes Consequent to Public Law 111-216 and the FAA First Officer Qualification Rule
- Pilot Source Study 2015: An Analysis of FAR Part 121 Pilots Hire after Public Law 111-216 Their Backgrounds and Subsequent Successes in US Regional Airline Training and Operating Experience
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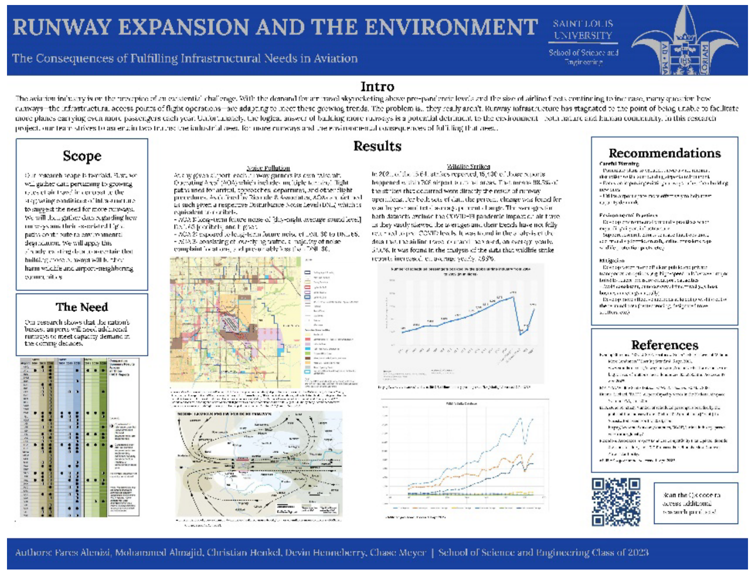

Papers:

The Feasibility of Lowering Hiring Minimums in the United States: A Comparative Analysis

Logan Hine, Ahmad Lingga, Mince Mbisikmbo, Patrick Waterman

Aviation Science

Parks College; Saint Louis University

ASCI-4350 Team Resource Management

Abstract

The number of pilots in America is constantly growing, and the need for professional pilots is projected to continue to grow at a steady rate moving forward. We aimed to look at whether or not the FAA's requirement of 1500 hours to receive an ATP certification should be upheld or whether or not it is possible to be reduced. We aimed to look at aspects of both safety as well as the effects on pilot training and the number of instructor pilots. With group members from overseas nations we wanted to compare and contrast how those countries fill job openings, and how their pilots are trained.

We hypothesized that an hour reduction could be possible, but were unsure as to whether or not it is likely. We believed that with the sheer number of student pilots and the already existing lack of instructors and other resources, that any drop in hour requirements would lead to flight instructors fleeing to the airlines. When it came to safety, we thought that an hour increase had in fact made commercial airline operations safer, but were unsure at what rate.

When it came to researching this project we decided to locate studies done by other university affiliated flight programs and took a look at their operations. We were also able to look at safety surveys done by and about the FAA as to whether airline safety was increased or decreased post hour increase. , we had opportunities to locate international sources on flight training requirements and safety records which gave us good insight and comparison data.

Following our research, our hypotheses were mostly correct and we found that both safety was increased and that it is very unlikely that flight schools could survive post hour reduction. We had a few other additional unrelated, but applicable discoveries and were surprised by some of the information that we had found.

Ultimately this topic has been somewhat hot lately as there have been efforts by airlines to try and get these numbers reevaluated in order to increase the number of pilots available to work for them. We felt as if the airlines became desperate enough they could make a strong enough case to the FAA, although we would strongly advise against it. Numbers have shown that this would likely not be a good move and could lead to a decrease in airline safety.

Introduction

In the year 2013 after a Colgan Airlines crash killed 50 people, the FAA (Federal Aviation Administration) introduced new policies which required commercial pilots to reach 1500 hours in order to be able to fly commercial airliners. Prior to this accident, the FAA only required pilots needed 250 hours which was obviously significantly less. Airlines and pilots alike began to get worried that they would never reach the airlines, and that they would have to spend thousands of dollars to reach their goal. Additionally, this rule change led to pilots finding obscure ways to earn their hours with jobs like banner towing, sky dive pilot, and many other jobs. The CFI (certified flight instructor) market also gained significant traction as this was another way for pilots to gain hours towards the 1500 mark. Airlines became worried because they were unsure how they would find any pilots with the new requirements. Nine years down the road the picture has begun to shift and while airlines have been able to find pilots, air travel has grown significantly which has led to a shortage for different reasons. Airlines have begun to lobby the FAA for reduced hour requirements saying that the one accident was not a good indicator for the rule change, and that lowering the hour requirement would not lead to any less safe of operations.

Ultimately, we aim to look at what would happen if the airlines were to succeed and the FAA were to lower the hiring requirements back to 250. We want to see whether or not there would still be enough CFI's left to teach the amount of students who want to flight train; even under today's circumstances there still seems to be a shortage of people who can instruct. We want to know if this would cause a pilot shortage in the opposite direction that it's currently going.

In order to answer these questions, we must look at data not only from the United States, but also from around the world. Many countries do not have the high hour requirements that the United States does, so we must take a look at how students get trained and how many people are flight instructing. We will also take a look at historic information. Obviously this rule change only took place 9 years ago; what is different in today's training landscape? An additional way we would like to produce information is through asking questions. We aim to ask instructors how they feel the market would be impacted. We want to find out what they would do if there were different hour requirements. Ultimately, we aim to look at a large scope of information to give us the best idea of what may change.

Literature review

The 2012 Pilot Source Study (Phase III): Response to the Pilot Certification and Qualification Requirements for Air Carrier Operations.

https://docs.lib.purdue.edu/jate/vol2/iss2/2/

Reading this article talks about the relationship between the requirements of certified flight instructors (CFI), the requirements for Airline Transport pilot (ATP), and enrollment and safety at flight schools. It is clear that the number of students enrolling in flight schools, especially larger flight schools, was significantly affected by the introduction of ATP and CFI Certification requirements. The effect was an increase in both the number of students enrolling in flight training programs and CFI's being trained. The study also shows that the implementation of ATP and CFI requirements impacted flight safety and consistency of flight training positively, and that led to a decrease in the number of accidents caused by pilot error.

The conclusion of this study is that the implementation of ATP and CFI certification requirements impacted the development of the aviation industry positively with an improvement in safety and an increase in flight school enrollment.

Pilot Source Study 2015: ***"A Comparison of Performance at Part 121 Regional Airlines Between Pilots Hired Before the U.S. Congress Passed Public Law 111-216 and Pilots Hired After the Law's Effective Date"*** **https://commons.und.edu/avi-fac/22/**

In this paper, the ATP (Airline Transport Pilot) qualification is not mentioned particularly. However, it does touch on the significance of a pilot's training and expertise in preventing general aviation accidents. The study emphasizes the significance of continuing training and knowledge accumulation over the course of a pilot's career. The paper suggested that in order to maintain knowledge and skills, continuous learning, training, and improvement is required. The document emphasizes the significance of pilot training and experience in preventing accidents in general aviation, even though it does not expressly address ATP certification. The most advanced level of pilot certification in the US is the ATP, which necessitates extensive training and experience. The demanding requirements for ATP certification are intended to ensure that pilots have the abilities and information required to fly complex aircraft.

Pilot Source Study 2015: ***"Airline Transport Pilot Certification and Training: A Review of Relevant Research and Recommendations"***

https://docs.lib.purdue.edu/jate/vol5/iss2/1/

This article focuses on the importance and necessity of ATP certification, the article contains research connected to ATP certification and training with some of the most important findings and results being;

1. ATP certification decreased accident rates in commercial aviation
2. ATP certification and training are an important part of commercial aviation safety, and in response to changes in Technology, safety concerns and the aviation industry in general, ATP certification standards changed as well.
3. the latest changes or updates to the ATP certification requirements were introduced due to the need better training and better preparation for airline pilots, changes were in the Transport Pilot Certification Training Program (ATP CTP) and the Multi-crew Pilot License (MPL)
4. These changes have had a big effect on CFIs since they now have to modify their training programs to guarantee that their students are learning the skills and knowledge needed to pass the new ATP certification standards.

The article's overall thesis is that, because CFIs are always required to adjust to changes in the market and regulations, the expansion of ATP certification requirements and standards has had a major effect on aviation and CFIs. Yet, in order to decrease the risk and lower the possibility of accidents in aviation, and to always guarantee that the pilots that obtain an ATP have the required skills and Knowledge to be able to safely operate large, complex, commercial aircrafts, the adjustment and updates to the ATP certification requirements are needed

Pilot source study(2022): ***"Airline Bid To Reduce Flight Hours For New Pilots Rejected By FAA"***
https://www.npr.org/2022/09/21/1124201271/airline-bid-reduce-flight-hours-new-pilots-faa-rejects

According to this article, a group of airlines proposed to lower the number of flight hours necessary for obtaining an Airline Transport Pilot (ATP). Following are some essential points about ATP from the article:

1. The ATP certification is the highest certificate for pilots, and it is required for large, complex, commercial aircraft operation
2. The FAA, or Federal Aviation Administration, establishes requirements for ATP certification, which at the moment call for an absolute minimum of 1,500 hours of flight time in addition to additional training and experience prerequisites.
3. the airlines' proposal to the FAA was to reduce the required flight time hours for ATP certification down to 1,000 hours, in response to the shortage of qualified pilots to face workforce challenges in the aviation and airline industry, the proposal was faced with rejection due to safety concerns and the need for maintaining high standards for pilots by the FAA.
4. Pilot advocates and experts in the field expressed their concern about reducing or lowering the requirements and standard for obtaining an ATP because it may compromise safety and increase the risk of accidents related to pilot error.

In summary, the article makes the case that ATP certification is still an important part of safe operation in aviation and that the FAA cautiously establishes and upholds the requirements for ATP certification. Even though the aviation industry may face difficulties and labor shortages, keeping high standards for pilot training and certification remains important for preserving the safety of commercial aviation operations.

Methodology

The research paper portion of our project began with us sitting down as a team and dividing the portions of the research paper into parts. The bulk of our research came from several online sources ranging from scholarly journals written by subject matter experts to products released by the FAA pertaining to regulations involving ATP minimums. Our first step of the research process was to scour articles and regulations looking for information on the current ATP minimums. We found several pieces of writing that laid out the foundation of our research. We then looked for references that pertained to special instances where it would be made possible to obtain an ATP with less than the prescribed amount of flight time. We found that there are a few cases where a pilot could have the number of required flight hours reduced from the initial 1500. We felt that it was extremely important to ensure that all our research came from qualified sources, meaning that any information used in our paper and presentation came from either a qualified subject matter expert or the FAA itself. We felt that this was a to gather information and confirm that the sources we used were credible. Once we compiled several sources two of our group members began sifting through them in order to pull valuable information from them. Not all of the initial sources we found were used in our research but it was still important for us to look over them to ensure they did not contain any information that would be beneficial to our work. After this was completed we were able to divide our references into primary and secondary sources. This allowed us to keep track of the key sources that would be used to describe data and separate them from sources that proved the input of our subject matter experts and the opinions and commentary of other researchers.

Results

The findings present data based on three sections of the research questionnaire. The first section of the research questionnaire consisted of collecting data in effect before and after the passage of Pthat can be used in assessing the possibility if the airlines were to succeed and the FAA were to lower the hiring requirements back to 250. In this section, we analyze the number of air carrier accidents that happen pre and post-PL 111-216 and compare the minimum hiring requirement for Air Transport Pilot prior to and post-PL 111-216. The second part of the research questionnaire consisted of whether or not there would still be enough CFIs left to teach the number of students who want to flight train; even under today's circumstances, there still seems to be a shortage of people who can instruct. We examined the data from a couple of journals of pilot sources studies 2010-1018. We collected data regarding the flight programs and the different percentages of CFI and the students. And we also analyzed data on instructors' perspectives on the market that would be impacted and found out what they would do if there were different hour requirements and whether it would cause a pilot shortage in the opposite direction that it's currently going. We compiled the data in an analysis report. The last section of the questionnaire consisted of data analysis on whether the feasibility of lowering the hiring minimum is possible by comparing the hiring minimum of ATP in the U.S., Saudi Arabia, and Indonesia.

Analysis of the number of air carrier accidents that happen pre and post-PL 111-216.

In answering question 1 from the research questionnaire, we analyzed the data from Airlines for America that was depicted by the National Transportation Safety Board (NTSB)'s safety record of the U.S. Air Carriers on the number of air carrier accidents that happened pre and post-PL 111-216. Table 1, the number of accidents that occurred before and after the implementation of Public Law 111-216, indicates that in the safety record of the year 2000-2021, the total number of accidents prior to 2010 was 357, with 17 fatal accidents that took the total of 777 fatalities. On the other hand, the total number of accidents after 2010 was 277, with two fatal accidents totaling two fatalities. The accident data shows that the number of accidents decreased after the passage of Public Law 11-216, and the safety of air carrier operations increased as it met the purposes of the Airline Safety and Federal Aviation Administration Act of 2010. This result means that raising the minimum hiring requirement, such as having the minimum required number of flight hours to be an air transport pilot, helps to increase the proficiency of pilots, which creates a safe and efficient flight operation that leads to a decrease in the number of accidents.

Table 1

Safety Record of U.S. Carriers (Part 121 Scheduled Service): 2000 to Present

Year	Total accidents	Fatal Accidents	Fatal accidents per 100,000 Departures	Total fatalities	Fatalities: Onboard
2000-2010	357	17	0.122	777	766
2010-2021	277	2	0.021	2	2

Source of data: Data and Statistics of Safety Record of U.S Air Carriers

According to the air carriers' accident results in Table 1, there were a high number of accidents before the implementation of the minimum requirement for an ATP certificate. The number gradually decreased after the law was passed. Therefore, the passage of PL 111-216 has impacted the U.S. Airline industry to be more effective and aware of the importance of training and improvement of personal skills for flight crews, especially pilots. Even though ATP certification might not be the massive factor discussed in contributing to the airline accident, continuous learning and improvement are essential in maintaining technical and impersonal skills, and knowledge is vital. Similar results were shown in *Pilot Source 2015*, where the authors discussed that the quality of education and flight training has more impact than total flight hours. All three Pilot Source Studies have shown that flight hours are not a reliable predictor of performance by pilots. Thus, instead of focusing on the minimum requirement for an ATP certificate, that will encourage potential pilots to use various ways, including following a malicious path to achieve it. It is crucial to focus on training potential pilots to be more experienced and provide an advanced quality training environment for the pilots to perform well in order to operate complex aircraft safely and minimize the risk of accidents (Smith et al,. 2017).

The comparison of the minimum hiring requirement for Air Transport Pilot prior to and post- PL 111-216.

The second part of the data analysis to answer question 1 was to look at the historical data on the minimum requirement for Air Transport Pilots before and after PL 111-26. And also evaluate the difference in qualifications, benefits, and limitations in assessing the possibility of if the airlines were to succeed and the FAA were to lower the hiring requirements back to 250.

Table 2

Commercial pilots' qualifications prior and post Public Law 111-216 Section 216

	Prior to Public Law 111-216 Section	Part 121 commercial pilots could possess a commercial pilot license with multi-engine and questionnaire ratings with significantly fewer flight hours and still be qualified as a first officer for Part 121 air carriers.

<table>
<tr><td rowspan="4">Qualifications</td><td rowspan="2">216</td><td>Collegiate flight students could earn as few as 500 total flight hours before gaining employment with a Part 121 air carrier.</td></tr>
<tr><td>Pilots operating as first officers under Part 121 carriers were not required to have earned an ATP certificate.</td></tr>
<tr><td rowspan="2">After Public Law 111-216 section 216</td><td>ATP certification is the highest level of certification for pilots and is required to operate large commercial aircraft in the U.S.

All ATP-certificated pilots must also have received flight training, academic training, or operational experience that will prepare a pilot, at a minimum, to:

(1) function effectively in a multi-pilot environment,

(2) function effectively in adverse weather conditions, including icing conditions,

(3) function effectively during high altitude operations, and

(4) function effectively in an air carrier operational environment (111th Congress, 2010 pp. 19-21).</td></tr>
<tr><td>Section 217, of PL 111-216, states that an ATP certificate requires a minimum of 1,500 hours of total flight time. However, an exception to these</td></tr>
</table>

		1,500 hours now exists for collegiate flight students. Students can now earn a restricted-ATP (R-ATP) certificate with only 1,000 hours of total flight time. - PL 111-216 still requires the collegiate flight student to accumulate several hundred additional flight hours beyond current academic requirements before he/she can sit in the right seat (first officer) of a U.S. air carrier.
		Overall, the impact of these two sections 216 and 217 of PL 111-216 on collegiate flight programs in the U.S. may include: (1) an increase in student flight costs, (2) a decrease in student enrollment and/or student retention issues in collegiate flight programs, (3) a 7 decrease in post-graduate job placements such as first officers, and (4) the increased risk of financial viability of U.S. collegiate flight programs.
	After the Public Law	Research has shown that ATP certification is associated with lower accident rates in commercial aviation.

Benefits	111-216	ATP certification is a critical component of aviation safety, and the standards for ATP certification have evolved over time in response to changes in the aviation industry, technological advances, and safety concerns.
Challenges/ Limitations		The impact of these changes on CFIs has been significant, as they must adapt their training programs to ensure that they are providing their students with the necessary knowledge and skills to meet the new ATP certification requirements.
		Pilots shortage: high number of pilot demands and lower number of qualified pilots supply in the future.
		All first officers are now required to earn considerably more flight hours. An ATP certificate for employment with a U.S. air carrier.
		These additional flight hours represent a significant financial expense not previously experienced by collegiate flight students.

Source of data: Commercial pilots Requirement Prior to Public Law 111-216 section 216 (Casebolt, 2015).

Table 2 indicated some qualifications, benefits, and limitations to being an ATP certificate holder before and after the passage of Public Law 111-216. The data indicated that before PL 111-216, pilots operating as first officers under Part 121 carriers were not required to have earned an ATP certificate and could be employed with fewer flight hours and as few as 250-500 total flight hours. Thus, there were more pilots compared to job availability which allowed people to lie to be pilots in command, which led to more accidents occurring as the pilots had lower qualification requirements. After the Airline Safety and Federal Aviation Administration Extension Act of 2010 implemented PL 111-216, the qualifications for ATP increased as all flight crewmembers operating in Part 121 air carriers must hold an FAA-issued ATP certificate. They must also have received flight training, academic training, or operational experience that will prepare a pilot, at a minimum, to function effectively under any circumstances. An ATP certificate requires a minimum of 1,500 hours of total flight time; however, students can now earn a restricted ATP (R-ATP) certificate with only 1,000 hours of total flight time. These high flight hours requirements increase student flight costs, decrease student enrollment in flight schools, and create challenges or limitations. For instance, pilot shortage as the pilot demand increases and the supply decreases, and financial issues due to more training after graduating from flight programs and bachelor's degree. Research has shown that ATP certification is associated with lower accident rates in commercial aviation and is a critical component of aviation safety. In addition, there are some benefits after the PL 111-216; however, the current research results indicate that commercial pilots were more successful in completing training than those holding an ATP certificate. This would indicate that quality of experience, not just the quantity of hours and certification criteria, better predicts pilot performance at the regional carriers. According to the results of both the 2010 Pilot Source Study and the 2012 Pilot Source Study, pilots with more than 1,500 hours were less successful in regional airline training than in some pilot groupings with fewer than 1,500 hours. This indicates that using a quantitative measure of Total Flight Hours as the success predictor is unsuitable for the aviation industry that constantly strives to improve safety and training performance. Rather than relying solely on a quantitative measure of total flight hours, the industry should also consider two qualitative measures: (a) the quality of training a pilot receives and (b) the quality of flight hours a pilot obtains after training is complete (Smith et al., pg:22, 2013).

The comparison of the number CFIs and flight students in flight programs and the effect of ATP on them.

The second section of the research questionnaire compared the number of CFIs and flight students in in-flight programs and the effect of ATP on CFIs and flight students. Flight instructor jobs demographic statistics data indicated that the average number of years that certified flight instructors enjoy staying in their job for 1-2 years for a percentage of 37%, where 53 % prefer to work at private companies over education companies 34%. These results showed that more flight instructors prefer to work in the private sector than education, creating fewer CFIs in-flight programs and adding to the shorter time they work in the education sector (Zippia, 2022). In contrast, the number of student pilot certificates active in the United States in 2020 was over 222,630 students ((Published by Statista Research Department & 3, 2023). These statistics indicated that there still seems to be a shortage of people who can instruct as there is a higher number of students pursuing flight training. The *2010 Pilot Source Study* produced five significant findings; one was that certified flight instructors (CFI) had fewer extra training events and comparatively fewer non-completions than pilots who were not flight instructors. In addition, the research also indicated that flight instructors are at a disadvantage when it comes to gaining the required aeronautical experience required for the FAA ATP certificate; for instance, a full-time flight instructor obtains an average of 446 total flight hours per year, which take the individual approximately 2.8 years to obtain the needed flight hours to meet the FAA ATP requirement of 1,500 hours of total time. Historically, flight instructing has been the bridge between finishing advanced pilot training and being hired as a pilot for an airline. students pursuing a professional pilot degree attend collegiate flight programs with aspirations of job placement in commercial or corporate aviation. They will build flight hours through flight instruction to meet their ATP minimum. As the number of CFIs achieves their ATPs minimum hours, it will affect the flight training CFIs number, which might lead to a shortage of CFIs needed. Some of the reasons for the anticipated pilot shortages are varied and may result from a combination of things including, but not limited to, the mandatory retirement age for U.S. pilots, increased flight hour requirements for ATP and R-ATP certificates, and the increase in transport demand in the U.S. Therefore, to solve this issue, the ATP minimum requirements can be taken into consideration in making changes for the better future of pilot operations.

The feasibility of lowering the hiring minimum is possible by comparing the hiring minimum of ATP in the U.S., to Saudi Arabia, and Indonesia.

The last section of the research questionnaire explored and analyzed whether the feasibility of lowering the hiring minimum is possible by comparing the hiring minimum of ATP in the U.S., to Saudi Arabia, and Indonesia.

Table 3

Qualifications for Hiring Minimums of ATP

The United States	The FAA ATP Requirements: ● Be at least 23 years of age ● Must hold either: ○ A commercial pilot certificate with an instrument rating ○ Or, meet the military experience requirements to qualify for a commercial pilot certificate, and an instrument rating, ○ Or, a foreign airline transport pilot license with instrument privileges

<table>
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Medical requirements:

Hold a 1st class medical certificate to act as Pilot-In-Command
Hold a 2nd class medical certificate to act as Second-In-Command

1,500 hours of Total Flight Time
500 hours of Cross-Country Flight Time
250 hours as Pilot-In-Command (PIC)
100 hours of Night Flight Time
75 hours of Instrument Training
50 hours of In Class of Rating Sought
Pass an ATP knowledge test
Complete and pass an ATP-CTP training program

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<tr><td rowspan="2">Saudi Arabia</td><td>

Requires certificates up to multi-engine
270 hours total flying time (25 of which in multi-engine)
27 years old or less.
Has to be a saudi citizen

</td></tr>
<tr><td>
FlyNas

Requires certificates up to multi-engine
240 hours total flying time (25 of which in multi-engine)
Age between 19 and 35
Has to be a saudi citizen

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Indonesia	Airline Transport Pilot License (ATPL): ● 1000 hours of total flying experience; - 200 command hours flying experience on type; ● Hold minimum 250 hours on aircraft. (simulator time not included) for smaller aircraft. ● Minimum of level 5 ICAO English proficiency test ● ICAO Class 1 flight crew medical certificate (current), no restriction except for corrective glasses. ● At least 18 years old to start your pilot training in Indonesia and at least 23 years old for ATP. ● Flight school graduate ● Free of accident-incident verification report from authority. ● Valid passport minimum 24 months left

Sources of data: FAA ATP Requirements, Saudi Arabia and Indonesia minimum hiring qualifications for airline pilots websites ((Madwire, 2022).

We researched the data regarding minimum hiring qualifications for ATP certificates in the United States, Saudi Arabia, and Indonesia in order to compare them and see whether there is a possibility of lowering the hiring minimum in the United States. Table 3 shows the minimum flight hours for Saudi Arabia and Indonesia is five times lower than those in the United States; Indonesia is about 250 for smaller aircraft and about 1000 hours for major airlines. Saudi Arabia with 270 hours total flying and certificates up to multi-engine. In the United States, it is required 1,500 hours of Total Flight Time and also to complete and pass an ATP-CTP training program. To determine whether having high total flight hours for ATP impacted high safety in flight operation, we can see from the result of the rank of countries and regions with the highest number of fatal civil airline accidents from 1945 through 2022. The data indicated the United States holds the first place with 864 accidents and Indonesia in seventh place with 106 accidents. At the same time, Saudi Arabia is not included in the lists (Published by Statista Research Department & 3, 2023). Given the statistics data, it shows that having high flight time does not have a massive impact on the safe operation of flight because even though the U.S. required higher flight times to get ATP certificate, it has the highest number of accidents which explains the inversely proportional relationship or negative relationship. Despite this result, many different factors contribute to decision-making that requires a minimum of 1.500 flight hours in the U.S. Nevertheless; the U.S might need to see the possibility of lowering the hiring minimum of ATP by analyzing the data on airline safety around the world and some crucial factors that might impact the effectiveness and safety of the aviation industry.

Discussion

Based on the research conducted, we have been able to discover a few different things that not only we didn't initially predict, but additionally lead us to some additional discoveries that we did not plan to find. On the topic of safety, we were able to make a couple observations which tie into each other pretty well; the idea that flight hours have made a significant difference in safety, but also that flight hours may not even indicate whether or not someone is a proficient pilot. pilots at all different stages in their training have to take certification tests after they have completed numerous prerequisites such as training objectives, hour requirements, as well as endorsements from their instructors. Ultimately, someone could complete all of these items and they still may not be at a good enough skill level to safely operate a larger aircraft. This is however impossible to measure, and there is not necessarily any sort of test or recruitment moving forward that would prevent these individuals from flying other than seeing how they perform in the workplace. The second part of the observation made was that once the hour requirements were increased, there was a significant reduction of fatal crashes. There were still a good amount of crashes, but it could be theorized that with more experience pilots know how to react in different scenarios and can prepare the plane to be in a safer position.

With regards to the research conducted on the actual numbers of flight instructors versus the number of students, we were able to identify information that was more closely related to what we had initially predicted. The number of people who are interested or who are already student pilots is increasing year over year whereas the number of people who are certified to instruct is not rising at the same rate. In addition to the research that was conducted about overseas flight training (and safety) it was a little bit harder to measure the data simply considering the scales of operations. While there are less accidents, there are also significantly less flights that take place on a daily basis. Because of this, the number of student pilots is also scaled down considerably. Due to the lack of flight schools or instructor pilots in these countries, many students choose to relocate to areas where there are dedicated and established flight training programs which will allow them to move through training in a more efficient manner and most likely in better equipment. We were still able to pull some valuable data from overseas sources, and were able to make conclusions similar to what we had theorized.

Conclusion

In conclusion, we have ultimately come to the decision that it would not be feasible or realistic for the FAA to deregulate the hour requirements as they sit. As mentioned previously, flight time as a lone factor has not done a perfect job of predicting pilot safety, but they have so far done a good enough job. The number of fatal accidents has drastically decreased since the hour hike, and we believe if it went away, we could see an increase in deaths. With regards to flight training, we still do not believe that it would be realistic to drop the ATP hour requirements. The number of CFI’s we currently have are not even enough to support the amount of people who want to become pilots. It is a little difficult to see from our current perspective considering Parks college was always well staffed, however non university affiliated programs often find themselves scrambling to find well qualified instructors. Additionally, we were able to identify what happens in other countries when they have a lack of flight instructors; it leads to outsourcing and a drop in the quality of work. Lastly, the number of pilots who could immediately advance from flight instructor to airline pilot, or even commercially rated pilot to airline pilot would overwhelm the airlines as well as overwhelm the flight schools causing a tremendous logistical issue that would force some unusual situations.

At the current rate that pilot jobs are needed, it is possible that the FAA reconsiders their decision to uphold the hour requirement. We feel that it is not advisable to do so, and would strongly recommend not changing the requirements.

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What is the Future for Zero-Carbon Aviation Fuels?

Samuel Byrne, Eric Deles, Joseph Mason, Kyle Kaestner, and Marike Kobepa

Aviation Science

Saint Louis University

ASCI-4350 Team Resource Management

Abstract

This literature review will be a comprehensive dive into the current issues and challenges facing a future with zero aviation emissions. These key aspects are infrastructure, electric technologies, hydrogen technologies, and construction/planning challenges. The aviation industry wants to jump to alternative fuels as fast as it can and the technology is quickly growing, but there is slow progress towards their actual implementation.

In this paper we want to examine; what are the challenges in infrastructure, electric technologies, hydrogen technologies, and construction/planning that are preventing the aviation industry from being zero emission. Current technologies are not yet developed enough for new carbon-free fuel forms to be used functionally on aircraft, ground infrastructure for both electric and hydrogen aircraft has yet to be scaled to an aviation level, and aviation stakeholders are too slow to implement new policies and procedures on new fuels. In this study, all of the data was collected through online research.

There is a plethora of industry stakeholders that are trying to forward zero emissions technologies and have posted their findings, press statements, and opinions. This team gathered those findings to create conclusions about what the future holds for aviation.

The results of this study found that progress is lagging in each area we explored because of a few reasons. For infrastructure, the technology already exists. Many mature industries already use electric charging and hydrogen fueling. However, none do these things on the scale that a large international airport would need. Scaling all these existing technologies up requires a lot of planning and money. For electric and hydrogen aircraft the technologies simply do not exist right now. There are no batteries dense enough to have a true electric transport category aircraft. The technology for hydrogen fuel cells that are light enough and safe enough to go into an airplane also do not exist yet. Lastly, the Federal Aviation Administration has little to no existing regulations or guidance on implementing electric or hydrogen aircraft. While they will certify these aircraft on a developmental or experimental basis, there is nothing written into the regulations as to the best practices during ground operation. Our most important finding is that with the current and projected technology, we came to conclusions on which segments of aviation could use which technologies best.

The reason this study is important is there seems to be a lot of excitement surrounding zero emissions but the practicality of them is missed in many publications. Stakeholders in the industry want to build interest in the future so they leave out the negatives or certain challenges that do not have answers. By looking outside the industry and comparing findings to those inside the industry we have been able to paint a complete picture of what we think the future of aviation fuels is going to look like.

Introduction

. This portion will cover the sources used, an interpretation of their content, and how they fit into the greater body of knowledge. Each area where challenges were found will have its literature review. Next, the methodology will be discussed. Here the methods we used to collect the data will be discussed. After the methodology, there will be a review of the results determined in each of the areas. Then a discussion of the findings, where the results will be interpreted and synthesized. Last will be our conclusion where the paper will be wrapped up with the things this group would like the reader to take away.

Literature Review

Infrastructure

In regards to the airport itself in terms of infrastructure, there are a significant number of challenges that must be addressed when considering adding any type of electrical or hydrogen-based systems. A research study was conducted by the National Academies of Sciences, Engineering, and Medicine which was published in 2022 that went into detail on these challenges.

The first obstacle towards an electric and hydrogen-based system is presented in Chapter 16 of the report on page 137, Aircraft Scenario Planning. It explains that the average airport requires "40 to 50 MW" of power during the day, and "35 to 36 MW" at night. When incorporating an electric aircraft-type system, a careful analysis of the "aircraft-specific power supply requirements" has to be made to ensure that the airport's current infrastructure can support the increased power requirements that come with its addition (NATIONAL ACADEMY, 137).

These power supply requirements are directly tied to the method of electrical or hydrogen system that an aircraft utilizes. Referenced in Chapter 8 of the report on page 85, Airside Requirements, section 8.1 lists the current three options that are being considered for electric-based systems: "Recharge by fixed ground chargers, also known as charging stations", "Recharge by the mobile supercharger on batteries (truck or trailer)", and "Battery swap at the gate (batteries are recharged separately)".

With smaller airports, the requirements for these would be far less difficult to consider given the space that general aviation and regional airports have and these airports would be able to utilize their current facilities through the installation of "aircraft battery charging stations" and "low-clearance pop-up chargers" (NATIONAL ACADEMY, 88). This is because aircraft typically sit for decent durations or even fly sporadically or once a day depending on the airport.

Commercial airports, however, would face greater difficulty, particularly larger airports with high departure rates and international flights. The core issue presented is trying to maintain the current pace of ground operations as any significant increase in the turnaround time will reduce the financial advantage of electric aviation for flight operators and negatively affect gate capacity (NATIONAL ACADEMY, 88).

With fixed or mobile chargers, this issue comes to light with the question typing back to the first obstacle: would the airport's electrical infrastructure or charging system handle a large number of aircraft at once or even be able to charge larger-sized aircraft? According to the report, current charging technology can only produce an output of 600 kW of power, with regional commercial airliners that are being designed with a hybrid system with the lowest end requiring at least 600 kW and larger aircraft in concept requiring up to 7 MW (NATIONAL ACADEMY, 88). Should the airport want to eventually handle six or seven large-body hybrid aircraft, that automatically nearly doubles the average power used from 40 to 50 MW during the day to 82 to 99 MW, requiring a substantial upgrade to the overall power capacity that the airport can handle. Depending on the capacity of an aircraft's battery, this could significantly increase ground time and reduce flight time.

Lastly, utilizing a battery system alleviates some of that so long as “ground handlers and FBOs have an adequate inventory of fully charged batteries” (NATIONAL ACADEMY, 88). There are three requirements to maintain a battery changing system: “Equipment and trained personnel to load and unload batteries from the aircraft”, “Inventory of batteries that are compatible with the aviation activity and aircraft fleet”, and “an infrastructure to store and charge batteries”. These would be more useful for commercial airports and larger aircraft as if they are charged ahead of time it is a matter of swapping it out and letting the plane continue. The issue that comes into play however, is not just having the storage space and charging capacity to handle this, but the report also picks on the potential that this might “have to be performed by licensed mechanics instead of trained ground handlers” (NATIONAL ACADEMY, 88). Depending on the airline's operation, this could result in additional operational difficulties for them.

Shifting to hydrogen-based systems, there are also three proposed methods for this type of charging: "Refuel hydrogen from a hydrant system", "Refuel hydrogen from a tanker (truck)", and "Swap H2 containers" (NATIONAL ACADEMY, 85). When looking at hydrogen, one major advantage that has been found is that it has a high energy density which according to the research report: "the energy found in 1 kg of hydrogen equates to that found in 3kg of jet fuel (kerosene)" (NATIONAL ACADEMY, 89). This means that, essentially, for every part of hydrogen powering an airplane, 3 parts of jet fuel would have been required. So if an aircraft utilizes 30,000 lbs of jet fuel, only 10,000 lbs of hydrogen would have been required instead.

Risks of hydrogen storage, however, can be high, as it is quickly noted that the element itself is not only very flammable but also has a very low viscosity making it susceptible to leaking, is colorless and odorless making detection difficult. These factors combined can easily result in a leak going unnoticed and, along with the pressure requirements that must be maintained due to hydrogen's viscosity level can result in a very risky situation from even a small leak (NATIONAL ACADEMY, 89). According to the report, holding it at high pressure also has its risks, and the gas in the event of impingement can not only damage the aircraft, or cause the fueling pipe to whip around, but the gas pressure can also "cut bare skin" of someone nearby in addition to flying debris should the tank ever rupture (NATIONAL ACADEMY, 89).

A natural risk that moves towards this fear is that hydrogen can cause both metal and plastic to become brittle and structurally weaken over time, gradually increasing the risk that an impingement could occur and would require more maintenance and observation as the age of the tank(s) becomes more of a factor, so the usage of both a carbon fiber composite casing and a high-density polymer liner for the tank itself address this potential issue and slow the risk, but are much more expensive compared to the regular containers (NATIONAL ACADEMY, 91).

Addressing concerns, it was noted within the report that the Harvard Environment, Health, and Safety Department created a fact sheet regarding safety precautions that should be taken in the event hydrogen containers are used at an airport. These are: "Store the containers with adequate ventilation in the warehouse", "Maintain the temperature of the warehouse that does not exceed 125 degrees Fahrenheit", "Secure hydrogen containers and tanks to prevent falling or being knocked over", "Use flash arrestor on tanks", "Store full and empty cylinders separately", and "Equip building with an automatic sprinkler or deluge system in case of fire" (NATIONAL ACADEMY, 92).

Electric Aircraft

One of the biggest challenges to electrically-propelled aircraft is having batteries with high enough energy density to accommodate an economically useful range (Pascal 21, Ribeiro, et al).

While the field of electric propulsion is relatively new, electric aircraft manufacturers are taking cues from the consumer electric vehicle market in that they are adopting standardized charging methods. General aviation scale aircraft manufacturers use the same charging ports as commercial electric vehicles, rather than proprietary chargers or connectors (Pipistrel Manual 8).

In the US and EU, the Combined Charging System (CCS) charger is the most prevalent charger form factor. In Japan, CHAdeMO is the leading connector, and GB/T is the connector of choice in China. All of these comply with the same electrical standards, with the incompatibilities only in a handshake and locking mechanism, meaning that it is feasible to convert a given vehicle to any given charger configuration (MUXSAN). Megawatt chargers are also on the horizon to accommodate charging very large batteries in very short times (NREL.gov).

An aircraft need not be grounded for the entirety of its charging time, either. It is feasible to design aircraft batteries such that they can be swapped with a fully charged one relatively quickly, and the discharged battery be recharged while the aircraft conducts another mission. Researchers at Delft University have been exploring scheduling solutions for a fleet of electric aircraft. This, of course, would necessitate the inclusion of easily-accessible battery compartments in the aircraft and the installation of safe charging bays for the batteries on the ground.

The ALICE commuter aircraft being developed by Eviation, is the current frontrunner for commercial electric aircraft. At the time of writing, the platform is still in active development, and information on its charge time and connectors was not publicly available. However, the stated operating range as of Q1 2023 was given as 250 miles (Eviation), with expected advancements in battery technology it could reach the target range of 900 miles by 2024 (Hamilton 40).

Unfortunately, even ALICE's range is not yet commercially viable today. The specific energy density vs productivity of current electric motors and storage is simply not yet high enough for commercial flight operations and is not expected to be viable before 2035. The specific energy of batteries would need to be more than 2000 Watt-hours/kg for electric aircraft to be competitive in regional jet operations, and the best batteries available today can only deliver about 265 Watt-hours/kg (Hall et al. 28-29).

Hydrogen Aircraft

A hydrogen-powered aircraft is an airplane that uses hydrogen fuel as a power source, hydrogen can either be burned in a jet engine or another kind of internal combustion engine or can be used to power a fuel cell to generate electricity to power an electric propulsor. According to IATA ''hydrogen is the most abundant element in the universe and its liquid form contains about 2.5 times more energy per kilogram than kerosene. When burning, hydrogen only produces water vapor as a by-product, since the fuel has no carbon content to start with. With regards to local air quality, hydrogen combustion produces up to 90% less nitrogen oxides than kerosene fuel, and it eliminates the formation of particulate matter. From an environmental and energy content perspective, hydrogen has abundant potential. An advantageous criterion for any fuel is high energy density, inexhaustibility, cleanliness, convenience, and independence from foreign control. Liquid hydrogen achieves the criteria, along with the potential to eliminate combustion emissions.

Another useful feature of hydrogen is that it can be used as a replacement for liquid fuel or as a fuel cell for electrical power. Electrical fuel cells could be suitable for short-range aircraft while hydrogen combustion would be suitable for long-range and higher payloads. Hydrogen fuel cells are already common devices found in cars, buses, and aircraft servicing vehicles. Liquid hydrogen fuel has a lower volumetric density than kerosene. It is estimated that to complete a given mission, despite the aircraft requiring a lower mass of fuel, the space that this fuel would occupy would be around 4 times larger than that of kerosene. This presents a challenge for airframe designers and would require a significant redesign of conventional airframes. Water vapor is another greenhouse gas produced by the combustion of fuel, and although the radiative forcing (difference between the energy absorbed through the Earth’s atmosphere compared to the energy that is reflected into space) is lower than that of CO2, it still contributes towards global warming. Hydrogen combustion would produce about 2.6 times more water vapor than kerosene fuel. In a study about the climate change effects of hydrogen aircraft, Ponater et al. evaluated the individual and accumulated effects of the emissions of a hydrogen-based flight to a kerosene-based flight. Overall, this literature review provides valuable information about hydrogen liquid fuel's potential benefits and challenges. It also addresses the challenges for hydrogen to be a viable fuel source. Besides outlining the benefits of hydrogen as a fuel source, like its large energy density, low emissions, and versatility in production methods, it also acknowledges the limitations of hydrogen technology, its high production costs, and the need for significant infrastructure investments. This article lacks further research and development in hydrogen fuel cells to improve their efficiency and safety.

Airbus, ZeroAvia, and Hydrogen Aero are three aircraft manufacturers interested in designing aircraft with hydrogen-electric powertrains. Airbus is aiming towards the world's first zero-emissions commercial aircraft with ZEROe concept aircraft by 2035 to power future aviation. All three ZERO concepts are hybrid-hydrogen aircraft; they are powered by hydrogen combustion modified gas turbine engines. All the technologies are complementary, and the benefits are additive. The methodologies being explored to use hydrogen are as detailed below really interesting content, but it must be supported with citations and references..

Hydrogen can be used directly as fuel for combustion with oxygen that can be used in a turbofan or turbojet engines, or it can be used in Hydrogen Fuel Cells to create electrical power that complements the gas turbine, resulting in a highly efficient hybrid-electric propulsion system. Through future ground and flight testing, Airbus expects to achieve a mature technology readiness level for a hydrogen-combustion propulsion system by 2025. Some example Airbus ZEROe concept aircraft incorporate a Blended-Wing Body, with the exceptionally wide interior opening up multiple options for hydrogen storage and distribution such as underneath the large wings. Two hybrid-hydrogen engines provide thrust on this concept aircraft (Airbus).

Moreover, Airbus is collaborating to utilize a Hydrogen Hib in New Zealand starting with Christchurch International Airport, ''Ultimately, the partners will evaluate the means of deploying hydrogen hubs at airports, starting with the case study at Christchurch. If successful, commercial hydrogen-powered aviation could be extended to cover the entirety of New Zealand's domestic network. The additional participants in the consortium include Christchurch International Airport, Fortescue Future Industries (FFI), Hiringa, and Fabrum. New Zealand, with its large share of renewable energy sources in its energy mix, is a model for a proactive, forward-looking ecosystem with a huge potential for low-carbon hydrogen production'' (Airbus).

ZeroAvia is a British/American hydrogen-electric aircraft developer, aiming to satisfy missions from 20-seat regional trips to over 100-seat long-distance flights, ZeroAvia enables scalable, sustainable aviation by replacing conventional engines with hydrogen-electric powertrains. According to ZeroAvia “hydrogen-electric powertrains offer a long-range, lower fuel and maintenance costs, and zero emissions. Non-toxic hydrogen and compressed gas storage are more reliable with less severe consequences in the event of failure. Compressed hydrogen tank integrity is superior to conventional liquid fuel tanks. Also, hydrogen has a lower radiant heat than conventional gasoline.” ZeroAvia had completed a short test flight in the mid of January from Cotswold Airport, “the startup ZeroAvia said it successfully flew its 19-seat prototype plane during a 10-minute flight test… marking an early but important step toward hydrogen-fueled flying. The twin-engine aircraft was retrofitted to include fuel cells — which convert hydrogen into electricity — and batteries on one side, with the other side using an oil-burning jet engine” (Gallucci, 2023). This is a great starting point for hydrogen-fueled aircraft to be more robust in seeking to curb emissions by designing more fuel-efficient engines and combustion jet engines burning liquid H2. “ZeroAvia said it expects to deliver a 2- to 5-megawatt hydrogen-electric propulsion system that’s certified to fly in 2023, with plans to launch nine- to nineteen-seater commercial aircraft with a 300-mile range by 2025” (Gallucci, 2023).

Universal Hydrogen is a Los Angeles-based company also focused on the decarbonization of aviation by making hydrogen a viable long-term fuel source. Hydrogen Aero is also aiming to create a better and greener environment through hydrogen zero-carbon fuel. A hydrogen regional airliner operated by Universal Hydrogen completed its first flight early in March from Washington state, setting a new record. “Successfully flew a 40-passenger aircraft using primarily hydrogen during part of the 15-minute flight. The Los Angeles–based startup replaced one of the plane’s two turbine engines with a fuel-cell electric powertrain. The flight came just weeks after another hydrogen aviation startup, ZeroAvia, flight-tested its prototype plane over the English countryside. The 19-seater flew for 10 minutes, making it the largest aircraft powered partly by hydrogen to take flight. That mantle now apparently belongs to Universal Hydrogen’’ (Gallucci, 2023).

Hydrogen power has become available to the aviation industry but is difficult to utilize in its natural form as it is extremely buoyant and light in weight, therefore the main challenge in hydrogen-powered aircraft is hydrogen storage. In nature, hydrogen is an extremely light atom that can either be bonded to oxygen (in water) or carbon (in gas), resulting in a low volumetric density. ‘’Powered by hydrogen, the aircraft would require four to five times the volume of conventional fuel to carry the same onboard energy. Providing hydrogen in gas form also requires a lot of storage volume. The compression required by the storage volume can then increase costs and energy needs. As a result, storage can get heavy. At the same time, the mass of liquid hydrogen tanks must decrease by 50%. Because of this, hydrogen storage appears to be a materials science challenge in trying to identify lightweight materials that will not react with hydrogen. Therefore, a better understanding of its interactions with other elements (such as metals or composites) is crucial’’ (SolidSolutions, 2022). Thus, aircraft manufacturers must have a platform or third party to minimize risk and observe and test aircraft designs under different operating conditions.

Liquid hydrogen tanks can benefit from unique platforms or third-party solutions that enable designers and engineers to evaluate pressure stratification and temperature stratification at the design stage. Therefore, an efficient storage tank system is needed to achieve hydrogen sustainability in aviation with specific specifications such as ‘’the storage tanks must be manufactured with specialized materials to withstand extreme temperatures. Moreover, the tanks must have thick walls and provide sufficient isolation between stacks to minimize the heat influx through the tank walls. The leaking heat can cause the LH2 to boil and absorb the surrounding heat necessary to keep the LH2 at deep freeze temperatures. Cryogenic tank manufacturers aim to keep the boil-off condition below 1% per day. The shape of the tanks must be as close to a sphere as possible to minimize design losses. A sphere exposes the least surface per held mass of LH2. To maintain the center of gravity, equal-sized LH2 tanks must be placed such that they do not affect the pitching or tipping moment of the aircraft. Stacks of spherical tanks can be placed in the aircraft’s front section (just behind the cockpit on the lower deck) and the rear section (just forward of the tailplane). A vacuum flask technique with additional insulation on top will ensure the LH2 boil-off condition is minimized. If the tank loses the vacuum, insulation layers contain the heat influx within the system.'' (Memon, 2023).

Construction/Planning

When it comes to the legal aspect of planning charging infrastructure there are lots of hoops to get through. For this specific section of our research, we reviewed press releases and articles published by construction and consulting companies. These articles outlined the beginning processes to get airports and the surrounding areas to support new carbon-free energy methods.

To construct a charging site you have to plan the location, size, chargers, and the associated electric support infrastructure. Like any airport, this charging location would have to be large enough to support multiple different-sized aircraft. "Some electric aircraft have wingspans of 50 feet or more. Setbacks and object-free areas will need to be checked, and aircraft will need room to park when they are done charging" (MeadHunt, 2022). Utilities would also have to be analyzed to be sure that the electricity being supplied to the charging location could support the load. "Widespread implementation of electric aircraft in the small and medium-aircraft markets may increase daily airport electricity demand by as much as 30 megawatts (MW), significantly more than what all but the largest airports use" (Weaton and Williams, 2022). To provide enough power, coordination will need to take place with providers to increase the power supply and possibly upgrade the grid or existing infrastructure. Additionally, airport stakeholders such as FBOs may want to install chargers at their ramp to increase revenue and traffic. This would require planning on the operator's end to ensure they have the necessary facilities to handle the increase in traffic.

With any airport project, there has to be an environmental review for the impact of the project. "The Federal Aviation Administration (FAA) will determine its level of environmental oversight through the Section 163 process as described in the FAA Reauthorization Act of 2018"

(MeadHunt, 2022). The chargers are pretty environmentally friendly and would not have much of an impact on the site's location. Larger impacts could be the running of utilities either underground or above ground. This could result in the clearing of areas that are wooded or possibly wetlands, etc. "Some large hub airports currently contract with local utility providers to host solar arrays onsite" (Weaton and Williams, 2022). If large-scale solar arrays are installed this creates additional clearing, construction, and possibly environmental concerns. Once constructed, though, solar arrays would be environmentally friendly. For a hydrogen tank swap, the challenge is storage facilities that can safely house the hydrogen and be accessible for aircraft. If the ramp for the charging site is near noise-sensitive areas this could also be a consideration. Electric infrastructure can sometimes generate noise besides the obvious noise created by a busy apron of coming and going aircraft.

Every airport maintains an airport master layout plan. This plan contains a full survey of the airport property with future layouts and plans. When there is a project being proposed, this master plan is required to be updated to reflect the project. This is part of the planning process with the environmental impact. These plans are very detailed and would contain utility, elevation, drainage, and other relevant information. For any charging site on a ramp, a new airport master plan would be required to be drafted, reviewed, and approved for the project to go forward. If utilities are to be moved or created for this charging site this could also impact the airport and require more construction. This would also need to be included in the master plan.

The final step for construction would be the FAA Form 7460 which is a notice of construction for the FAA. "FAA Form 7460-1 needs to be submitted for airspace review, a construction safety and phasing plan is needed, and notice should go out to any tenants and users that may be affected by construction activities" (MeadHunt, 2022). The form must be submitted 45 days before the date of proposed construction. Additionally, the airport would need to facilitate notices to any other nearby businesses at the airport that would possibly be impacted. This is also true for potential air traffic impacts if the nearby taxiways or runways would need to be closed to ensure safety around the construction site.

Methodology

For this paper, the group decided to gather data through research in the aviation industry and academia. The group members focused mainly on those sources that had either done extensive technical research or were in the process of developing zero-emissions technologies. Opinions or guesstimations were not needed for the study conducted in this paper. Instead, hard evidence on where technologies are in development and when they could be implemented was sought out. Publications from companies such as Airbus, ZeroAvia, and Pipistrel were relied on heavily. This is because these companies either have produced hydrogen or electric aircraft or have a timeline for developing them.

Results

Through the research stated earlier the group has drawn results for each area. For infrastructure, there is a significant amount of analysis and research that still yet needs to be accomplished by individual airports in determining if and how they can support either electric, hydrogen, or both. Analysis and research around real estate capacity to see if there is sufficient space to adequately provide hydrogen storage, battery storage, or charging system installations. Individual airports would also need to assess what the increases in demand on the power grid would be, and determine if transmission lines to the airport can accommodate the increased loads. Around the costs of purchasing and installing the equipment, if the appropriate budget is available to do so and allow. As a whole, the framework to accomplish this has been completed and at this point, it is now dependent on the infrastructure and technological capabilities of those that wish to utilize it. Similar results were drawn from the research into electric aircraft. With the existing technologies, charging the aircraft is the biggest challenge.

Ground charging infrastructure for aircraft is comparable to that of commercial EV chargers. The challenges of installing fast chargers for an electric aircraft are comparable to that of installing an EV charger, primarily access to a high-voltage power supply. As fleet sizes at airports increase, charging in parallel can lead to challenges in having sufficient power available, which can be offset by charging aircraft or swappable aircraft batteries at off-peak times. Unlike electric aircraft, the results from the research into hydrogen aircraft are less focused on the new technologies and more focused on aircraft design. The technology to store and use hydrogen exists but implementing it into an aircraft has been the main challenge.

Hydrogen could provide one solution for fully decarbonizing long-range flights. The hydrogen sector offers both opportunities and limitations. An opportunity would be that burning hydrogen in a jet engine would result in only water vapor emissions. Using this fuel would virtually eliminate carbon-related emissions, such as carbon emissions. However, incorporating a hydrogen fuel tank would require a considerable change to aircraft architecture. Various aircraft designs would be required and some designs utilize blended wing and body aircraft. While this may produce some aerodynamic advantages, a possible downside could be the time involved in the certification of radical modifications to aircraft.

In addition, substantial costs are involved in designing and certifying upgraded aircraft and operational infrastructure. The potential for a new aircraft or engine design is approaching its limit in terms of fuel efficiency, and as other sectors turn to renewable energy, aviation will need to consider all options for reducing its emissions to remain in line with the industry target of halving net CO2 emissions by 2050. To implement all of these new technologies, construction on airports needs to happen soon. The results from this area were few which the group determined was a very important result in itself. The FAA and other organizations have yet to catch up to the advancing technologies so the requirements to plan and build zero-emissions airports still need to be created.

Due to the large number of processes that take place when constructing new sites at airports, there is a lot of coordination that takes place. Approval from many different agencies is needed and planning must start early. From our research, we’ve gathered that the process to fully electrify an airport, meaning to support electric aircraft charging and/or hydrogen, would be a multi-year project. This includes updating and managing the living document of airport master plans. This is essential for all major airport projects. Environmental reviews are also required for airports that receive federal funding. Depending on the airport and situation we can conclude that this could have a large-scale impact. Many airports are not already equipped to provide the means necessary to support the new technology. Bringing in the required utilities or in some other cases constructing solar arrays could require additional property and could impact sensitive environmental areas. Airports use lots of energy for powering lighting systems, terminals, hangars, and other businesses nearby. Adding new fuel sources would dramatically increase the energy requirement creating additional problems for the energy industry.

From our review of multiple sources, there has been little legal or regulatory guidance for this new emerging technology. The legal perspective is lagging behind the technology. Other than the general FARs concerning aircraft certification and airport construction processes, there have not been any specific alternative fuel flight rules created. Because alternative fuel aircraft are still a very new and developing technology we expect the research and development to help spark further guidance and regulation.

Discussion of Findings

There are already millions of tonnes of carbon dioxide and gas emissions generated by aviation each year, which has a significant impact on the environment, according to Aviation Benefits Beyond Border “Air transport generated 895 million tonnes of carbon dioxide (CO2) in 2018” this may sound a lot but aviation only producing 2% of CO2 generated by all human activities every year; such as electricity, road transport, buildings, heat & electricity, shipping, cement, Iron & steel, and other industrial. “As aviation grows to meet increasing demand - particularly in fast-growing emerging markets - and as other sectors of the economy reduce emissions, aviation’s share of overall emissions is likely to increase” (Aviation Benefits Beyond Border).

As the demand for air traffic will grow in commercial aviation as the demand increases for passengers, “20 years ago, there were 2 billion passengers on planes, today there are 4 billion. If we continue at the same pace, 16 billion people will fly by 2050, according to the forecasts of the International Civil Aviation Organization (ICAO). However, even if the energy performance of engines improves, even if certain engines are electric, and even if the share of biofuels has increased, this will lead in the best case to a doubling of greenhouse gas production (David, 2022).” Due to the record increase in traffic, and the significant increase in the number of passengers, and trade volume, aviation, and international shipping are the fastest-growing sources of emissions. As for shipping alone, according to Energy Industry Review ‘’emissions from international aviation and shipping have increased by almost 130% and 32% respectively over the past 20 years. This is the fastest growth in the entire transport sector, the only one in which emissions have increased since 1990.’’ By 2050, despite improvement in fuel consumption, it is expected that aircraft emissions will be 7-10 times higher than the 1990 levels.

Alternative fuels are needed by the aviation industry now. As the industry grows, the carbon footprint of the industry will also continue to grow. The longer it takes to rid aviation of biofuels the more damage is done to the environment. This study is important because aviation stakeholders must first understand the issues it faces before they can tackle them. In this study, those issues were laid out and now a plan of action is needed to go in the right direction.

Through the research done in this study, the group has determined that some challenges faced by a zero emissions future can be helped and some cannot. Right now the aviation industry is limited by the development of more dense and efficient batteries. What the aviation industry can do to move forward with electric and hydrogen technologies is to plan. As discussed these new aircraft are going to have new needs and new requirements. Stakeholders can start planning now how they are going to meet these new needs. Airports can start looking at where they can store hydrogen and how charging stations can be built and set up. Manufacturers can start planning the infrastructure requirements their new-age aircraft are going to need so that the industry can be prepared for them. Lastly, the Federal Aviation Administration needs to get ahead of the curve and start regulating now, or risk increasing the time before the aviation industry can properly adopt zero-carbon fuels.

Conclusion

Almost everyone in the United States is affected by aviation in some way. Whether that is being a passenger, getting goods shipped, or being in the industry. The world is relying on aviation more and more every year. This means a bigger and bigger carbon footprint. Every person that uses aviation is responsible for this carbon footprint. As humans, we are responsible for being good stewards of this planet. Alternative fuels such as electricity and hydrogen are the answer to this problem of environmental impact. The faster these technologies are in the industry the greater the impact can be reduced. As the group stated, some things cannot be helped, such as battery technology. But nothing is stopping the industry from planning. While the average person may not see their role in this. Anyone can be a part of the solution. Anyone who is an aviation stakeholder has a responsibility to begin planning for this future. Every consumer of aviation is a stakeholder which means that someone who just flies everyone once in a while is still part of the problem and still has a responsibility. Something as little as voting in favor of making changes at your local airport will make a difference. A future without AVGAS and Jet-A is coming and the aviation industry needs to be ready.

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ASCI 4350 - Homework Assignment 1 - Name Redacted
This assignment should be uploaded to Canvas no later than Wednesday, February 8th by the end of the day. Please respond to the following four questions. (SLO 4)
1. Describe the importance of a positive attitude toward lifelong learning when working in a high-consequence field. (300 word minimum)
A positive attitude towards lifelong learning is critical for those working in high-consequence fields, such as aviation. In this field, it is crucial to stay current with the latest technology, best practices, and regulations, as even small mistakes can have severe consequences. Therefore, continuous education and professional development are essential to ensure that individuals remain at the top of their game and can make informed decisions in high-pressure situations. Learning is a lifelong journey and it's especially important in fields where even small mistakes can have big consequences, like aviation. To be the best in this field, we need to keep up with the latest technology, best practices, and regulations. That's why continuous education and professional development are a must. Having a positive attitude towards learning allows us to take charge of our own growth and seek out new opportunities to improve. This helps us stay ahead of the curve and maintain the highest levels of safety for passengers and crew. It also helps us adapt to new challenges and have a growth mindset, which is key in this fast-paced industry. Not only does a love for learning benefit our work, but it also has a positive impact on our personal and professional growth. It keeps us engaged and motivated and helps us take pride in what we do. In conclusion, a positive attitude towards lifelong learning is crucial for success in high-consequence fields like aviation. By staying current and continuously learning, we can ensure the safety and security of passengers and crew and make informed decisions even under pressure.
2. Describe the importance of personal integrity when working in a high-consequence field. (300 word minimum)
Personal integrity is a cornerstone of success in high-consequence fields like aviation, where the stakes are high and even small mistakes can have severe consequences. Personal integrity refers to a set of moral and ethical principles that guide an individual's behavior, both in their personal and professional lives. In a high-stakes industry like aviation, it's critical to maintain these principles and consistently apply them, in order to make ethical and

responsible decisions, even in challenging or stressful situations. Having strong personal integrity means that individuals are more likely to act in the best interests of their team and the organization, and to uphold their commitments and responsibilities. This can build trust and credibility among colleagues and stakeholders, fostering a positive working environment and promoting collaboration and teamwork. When everyone on the team is committed to acting with integrity, it leads to better outcomes for passengers, crew, and all personnel involved. But personal integrity isn't just about the impact it has on others, it also enhances an individual's own personal and professional growth. By consistently upholding their principles, individuals take pride in their work and develop a strong sense of self-esteem and confidence. They know that they are doing the right thing and acting in line with their values, which is incredibly empowering. In conclusion, personal integrity is a critical aspect of success in high-consequence fields like aviation. It promotes ethical and responsible decision-making, builds trust and credibility, and enhances personal and professional growth. By consistently applying our moral and ethical principles, we help ensure the safety and security of all passengers, crew, and equipment, and contribute to the success of our team and the aviation industry. In a field where even small mistakes can have serious consequences, personal integrity is essential for maintaining the highest standards of professionalism and excellence.

3. Describe the importance of embracing diversity when serving on a high-consequence team. (300 word minimum)

Embracing diversity is crucial when serving on a high-consequence team in aviation, as it helps to promote a culture of inclusiveness and respect, while also enhancing the team's overall performance and effectiveness. In aviation, it is essential that individuals from diverse backgrounds, perspectives, and experiences are able to work together effectively to achieve a common goal. By embracing diversity, individuals are able to leverage the unique strengths, perspectives, and skills that each team member brings to the table, which can help to promote innovation, improve problem-solving, and increase creativity. Furthermore, an inclusive and respectful team environment can also help to foster better communication and collaboration, leading to improved decision-making, and ultimately better outcomes for passengers, crew, and other personnel. Embracing diversity also helps to promote a culture of safety and security in aviation. By fostering an inclusive environment, individuals are more likely to understand, respect, and appreciate differences, which can help to reduce misunderstandings and tensions, and to ensure that all team members feel valued and supported. This, in turn, can help to improve the overall safety culture within the team and to ensure that all individuals are working together effectively to mitigate potential risks and hazards. Moreover, embracing diversity can also help to attract and retain a highly skilled and diverse workforce, which is essential in high-consequence fields like aviation. When individuals feel valued and respected, they are more likely to be engaged and motivated in their work, which can lead to improved job satisfaction and increased retention rates. In conclusion, embracing diversity is critical for ensuring that individuals serving on a high-consequence team in aviation are able to work together effectively and efficiently to achieve their common goals. By promoting inclusiveness and respect, individuals can help to foster a culture of safety, security, and collaboration

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This assignment should be uploaded to Canvas no later than Wednesday, February 8th by the end of the day. Please respond to the following four questions. (SLO 4)

1. Describe the importance of a positive attitude toward lifelong learning when working in a high-consequence field. (300 word minimum)
The phrase that a pilot never stops learning is very true. I feel that in any profession that is in a high consequence field, you always need to be retraining, learning, and better yourself through various qualifications. In the same way why nurses have go through yearly tests to keep their credentials valid, why military members go through requalification training for their specific job, and the same way that police officers have to be physically fit and requalify for firearms training yearly. All these professions including being a pilot are all high consequence fields and a level of proficiency and professionalism is required. You want to come in with the attitude that you do not know everything because we simply cannot know everything about airplanes. There also requires a certain level of humility. In the same attitude that the United Airlines Captain Al Haynes studied asymmetric thrust and how it affects aircraft performance could have been the very reason an un-survivable crash became survivable. Since Al Haynes was a lifelong learner, he read on the affects that asymmetric thrust and losing an engine could affect an aircraft. Had he not been a lifelong learner, I fear the crash outcome would have been much worse. But he survived to tell the story! You should want to become a lifelong learner because when the learning stops you can become complacent and that is not good in a high consequence environment. It is important to come at the attitude with a genuine care for your profession and curiosity to do better. Likewise, I try to come at aviation with the same attitude. The moment you stop learning or wanting to learn is when you can get yourself in trouble. In times distress and emergency situations, your ability to react and make a good decision depends on your training. But also, your curiosity to learn which supports those decisions and actions in stressful situations.

2. Describe the importance of personal integrity when working in a high-consequence field. (300 word minimum)
Personal integrity is very important in a high consequence environment. Integrity is the ability to have amoral compass or code that allows you to make logical decisions. The hope is that when working in a high consequence environment like a cockpit, that both individuals working together has a high level of integrity. You both want to be able to make sound decisions and follow standard operating procedures to the letter. You both have a high code of principles or standards (integrity) to follow those procedures and make safe sound decisions. You essentially hold up your end of the deal while your partner does as well. You do not want to have someone who does not have a high level of integrity, confidence, or mental sanity. My first thought that comes to mind is the Germanwings crash back in the mid 2000s. That is an example in my mind of a pilot that did not have a high level of integrity, care, or concern for others. He needed mental health treatment for depression and chose to be selfish instead of seeking the proper support and take a break from flying. A person with a high level of integrity would have been reexamined medically and made the safe and sound choice to take time away from flying. I am not being harsh of that first officer; I understand people in those mental situations sometimes cannot help themselves, but I wished someone had recognized it prior to the accident. Procedures and rules are in place for a reason, for the safety and for the care and concern of others. Having a high level of integrity means following them and doing the right thing. During normal and abnormal operations, it is important to work well in the team environment to complete the mission at hand. Completing the mission successfully is having a good level integrity as part of your toolbelt.

3. Describe the importance of embracing diversity when serving on a high-consequence team. (300 word minimum)
I believe that diversity in experience, upbringing, knowledge, and background are all important. I

believe embracing diversity of experience and knowledge are paramount in a high consequence environment. Similar to the situation with Captain Al Haynes, he had some knowledge on using differential thrust to fly the aircraft and keep it straight and level from his own knowledge. The check/simulator instructor Captain who was a passenger assisted the crew since he has a more overall picture of how the aircraft operated and its systems. He probably had a more in-depth knowledge on information since he was a simulator instructor. Putting together the experience of the Sim Captain, Captain Al Haynes, and the First Officer, the vast diversity of knowledge is most likely what saved more lives. By cooperating and accepting the diversity, the crew of the United flight was able to operate very well in the high consequence scenario given the odds were stacked against them. While knowledge and experience are important, diversity in how and where you grew up can play a big factor in how you work in a crew environment. Using the example of the flight deck, having a pilot with experience landing in all weather conditions at short runways in Alaska and another pilot who may have had inter-island flying the Caribbean are two vastly different experiences. But it should be seen that the diversity of where they built the majority of their flight experience and how that environment shaped them into the pilot that they are today. Not only does this offer plenty of experience but it can allow for an exchange of diverse ideas that people can learn from. Afterall, life-long learning is key in a high consequence environment, so the diversity aspect only makes the individual stronger but also the crew stronger.

4. Describe the importance of embracing diversity when leading a high-consequence team. (300 word minimum)

When leading a team in a high consequence environment, diversity is key to that team's success. A bad leader is one who believes they are the ultimate authority and cannot be wrong. A good leader is one who can use all the people on their team and diversity to accomplish the mission. Listen to the people below you. My father was an officer in the U.S. Air Force, he was an engineer. He worked in a joint civilian and military unit. When leading his unit, he would accept the diversity of people's experiences. In his mind, as a new officer and college graduate, how could he lead people who may have more experience in the field than him even if they were enlisted. His goal would be to talk to the enlisted, see what they had to offer to the conversation and use their specific jobs and specialties to complete the mission together. He would also ask questions and learn from the people below him. Oftentimes the best leader is one who can understand all the various roles of the people they are leading. By doing this, he also took the time to get to know his men and understand them on a personal level. This was a way to build comradery while also gaining the respect of his men. He told me that many new officers and college graduates would bark orders and tell the enlisted personnel to do their jobs without getting to know them or their jobs. They figured since they had rank and a college degree that they were "better" than the enlisted. This couldn't be further from the truth, if anything they lost the chance to gain the diversity in experience and knowledge from their men while also losing the respect of their men. These officers did not last long is what I am told. The military just like the cockpit is a high consequence environment and accepting the diversity, strengths, and weakness of your subordinates and equals is paramount to the success of the organization

Flight Science – Data Collected in Support of
Program Mission and Education Goals and SLO 2

Performance Indicator Rubric

Course: ASCI 3070 Flight Crew Fundamentals Course Instructor:_____Donald Schmidt________________

Semester Taught: __spring ‘23__________Number of Students in Course:_____15_____

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = “C”)
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	100%	yes

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

The course appeared to be successful. The main goals were class participation, a midterm paper and a final simulation. The paper of which I will attach a copy was intended to explore an aviation event that dovetailed into the discussion topics previously covered in the course. The assignment was not intended to merely rehash the accident itself, but to discuss it in the students' own words from the perspective of class topics. These would include the importance of standard operating procedures, crew resource management, checklist theory and usage, and turbine transport systems. Overall this major project was successful and some of the best work that had been submitted in recent years. The final project was a simulation based exercise, the intention of which was to work through the flows and checklists for the CRJ700. Exercise was to be started with the aircraft sitting on the ramp following through takeoff, culminating in a successful completion of the takeoff profile to altitude. The time limitation was 15 minutes. This was to address the extreme time it was taking students completely new to the platform. Again this final exercise was completely successful with each student taking time throughout the semester to study these procedures on their own and all were able to complete the exercise within the allotted period. The secondary objective of this exercise was to “learn how to learn” a new and complex aircraft, unfamiliar flows, checklists, and profiles. The secondary objective was also a success, with all students proving so by their study habits and successful completion of the scenario in a timely fashion.

**Attach description of assignment used for assessment and samples of student work.*

The assignment description for the paper was as follows:

Provide a discussion and examination of BritAir 5937’s accident in Lorient, France. Specifically the issues of the accident as they relate to the work and lecture thus far in class, with explorations into the issues of Standard operating procedures, crew resource management, and checklist usage and how they may have impacted the situation.

Donny Shmidt

30/30 Nice work

Flight Crew Fundamentals
4/10/23

Brit-Air CRJ 700 Accident Analysis

On the 16th of October 2012, an experienced 42-year-old captain and 45-year-old co-pilot flying the CRJ-700 did not carry out their duties properly and overran runway 25 at Lorient Lann Bilhoué. Both had at least 3,000 hours in the CRJ, and their professional levels were qualified as good. It is an unfortunate accident, but it can happen to any pilot when risk factors stack up.

Before the flight even began, the pilots did not have a mental check of their attitudes toward the flight. Both pilots arrived at their trip's fifth and final flight rushed and fatigued. The captain's short turnaround led to meteorological preflight preparation being completed in the cockpit. The pilot saw rain and a crosswind of 15 to 20 kt; he felt there was a risk of wind shear and considered landing on the runway with a flaps 30º configuration. The fatigue and rush amidst the preflight led to the captain having tunnel vision in choosing that configuration, as he never adjusted for the conditions met during the actual flight.

The fatigue factor continued to be a very concerning problem for these pilots throughout the flight. The crew spoke about their fatigue on the ground, while the PM even mentioned his fatigue and weariness before the descent. Moreover, the pilots even talked of their desire to complete the flight as soon as possible in the cockpit. The hazardous attitude displayed due to the fatigue felt by the pilots led to a considerable lack of situational awareness as they approached deteriorating weather conditions in which they needed more experience flying in.

In the prelanding, descent, and landing phase, the errors kept stacking, ultimately leading to the accident. The crew resource management amidst this flight was poorly executed in all phases. The crew inappropriately used their checklists and flows amidst descent and approach. The approach checklist was interrupted by the controller and resumed by the pilots in the wrong place, which shows an apparent lack of care and discipline. As a result of the checklists being used as an "action guide," the crew did not calibrate the altimeter. The captain later asked the first officer if the approach checklist had been completed because the altimeter was incorrectly calibrated.

This phase is where a critical error by the crew occurred. Both pilots were fatigued, trying to complete a checklist, and were interrupted by a controller. The controller states that there is a wind from 160º gusting up to 26kt, a severe squall, and that the previous aircraft encountered difficulties during landing due to "aquaplaning." The fatigued pilots hear the controller, and their mind goes back to completing the checklist at hand (improperly, as a matter of fact). Although the crew had a checklist to complete, the lack of the pilots recognizing the controller's interruption as extremely important led to the danger being improperly perceived, and their situational awareness was not modified.

Really nice development

The moment the crew heard the controller state winds from 160º with gusts up to 26 kts and the previous aircraft encountered "aquaplaning," their minds should have immediately started considering landing distance and standard operating procedures of British Airway's landing techniques. The landing distance calculated by the crew during their rushed ground operation only left a margin of 80m. This was calculated using non-contaminated runway conditions. The pilots should have been aware of the landing distances with a runway contaminated by water. Under calculations, a flaps 45º approach with the airplane's performance would theoretically permit it to land on a contaminated runway, but when tested by manufacturers, the roll distance was 1,358, which is inadequate. Regardless of pin-pointing theoretical landing distances, the pilots should have immediately recognized that their initial calculation of 80m remaining would not be sufficient with a 30º flap configuration, a contaminated runway, and an almost direct crosswind amidst a squall which could, and did, turn into a tailwind.

The controller's phraseology was imperfect, and the pilots did not hear the word contaminated directly. However, the pilots still could have followed the standard operating procedure for a contaminated runway, as there were previous reports of aquaplaning. Following standard operating procedures or even using a similar landing technique in the SOPs would have resulted in a safer result. The British Airway SOPs in section 1.17.1.4.3 Landing Technique state that on a contaminated runway, the pilot should:

1. "Land with flaps in the 45º position
2. Make Firm Landing
3. Landing is prohibited if the XC is greater than 10kt and if braking is poor" (1.17.1.4.3)

ALWAYS DANGEROUS

Unfortunately, none of these measures were met as the captain continued with his preflight decision of a 30º flap configuration approach. A 45º flap configuration approach would have led to a 132 kt approach with a 10 kt gust factor, ultimately a 142 kt approach.

The crew disregarded SOPs and announced they would use an airspeed reading of 140 knots which is not procedural and is not backed by anything more than "personal knowledge." On the actual approach, the airplane's airspeed increased above 150 kts for 10 seconds, even maxing out at 155. The pilots crossed the runway 25 threshold at 56 feet, flying 153 kts with a 4 kt tailwind. Brit Air SOPs state that "deviations on approach below 1,000 ft relate to certain parameters including indicated airspeed which should be between VAPP +10kt… when a deviation occurs, the PM calls it out. If no immediate correction is made, a go-around is imperative" (1.17.1.4.6). The crew disregarded callouts, made no immediate correction to their fast airspeed, and did not make a go-around. It was a direct disregard for SOPs, and unfortunately, this led to the plane overrunning runway 25.

There are many things the pilots could have done differently to avoid this accident. Although uncommon, the fatigued pilots could and should have reported their fatigue. Instead, they continued to rush, failing to recognize the threats and hazards associated with their flight. Whether it be the lack of care for the controller's weather warnings, the misuse of checklists, the

improper approach configuration, the un-sterile cockpit, the disregard for SOPs that would have led to a go-around, or the general lack of situational awareness regarding the runway's conditions, these pilots were risk stacking. The stacking risks ultimately caught up to them as their plane hit the runway 25 localizer antenna before coming to rest approximately 200m past the threshold of runway 07.

It is an unfortunate accident; the pilots could have made better decisions, but we cannot blame it all on them. Other factors were involved, such as the lack of common phraseology between the controllers and crews to understand the true condition of the contaminated runway or the characteristics of runway 25's water logging tendencies not being documented in the Brit Air Operations manual. Brit Air pilots were also unprepared for a situation like this, regardless of being fatigued or rushed. Their training and recurrent training checks only provide one scenario per session, no nighttime scenario, and conditions with runway water contamination cannot be simulated. Their briefings on airplane performance also do not include threat and error management. Threat and error management trains crews to be exposed to threats and to be able to identify errors that happen. Unfortunately, only the captain had been exposed to TEM training as it was newly implemented in 2012, the year of the accident. What can be done is to have all pilots trained to identify threats and manage errors. A pilot should be taught to run a mental checklist on themselves, such as the ADM process of:

"(1) Identifying personal attitudes hazardous to safe flight.
(2) Learning behavior modification techniques.
(3) Learning how to recognize and cope with stress.
(4) Developing risk assessment skills.
(5) Using all resources in a multi-crew situation.
(6) Evaluating the effectiveness of one's ADM skills" (Advisory Circular 60-22)

Whether at Brit Airways or a mom-and-pop Part 61 school, pilots should be trained by a threat and error management course and taught the proper steps of Aeronautical Decision Making to safely rely on their situational awareness, problem recognition, and sound judgment to reduce risks associated with each flight.

BE CAREFUL w/ SLANG

AWESOME JOB SOME OF THE BEST EXPLORATION AND DEVELOPMENT I'VE SEEN.

Donny Schmidt 30/30 Awesome

ASCI 3070

04/10/2023

Reflection on Brit Air DB5937

In fall of 2012, Britair DB5937 overran a runway in Lorient, France which sparked a conversation regarding the formality and use of Standard Operating Procedures (SOPs), safety margins within airlines, and various crew training. While weather most likely played a factor in the overrun, this paper will review the pilot and airline related decisions that resulted in the incident. It'll also review how modern day SOPs and safety margins would have possibly prevented the overrun and the impact modern day SOPs have on operations.

When reviewing the many factors that contributed to the incident, it's important to highlight the main overall reasons discussed in the incident report. The first main point is around fatigue of the pilots. This flight was the fifth of the day and the last. CVR captures the pilots discussing their fatigue and readiness to go home (Hradecky, 2012). The next factor is focused on the lack of safety margins within the pilots decisions and airline standards. This is discussed as the majority of the decisions captured vocally seem to be made with little margin of error. In aviation, it is important to remember that nothing will ever be perfect, including performance. Perhaps threat and error management (TEM) training isn't taught as much at this point in time. With all of this in mind, the final issue brought up throughout the incident report comes around the lack of routine. A lack of routine, which encaptures all the incidences discussed above, comes from a lack of SOPs and other standardizations aviation has developed. As we continue our discussion, we'll now discuss the various issues and where SOPs could have come into play to avoid the situation occurring.

It's important to reflect on the winds and weather for that day with the first point of lack of SOP and standardization. The winds on this day were 160 @ 16 gusting 26 knots. Visibility was 2000 to 3000 meters, most likely due to the rain that was falling. With the amount of rain falling, pilots prior to the accident were reporting difficulty breaking and the runway wet with puddles (to be discussed later). Lastly, the pilots note windshear on the ILS approach. With all this in mind, the captain quickly, with little discussion, notes that they will be keeping their airspeed above the VAPP, set at 140 kts for this flight (Hradecky, 2012). This is the first topic where an SOP could be useful. While it might be general knowledge that keeping the airspeed faster during an approach helps with windshear, it might not be specified as an approved procedure for the airline or might need additional steps when making this decision including increasing runway needed by a certain percentage.. In modern day aviation, Windshear Detection Systems (WSDS) have been able to alert pilots of possible windshear alerts. These systems would be nice to hold as when one goes off, most, if not all airlines have procedures that require a go around (FAA). It is also important to realize the effect this decision has on landing distances, something which isn't discussed by the pilots. Lastly, with a higher approach speed comes an unstable aircraft. This is where the main issue occurs. As discussed in the report, an aircraft doing 10kts or more over the VAPP (DB5937 was doing 15kts over at one point) is defined as unstable and should go around. This is a modern day SOP many airlines follow, as discussed in SKYbrary's article on SOPs. The pilots of this flight didn't do so which risked the aircraft overrunning the runway, floating too much, or flying into the ground with a nose down attitude. Implementing this SOP would make it standard for an unstable approach at VAPP + 10kts or more to go around and either reattempt the approach or divert to a more suitable airport

(SKYbrary). During this incident, that SOP wasn't followed and crew communication was minimal in the decision, leading to an nonstandard, more dangerous approach.

With a faster approach means a longer runway needed. The runway and its analysis from the pilots is the second issue in this report which an SOP and stricter standardization would have possibly prevented this accident. Within the Britair procedures, runway 25 at Lorient isn't explained in detail (highlighting the encouragement to not use this runway?). Due to this, the pilots are unaware exactly how smooth the runway surface is and other important information. In their analysis of the runway, they also give themselves 80 meters of margin (Hradecky, 2012). Had an SOP been developed and used, the pilots would have most likely been forced to reevaluate the runway decision and incorporate a higher margin of error to allow for situations with rain, gusty winds, not using full flaps (the crew uses flaps 30 instead of 45 to allow for passenger comfort which isn't standardized within the company), and puddles on the runway. It's also important to highlight the phraseology used by air traffic controllers and pilots prior to the incident and their use of the word "puddles." There are 4 runway condition standards at this time, which are dry, wet, puddles, and flooded. "Wet with puddles" is what is told to the pilots which is nonstandard and potentially creates issues with the pilots understanding the extent of the runway condition. That, alongside no equipment to measure the puddles, created a nonstandard situation (Hradecky, 2012). Continuing to develop phraseology creates more standardization and allows all aviators to further understand the situations without question. In modern day operations, many airlines require the aircraft to land on a runway that is the calculated landing distance and a certain percentage added from that (Cornell). At Parks our FOM states that student pilots must have enough runway to takeoff times 200% on solo flights. Had a standard

AWESOME

LANDING PERFORMANCE REQUIREMENTS.

been set for Britair on landing distances and runway length requirements, further margin and communication between the crew would have been needed, overturning their previous decision.

The final issues result from the improper use of detailed briefings and the use of flows/checklists. During the investigation, the public learned that checklists used during the approach and landing phase of flight weren't fully completed. While the crew had hopefully all the aspects of the checklist covered in their flows, they had not cross checked their actions with the checklist in full due to an ATC interruption. It is also learned that the pilots had done a shorter than normal brief of the approach and landing, using non standard phraseology within it. With all this in mind, the lack of awareness of the aircraft and lack of planning lead to the accident potential. Had the crew done the checklists and briefs correctly, the issues that followed including phraseology each pilot used, a proper plan of action, error margins, and threats associated with the flight would have all been discussed, covered and agreed upon, creating a plan of action had something gone wrong like a fast approach speed and unstable approach creating a more in depth conversation of the actions they were taking.

Within this paper, we've discussed the main topic of standardizing procedures, phraseology, and actions within flight. Through proper training and enforcement of SOPs, aviation becomes a lot safer and decisions made in flight are decided upon data, resulting in safer flying. Had the pilots of DB5937 done proper briefings and checklists, considered safety margins, followed set proper procedures, and done actions like go around when unstable, the resulting accident would have unlikely occurred. SOPs and the training surrounding them have developed to allow for higher amounts of safety and better, more uniform decision making between pilots and crew. FAA and other aviation regulation agencies continue to develop deep, well-worded regulations to enforce proper aviation actions. Companies further these regulations

with company policies to enforce these regulations and then some, adding further safety related rules. Proper following of these SOPs has been found crucial and when deviating from them, can prove costly and extremely dangerous, as presented in this accident.

Excellent work.
Great Tie ins.

Work Cited

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Performance Indicator Rubric

Course: ASCI 4012 Introduction to Flight Crew Operations Course Instructor: John Denando

Semester Taught: Fall 2022 Number of Students in Course: 28

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	(264/308) 86% of the class achieved a 70%	YES
SLO 3: Apply effective oral and written communication skills to function effectively in the aviation environment.	(75/84) 89% of the class achieved a 70%	YES
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	(210/280) 75% of the class achieved a 70%	YES

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

I believe there is still a lack of transfer of material from the classroom to the simulator. The majority of students reported not utilizing the CRJ training room in between simulator lessons. Given the normal maintenance issues this semester, one would assume the PC simulator would be used to maintain proficiency. However, since it was not mandated, it appears that this study resource was not used.

The Decision-making assessment is satisfactory in my opinion.

24 out 28 students began this course with an instrument rating. Evidence shows students have a rote level of learning pertaining to instrument operations in the national aviation environment. This course material sought for deeper understanding and actual application in the simulator of instrument procedures that the students are not able to be exposed to at the flight line. When asked to answer questions pertaining to regulations and whether we could takeoff or land, scores were lower than compared to SLO 1 assessment questions.

- I would suggest noting the initial instrument course that there is a difference between part 91 instrument operations and part 121/135 operations. Perhaps note some of the differences, but do not get into much depth.

All material used to evaluate student learning outcomes for this course were in the form of questions found on quizzes and exams.

SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.

1. **Quiz 1 Question 1 (SLO 1. 27/28 students answered correctly)**
   - The guidance and procedures found in the Billiken Air Express are optional to use when operating Billiken Air Express aircraft.
     - TRUE
     - **FALSE**

2. **Quiz 2 Question 8 (SLO 1. 28/28 students answered correctly)**
   - When a takeoff minimum is not published, the certificate holder may use the applicable standard takeoff minimum and any lower than standard takeoff minimums authorized by the operations specifications.
     - **TRUE**
     - FALSE

3. **Quiz 4 Question 14 (SLO 1. 25/28 students answered correctly)**
   - Current winds are 300 at 11, gusting 17. KSTL is landing runway 12L. Can we accept this?
     - Yes.
     - Yes, if the gusts go away.
     - **No.**

4. **Quiz 4 Question 17 (SLO 1. 28/28 students answered correctly)**
   - You are flying with the company's worst captain. He is high and fast, and at 240 KIAS asks for FLAPS 1, 8 and 20, and gear down to slow down. Can you do this?
     - Yes.
     - **NO**.
     - Yes, but you secretly wait until 230 KIAS to bring down the gear.

5. **Quiz 5 Question 9 (SLO 1. 18/28 students answered correctly)**
   - AT 10,000' MSL, the max airspeed of the CRJ700 is...
     - **335 KIAS**
     - 320 KIAS
     - 250 KIAS
     - 300 KIAS

6. **Mid-Term Question 37 (SLO 1. 28/28 students answered correctly)**
   - During takeoff, an engine failure occurs after V1. The crew should...

- **Regardless of if the aircraft is on the ground or in the air, continue the takeoff since the engine failure occurred after V1.**
- Reject the takeoff if the airplane is still on the runway.
- If airborne and less than 50 feet, reduce the power on the good engine to idle and land on the remaining runway.
- Have a quick discussion about what to do and then make a decision to continue or reject.

7. **Final Question 11 (SLO 1. 12/28 students answered correctly)**
   - Refer to the KMSP ILS RWY 30R. ATIS reports 3/4 mile visibility. Tower reports current RVR for 30R is TDZ 2400, ROLL 3000. Can we proceed past the final approach fix?
     - YES
     - **NO**

8. **Final Question 12 (SLO 1. 24/28 students answered correctly)**
   - Refer to the KMSP ILS RWY 30R. ATIS reports 1/4 mile visibility. Tower reports current RVR for 30R is TDZ 4000, ROLL 1200. Can we proceed past the final approach fix?
     - **YES**
     - NO

9. **Final Question 27 (SLO 1. 24/28 students answered correctly)**
   - You are on an ILS just outside the FAF, the gear is down and flaps 30. We are high and fast, and the PF calls flaps 45 at 180 KIAS. If you don't select flaps at this moment, you won't meet the stabilized approach criteria. As PM, you should...
     - Notify the PF that we are too fast for flaps 45, wait for him to slow, then select flaps 45 and continue.
     - Select flaps 45 and notify the PF we are high, and as long as he says **"CORRECTING"**, it is ok to continue.
     - **Notify the PF that we are too fast for flaps 45 and suggest a missed approach.**
     - Immediately select flaps 45, see if we are stable by 1,000' AFE, then determine whether or not to continue or execute a missed.

10. **Final Question 45 (SLO 1. 28/28 students answered correctly)**
    - Refer to the CLVIN RNAV departure. You are departing runway 4R, and ATC clears you, "Billiken 1012, RNAV to NITRN, runway 4R, cleared for takeoff." At 1,000 feet AFE, the PF commands "SPEED 250, FLAPS UP." As PM, you should...
      - Bug 250 because the PF said so.
      - **Bug 230 because of the speed restriction at NITRN and remind the PF of the speed restriction.**
      - Bug 200 and not tell the PF what or why you are doing that.
      - Do nothing and see if the PF catches it on their own.

11. **Final Question 66 (SLO 5. 22/28 students answered correctly)**
    - Refer to the CLVIN2 RNAV DEPARTURE. If tower says, "BILLIKEN 1012, RUNWAY 4R, RNAV TO NITRN, CLEARED FOR TAKEOFF." Above 10,000' what is the maximum speed we can fly until either 17,000' or advised by ATC.

- **280 KIAS**
- 250 KIAS
- 335 KIAS
- The speed listed in the climb section of the SOP Expanded Checklist

SLO 3: Apply effective oral and written communication skills to function effectively in the aviation environment.

1. **Quiz 1 Question 14 (SLO 3. 25/28 students answered correctly)**
   - In the SOP CHAPTER 2: OPERATIONAL GUIDANCE, there is guidance given on what to say when receiving altitude changes from ATC. Although there is specific wording in the manual, the pilot may change this as they please and put their own "spin" on it as long as they comply with the clearance.
     - TRUE
     - **FALSE**

2. **Quiz 4 Question 28 (SLO 3. 25/28 students answered correctly)**
   - The PF flies the aircraft outside of the Billiken Air Express stabilized approach criteria below 1,000' AFE. The runway is 12,000' long and the condition is dry. You have two thrust reversers and everything is working normally. As PM, you should...
     - say nothing, continue and land normally, then de-brief at the gate.
     - **call "unstable, missed approach".**
     - call "unstable" and ensure he/she corrects.
     - take the controls, then de-brief over Starbucks.
     - allow it to continue, then take the controls if it doesn't get better.

3. **Mid-Term Question 12 (SLO 3. 25/28 students answered correctly)**
   - You are flying with a new First Officer. He is high and behind the aircraft coming in for landing. He asks for flaps 1 at 235 KIAS. You should...
     - give him flaps 1 because there is nothing wrong with this scenario.
     - **tell him he is too fast and will give them to him when he is below the maximum flaps 1 speed.**
     - give him flaps 1 knowing that he is too fast because if you do not give him flaps 1 the approach will result in a go-around.
     - give him flaps 1 and suggest he follow it with flaps 8 and flaps 20 because we are high and fast.

SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.

1. **Quiz 4 Question 26 (SLO 5. 24/28 answered correctly)**
   - You are filed on a STAR (not an RNAV STAR). It has numerous EXPECT crossing restrictions on arrival. Even if ATC does not clear you to cross at this altitude, you must still cross at the altitude listed on the chart.
     - YES
     - **NO**

2. **Quiz 4 Question 27 (SLO 5. 25/28 answered correctly)**
   - On STARs that ARE NOT RNAV STARs, speed restrictions are still mandatory.
     - **TRUE**
     - FALSE

3. **Mid-Term Question 4 (SLO 5. 18/28 students answered correctly)**
   - An RNP approach in a foreign country is the same as a GPS (RNAV) in the United States and does not require any extra training.
     - **TRUE**
     - FALSE

4. **Mid-Term Question 17 (SLO 5. 26/28 students answered correctly)**
   - Standard Instrument Departures (SIDs) require an ATC clearance prior to being flown.
     - **TRUE**
     - FALSE

5. **Quiz 6 Question 7 (SLO 5. 27/28 students answered correctly)**
   - The Single-Engine Takeoff Path is an extension of the Captain's emergency authority and must be stated as such to ATC as soon as practical.
     - **TRUE**
     - FALSE

6. **Final Question 14 (SLO 5. 8/28 students received full credit, 4/28 students received partial credit, 16/28 students received zero credit)**
   - Refer to the KMSP ILS RWY 30R. What is the final approach fix? (This question type was "short answer". Each bullet point represents an example of real answer.)
     - **Glideslope intercept at the lowest published altitude (correct)**
     - Glideslope intercept at the highest altitude (incorrect)

- JACKO (incorrect)

    - **Glideslope intercept at 3,000’ (correct)**

7. **Final Question 19 (SLO 5. 28/28 students answered correctly)**
    - Refer to the GOPHER 1 arrival. What speed must we be at crossing the GEP VOR? ATC has not assigned any speed on the arrival.
        - **Pilot's discretion/Billiken Air Express descent profile speed (as long as we are above 10,000', greater than 250 KIAS and less than 335 KIAS. Below 10,000, 250 KIAS)**
        - 300
        - 280
        - 250

8. **Final Question 20 (SLO 5. 14/28 students answered correctly)**
    - Refer to the GOPHER 1 arrival. ATC says, **"DESCEND AND MAINTAIN 11,000, MINNEAPOLIS ALTIMETER IS 29.97"**. You cross the GEP VOR at 12,200. Did you violate ATC's clearance?
        - YES
        - **NO**

9. **Final Question 32 (SLO 5. 10/28 students answered correctly)**
    - Reference KMSP 10-9A. Tower is reporting 1/4 SM visibility. No RVRs are usable. Runway 4 is in use (all other runways closed). Can we depart?
        - **Yes**
        - Yes, but we have to wait to the RVRs become usable or the visibility increase to standard takeoff minimums.
        - No

10. **Final Question 64 (SLO 5. 28/28 students answered correctly)**
    - The primary reason for a departure procedure is to provide obstacle clearance protection information to pilots. A secondary reason is to increase efficiency and reduce communications and departure delays using Standard Instrument Departures.
    - **TRUE**
    - FALSE

Performance Indicator Rubric

Course: ASCI 4013 Introduction to Flight Crew Operations Laboratory Course Instructor: John Denando

Semester Taught: Fall 2022 Number of Students in Course: 28

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	100%	YES
SLO 3: Apply effective oral and written communication skills to function effectively in the aviation environment.	100%	YES
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	100%	YES

Course Assessment (Intended Use of Results)

Since the inception of this course in 2008, this is the first time the first twelve simulator lessons (lab section curriculum) of ASCI 4012 has changed. The material presented in the classroom served as a preview as to what would be covered the subsequent week in the lab. Based on instructor feedback, it did prove beneficial to the students. In the one group where I acted as their instructor, there were still weaknesses in areas that were taught in ASCI 3062 - Turbine Aircraft Transition.

Areas where I believe the simulator section could improve are as follows:

1. Mandate practice or study time in the PC lab with an instructor. I believe an amount of 30 minutes would provide a significant increase in the retention of material that should be retained.
2. Improve standardization among instructors.
3. Request a grading matrix from Bill Irwin who developed a matrix when he was the instructor of the course.
4. The inconsistency of the simulator schedule due to maintenance issues on the simulator continues to be an issue. Students sometimes go for weeks without going in the simulator, thus causing a lot of learning to be forgotten. This does not nullify the students' ability to practice on their own, which needs to improve, however, it has consistently proved detrimental to learning since its beginning.

5. Prepare better study material/course schedule/outline so that students can better prepare for lab each week.

LESSON #5: Flight 1005

CA / PM: ____

FO / PF: ____

I. DESCENT
   a. Perform Descent: D
      i. Pilots correctly perform descent checklist procedures.
      ii. Pilots maintain a sterile flight deck below 18,000 ft.
      iii. Pilots correctly use ice protection, radar, and ignition.
      iv. Pilots comply with descent profile speeds.
      v. Pilots comply with STARs and ATC clearances.
      vi. Pilots are aware of their fuel situation and have enough fuel to complete the flight safely.
      vii. Pilots correctly operate the FMS.
      viii. Pilots correctly operate the flight director and autopilot.
      ix. PM correctly calls out deviations and errors.
      x. Pilots comply with airspace and airspeed restrictions during an arrival into a non-radar environment.
      xi. PF maintains airspeed within +/- 10 knots or .02 mach.
      xii. PF maintains heading within +/- 5 degrees.
      xiii. PF maintains altitude within +/- 100 ft.
      xiv. NOTES:
         1. Both crew members unsure of appropriate "flows" for their respective seats.
         2. Situational awareness was weak leading to airspeed deviations.
         3. Unsure of how extend the runway centerline on the FMS.
         4. PM did not make appropriate callouts when tolerances for airspeed were not maintained.

   b. Perform PF/PM Tasks: C
      i. Pilots correctly enter approach into FMS.
      ii. Pilots correctly set up navigation frequencies and courses.
      iii. Pilots correctly set approach minimums.
      iv. Pilots correctly calculate landing distance.
      v. PM correctly set landing speeds.
      vi. PF briefs weather.
      vii. PF briefs the arrival, approach, airport, and NOTAMs.
      viii. PF briefs highest threat.
      ix. NOTES:
         1. Crew unsure what setting to use for minimums on the PFD.
         2. Crew did not know how to set landing speeds.

II. APPROACH:
   a. Perform CAT I ILS Approach: B-
      i. Pilots comply with the published approach procedure.

ii. Pilots correctly configure flaps and gear at appropriate times.

iii. PM correctly makes required callouts.
iv. PF correctly makes required callouts.
v. Pilots correctly perform before landing checklist.
vi. Pilots correctly identify the runway environment before descent below minimums.
vii. Pilots correctly decide to execute a missed approach when appropriate.
viii. Pilots correctly operate the FMS.
ix. Pilots correctly operate the flight director and autopilot.
x. PM correctly calls out deviations and errors.
xi. PF maintains no more than one-quarter deflection of the localizer and glide slope.
xii. PF maintains airspeed within +/- 5 knots.
xiii. PF maintains a stabilized approach.
xiv. NOTES:
1. Due to lack of studying, students behind on situational awareness and appropriate callouts.

III. LANDING:
a. Perform Normal Landing: B
i. PF lands in the touchdown zone, not to exceed one-third of the runway length.
ii. PF executes touchdown on the runway centerline.
iii. PF correctly uses brakes.
iv. PF correctly uses thrust reverse.
v. PM correctly makes required callouts.
vi. PF maintains positive directional control during the landing rollout.
vii. PM correctly calls out deviations and errors.
viii. PF maintains a stabilized flight path.
ix. PF maintains airspeed within +/- 5 knots.
x. NOTES:
1. Landing was performed to the level expected for this lesson.
2. Airspeed control was not within standard.

IV. SYSTEMS:
a. Operate Autopilot: C-
i. Autopilot general knowledge
ii. Autopilot controls and indications
iii. Autopilot limitations
iv. Autopilot operation
v. NOTES:
1. General autopilot knowledge and application is lacking considering this is lesson 5 and numerous modes and usage have been focused on the first four lessons.

V. HUMAN FACTORS:
a. Demonstrate Communication Skills: C-
i. Pilots use standard phraseology and language as specified in the SOP to communicate with other parties and in a manner that is clear to understand.

ii. Listeners seek clarification to unclear plans and communicators clarify ideas that were not clear to the listener.

iii. Pilots pre-brief operational requirements as well as identify threats, develop viable mitigation strategies for them, and communicate expectations to fellow crewmembers.
iv. Pilots debrief threats encountered and assess the outcome of employed mitigation strategies.
v. Pilots demonstrate teamwork by communicating concerns to fellow crewmembers and promptly and positively responding to communication from others.
vi. Pilots demonstrate willingness to receive constructive feedback and accept critiques without becoming defensive.
vii. NOTES:
1. **There was a lot confusion throughout the flight due to lack of studying. This caused a communication breakdown as neither pilot knew their specific role.**

b. Demonstrate Workload Management Skills: C+
i. Pilots prioritize tasks and distribute workload between PF/PM to manage the flight path and prioritize flying the airplane above all other tasks.
ii. Pilots create time to manage threats and make decisions to prevent task saturation.
iii. Pilots adjust automation levels to match situational demands, reduce workload for the crew, and enhance attention management.
iv. Pilots recognize phases of flight where they are most vulnerable to flight path deviations and strategically plan workload to manage distractions by completing non-monitoring tasks during lower areas of vulnerability
v. NOTES:
1. **When asked what tasks were to be accomplished prior to descent, the PM did not know what was supposed to be accomplished. This was covered in the previous lecture.**

c. Demonstrate Problem Solving/Decision Making Skills: NA
i. Captains follow the decision-making process to review assumptions, choose the most viable solution based on the data and continue to evaluate the decision for viability.
ii. Pilots determine the criticality of threats encountered and match decisions to manage the threats.
iii. Pilots use available resources to expand the team as necessary to manage threats and make sound decisions.
iv. First Officers contribute pertinent information to enhance the decision-making process.
NOTES:

d. Demonstrate Situational Awareness Skills: D
i. Pilots recognize potentially distracting situations and develop strategies to mitigate the distraction potential.
ii. Pilots recognize and communicate to other when individual awareness is low and work to raise awareness levels.
iii. Pilots maintain an awareness of the aircraft position and potential hazards associated with it.
iv. NOTES:
1. **Due to the lack of studying and preparation, the crew was consistently**

unaware of the aircraft position and energy state throughout the descent.

e. Demonstrate Monitor and Cross-Checking Skills: C
   i. Pilots demonstrate acceptance of a flight path monitoring responsibility by maintaining constant situational awareness of the aircraft's flight path and immediately bringing any concerns to the PF's attention.
   ii. Pilots communicate effectively with each other to develop and maintain a shared mental model of how to assure the flight path of the aircraft.
   iii. Pilots callout deviations from intended flight path as specified in the SOPM.
   iv. Pilots verify changes to flight path configuration and/or automation.
   v. Pilots monitor AC systems and status for threats to safety and callout observed indications.
   vi. Pilots comply with SOP PM assignments.
   vii. NOTES:
      1. The lack of coordination between the crew enhanced the confusion of the entire flight (from top of descent to landing).

f. Demonstrate Professionalism Skills: C-
   i. Pilots comply with the professional appearance, grooming, and dress standards as specified in the Billiken Air Express Pilot Policy Manual.
   ii. Pilots conduct themselves with an attitude, language, and demeanor aligned with Billiken Air Express guiding principles.
   iii. Pilots adjust leadership styles to match the situational demands and demeanor of the followers.
   iv. Captains assist the chief pilot in mentoring and furthering the progress of the SIC.
   v. First Officers apply the 10 rules of good followership as listed in the enhanced leadership manual.
   vi. Pilots demonstrate a commitment to being fully compliant with procedures.
   vii. Pilots correctly use Threat Management to organize CRM skills and manage anticipated/unanticipated threats.
   viii. NOTES:
      1. The lack of preparation was evident; more evident in one crewmember compared to the other. Such a lack of preparation had a significant negative impact on the other student's performance. When I asked questions and the student didn't know the answer, it caused multiple pauses in the lesson to "teach" material that the student should have had a better knowledge about. The material should have been more of a review, or this is how it is applied compared to having to teach it as it had never been discussed before.

LESSON #10: Flight 1010

CA / PM:

FO / PF:

I. TAKEOFF:
   a. Perform Engine Failure at V1: A-
      i. PF maintains directional control when the engine fails.
      ii. PF correctly makes required callouts.
      iii. PM correctly makes required callouts.
      iv. Pilots correctly retracts flaps.
      v. Pilots correctly comply with the single engine departure procedure.
      vi. Pilots correctly operate the flight director and autopilot.
      vii. PM correctly calls out deviations and errors.
      viii. PF maintains heading within +/- 10 degrees.
      ix. PF maintains airspeed within - 0/+ 5 knots.
      x. PF maintains acceleration altitude within +/- 100 ft.
      xi. NOTES:
         1.

II. APPROACH:

   a. Perform CAT I ILS Approach: A
      i. Pilots comply with the published approach procedure.
      ii. Pilots correctly configure flaps and gear at appropriate times.
      iii. PM correctly makes required callouts.
      iv. PF correctly makes required callouts.
      v. Pilots correctly perform before landing checklist.
      vi. Pilots correctly identify the runway environment before descent below minimums.
      vii. Pilots correctly decide to execute a missed approach when appropriate.
      viii. Pilots correctly operate the FMS.
      ix. Pilots correctly operate the flight director and autopilot.
      x. PM correctly calls out deviations and errors.
      xi. PF maintains no more than one-quarter deflection of the localizer and glide slope.
      xii. PF maintains airspeed within +/- 5 knots.
      xiii. PF maintains a stabilized approach.
      xiv. NOTES:
         1. PM didn't extend the center line/PF forgot to ask

   b. Perform Single-Engine Approach: B+
      i. Pilots comply with the published approach procedure.
      ii. Pilots correctly configure flaps and gear at appropriate times.
      iii. PM correctly makes required callouts.
      iv. PF correctly makes required callouts.
      v. Pilots correctly perform before landing checklist.

vi. Pilots correctly identify the runway environment before descent below minimums.

vii. Pilots correctly decide to execute a missed approach when appropriate.
viii. Pilots correctly operate the FMS.
ix. Pilots correctly operate the flight director and autopilot.
x. PM correctly calls out deviations and errors.
xi. PF maintains no more than one-quarter deflection of the localizer and glide slope.
xii. PF maintains airspeed within +/- 5 knots.
xiii. PF maintains a stabilized approach.
xiv. NOTES:
1. PF called for flaps 45, but corrected before flaps positioned – not sure PM was going to catch it.

c. Perform Single-Engine Missed Approach: A
i. Pilots correctly comply with the ATC instructions or charted missed approach procedure.
ii. PM correctly makes required callouts.
iii. PF correctly makes required callouts.
iv. Pilots correctly operate the FMS.
v. Pilots correctly operate the flight director and autopilot.
vi. PM correctly calls out deviations and procedure errors.
vii. PF descends no lower than -50 ft. below approach minimums on missed approach.
viii. PF maintains acceleration altitude within +/- 100 ft.
ix. PF maintains altitude within +/- 100 ft.
x. PF maintains heading within +/- 5 degrees.
xi. NOTES:
1. Well done

III. LANDING:
a. Perform Single-Engine Landing: A
i. PF lands in the touchdown zone, not to exceed one-third of the runway length.
ii. PF executes touchdown on the runway centerline.
iii. PF correctly uses brakes.
iv. PF correctly uses thrust reverse.
v. PM correctly makes required callouts.
vi. PF maintains positive directional control during the landing rollout.
vii. PM correctly calls out deviations and errors.
viii. PF maintains a stabilized flight path.
ix. PF maintains airspeed within +/- 5 knots.
x. NOTES:
1. Good

IV. SYSTEMS:
a. Operate Autopilot: A
i. Autopilot general knowledge
ii. Autopilot controls and indications
iii. Autopilot limitations
iv. Autopilot operation

v. **NOTES 1:**
    1. Kyle is still clearly more proficient with the functionality of the FMS than Drew is

LESSON #10: Flight 1010

V. HUMAN FACTORS:
  a. Demonstrate Communication Skills: A
    i. Pilots use standard phraseology and language as specified in the SOP to communicate with other parties and in a manner that is clear to understand.
    ii. Listeners seek clarification to unclear plans and communicators clarify ideas that were not clear to the listener.
    iii. Pilots pre-brief operational requirements as well as identify threats, develop viable mitigation strategies for them, and communicate expectations to fellow crewmembers.
    iv. Pilots debrief threats encountered and assess the outcome of employed mitigation strategies.
    v. Pilots demonstrate teamwork by communicating concerns to fellow crewmembers and promptly and positively responding to communication from others.
    vi. Pilots demonstrate willingness to receive constructive feedback and accept critiques without becoming defensive.
    vii. NOTES:
      1. All communications clear and concise

  b. Demonstrate Workload Management Skills: A
    i. Pilots prioritize tasks and distribute workload between PF/PM to manage the flight path and prioritize flying the airplane above all other tasks.
    ii. Pilots create time to manage threats and make decisions to prevent task saturation.
    iii. Pilots adjust automation levels to match situational demands, reduce workload for the crew, and enhance attention management.
    iv. Pilots recognize phases of flight where they are most vulnerable to flight path deviations and strategically plan workload to manage distractions by completing non-monitoring tasks during lower areas of vulnerability
    v. NOTES:
      1. Reminded both to start arrival tasks earlier (ATIS/speeds)

  c. Demonstrate Problem Solving/Decision Making Skills: A
    i. Captains follow the decision-making process to review assumptions, choose the most viable solution based on the data and continue to evaluate the decision for viability.
    ii. Pilots determine the criticality of threats encountered and match decisions to manage the threats.
    iii. Pilots use available resources to expand the team as necessary to manage threats and make sound decisions.
    iv. First Officers contribute pertinent information to enhance the decision-making process.
    v. NOTES:
      1.

  d. Demonstrate Situational Awareness Skills: A
    i. Pilots recognize potentially distracting situations and develop strategies to mitigate the distraction potential.
    ii. Pilots recognize and communicate to other when individual awareness is low and work

to raise awareness levels.

iii. Pilots maintain an awareness of the aircraft position and potential hazards associated with it.
iv. NOTES:
1.

e. Demonstrate Monitor and Cross-Checking Skills: A
i. Pilots demonstrate acceptance of a flight path monitoring responsibility by maintaining constant situational awareness of the aircraft's flight path and immediately bringing any concerns to the PF's attention.
ii. Pilots communicate effectively with each other to develop and maintain a shared mental model of how to assure the flight path of the aircraft.
iii. Pilots callout deviations from intended flight path as specified in the SOPM.
iv. Pilots verify changes to flight path configuration and/or automation.
v. Pilots monitor AC systems and status for threats to safety and callout observed indications.
vi. Pilots comply with SOP PM assignments.
vii. NOTES:
1.

f. Demonstrate Professionalism Skills: A
i. Pilots comply with the professional appearance, grooming, and dress standards as specified in the Billiken Air Express Pilot Policy Manual.
ii. Pilots conduct themselves with an attitude, language, and demeanor aligned with Billiken Air Express guiding principles.
iii. Pilots adjust leadership styles to match the situational demands and demeanor of the followers.
iv. Captains assist the chief pilot in mentoring and furthering the progress of the SIC.
v. First Officers apply the 10 rules of good followership as listed in the enhanced leadership manual.
vi. Pilots demonstrate a commitment to being fully compliant with procedures.
vii. Pilots correctly use Threat Management to organize CRM skills and manage anticipated/unanticipated threats.
viii. NOTES:
1.

LESSON #12: Flight 1012

CA / PM: [redacted]

FO / PF: [redacted]

I. TAKEOFF:

a. Perform Normal Takeoff: **A-**

i. Pilots correctly use ice protection, radar, and ignition as required.
ii. Pilots correctly transfer the controls (if applicable).
iii. Pilots correctly set thrust.
iv. PF correctly rotates.
v. PF correctly makes required callouts.
vi. PM correctly makes required callouts.
vii. PM correctly retracts flaps.
viii. Pilots correctly operate the flight director and autopilot.
ix. PM correctly calls out deviations and errors.
x. PF maintains centerline during takeoff roll.
xi. PF maintains heading within +/- 5 degrees.
xii. PF maintains airspeed within -0/+ 10 knots.
xiii. **NOTES:**

b. Perform Engine Failure at V1: **B**

i. PF maintains directional control when the engine fails.
ii. PF correctly makes required callouts.
iii. PM correctly makes required callouts.
iv. Pilots correctly retracts flaps.
v. Pilots correctly comply with the single engine departure procedure.
vi. Pilots correctly operate the flight director and autopilot. **No**
vii. PM correctly calls out deviations and errors.
viii. PF maintains heading within +/- 10 degrees.
ix. PF maintains airspeed within - 0/+ 5 knots.
x. PF maintains acceleration altitude within +/- 100 ft.
xi. NOTES:

1. 2 hands on the autopilot at the same time

II. DESCENT

a. Perform Descent: **B+**

i. Pilots correctly perform descent checklist procedures.
ii. Pilots maintain a sterile flight deck below 18,000 ft.
iii. Pilots correctly use ice protection, radar, and ignition.
iv. Pilots comply with descent profile speeds.
v. Pilots comply with STARs and ATC clearances.
vi. Pilots are aware of their fuel situation and have enough fuel to complete the flight safely.
vii. Pilots correctly operate the FMS.

viii. Pilots correctly operate the flight director and autopilot.

ix. PM correctly calls out deviations and errors.
x. Pilots comply with airspace and airspeed restrictions during an arrival into a non-radar environment.
xi. PF maintains airspeed within +/- 10 knots or .02 mach.
xii. PF maintains heading within +/- 5 degrees.
xiii. PF maintains altitude within +/- 100 ft.
xiv. NOTES:
1. Did not assess on lights and anti-ice

b. Perform PF/PM Tasks: **B-**
i. Pilots correctly enter approach into FMS.
ii. Pilots correctly set up navigation frequencies and courses.
iii. Pilots correctly set approach minimums.
iv. Pilots correctly calculate landing distance.
v. PM correctly set landing speeds.
vi. PF briefs weather.
vii. PF briefs the arrival, approach, airport, and NOTAMs.
viii. PF briefs highest threat.
ix. NOTES:
1. Nothing beyond the approach was briefed

III. APPROACH:

a. Perform LOC Approach: **A**
i. Pilots comply with the published approach procedure.
ii. Pilots correctly configure flaps and gear at appropriate times.
iii. PM correctly makes required callouts.
iv. PF correctly makes required callouts.
v. Pilots correctly perform before landing checklist.
vi. Pilots correctly identify the runway environment before descent below minimums.
vii. Pilots correctly decide to execute a missed approach when appropriate.
viii. Pilots correctly operate the FMS.
ix. Pilots correctly operate the flight director and autopilot.
x. PM correctly calls out deviations and errors.
xi. PF maintains no more than one-quarter deflection of the LOC.
xii. PF maintains airspeed within +/- 5 knots.
xiii. PF maintains a stabilized approach.
xiv. NOTES:
1. Did RNAV instead, no issues

b. Perform Missed Approach Procedure: **B-**
i. Pilots correctly comply with the ATC instructions or charted missed approach procedure.
ii. PM correctly makes required callouts.
iii. PF correctly makes required callouts.
iv. Pilots correctly operate the FMS.

v. PM correctly retracts flaps.
vi. Pilots correctly operate the flight director and autopilot.

vii. PM correctly calls out deviations and procedure errors.
viii. PF descends no lower than -50 ft. below approach minimums on missed approach.
ix. PF maintains altitude within +/- 100 ft.
x. PF maintains heading within +/- 5 degrees.
xi. NOTES:
1. Late to go around

c. Perform CAT I ILS Approach: **A**
xv. Pilots comply with the published approach procedure.
xvi. Pilots correctly configure flaps and gear at appropriate times.
xvii. PM correctly makes required callouts.
xviii. PF correctly makes required callouts.
xix. Pilots correctly perform before landing checklist.
xx. Pilots correctly identify the runway environment before descent below minimums.
xxi. Pilots correctly decide to execute a missed approach when appropriate.
xxii. Pilots correctly operate the FMS.
xxiii. Pilots correctly operate the flight director and autopilot.
xxiv. PM correctly calls out deviations and errors.
xxv. PF maintains no more than one-quarter deflection of the localizer and glide slope.
xxvi. PF maintains airspeed within +/- 5 knots.
xxvii. PF maintains a stabilized approach.
xxviii. NOTES:
1. Well executed

d. Perform Single-Engine Approach: **B-**
xxix. Pilots comply with the published approach procedure.
xxx. Pilots correctly configure flaps and gear at appropriate times. **No**
xxxi. PM correctly makes required callouts.
xxxii. PF correctly makes required callouts. **No**
xxxiii. Pilots correctly perform before landing checklist.
xxxiv. Pilots correctly identify the runway environment before descent below minimums.
xxxv. Pilots correctly decide to execute a missed approach when appropriate.
xxxvi. Pilots correctly operate the FMS.
xxxvii. Pilots correctly operate the flight director and autopilot.
xxxviii. PM correctly calls out deviations and errors.
xxxix. PF maintains no more than one-quarter deflection of the localizer and glide slope.
xl. PF maintains airspeed within +/- 5 knots.
xli. PF maintains a stabilized approach.
xlii. **NOTES:**
1. PF tried to configure full flaps before PM stopped him

IV. LANDING:
a. Perform Single-Engine Landing: **B-**
i. PF lands in the touchdown zone, not to exceed one-third of the runway length.
ii. PF executes touchdown on the runway centerline.

iii. PF correctly uses brakes.
iv. PF correctly uses thrust reverse.

v. PM correctly makes required callouts.
vi. PF maintains positive directional control during the landing rollout.
vii. PM correctly calls out deviations and errors.
viii. PF maintains a stabilized flight path.
ix. PF maintains airspeed within +/- 5 knots.
x. NOTES:
1. Trouble keeping centerline

V. SYSTEMS:
a. Operate Autopilot: **A**
i. Autopilot general knowledge
ii. Autopilot controls and indications
iii. Autopilot limitations
iv. Autopilot operation
v. NOTES:
1.

VI. HUMAN FACTORS:
a. Demonstrate Communication Skills: **B**
i. Pilots use standard phraseology and language as specified in the SOP to communicate with other parties and in a manner that is clear to understand.
ii. Listeners seek clarification to unclear plans and communicators clarify ideas that were not clear to the listener.
iii. Pilots pre-brief operational requirements as well as identify threats, develop viable mitigation strategies for them, and communicate expectations to fellow crewmembers.
iv. Pilots debrief threats encountered and assess the outcome of employed mitigation strategies. **No**
v. Pilots demonstrate teamwork by communicating concerns to fellow crewmembers and promptly and positively responding to communication from others.
vi. Pilots demonstrate willingness to receive constructive feedback and accept critiques without becoming defensive.
vii. NOTES LEG 1:
1. PM corrected PF multiple times

b. Demonstrate Workload Management Skills: **A**
i. Pilots prioritize tasks and distribute workload between PF/PM to manage the flight path and prioritize flying the airplane above all other tasks.
ii. Pilots create time to manage threats and make decisions to prevent task saturation.
iii. Pilots adjust automation levels to match situational demands, reduce workload for the crew, and enhance attention management.
iv. Pilots recognize phases of flight where they are most vulnerable to flight path deviations and strategically plan workload to manage distractions by completing non-monitoring tasks during lower areas of vulnerability
v. NOTES:
1.

c. Demonstrate Problem Solving/Decision Making Skills: **B-**

   i. Captains follow the decision-making process to review assumptions, choose the most viable solution based on the data and continue to evaluate the decision for viability.
   ii. Pilots determine the criticality of threats encountered and match decisions to manage the threats.
   iii. Pilots use available resources to expand the team as necessary to manage threats and make sound decisions.
   iv. First Officers contribute pertinent information to enhance the decision-making process.
   v. NOTES:
      1. Captain regularly corrected and prompted first officer into callouts

d. Demonstrate Situational Awareness Skills: B
   i. Pilots recognize potentially distracting situations and develop strategies to mitigate the distraction potential.
   ii. Pilots recognize and communicate to other when individual awareness is low and work to raise awareness levels.
   iii. Pilots maintain an awareness of the aircraft position and potential hazards associated with it.
   iv. NOTES:
      1.

e. Demonstrate Monitor and Cross-Checking Skills: **B**
   i. Pilots demonstrate acceptance of a flight path monitoring responsibility by maintaining constant situational awareness of the aircraft's flight path and immediately bringing any concerns to the PF's attention.
   ii. Pilots communicate effectively with each other to develop and maintain a shared mental model of how to assure the flight path of the aircraft.
   iii. Pilots callout deviations from intended flight path as specified in the SOPM.
   iv. Pilots verify changes to flight path configuration and/or automation.
   v. Pilots monitor AC systems and status for threats to safety and callout observed indications.
   vi. Pilots comply with SOP PM assignments.
   vii. NOTES:
      1. Missed several "check speed" calls

f. Demonstrate Professionalism Skills: **A-**
   i. Pilots comply with the professional appearance, grooming, and dress standards as specified in the Billiken Air Express Pilot Policy Manual.
   ii. Pilots conduct themselves with an attitude, language, and demeanor aligned with Billiken Air Express guiding principles.
   iii. Pilots adjust leadership styles to match the situational demands and demeanor of the followers.
   iv. Captains assist the chief pilot in mentoring and furthering the progress of the SIC.
   v. First Officers apply the 10 rules of good followership as listed in the enhanced leadership manual.
   vi. Pilots demonstrate a commitment to being fully compliant with procedures.

vii. Pilots correctly use Threat Management to organize CRM skills and manage anticipated/unanticipated threats.

viii. NOTES:

1.

Performance Indicator Rubric

Course: ASCI 4022 Advanced Flight Crew Operations Course Instructor: John Denando

Semester Taught: Spring 2023 Number of Students in Course: 28

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	100%	Yes
SLO 3: Apply effective oral and written communication skills to function effectively in the aviation environment.	100%	Yes
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	100%	Yes

Course Assessment (Intended Use of Results)

Students do well on quizzes and that does not transfer over to the simulator. Perhaps being in the classroom more than once a week will help.

Students often lack critical thinking skills. It appears that it is not being taught early in their training. Improve this with the flight instructors and on the flight line and you will see improvements in this course.

SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.

Quiz 1, Question 1: 26/28 (93%) answered correctly.

The SOP provides guidance to crews on how to operate Billken Air Express aircraft and compliance within the procedures found in the manual is at the discretion of the captain. For example, captains may develop their takeoff briefing and use that in lieu of using the example found in the Billiken Air Express SOP.

- True
- **False**

Quiz 1, Question 10: 25/28 (89%) answered correctly.

When arriving to the airport from an overnight, crews must be...

- At the gate 35 minutes prior to departure
- At the airport 35 minutes prior to departure
- At the airport 45 minutes prior to departure
- **At the gate 45 minutes prior to departure**

Quiz 1, Question 22: 21/28 (75%) answered correctly.

It is June in Dallas and 95 degrees. We should use the______during power up and boarding.

- Either the GPU or APU
- **APU**
- GPU

Quiz 3, Question 12:

During cruise, you get an ACARS message from dispatch stating the destination weather is 10 miles, with overcast skies at 1800' (10 SM, OVC 018). Select the correct statements from the following...

- Disregard the message and go back to (illegally) playing your saved BROOKLYN CUZZO videos from your phone.
- **If both the PIC and Dispatcher agree the flight can be operated safely, continue to the destination without adding an alternate.** 23/28 answered correctly.
- Sip on some Starbucks before deciding NOT to respond to dispatch.
- **Divert and get more fuel.** 20/28 answered correctly.
- **Add an alternate that is close enough to be within the fuel burn capability of the aircraft. (Alternate is 20 minutes away and we are landing with 30 minutes more than our reserve fuel).** 23/28 answered correctly.

- Do not respond to dispatch at all.

Mid-Term Question 1:

Select the following instances when a missed approach would be appropriate.

- In VMC conditions after the runway in sight call has been made, a malfunction of the navigation equipment. 25/28
- **In IMC conditions after the runway in sight call has been made, a malfunction of the navigation equipment.** 28/28
- **The approach becomes unstable.** 27/28
- **Upon reaching minimums the runway is not in sight.** 26/28

SLO 3: Apply effective oral and written communication skills to function effectively in the aviation environment.

Quiz 1, Question 5: 23/28 (83%) answered correctly.

In flight, who reads the Quick Reference Checklist (QRC)?

- CA
- FO
- PF
- **PM**

Quiz 3, Question 17: 28/28 (100%) answered correctly.

The pilot in command and an authorized aircraft dispatcher shall sign the release only if they both believe that the flight can be made with safety. However, if the dispatcher feels it is safe to go and the captain does not, the flight is still legal to depart.

- True
- **False**

Quiz 4, Question 19: 25/28 (89%) answered correctly.

Use standard ICAO radio phraseology (see Jeppesen, Air Traffic Control section). Be clear and concise and state each digit of a number separately, e.g. “Billiken Air Four One Six Three” instead of “Billiken Air Forty One Sixty Three.”

- **True**
- False

SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.

Mid-Term, Question 5: 28/28 (100%) answered correctly.

During any abnormality in flight, it is more important to get the QRH read immediately, before ensuring the aircraft's flight path is appropriate and stable.

- True
- **False**

Mid-Term Question 25: 20/28 (71%) answered correctly.

During taxi out, the right engine catches fire. The captain reaches over, without communicating anything to the First Officer, and shuts off the engine using the thrust lever. Is the consistent with Billiken Air Express procedures?

- Yes
- **No**

Performance Indicator Rubric

Course: ASCI 4023 Advanced Flight Crew Operations Laboratory   Course Instructor: John Denando

Semester Taught: Spring 2023   Number of Students in Course: 28

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	100%	Yes
SLO 3: Apply effective oral and written communication skills to function effectively in the aviation environment.	100%	Yes
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	100%	Yes

Course Assessment (Intended Use of Results)

This semester presented challenges that I have never seen in my 15 years teaching in the simulator. My assumption is that the frustration due to issues with the simulator consistently not working properly bled over to everyone's attitude in accomplishing all lessons with professional instruction. Both students and instructors seemed to prefer not to accomplish lessons rather than find time to make them up. Based on input from other instructors, material from the classroom as well as previous courses did not transfer into the simulator as hoped. Weekly homework may help improve the transfer, but that assumes the student puts in the time to study. Student's grades on quizzes do not correlate with the performance in the simulator. I believe many received higher grades than they should have; this was discussed with instructors before, but between a lack of instructor experience and the simulator not working, my view for this course has a long way to go. In conjunction with my resignation, perhaps it is time to lower the standard and expectations of the students for this course. It is disheartening to write that, but I believe "the sim breaking" only goes so far.

Out of the 9 instructors, only 2 have professional experience in the areas covered during this course. With smaller class sizes, I could be more selective with whom I asked to instruct in the sim. Due to the size of this class, we struggled to get instructors to teach the course, let alone

instructors with professional experience or instructors whom I would have personally asked to teach for me.

I would suggest making this course optional for those who want to put in the effort, increase the amount of time spent studying outside the classroom, or perhaps what will be a significant improvement is having the course 2-3 times a week. As discussed many times, students without an instrument rating have no business in the course. Not only does it negate their learning, but it also hinders the learning of their simulator partner.

Student Debriefing Example 1

- Our eighth simulator was a LOFT from Minneapolis to Cedar Rapids. This lesson was our final one of the semester to evaluate whether or not we could effectively use CRM to get from our origin to our destination.

  The original plan for the LOFT was going to incorporate a scenario that included us coming into a windshear scenario in Cedar Rapids. Upon briefing the scenario on the release and realizing that there was added contingency fuel for an alternate at Des Moines, our plan was to go to Cedar Rapids, shoot the approach, and if we went missed, we would elect to divert because the winds were more favorable in Des Moines.

  Upon briefing our plan with our instructor, he believed that we had the right plan in place and elected to change the lesson to do the planned flight with no windshear, but to make sure that we could go through the flows and callouts correctly for the CRJ-700.

  Both of us did a great job from the start to finish briefing the flight, talking with ATC. I don't believe that we had any major issues other than being rusty with our flows once on the ground.

  I believe that this course has been very helpful in preparing me to become a future pilot for a turbine jet in the future and to work toward operating a safe flight with another person in the seat next to me and knowing how to communicate with them. Although the course didn't have enough time to go through all of the material, it was great to get a glimpse at what I could be experiencing in the next few years after college. I am forever grateful for this opportunity, and I hope to someday apply my learning and knowledge in the aeronautical industry.

Student Debriefing Example 2.

- For the seventh lab, we completed our second LOFT that consisted of traveling to KDEN from KRAP airport. Compared to our first LOFT, I thought that it went a lot smoother for a few reasons. I was acting as captain/PM and Michael was acting as FO/PF. Our startup, taxi out, takeoff, and cruise procedures were very smooth, as our callouts and flows were practiced beforehand and memorized. For the WARTS briefing, we had to ensure that we briefed the weather extra carefully due to thunderstorms arising and forming to the east of Denver, and ensured that, with the given conditions and circumstances relating to fuel, our alternate (KCOS) could be reached.

  Once we reached our cruising altitude, we briefed the upcoming STAR and approach procedures to ensure that we were prepared for what we could expect to happen, as well as get ahead of the airplane. However, we noticed that the fuel situation onboard was below what we anticipated once we flew closer to KDEN. We informed ATC of the situation, and received vectors towards KDEN and successfully completed an instrument approach into the airport. Michael and I's procedures for descent, approach, and landing operations were smooth and portrayed effective CRM, communication, and efficiency skills.

  This LOFT was successful, even though there were minor mistakes with a few flows towards the end of the lesson. Michael and I noticed the fuel situation and followed correct emergency and ATC procedures to correct for it, as well as worked together to ensure the safety of the aircraft was not compromised during any phase of flight. We are confident that we can bring these skills to our next LOFT operation so it will

be safe and successful!

Student Debriefing Example 3

- In today's lesson we went through all the checklist from the gate to the runway. We found out some mistakes we made from Donny's class. For example, we should do the flow independently and silently first, and then do the normal checklist. We also realized that there is a lot of memorization work that needs to be done. Basically, we need to remember all the expansion checklists, especially for things like the FLIGHT INSTRUMENT setup, pilot flying will need to state, "THE AUTOPILOT IS COUPLED TO MY SIDE, ALITITUDE PRE-SELECT ( ), ALTIMETER (_), HEADING BUG SET FOR RUNWAY (__)." Overall, it is not an easy job. We need to work together. Hopefully we can do as complete as possible for the next sim lesson.

CA / PM: Student 1

FO / PF: Student 2

I. PRE-DEPARTURE GROUND OPERATIONS:

a. Report for duty: **A**

i. Pilots report to the aircraft on time.
ii. Pilots report fit for duty.
iii. Pilots report for duty with a flashlight.
iv. Pilots report for duty with a headset.
v. Pilots report for duty with a current company identification badge.
vi. Pilots report for duty with a pilot certificate with appropriate type and class endorsement.
vii. Pilots report for duty with a current FAA medical certificate.
viii. Pilots report for duty with a valid passport.
ix. Pilots report for duty with an FCC radio permit.
x. Pilots report for duty wearing a Billiken Air Express approved uniform.
xi. NOTES:

b. Perform crew briefing: **F**

i. Captain correctly conducts the initial crew briefing.
ii. Captain correctly briefs cabin crew on pertinent items prior to each flight.
iii. NOTES:

1. Neither crew did not perform the required briefing.

c. Perform external inspection: **A**

i. Pilots correctly perform an external inspection prior to and after each flight.

d. Perform Originating Checklist: **CA: C+ and FO: B**-

i. Captain correctly performs originating checklist flow.
ii. First Officer correctly performs originating checklist flow.
iii. Pilots correctly perform challenge and response checklist.
iv. NOTES:

1. CA turned on beacon (should be turned on during ENGINE START flow).
2. CA no hydraulic test. When I prompted him to do it, it was done incorrectly. Also left pumps running after test

complete.

3. **FO turned probes ON (should be done during PRE-TAXI flow)**

4. **FO did not turn on thrust reversers.**
5. **FO turned emergency lights ON instead of ARMED.**

e. Perform Pre-Start Checklist: **CA: F and FO: A-.**

i. Captain correctly performs prestart checklist tasks.
ii. First Officer correctly performs prestart checklist tasks.
iii. PF correctly performs PF prestart checklist tasks.
iv. PM correctly performs PM prestart checklist tasks.
v. Pilots correctly perform challenge and response checklist
vi. NOTES:

1. **CA did not know how to set up FMS. Was entering in each fix individually.**
   a. **CA did not set up MFDs correctly.**

f. Perform Takeoff Briefing: **A-**

i. PF briefs weather.
ii. PF briefs the airport, rejected takeoff plan, area departure, NOTAMs, and engine out procedure.
iii. PF verifies the route in the FMS against the clearance PMs.
iv. PF briefs highest threat.
v. NOTES:

1. **Did not verify fixes in FMS against the charts.**
2. **Flight instruments, "autopilot coupled to my side…" not accomplished.**
3. **Single-engine departure procedure not briefed.**

g. Perform Weight and Balance: NA

i. CA ensures weight and balance is calculated

h. Perform Engine Start Checklist and Pushback: **CA:F and FO: D**

i. Captain correctly performs engine start checklist flow.
ii. Captain and or First Officer correctly performs engine start checklist tasks.
iii. Pilots correctly perform challenge and response checklist.
iv. Pilots correctly perform pushback.
v. Pilots correctly start engines.
vi. NOTES:

1. **Before the checklist, while at the gate putting in takeoff data and cargo door open, CA reached over sets flaps to 20.**

2. CA called for checklist before doing flow.

3. **CA calling metering on ramp frequency.**
4. **Called for push on COMM 1 and no communication with ramp crew established before calling.**
5. **Doing checklist without the flow and CA calling fuel pumps ON when not actually on.**
6. **FO called hydraulic pumps and CA turned off both Hydraulic SOVs.**
7. **CA turned on fuel crossflow before starting engines during pushback.**
8. **CA introduced fuel… FO pressed the start button. Did for #1 engine as well**
    a. **"Good start on engine 1 at 45%"**
9. **FO told ramp it's ok to disconnect.**

i. Perform Aborted Start: NA
    i. Pilots correctly recognize abnormal start indications.
    ii. Pilots correctly perform start abort memory item.
    iii. Pilots correctly complete start abort QRC and QRH procedure.
    iv. NOTES:

j. Perform Pre-Taxi Checklist: **CA: C- and FO: B+**
    i. Captain correctly performs taxi checklist flow.
    ii. First Officer correctly performs taxi checklist flow.
    iii. Pilots correctly perform challenge and response checklist.
    iv. NOTES:
        1. **CA turned on thrust reversers (part of FO's ORIGINATING FLOW)**
        2. **EICAS status messages boxed.**

k. Perform Taxi: **CA: B and FO: B+**
    i. Captain conducts a single engine taxi when conditions permit.
    ii. First Officer correctly performs engine start procedure during taxi.
    iii. First Officer writes down complex taxi instructions.
    iv. Pilots comply with taxi instructions issued by ATC.
    v. Pilots correctly use aircraft deicing/anti-icing equipment during taxi.
    vi. Captain taxis aircraft at a safe speed.
    vii. Pilots use correct procedures when crossing active runways.
    viii. Pilots maintain a sterile flight deck.
    ix. Pilots have the airport diagram chart available for reference during taxi.
    x. First Officer correctly calls out deviations and errors.

xi. NOTES:

1. **Put 121.72 and not 121.75 in frequency.**
2. **CA did not have taxi diagram out and visible.**
3. **Missed taxiway Victor (can be difficult to see in sim).**

l. Perform Before Takeoff Checklist: **CA: and FO: D.**

i. First Officer correctly performs before takeoff checklist to the line flow.
ii. First Officer correctly performs before takeoff checklist to the line tasks.
iii. Captain correctly performs before takeoff below the line checklist flow.
iv. First Officer correctly performs before takeoff checklist below the line flow.
v. Pilots correctly perform challenge and response checklist.
vi. NOTES:
1. **Transmitted on ground, did not call FAs and get "cabin secure".**
2. **CA called for "Below the line" part of the checklist before getting cleared to cross the runway**
    a. **CAS "checked/cleared" not done appropriately.**
3. **Told to monitor tower and FO called tower.**

II. TAKEOFF:

a. Perform Normal Takeoff: **CA/PM: C and FO/PF: B**

i. Pilots correctly use ice protection, radar, and ignition as required.
ii. Pilots correctly transfer the controls (if applicable).
iii. Pilots correctly set thrust.
iv. PF correctly rotates.
v. PF correctly makes required callouts.
vi. PM correctly makes required callouts.
vii. PM correctly retracts flaps.
viii. Pilots correctly operate the flight director and autopilot.
ix. PM correctly calls out deviations and errors.
x. PF maintains centerline during takeoff roll.
xi. PF maintains heading within +/- 5 degrees.
xii. PF maintains airspeed within -0/+ 10 knots.
xiii. NOTES:
1. **Clearance "turn left heading 180" and cleared for takeoff and FO set the heading to 180 while on the ground. Fixed it before beginning takeoff roll.**
2. **CA moves up thrust levers and said, "Check thrust" even though he wasn't PF.**
3. **PF forgot and CA did not recognize TOGA buttons were not pressed.**

4. **“Speed mode heading mode” called before V2+20**

III. CLIMB:

a. Climb: **CA/PM: B and FO/PF: A-**

i. PM correctly performs after takeoff checklist.
ii. Pilots maintain a sterile flight deck through 10,000 ft.
iii. Pilots correctly use ice protection, radar, and ignition.
iv. Pilots comply with climb profile speeds.
v. Pilots comply with SIDs and ATC clearances.
vi. Pilots correctly operate the FMS.
vii. Pilots correctly operate the flight director and autopilot.
viii. PM correctly calls out deviations and errors.
ix. PF maintains airspeed within +/- 10 knots or .02 mach.
x. PF maintains heading within +/- 5 degrees.
xi. PF maintains altitude within +/- 100 ft
xii. NOTES:

1. **After T/O checklist missed fuel crossflow to MANUAL.**
2. **PM setting altitude alerter with autopilot on.**
3. **At 1,000 to go, CA, "check altitude", FO/PF, "1,000 to go".**

IV. CRUISE: **CA/PM: A- and FO/PF: A-**

a. Cruise

i. Pilots correctly perform top of climb fuel check.
ii. Pilots correctly use ice protection, radar, and ignition as required.
iii. Pilots comply with cruise profile speeds.
iv. Pilots comply with all ATC clearances.
v. Pilots are aware of their fuel situation and have enough fuel to complete the flight safely.
vi. Pilots correctly operate the FMS.
vii. Pilots correctly operate the flight director and autopilot.
viii. PM correctly calls out deviations and errors.
ix. PF maintains airspeed within +/- 10 knots or .02 mach.
x. PF maintains heading within +/-5 degrees.
xi. PF maintains altitude within +/- 100 ft.
xii. NOTES:

b. Respond to a System Failure/Malfunction (IF APPLICABLE, GENERATOR FAILURE)
    i. Pilots correctly identify system failure.

ii. Pilots correctly complete memory items when required.
iii. Pilots correctly complete the QRC procedure when required.
iv. Pilots correctly complete QRH procedures.
v. Pilots correctly confirm thrust levers, generators, and guarded switches.
vi. NOTES:

V. DESCENT: CA/PM: F and FO/PF: F

a. Perform Descent
   i. Pilots correctly perform descent checklist procedures.
   ii. Pilots maintain a sterile flight deck below 18,000 ft.
   iii. Pilots correctly use ice protection, radar, and ignition.
   iv. Pilots comply with descent profile speeds.
   v. Pilots comply with STARs and ATC clearances.
   vi. Pilots are aware of their fuel situation and have enough fuel to complete the flight safely.
   vii. Pilots correctly operate the FMS.
   viii. Pilots correctly operate the flight director and autopilot.
   ix. PM correctly calls out deviations and errors.
   x. Pilots comply with airspace and airspeed restrictions during an arrival into a non-radar environment.
   xi. PF maintains airspeed within +/- 10 knots or .02 mach.
   xii. PF maintains heading within +/- 5 degrees.
   xiii. PF maintains altitude within +/- 100 ft.
   xiv. NOTES:
      1. Given descend via clearance and forgot to set a lower altitude.
         a. PF asked if it was sim or something he's doing.
         b. During this the speed got to 257 KIAS
      2. Called approach and said descending to 11,000 as opposed to "descending via".
      3. Crew missed 3 crossing restrictions during the arrival.

b. Perform PF/PM Tasks
   i. Pilots correctly enter approach into FMS.
   ii. Pilots correctly set up navigation frequencies and courses.
   iii. Pilots correctly set approach minimums.
   iv. Pilots correctly calculate landing distance.
   v. PM correctly set landing speeds.
   vi. PF briefs weather.

vii. PF briefs the arrival, approach, airport, and NOTAMs.

viii. PF briefs highest threat.

ix. NOTES:

1. **FA notification not done properly.**
2. **Strobe lights not on (I noticed now and not sooner).**
3. **Landing data not set.**
    a. **CA/PM does not know how to find landing weight.**
4. **Did not make SKOTT as published. They were at 10,500'**
5. **Checklist interrupted and did not start over**
6. **CA had NO CLUE where the aircraft is on the arrival.**

VI. APPROACH:

a. Perform CAT I ILS Approach **CA/PM: F and FO/PF: D**

i. Pilots comply with the published approach procedure.

ii. Pilots correctly configure flaps and gear at appropriate times.

iii. PM correctly makes required callouts.

iv. PF correctly makes required callouts.

v. Pilots correctly perform before landing checklist.

vi. Pilots correctly identify the runway environment before descent below minimums.

vii. Pilots correctly decide to execute a missed approach when appropriate.

viii. Pilots correctly operate the FMS.

ix. Pilots correctly operate the flight director and autopilot.

x. PM correctly calls out deviations and errors.

xi. PF maintains no more than one-quarter deflection of the localizer and glide slope.

xii. PF maintains airspeed within +/- 5 knots.

xiii. PF maintains a stabilized approach.

xiv. NOTES:

1. **During the first approach, they did not have the appropriate NAV source selected and the aircraft went through the final approach course. They were still going 210 KIAS on a 10-mile file. ATC questioned as to whether or not they were going to be able to get down on the glide slope, to which they responded yes, but they still did not descend and eventually realized this approach was not going to be completed.**
2. **After receiving vectors for a second approach, the FO/PF realized the mistake from the first approach and had the NAV source set appropriately. However, the CA/PM did not, and the crew did not follow procedures at the gate when the autopilot verification was supposed to happen. Therefore, when the FO/PF selected APPR mode, it did not follow the FO/PF's flight control computer since it was coupled to the CA/PM's side.**

b. Perform Missed Approach Procedure: **CA: F and FO: F**

i. Pilots correctly comply with the ATC instructions or charted missed approach procedure.
ii. PM correctly makes required callouts.
iii. PF correctly makes required callouts.
iv. Pilots correctly operate the FMS.
v. PM correctly retracts flaps.
vi. Pilots correctly operate the flight director and autopilot.
vii. PM correctly calls out deviations and procedure errors.
viii. PF descends no lower than -50 ft. below approach minimums on missed approach.
ix. PF maintains altitude within +/- 100 ft.
x. PF maintains heading within +/- 5 degrees.
xi. NOTES:
   1. **No callouts from the profile were made.**
   2. **The crew went past the assigned altitude of 3,000 to 4,000.**
      a. **The PM did not make the required call to notify the PF of the altitude deviation.**
   3. **Pilots did not appropriately retract flaps.**
   4. **Pilots did not retract the gear.**

VII. LANDING:

a. Perform Normal Landing: **NA**
i. PF lands in the touchdown zone, not to exceed one-third of the runway length.
ii. PF executes touchdown on the runway centerline.
iii. PF correctly uses brakes.
iv. PF correctly uses thrust reverse.
v. PM correctly makes required callouts.
vi. PF maintains positive directional control during the landing rollout.
vii. PM correctly calls out deviations and errors.
viii. PF maintains a stabilized flight path.
ix. PF maintains airspeed within +/- 5 knots.
x. NOTES:
   1. **Did not happen due to time constraints.**

b. Perform FO After Landing Flow/Checklist
i. First Officer correctly performs after landing flow.
ii. First Officer correctly performs after landing checklist.
iii. NOTES:

1. **Did not happen due to time constraints.**

c. Perform CA Shutdown Flow/Checklist
    i. Captain correctly performs shutdown checklist flow.
    ii. Pilots correctly perform challenge and response shutdown checklist.
    iii. Pilots debrief flight
    iv. NOTES:
        1. Did not happen due to time constraints.

d. Perform FO Shutdown Flow/Checklist
    i. First Officer correctly performs shutdown checklist flow.
    ii. Pilots correctly perform challenge and response shutdown checklist.
    iii. Pilots debrief flight
    iv. NOTES:
        1. Did not happen due to time constraints.

e. Perform Terminating Checklist (IF APPLICABLE)
    i. Pilots correctly perform terminating/leaving the airplane checklist procedure.
    ii. NOTES:
        1. Did not happen due to time constraints.

VIII. SYSTEMS:
a. Operate Autopilot: **CA: C and FO: B**
    i. Autopilot general knowledge
    ii. Autopilot controls and indications
    iii. Autopilot limitations
    iv. Autopilot operation
    v. NOTES:

IX. ABNORMAL OPERATIONS
a. Perform Fuel Planning
    i. Pilots know minimum and emergency fuel limitations.
    ii. Pilots determine fuel requirements for an unplanned diversion.
    iii. Pilots determine fuel requirements for a planned diversion.
    iv. Pilots make appropriate diversion decision when fuel remaining is insufficient to safely complete the flight.

v. **NOTES:**
   1. **During missed approach, crew never discussed fuel situation.**

X. HUMAN FACTORS:

a. Demonstrate Communication Skills
   i. Pilots use standard phraseology and language as specified in the SOP to communicate with other parties and in a manner that is clear to understand.
   ii. Listeners seek clarification to unclear plans and communicators clarify ideas that were not clear to the listener.
   iii. Pilots pre-brief operational requirements as well as identify threats, develop viable mitigation strategies for them, and communicate expectations to fellow crewmembers.
   iv. Pilots debrief threats encountered and assess the outcome of employed mitigation strategies.
   v. Pilots demonstrate teamwork by communicating concerns to fellow crewmembers and promptly and positively responding to communication from others.
   vi. Pilots demonstrate willingness to receive constructive feedback and accept critiques without becoming defensive.
   vii. NOTES:
      1. ATC gave a descent clearance to 3,500 and PM read back 3,000. The PF asked him to question it and they got it correct.

b. Demonstrate Workload Management Skills
   i. Pilots prioritize tasks and distribute workload between PF/PM to manage the flight path and prioritize flying the airplane above all other tasks.
   ii. Pilots create time to manage threats and make decisions to prevent task saturation.
   iii. Pilots adjust automation levels to match situational demands, reduce workload for the crew, and enhance attention management.
   iv. Pilots recognize phases of flight where they are most vulnerable to flight path deviations and strategically plan workload to manage distractions by completing non-monitoring tasks during lower areas of vulnerability
   v. NOTES:

c. Demonstrate Problem Solving/Decision Making Skills
   i. Captains follow the decision-making process to review assumptions, choose the most viable solution based on the data and continue to evaluate the decision for viability.
   ii. Pilots determine the criticality of threats encountered and match decisions to manage the threats.
   iii. Pilots use available resources to expand the team as necessary to manage threats and make sound decisions.
   iv. First Officers contribute pertinent information to enhance the decision-making process.
   v. NOTES:

d. Demonstrate Situational Awareness Skills

i. Pilots recognize potentially distracting situations and develop strategies to mitigate the distraction potential.

ii. Pilots recognize and communicate to other when individual awareness is low and work to raise awareness levels.
iii. Pilots maintain an awareness of the aircraft position and potential hazards associated with it.
iv. NOTES:
1. **CA/PM did not use time at cruise to set up appropriately and was behind on descent setting landing data, which helped cause numerous missed crossing restrictions.**

e. Demonstrate Monitor and Cross-Checking Skills
i. Pilots demonstrate acceptance of a flight path monitoring responsibility by maintaining constant situational awareness of the aircraft's flight path and immediately bringing any concerns to the PF's attention.
ii. Pilots communicate effectively with each other to develop and maintain a shared mental model of how to assure the flight path of the aircraft.
iii. Pilots callout deviations from intended flight path as specified in the SOPM.
iv. Pilots verify changes to flight path configuration and/or automation.
v. Pilots monitor AC systems and status for threats to safety and callout observed indications.
vi. Pilots comply with SOP PM assignments.
vii. NOTES:
1. **CA/PM missed numerous opportunities to catch errors the FO/PF was making and did not.**

f. Demonstrate Professionalism Skills
i. Pilots comply with the professional appearance, grooming, and dress standards as specified in the Billiken Air Express Pilot Policy Manual.
ii. Pilots conduct themselves with an attitude, language, and demeanor aligned with Billiken Air Express guiding principles.
iii. Pilots adjust leadership styles to match the situational demands and demeanor of the followers.
iv. Captains assist the chief pilot in mentoring and furthering the progress of the SIC.
v. First Officers apply the 10 rules of good followership as listed in the enhanced leadership manual.
vi. Pilots demonstrate a commitment to being fully compliant with procedures.
vii. Pilots correctly use Threat Management to organize CRM skills and manage anticipated/unanticipated threats.
viii. NOTES:

Performance Indicator Rubric

Course: FSCI 2250 Instrument Flight Foundations

Course Instructor: Stephen Belt

Semester Taught: Fall 2022

Number of Students in Course: 39

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	76.03% within this category	Yes
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	74.66% within this category	Yes

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

Quarter Exam Level Assessment attached

FAA Written Exam: 79% pass rate (30/38)

Additional FAA-style quizzes and study sessions during course.

**Attach description of assignment used for assessment and samples of student work.*

FSCI 2250 SLO 1 and 5 Fall 2022

Category Performance Report

At-Risk Categories: 0 | **Total Courses**: 1

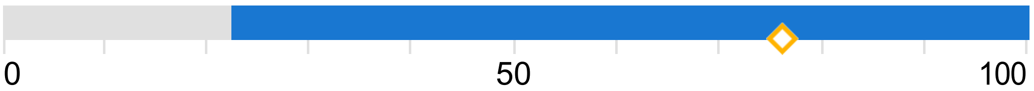
Date Range: **8/1/22 – 12/31/22** | Category At-Risk Threshold: **70%** | Needs Review Threshold: **70%**

Flight Science Student Learning Outcomes

At-Risk Categories: **0** | Total Categories: **2**

Average | Score Range | At-Risk | Needs Review | Doing Well

CATEGORY NAME	AVERAGE	ASSESSMENTS	STATUS
SLO 1: Conduct aviation operations in a professional, safe, and efficien...	76.03%	3	



ASSESSMENT NAME	AVERAGE SCORE WITH THIS CATEGORY	QUESTION / CRITERIA WITH THIS CATEGORY
Exam 1	67%	3 questions
FSCI 2250 Exam 2	78%	3 questions
Exam 3	84%	3 questions

SLO 5: An ability to apply the techniques, skills, and modern aviation t...

0 50 100

74.66% 3

×

ASSESSMENT NAME	AVERAGESCORE WITH THIS CATEGORY	QUESTION / CRITERIA WITH THIS CATEGORY
Exam 1	76%	4 questions
FSCI 2250 Exam 2	66%	2 questions
Exam 3	79%	3 questions

Assessment Performance

AVERAGE SCORE

71%

(71.3/100)

LOW SCORE

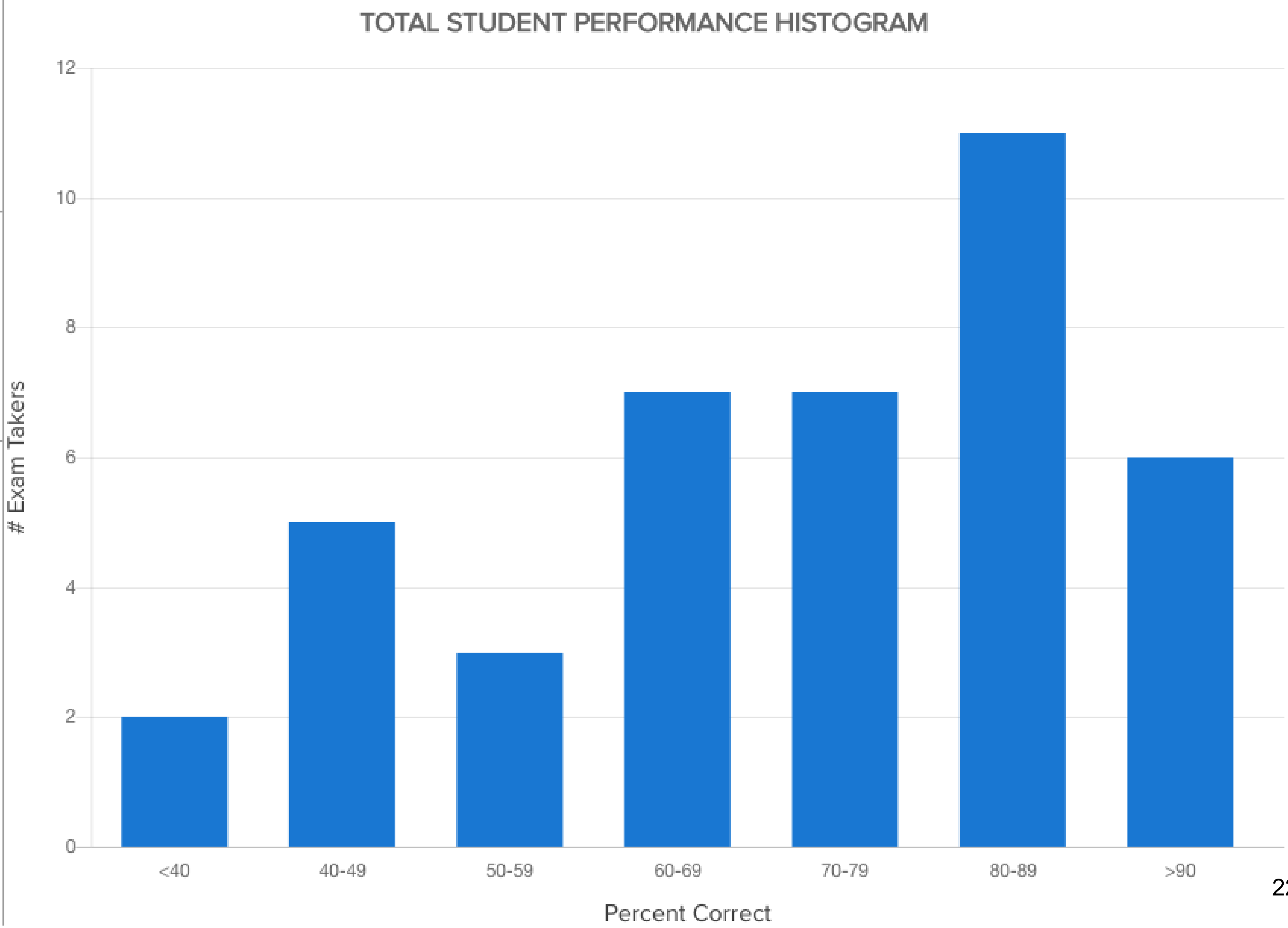
31%

(31.0/100)

HIGH SCORE

98%

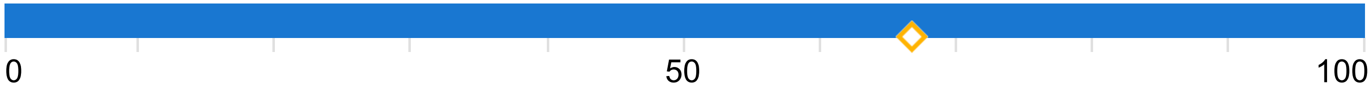
(98.0/100)



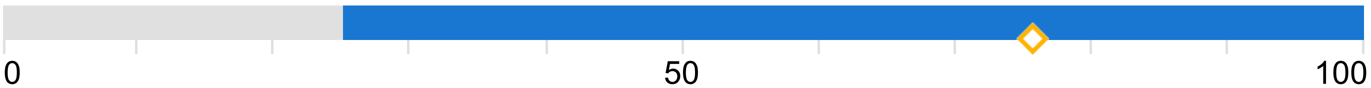
Category Performance

Average | Score Range

CATEGORY NAME	AVERAGE SCORE	QUESTIONS
In Flight Science Student Learning Outcomes SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	66.67%	3



CATEGORY NAME	AVERAGE SCORE	QUESTIONS
In Flight Science Student Learning Outcomes SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation r	75.61%	4



Assessment Performance

AVERAGE SCORE

88%

(88.5/100)

LOW SCORE

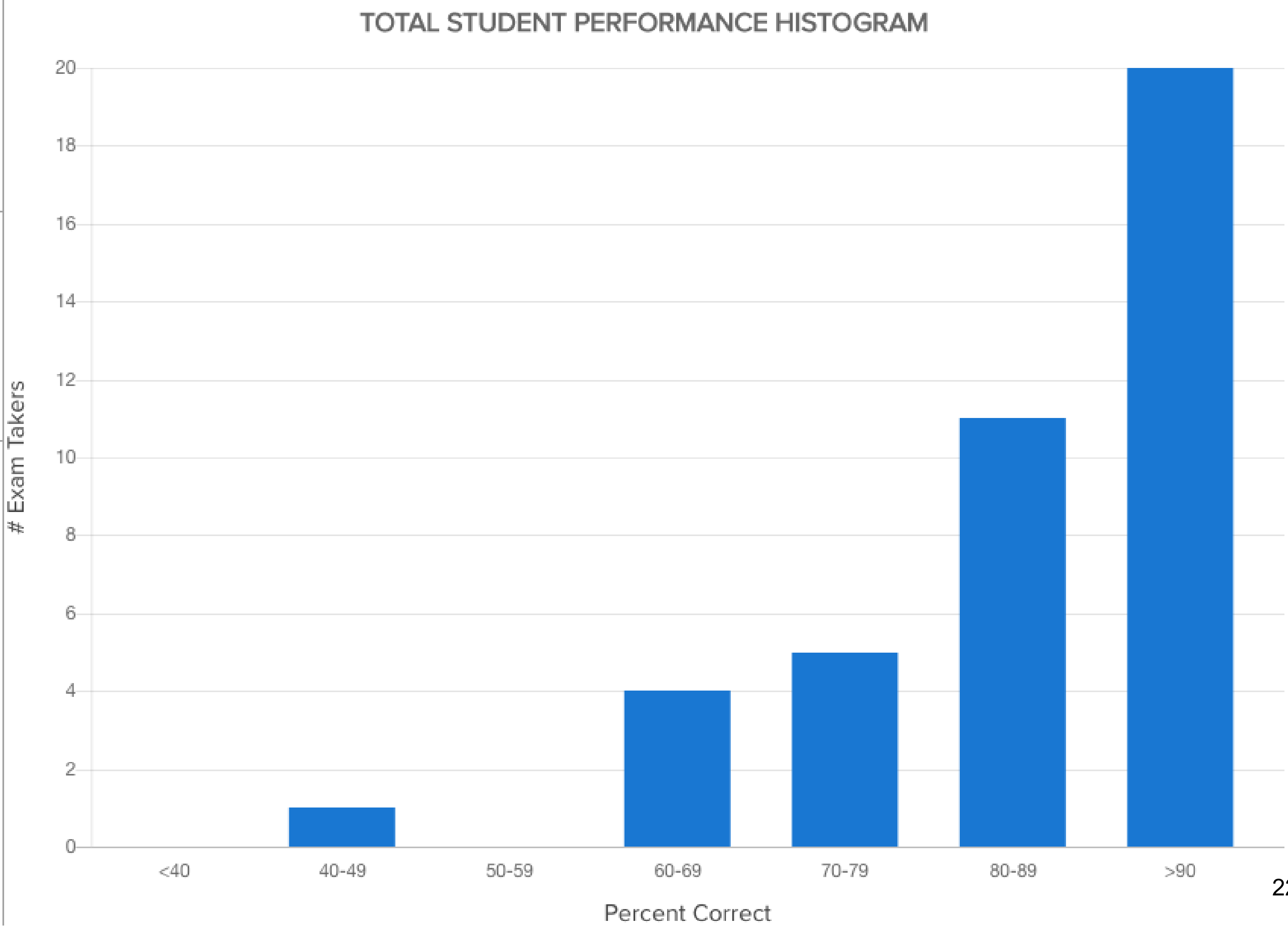
47%

(46.9/100)

HIGH SCORE

110%

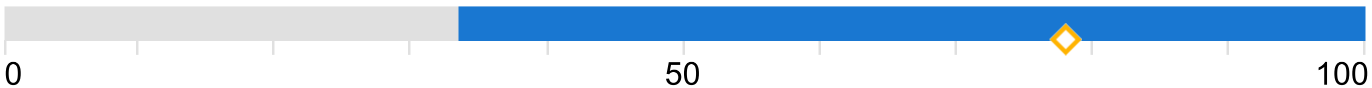
(110.4/100)



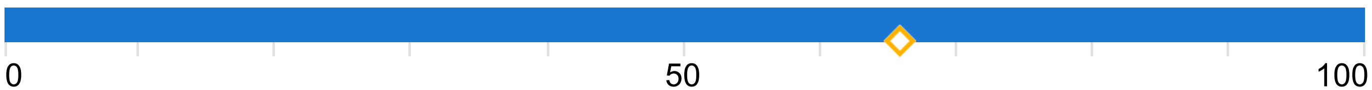
Category Performance

Average Score Range

CATEGORY NAME	AVERAGE SCORE	QUESTIONS
In Flight Science Student Learning Outcomes SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	78.05%	3



CATEGORY NAME	AVERAGE SCORE	QUESTIONS
In Flight Science Student Learning Outcomes SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation r	65.85%	2



FSCI 2250 Exam 3 Fall 2022

Assessment Performance

AVERAGE SCORE

86%

(85.5/100)

LOW SCORE

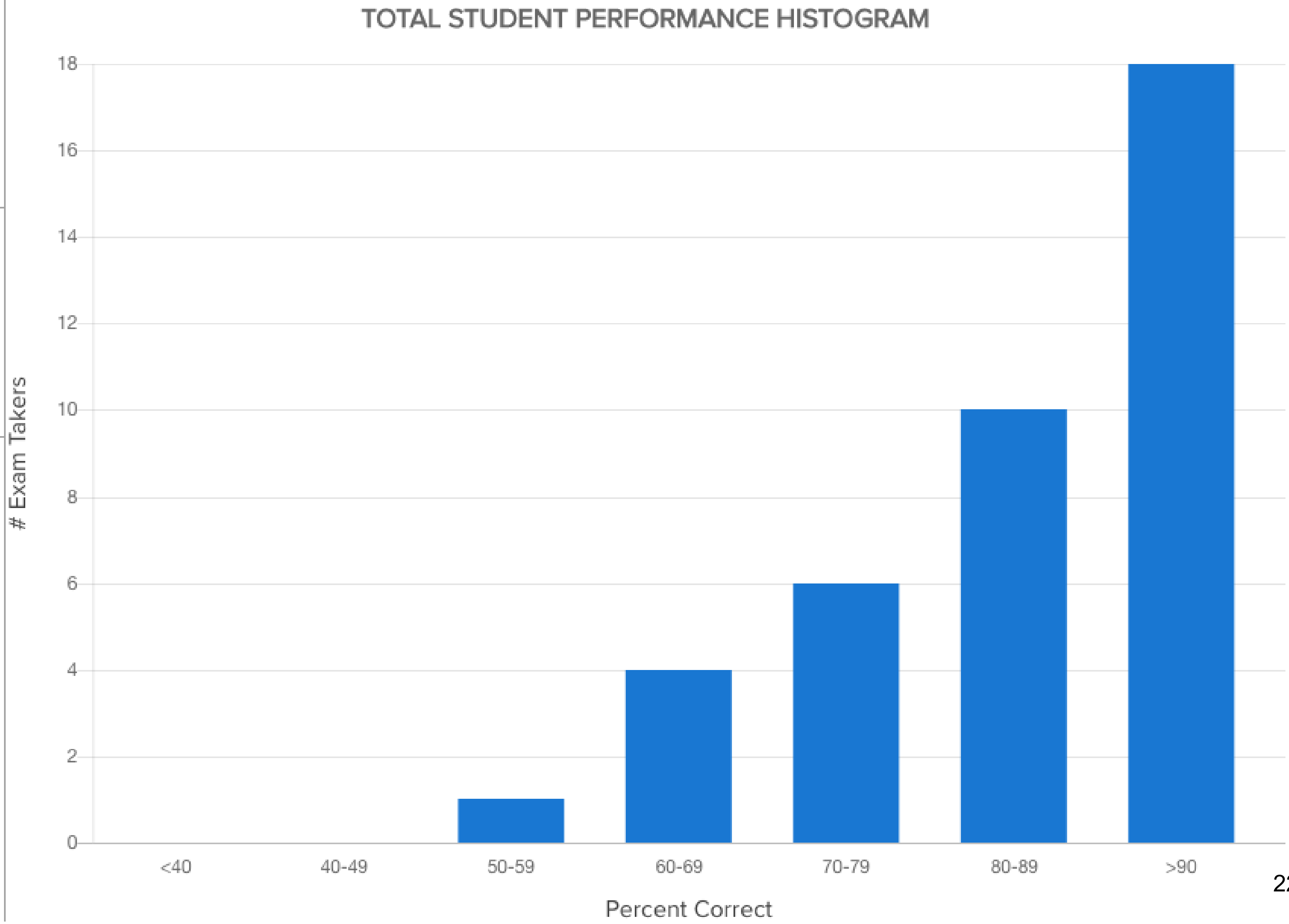
57%

(57.0/100)

HIGH SCORE

104%

(104.0/100)



Category Performance

Would you like to select the categories for this report use the top 25 categories used on this assessment?

SELECT CATEGORIES

USE TOP 25

FSCI 2250 Assessment Report Fall 2022

Date and Time of Exam Creation: 01/11/2022 6:10PM CST | Total Exam Points: 18 | Est. Completion Time: 15mins Avg. Point Biserial: 0.35 | Upper 27%: 0.88 | Lower 27%: 0.53 | Disc. Index: **0.35** | Difficulty: **0.75** | Total Questions: 18 | Multiple Choice: 16 | Fill in the Blank: 1 | Essay: 1

1. Prior to using GPS for IFR operations, what actions must you take?

A. For WAAS-certified GPS equipment, you must verify that RAIM will be available for the intended route and duration of the flight and ensure that your GPS navigational database is current.

✓ **B. For non-WAAS GPS equipment, you must verify that RAIM will be available for the intended route and duration of the flight and ensure that your GPS database is current**

C. For all GPS equipment, you must verify that WAAS will be available for the intended route and duration fo the flight and ensure that your GPS navigational database is current.

D. You do not have to do anything. The system does it for you.

Question ID: 9520 | Point Value: 1 | Categories: AABI Student Learning Outcomes, H. Use the techniques, skills, and modern technology necessary for professional practice, Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.

2. Preflight tolerance of the Altimeter is +/- ft. When the current local altimeter setting is properly set.

A. 50

B. 100

✓ **C. 75**

D. 25

Question ID: 9388 | Point Value: 1 | Point Biserial: .6 | Difficulty: 0.59 | Categories: AABI Student Learning Outcomes, A. Apply mathematics, science, and applied sciences to aviation related disciplines, AABI A-1, Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.

3. When performing a VOR operational check , who must document the it? What is required to be documented?

A. The pilot-in-command must enter date, place, bearing error in the aircraft log or other record.

B. The pilot-in-command must enter the date, place, bearing error, and sign the aircraft log book

C. The person conducting the check must enter date, place, and bearing error in the aircraft log books.

✓ **D. The person conducting the check must enter the date, place, and bearing error and sign the aircraft log or other record.**

Question ID: 9374 | Point Value: 1 | Point Biserial: .29 | Difficulty: 0.81 | Categories: Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner., FSCI 2250 Course Level Objectives, 6. Recognize applicable federal aviation regulations, and discuss basic applications of these regulations.

t2lchart.png

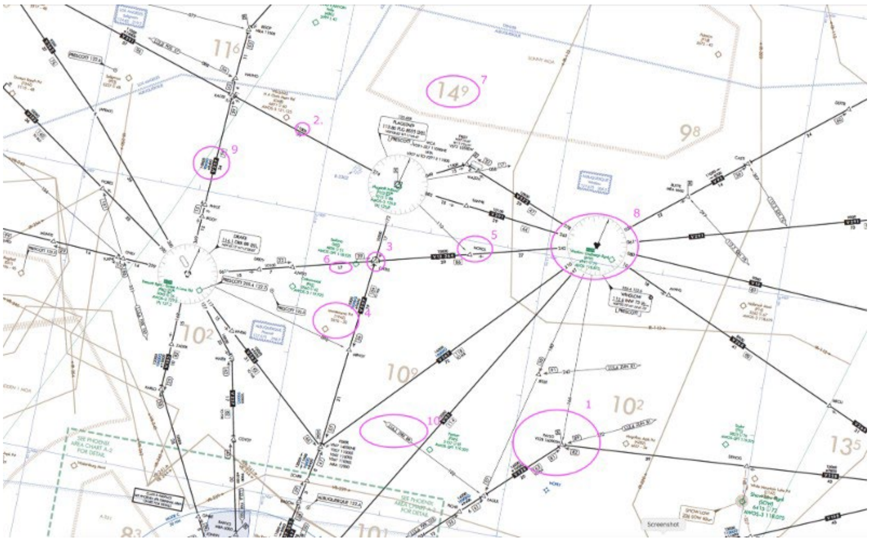
4. (Please use the L-chart excerpt provided to answer this question) What is the significance of the color of Item 4?

A. Non-towered airport

✓ **B. No published IAP**

C. No Voice

D. No good



Question ID: 17094 | Point Value: 1 | Point Biserial: .11 | Difficulty: 0.99 | Categories: Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.

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5. DEPARTURE

You are preparing to depart Santa Fe Municipal SAF on an IFR cross country to Denver. You receive the following clearance: "cleared to Denver International Airport via the Poake Two Departue, Taos transition, then as filed." Once you copy and read back the clearance, you request taxi clearance are cleared to taxi to runway 20. Prior to departure, you review the SID. At what point does the DEPARTURE segment end and the TRANSITION segment begin?

A. CFFDN

B. SAF

✓ **C. POAKE**

D. TAS

Question ID: 10156 I Point Value: 1 I Point Biserial: .21 I Difficulty: 0.79 I Categories: Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner., FSCI 2250 Course Level Objectives, 3. Identify, explain and apply the important elements of instrument departure, enroute and approach procedures.

6. When Cindy receives her IFR clearance to Chicago she hears the phrase "cleared as filed." What does that specific phrase tell her? (Cleared as filed includes _)

A. She may fly the flight plan she has filed, including the altitudes and departure procedures.

B. She may fly the route she has filed, and is automatically cleared to her destination.

C. She may fly the entire flight plan she has filed, and is automatically cleared to her destination.

✓ **D. She may fly the route she has filed, but she will still receive a clearance limit, altitudes, and departure procedures.**

Question ID: 10149 I Point Value: 1 I Point Biserial: .37 I Difficulty: 0.61 I Categories: Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner., FSCI 2250 Course Level Objectives, 3. Identify, explain and apply the important elements of instrument departure, enroute and approach procedures.

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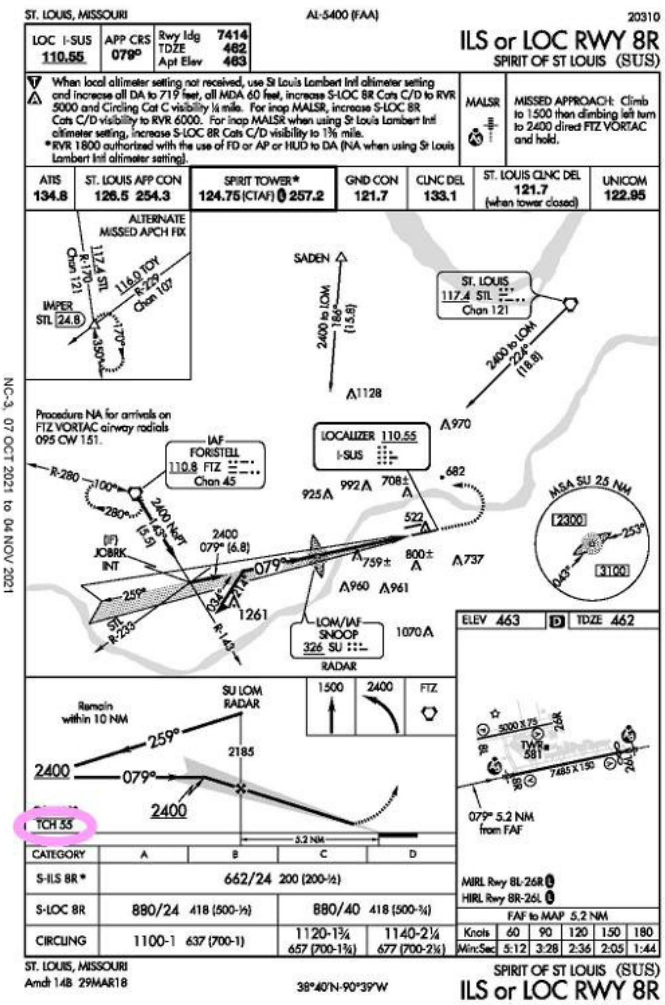
7. Explain item 3. (TCH 55)



✓ **A. IF you are on glide slope, you will cross the runway threshold at 55' AGL**

B. IF you are on glide slope, you will touch down 55' past the threshold

C. The Tower Clearance Height is 55'

D. The Tower Enroute Clearance is on page 55

Question ID: 10624 I Point Value: 1 I Point Biserial: .51 I Difficulty: 0.88 I Categories: Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.

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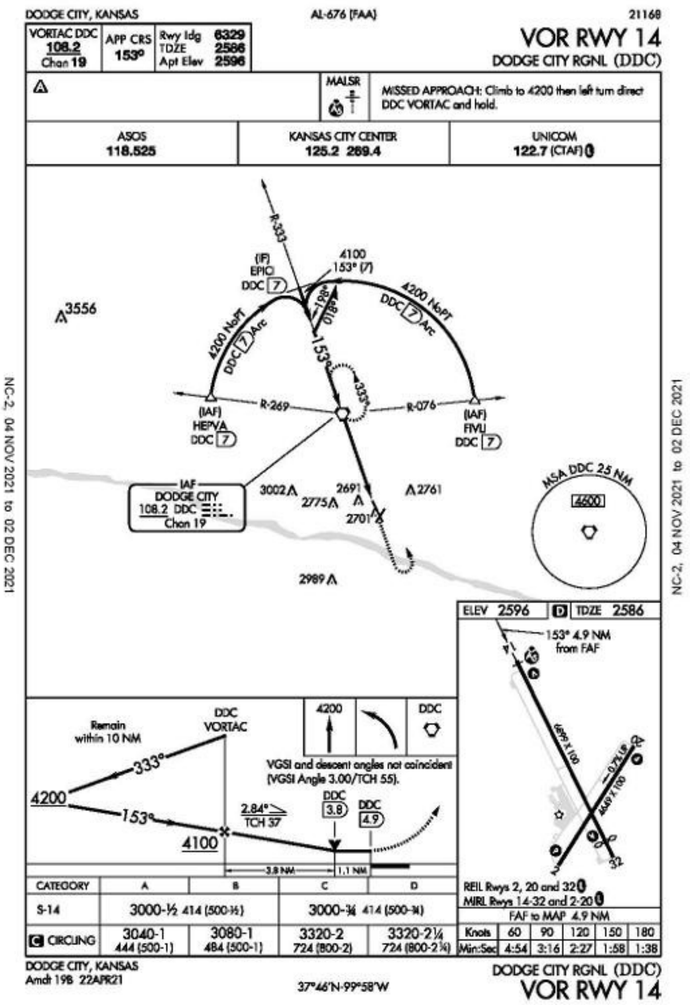
8. What is the Missed Approach Point for this approach?



A. 4 minutes 54 seconds at 60 KIAS

B. **4.9 DME from the Dodge City VORTAC**

C. 1.1 NM

D. DDC 3.8

Question ID: 10621 I Point Value: 1 I Point Biserial: .32 I Difficulty: 0.74 I Categories: AABI Student Learning Outcomes, AABI H-1, Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.

9. How do you determine you are on the intermediate segment if there is no intermediate fix?

A. When you cross the "IAF" outbound toward the procedure turn

B. When you are headed to the airport

C. With a Maltese Cross

D. It is when you are established on the published route and proceeding inbound to the final approach fix, are properly aligned with the final approach course, and are located within the prescribed distance from the FAF.

D. It is when you are established on the published route and proceeding inbound to the final approach fix, are properly aligned with the final approach course, and are located within the prescribed distance from the FAF.

Question ID: 10610 I Point Value: 1 I Point Biserial: .14 I Difficulty: 0.87 I Categories: Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.

10. Only the attitude indicator provides information of pitch and bank.

A. **Direct and immediate**

B. Indirect

C. Derived and interpolated

D. Any

Question ID: 9376 I Point Value: 1 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot., FSCI 2250 Course Level Objectives, 1. Explain the requirements of ICAO/FAA for instrument flight, 5. Recognize and evaluate various conditions effecting the safety of flight, aeronautical decision-making, airmanship, and physiological readiness of instrument flight.

11. How does the blockage of the static port affect each of the pitot-static instruments during a descent from the altitude where the blockage occurred?

A. The airspeed indicator will show lower than actual airspeed, the VSI will read zero, and the altimeter will be frozen at the altitude the blockage occurred.
B. The airspeed indicator will give incorrect readings, the VSI will read zero, and the altimeter will be frozen at the altitude the blockage occurred.
✓ **C. The airspeed indicator will show faster than actual airspeed, the VSI will read zero, and the altimeter will be frozen at the altitude the blockage occurred.**
D. The airspeed indicator will give incorrect readings, the VSI freeze at the rate of descent it indicated when the blockage occurred, and the altimeter will be frozen at the altitude the blockage occurred.

Question ID: 9391 I Point Value: 1 I Point Biserial: .34 I Difficulty: 0.54 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot., FSCI 2250 Course Level Objectives, 5. Recognize and evaluate various conditions effecting the safety of flight, aeronautical decision-making, airmanship, and physiological readiness of instrument flight.

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12. Describe the proper sequence to recover from a nose-low unusual attitude:

1 ______
2 ______
3 ______

✓ **1. Power to Idle, Pull the power, Reduce Power**
✓ **2. Level the Wings, Wings level**
✓ **3. Pitch to the horizon, Pitch up, Raise the Nose**

Question ID: 9518 I Point Value: 1 I Point Biserial: .28 I Difficulty: 0.71 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot., FSCI 2250 Course Level Objectives, 5. Recognize and evaluate various conditions effecting the safety of flight, aeronautical decision-making, airmanship, and physiological readiness of instrument flight., 7. Assess best practice as it relates to instrument flight.

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13. What does staying on the VASI glide path assure on final approach?

✓ **A. Obstruction clearance within 10° the extended runway centerline and out to 4 nautical miles from the threshold**
B. That you will land on the runway
C. That you will have enough runway for your rollout
D. Obstruction clearance within 30° of the extended runway centerline and out 1 nautical mile from the threshold

Question ID: 10146 I Point Value: 1 I Point Biserial: .43 I Difficulty: 0.66 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot., FSCI 2250 Course Level Objectives, 3. Identify, explain and apply the important elements of instrument departure, enroute and approach procedures.

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14. In order, what are the 5 T's?

(Please write your essay response on a separate piece of paper)

Question ID: 10184 I Point Value: 1 I Point Biserial: .53 I Difficulty: 0.64 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot., FSCI 2250 Course Level Objectives, 7. Assess best practice as it relates to instrument flight.

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15. What is the standard climb gradient for departure obstacle clearance

✓ **A. 200 feet per nautical mile**
B. 200 feet per minute
C. 300 feet below traffic pattern altitude
D. 152 feet per minute

Question ID: 10152 I Point Value: 1 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot., FSCI 2250 Course Level Objectives, 3. Identify, explain and apply the important elements of instrument departure, enroute and approach procedures.

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16. Immediately after passing the final approach fix in bound during an ILS approach in IFR conditions, the glide slope warning flag appears. The pilot is

A. permitted to continue the approach and descend to the DH.
B. required to immediately begin the prescribed missed approach procedure.
✓ **C. permitted to continue the approach and descend to the localizer MDA.**

Question ID: 14829 I Point Value: 1 I Point Biserial: .47 I Difficulty: 0.68 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.

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17. Ryan is flying a sidestep maneuver. At what point may he begin the maneuver?

A. When he is cleared for the approach
B. When he reaches the MDA
✓ **C. When he has the runway that he is sidestepping to in sight**
D. Only after reaching the DA

Question ID: 10628 I Point Value: 1 I Point Biserial: .46 I Difficulty: 0.95 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.

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18. Austin is flying the ILS RWY 1 approach to WYS. His airplane is equipped with dual Avidyne IFD 440 receivers. ATIS is reporting 1200 overcast with 3/4 mile visibility and calm winds. He turns inbound from the procedure turn, intercepts the final approach course and descends to 9600 msl. He intercepts the glide slope and begins his descent at 90kias. At TARGY, he starts his timer. Shortly after that, he notices that his glide slope receiver has failed. What should he do? Could he continue the approach? How?

A. He should continue the approach to the DA6849
B. He should descend no lower than 7449 and proceed for 4:36 to the MAP
✓ **C. He should descend no lower than 7780 and proceed for 4:36 to the MAP**
D. He should immediately turn left to enter the hold at TARGY and query the controller

Question ID: 10632 I Point Value: 1 I Point Biserial: .25 I Difficulty: 0.75 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.

Performance Indicator Rubric

Course: FSCI 2550 Flight 4

Course Instructor: Ryan Boyer

Semester Taught: Spring 2023

Number of Students in Course: 19

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Percentage of student written exams and stage checks passed on first attempt)	Benchmark achieved? (Benchmark: 70% of student written exams and stage checks passed on first attempt)
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	Written Exam Pass Rate: 100% Stage Check Pass Rate: 87%	Yes
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	Written Exam Pass Rate: 100% Stage Check Pass Rate: 87%	Yes

Description of Assessment: The student assessment consists of multiple-choice module written exams as well as stage check practical exams. Written exams require a minimum score of 70% to pass. Each stage check consists of an oral portion and a flight portion, and satisfactory or unsatisfactory performance is determined in accordance with the Module Completion Standards and/or the appropriate Airmen Certification Standards (ACS)/Practical Test Standards (PTS). Attached are samples of the module completion standards included in the approved Training Course Outline. This document describes the expectations and assessment standards for stage check oral and flight checks. Also attached is a sample of a student's completed module written exam.

Recommendations: Continue to identify and discuss student stage check deficiencies with the instructional staff each semester. Revisions to course content and/or module completion standards will be made as needed to ensure adequate student preparation.

Module 7

Instrument Cross-Country and Partial Panel Operations

Prerequisites: Prior to beginning this module the student must have successfully completed Module 6.

Objective: To introduce IFR cross-country and partial panel operations and to complete the aeronautical knowledge and flight training required to prepare students to pass the Instrument Rating Airplane Knowledge and Practical Exams.

Completion Standards:

- The student must meet the following minimum training time requirements during this module:

DUAL			OTHER		
Local	XC	Inst. Ref.	ATD	Pre/ Post	Ground
11.5	6.0	13.0	5.5	5.6	18.0

- Prior to completion of the module, students must pass the FAA Instrument Rating Knowledge Exam.
- Prior to completion of the module, students must pass a stage check to evaluate their ability to:
  1) Demonstrate all applicable Tasks as specified in the Instrument Rating Airplane Airmen Certification Standards within the established standards.
  2) Demonstrate mastery of the aircraft by performing each Task successfully.
  3) Demonstrate proficiency and competency in accordance with the standards.
  4) Demonstrate sound judgment and exercise aeronautical decision making and risk management.

Notes:

- Lessons may be completed out of sequence as necessary to meet academic goals set by the instructor.
- Multiple instructional periods may be required to meet lesson requirements.

Module 8

Technically Advanced Airplane Operations

Prerequisites: Prior to beginning this module the student must possess a Private Pilot Airplane Single-engine Land certificate and an Instrument Airplane Rating.

Objective: To introduce the student to Technologically Advanced Airplane (TAA) operations and to gain proficiency in cross-country operations, commercial pilot maneuvers, and commercial aeronautical knowledge.

Completion Standards:

- The student must meet the following minimum training time requirements during this module:

TOTAL				OTHER		
Local	XC	TAA	Airplane	ATD	Pre/ Post	Ground
15.0	8.5	10.0	23.5	4.5	5.6	13.5

- Prior to completion of the module, students must pass a written exam to evaluate their understanding of:
  1) Major aircraft components and systems by describing normal operation of systems such as primary and secondary flight controls and trim, powerplant and propeller, landing gear, fuel, oil, hydraulic, electrical, flight instruments, avionics, and environmental systems.
  2) Use of all performance charts, tables, and data to determine takeoff and landing, climb, and cruise performance.
  3) Weather products required for preflight planning, current and forecast weather for departure, enroute, and arrival phases of flight.
  4) Meteorology applicable for flights conducted in both instrument and Visual Meteorological Conditions to include atmospheric composition and stability, wind, temperature, moisture, precipitation, weather system formation, airmasses, fronts, clouds, turbulence, thunderstorms, microbursts, icing, and fog.

5) Airworthiness, including certificate and document locations and expiration, required inspections, airworthiness directives, equipment requirements, and flight with inoperative equipment.
6) Currency requirements, privileges, limitations, medical certification, and documents related to commercial pilot operations.

- Prior to completion of the module, students must pass a stage check to evaluate their ability to:
  1) Perform steep turns and slow flight in accordance with published procedures while maintaining altitude +/- 100 feet, airspeed +/- 10 knots, and heading +/- 10 degrees.
  2) Perform power-on, power-off, and accelerated stalls in accordance with the Commercial Pilot testing standards.
  3) Perform chandelles in accordance with published procedures, complete the rollout at the 180° point +/- 15 degrees, no more than 10 knots above stall speed.
  4) Perform lazy eights in accordance with published procedures, arrive at each 180° point +/- 15 degrees, at an altitude +/- 150 feet from entry altitude, at an airspeed +/- 15 knots from entry airspeed.
  5) Perform steep spirals in accordance with published procedures, maintain a constant radius with only minor deviations while maintaining specified airspeed +/- 15 knots, and roll out toward specified heading +/- 15 degrees.
  6) Perform eights on pylons in accordance with published procedures, select suitable pylons, determine the approximate pivotal altitude, enter the maneuver at the appropriate altitude and airspeed, and maintain the reference line on each pylon with only minor deviations.
  7) Perform a power-off 180° accuracy approach and touch down -200/+400 feet from the specified touchdown point.
  8) Perform normal takeoffs and landings, short-field takeoffs, soft-field takeoffs, and soft-field landings in accordance with the Commercial Pilot testing standards.

9) Perform short-field landings, establish the recommended approach and landing configuration while maintaining airspeed +/- 5 knots, touchdown within 400 feet beyond a specified point with no side drift and minimum float.

Notes:

- Lessons may be completed out of sequence as necessary to meet academic goals set by the instructor.
- Multiple instructional periods may be required to meet lesson requirements.

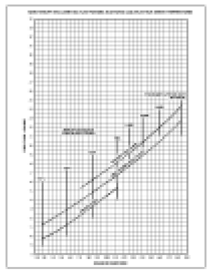
Commercial Pilot, Quiz Module 8 Exam (AQ)

Started: Mar 09, 2023 03:09 PM

Stopped: Mar 09, 2023 03:39 PM

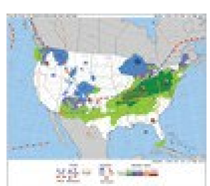
Grade: 98.00

Quiz Deadline: Dec 31, 2023 01:15 PM

Question	Answer
Question **GIVEN:** **Approximately how much ▮ight time would be available with a day VFR fuel reserve remaining?** (/gradebookutility/question.php?queID=45913) (/gradebookutility/question.php?queID=45913)  Figure 8. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=8&tabs=8&asIds[]=123657)	**Correct** Chosen: b
Question **Which chart provides a ready means of locating observed frontal positions and pressure centers?** (/gradebookutility/question.php?queID=52174)	**Correct** Chosen: a
Question **From which measurement of the atmosphere can stability be determined?** (/gradebookutility/question.php?queID=52112)	**Correct** Chosen: b
Question **Unless adjusted, the fuel/air mixture becomes richer with an increase in altitude because the amount of fuel** (/gradebookutility/question.php?queID=52305)	**Correct** Chosen: c
Question **When is pre▮ight action required, relative to alternatives available, if the planned ▮ight cannot be completed?** (/gradebookutility/question.php?queID=45766)	**Correct** Chosen: b
Question **If you are operating under BasicMed, what is the maximum speed at which you may ▮y?** (/gradebookutility/question.php?queID=45751)	**Correct** Chosen: a
Question **The angle of attack of a cruise propeller is** (/gradebookutility/question.php?queID=52342)	**Correct** Chosen: b

Question **The uncontrolled firing of the fuel/air charge in advance of normal spark ignition is known as** (/gradebookutility/question.php?queID=52319)	**Correct** Chosen: c

Fuel quantity	**65 gal**
Best power (level ▮ight)	**55 percent**

Question	Answer
Question While in flight a helicopter and an airplane are converging at a 90° angle, and the helicopter is located to the right of the airplane. Which aircraft has the right-of-way, and why? (/gradebookutility/question.php?queID=45787)	**Correct** Chosen: a
Question What is the standard temperature at 10,000 feet? (/gradebookutility/question.php?queID=52070)	**Correct** Chosen: a
Question Hazardous wind shear is commonly encountered (/gradebookutility/question.php?queID=52152)	**Correct** Chosen: c
Question The best power mixture is that fuel/air ratio at which (/gradebookutility/question.php?queID=52310)	**Correct** Chosen: b
Question Unless otherwise authorized or required by air trafic control, what is the maximum indicated airspeed at which a person may operate an aircraft below 10,000 feet MSL? (/gradebookutility/question.php?queID=45788)	**Correct** Chosen: c
Question An airplane is converging with a helicopter. Which aircraft has the right-of-way? (/gradebookutility/question.php?queID=45786)	**Correct** Chosen: b
Question If all index units are positive when computing weight and balance, the location of the datum would be at the (/gradebookutility/question.php?queID=45928)	**Correct** Chosen: b
Question 14 CFR Part 1 defines V_Y as (/gradebookutility/question.php?queID=45711)	**Correct** Chosen: c
Question What type of front is passing through area 1? (/gradebookutility/question.php?queID=52200) (/gradebookutility/question.php?queID=52200)  Figure 70. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=70&tabs=70&asIds[]=123657)	**Correct** Chosen: c

Question On an instrument approach where a DH or MDA is applicable, the pilot may not operate below, or continue the approach unless the (/gradebookutility/question.php?queID=45808)	Correct Chosen: a

Question	Answer
Question **When turbulence causes changes in altitude and/or attitude, but aircraft control remains positive, that should be reported as** (/gradebookutility/question.php?queID=52140)	**Correct** Chosen: c
Question **What steps must be taken when flying with glass cockpits to ensure safe flight?** (/gradebookutility/question.php?queID=52301)	**Correct** Chosen: c
Question **According to 14 CFR Part 91, at what minimum altitude may an airplane be operated unless necessary for takeoff and landing?** (/gradebookutility/question.php?queID=45794)	**Correct** Chosen: c
Question **While executing a 60° level turn, your aircraft is at a load factor of 2.0. What does this mean?** (/gradebookutility/question.php?queID=52040)	**Correct** Chosen: a
Question **As air temperature increases, density altitude will** (/gradebookutility/question.php?queID=45877)	**Correct** Chosen: b
Question **To act as pilot in command of an airplane towing a glider, a pilot must have accomplished, within the preceding 24 months, at least** (/gradebookutility/question.php?queID=45747)	**Correct** Chosen: b
Question **Before shutdown, while at idle, the ignition key is momentarily turned OFF. The engine continues to run with no interruption; this** (/gradebookutility/question.php?queID=52321)	**Correct** Chosen: b
Question **Who is responsible for filing a Near Midair Collision (NMAC) Report?** (/gradebookutility/question.php?queID=45871)	**Correct** Chosen: c
Question **If the airplane attitude initially tends to return to its original position after the elevator control is pressed forward and released, the airplane displays** (/gradebookutility/question.php?queID=52012)	**Correct** Chosen: b
Question **The ratio of an airplane's true airspeed to the speed of sound in the same atmospheric conditions is** (/gradebookutility/question.php?queID=52043)	**Correct** Chosen: c
Question **Which is required equipment for powered aircraft during VFR night flights?** (/gradebookutility/question.php?queID=45821)	**Correct** Chosen: b
Question **Advection fog has drifted over a coastal airport during the day. What may tend to dissipate or lift this fog into low stratus clouds?** (/gradebookutility/question.php?queID=52091)	**Correct** Chosen: c

<table>
<tr><th>Question</th><th>Answer</th></tr>
<tr><td>Question The pilot in command of an aircraft operated under IFR, in controlled airspace, shall report as soon as practical to ATC when (/gradebookutility/question.php?queID=45813)</td><td>Correct
Chosen: b</td></tr>
<tr><td>Question
GIVEN:
<table>
<tr><td>Temperature</td><td>70°F</td></tr>
<tr><td>Pressure altitude</td><td>Sea level</td></tr>
<tr><td>Weight</td><td>3,400 lb</td></tr>
<tr><td>Headwind</td><td>16 kts</td></tr>
</table>
Determine the approximate ground roll.
(/gradebookutility/question.php?queID=45923)
(/gradebookutility/question.php?queID=45923)

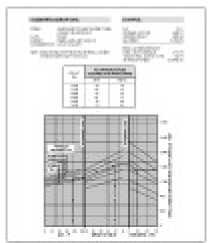
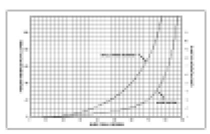
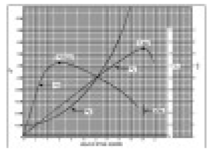



Figure 35.□
(/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=35&tabs=35&asIds[]=123657)</td><td>Incorrect (a)
Chosen: b</td></tr>
<tr><td>Question Authority for approval of a minimum equipment list (MEL) must be obtained from the (/gradebookutility/question.php?queID=45830)</td><td>Correct
Chosen: b</td></tr>
<tr><td>Question In theory, if the airspeed of an airplane is doubled while in level flight, parasite drag will become (/gradebookutility/question.php?queID=51985)</td><td>Correct
Chosen: c</td></tr>
<tr><td>Question A person with a Commercial Pilot certificate may act as pilot in command of an aircraft for compensation or hire, if that person (/gradebookutility/question.php?queID=45754)</td><td>Correct
Chosen: a</td></tr>
<tr><td>Question Unless otherwise authorized, what is the maximum indicated airspeed at which an aircraft may be flown in a satellite airport trafic pattern located within Class B airspace? (/gradebookutility/question.php?queID=45789)</td><td>Correct
Chosen: c</td></tr>
<tr><td>Question As the angle of bank is increased, the vertical component of lift (/gradebookutility/question.php?queID=51981)</td><td>Correct
Chosen: a</td></tr>
</table>

Question	Answer
Question **A pilot reporting turbulence that momentarily causes slight, erratic changes in altitude and/or attitude should report it as** (/gradebookutility/question.php?queID=52139)	**Correct** Chosen: b
Question **Commercial pilots are required to have a valid and appropriate pilot certificate in their physical possession or readily accessible in the aircraft when** (/gradebookutility/question.php?queID=45717)	**Correct** Chosen: b
Question **Which would increase the stability of an air mass?** (/gradebookutility/question.php?queID=52100)	**Correct** Chosen: b
Question **You are flying an aircraft equipped with an electronic flight display and the air data computer fails. What instrument is affected?** (/gradebookutility/question.php?queID=52300)	**Correct** Chosen: b
Question **In order to qualify for BasicMed, you must have received a comprehensive examination from:** (/gradebookutility/question.php?queID=45729)	**Correct** Chosen: c
Question **What is the stall speed of an airplane under a load factor of 2.5 Gs if the unaccelerated stall speed is 60 knots?** (/gradebookutility/question.php?queID=52033) (/gradebookutility/question.php?queID=52033)  Figure 4. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=4&tabs=4&asIds[]=123657)	**Correct** Chosen: c
Question **What flight time may a pilot log as second in command?** (/gradebookutility/question.php?queID=45737)	**Correct** Chosen: c
Question **Which is true with respect to formation flights? Formation flights are** (/gradebookutility/question.php?queID=45780)	**Correct** Chosen: c

Question	Answer
Question **How much altitude will this airplane lose in 3 statute miles of gliding at an angle of attack of 8°?** (/gradebookutility/question.php?queID=51997) (/gradebookutility/question.php?queID=51997)  Figure 3.□ (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=3&tabs=3&asIds[]=123657)	**Correct** Chosen: c
Question **If not equipped with required position lights, an aircraft must terminate flight** (/gradebookutility/question.php?queID=45825)	**Correct** Chosen: a
Question **You are conducting your preflight of an aircraft and notice that the last inspection of the emergency locator transmitter was 11 calendar months ago. You may** (/gradebookutility/question.php?queID=45824)	**Correct** Chosen: b
Question **Which list accurately reflects some of the documents required to be current and carried in a U.S. registered civil airplane flying in the United States under day Visual Flight Rules (VFR)?** (/gradebookutility/question.php?queID=45814)	**Correct** Chosen: c
Question **What is the base of the ceiling in the following pilot report?** **KMOB UA /OV APE230010/TM 1515/FL085/TP BE20/SK BKN065/WX FV03SM HZ FU/TA 20/TB LGT** (/gradebookutility/question.php?queID=52166)	**Correct** Chosen: c

Performance Indicator Rubric

Course: FSCI 2650 Navigation Foundations Course Instructor: Jack Schwarz

Semester Taught: Spring 2023 Number of Students in Course: 35

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	Final Exam - #4: 88.57%	Yes.
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	Final Exam - #5: 85.71%	Yes.

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

Recommendation is to continue the current methods of presenting the course materials to the class.

**Attach description of assignment used for assessment and samples of student work.*

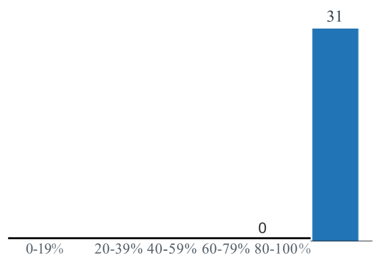
Es.s:.1Y 11 p::>ints pos:s ib le

G

An air craft is flying TAS 260 Ids a nd tracking 085"T.The *WN* is 045/50. How f.lr can the air cra ft fl y out from its b.lse .lnd re tu rn w it hin 1 hour ?

0.89	0.05	1.00	0.8 9tt pts
Difficulty Index	Discr iminat ion Inde x	RPB	Mea n Ea rn ed Score

Perf ormance by Quintile



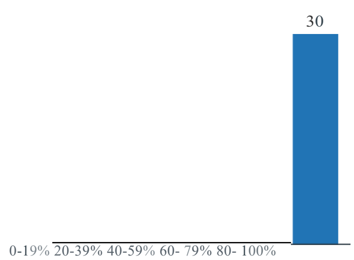
Es.say 12 p::>ints poss ib le

W

An aircraft is at FL340 with 260 KCAS and a true -18°C OAT. The wind component is a tailwind of 35 kts. When the aircraft is at 120 nm from• reporting point. ATC requests the crew to arrive 2 minutes later than plan t he re port ing po i nt How much do they need to reduce KCAS?

0.86	0.25	1.00	1.7112pts
Difficulty Inde x	Disc rim in .1t ion Index	RPB	Mea n Ea rned Score

Performance by Quintile



Performance Indicator Rubric

Course: FSCI 3550 Flight 5

Course Instructor: Ryan Boyer

Semester Taught: Spring 2023

Number of Students in Course: 25

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Percentage of student written exams and stage checks passed on first attempt)	Benchmark achieved? (Benchmark: 70% of student written exams and stage checks passed on first attempt)
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	Written Exam Pass Rate: 100% Stage Check Pass Rate: 90%	Yes
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	Written Exam Pass Rate: 100% Stage Check Pass Rate: 90%	Yes

Description of Assessment: The student assessment consists of multiple-choice module written exams as well as stage check practical exams. Written exams require a minimum score of 70% to pass. Each stage check consists of an oral portion and a flight portion, and satisfactory or unsatisfactory performance is determined in accordance with the Module Completion Standards and/or the appropriate Airmen Certification Standards (ACS)/Practical Test Standards (PTS). Attached are samples of the module completion standards included in the approved Training Course Outline. This document describes the expectations and assessment standards for stage check oral and flight checks. Also attached is a sample of a student's completed module written exam.

Recommendations: Continue to identify and discuss student stage check deficiencies with the instructional staff each semester. Revisions to course content and/or module completion standards will be made as needed to ensure adequate student preparation.

Module 9

Commercial Pilot ASEL Course Completion

Prerequisites: Prior to beginning this module the student must have successfully completed Module 8.

Objective: To complete the aeronautical knowledge and flight training required to prepare students to pass the Commercial Pilot Knowledge and Practical Exams.

Completion Standards:

- The student must meet the following minimum training time requirements during this module:

DUAL		SOLO	TOTAL	OTHER		
Local	XC	Airplane	Airplane	ATD	Pre/ Post	Ground
10.8	2.0	11.7	24.5	4.5	4.4	12.0

- Prior to completion of the module, students must pass the FAA Commercial Pilot Knowledge Exam.
- Prior to completion of the module, students must pass a stage check to evaluate their ability to:
  1) Demonstrate all applicable Tasks as specified in the Commercial Pilot Airplane Airmen Certification Standards within the established standards.
  2) Demonstrate mastery of the aircraft by performing each Task successfully.
  3) Demonstrate proficiency and competency in accordance with the standards.
  4) Demonstrate sound judgment and exercise aeronautical decision making and risk management.

Notes:

- Lessons may be completed out of sequence as necessary to meet academic goals set by the instructor.
- Multiple instructional periods may be required to meet lesson requirements.

Module 10

Multiengine Aircraft Operations

Prerequisites: Prior to beginning this module the student must be enrolled in the Commercial Pilot Added Rating Course, must hold a Commercial Pilot Airplane Single-engine Land certificate and must possess a valid Medical Certificate.

Objective: To complete the aeronautical knowledge and flight training required to prepare students to pass the Commercial Pilot Airplane Multiengine Land Added Class Rating Practical Exam.

Completion Standards:

- The student must meet the following minimum training time requirements during this module:

DUAL				**TOTAL**	OTHER		
Local Total	XC Total	XC Night	Inst. Ref.	**AMEL**	ATD	Pre/ Post	Ground
9.5	4.0	2.0	5.0	**13.5**	6.0	5.6	15.5

- Prior to completion of the module, students must pass a written exam to evaluate their understanding of the required knowledge areas included in the Commercial Pilot Airmen Certification Standards for an added Airplane Multiengine Land class rating.
- Prior to completion of the module, students must pass a stage check to evaluate their ability to:
  1) Demonstrate all applicable Tasks as specified in the Commercial Pilot Airplane Airmen Certification Standards within the established standards.
  2) Demonstrate mastery of the aircraft by performing each Task successfully.
  3) Demonstrate proficiency and competency in accordance with the standards.
  4) Demonstrate sound judgment and exercise aeronautical decision making and risk management.

Notes:

- Lessons may be completed out of sequence as necessary to meet academic goals set by the instructor.
- Multiple instructional periods may be required to meet lesson requirements.

Module 10 Exam Results for --------------------

Score for this quiz: **48** out of 58
Submitted Mar 20 at 8:32am
This attempt took 54 minutes.

Question 1

1 / 1 pts

For the following questions on airspeeds, please ensure your answer includes NUMBERS ONLY.

What airspeed (in knots) represents Vso in the PA44?

Correct!

55

orrect Answers

55

Additional Comments:

Question 2

1 / 1 pts

What airspeed (in knots) represents Vs1 in the PA44?

Correct!

57

orrect Answers 57

Additional Comments:

Question 3

1 / 1 pts

What airspeed (in knots) represents Vmc in the PA44?

Correct! 56

orrect Answers 56

Additional Comments:

Question 4

1 / 1 pts

What airspeed (in knots) represents Vfe in the PA44?

Correct! 111

orrect Answers 111

Additional Comments:

Question 5

1 / 1 pts

What airspeed (in knots) represents Vx in the PA44?

Correct!

82

orrect Answers

82

Additional Comments:

Question 6

1 / 1 pts

What airspeed (in knots) represents Vy in the PA44?

Correct!

88

orrect Answers

88

Additional Comments:

Question 7

1 / 1 pts

What airspeed (in knots) represents Vxse in the PA44?

Correct!

82

orrect Answers

82

Additional Comments:

Question 8

1 / 1 pts

What airspeed (in knots) represents Vyse in the PA44?

Correct!

88

orrect Answers

88

Additional Comments:

Question 9

1 / 1 pts

What airspeed (in knots) represents Vlo (retraction) in the PA44?

Correct!

109

orrect Answers

109

Additional Comments:

Question 10

1 / 1 pts

What airspeed (in knots) represents Vlo (extension) in the PA44?

Correct!

140

orrect Answers

140

Additional Comments:

Question 11

1 / 1 pts

What airspeed (in knots) represents Vle in the PA44?

Correct!

140

orrect Answers

140

Additional Comments:

Question 12

0 / 1 pts

What airspeed (in knots) represents Va in the PA44?

ou Answered

112 for 2700lbs / 135 for 3800lbs

orrect Answers

135

Additional Comments:

Question 13

1 / 1 pts

What airspeed (in knots) represents Vno in the PA44?

Correct!

169

orrect Answers

169

Additional Comments:

Question 14

1 / 1 pts

What airspeed (in knots) represents Vne in the PA44?

Correct!

202

orrect Answers

202

Additional Comments:

Question 15

1 / 1 pts

At what airspeed (in knots) should the PA44 rotate during a normal takeoff?

Correct!

75

orrect Answers

75

Additional Comments:

Question 16

1 / 1 pts

At what airspeed (in knots) should you conduct a short field approach in the PA44 (assume maximum gross weight)?

Correct!

75

orrect Answers

75

Additional Comments:

Question 17

1 / 1 pts

What is the maximum demonstrated crosswind component (in knots)?

Correct!

17

orrect Answers

17

Additional Comments:

Question 18

1 / 1 pts

What is the maximum ramp weight for the PA44 (in pounds)?

Correct!

3816

orrect Answers

3816

3,816

Additional Comments:

Question 19

1 / 1 pts

What is the maximum takeoff weight for the PA44 (in pounds)?

Correct!

3800

orrect Answers

3800

3,800

Additional Comments:

Question 20

1 / 1 pts

What is the maximum permissible weight in the baggage compartment in the PA44?

Correct!

200

orrect Answers

200

Additional Comments:

Question 21

1 / 1 pts

What is the maximum total fuel quantity (in gallons)?

Correct!

110

orrect Answers 110

Additional Comments:

Question 22

1 / 1 pts

What is the maximum usable fuel quantity (in gallons)?

Correct!

108

orrect Answers 108

Additional Comments:

Question 23

1 / 1 pts

What is the model of the right engine on the PA-44-180?

- O-360-A1H6
- Correct! LO-360-A1H6 (selected)
- IO-360-A1H6

Additional Comments:

Question 24

1 / 1 pts

The engines on the PA-44-180 are fuel injected and horizontally opposed.

- True
- Correct! False (selected)

Additional Comments:

Question 25

1 / 1 pts

The PA-44-180 is considered a high performance aircraft since the total horsepower is 360.

- True
- Correct! False

Additional Comments:

Question 26

1 / 1 pts

Cylinder head temperatures may be lowered during a climb by:

- Increasing airspeed.
- Opening the cowl flap.
- Enrichening the mixture.
- Correct! All of the above

Additional Comments:

Question 27

1 / 1 pts

In the PA-44-180, carburetor ice can be first detected by:

- ( ) A slow decrease in engine RPM.
- Correct! (•) A slow decrease in manifold pressure.
- ( ) A slow decrease in cylinder head temperature.

Additional Comments:

Question 28

1 / 1 pts

If the aircraft's battery is depleted, one way to get the aircraft started is to:

Connect a 28 volt power source to the external power receptacle located on the lower right side of the nose section.

Connect a 14 volt power source to the external power receptacle located near the step on the right side near the baggage door.

Correct!

Connect a 14 volt power source to the external power receptacle located on the lower right side of the nose section.

Additional Comments:

Question 29

0 / 1 pts

The purpose for the overvoltage relays are to prevent damage to the electrical and avionics equipment should an alternator's output cause the bus voltage to exceed_________volts.

ou Answered

14

orrect Answer

17

28

Additional Comments:

Question 30

1 / 1 pts

How would a pilot notice if an alternator has failed in flight in the PA-44-180?

- The voltmeter will drop below 12 volts and the ammeter will show a discharge.
- The voltmeter will drop below 14 volts and the ammeter will show a discharge.

Correct!

- The ALT light will illuminate and the ammeter for the failed alternator will show zero.

Additional Comments:

Question 31

0 / 1 pts

If one alternator fails in flight, what are the proper initial steps to restore operation of the affected alternator?

- Turn both alternator switches OFF, wait at least one second and then turn both alternators back on, one at a time.

orrect Answer

Turn the affected alternator switch OFF, then after one or more seconds, turn the affected alternator switch ON.

ou Answered

Turn off all non-essential electrical equipment and pull and reset the circuit breaker for the failed alternator.

Additional Comments:

Question 32

1 / 1 pts

Under which conditions will the "Gear Warning Horn Mute Switch" silence the horn?

Correct!

- Only if the horn was triggered by the power lever position.
- Only if the horn was triggered by the flap setting.
- Any time the horn is sounding and the gear is not down and locked.

Additional Comments:

Question 33

0 / 1 pts

The squat switch located on which gear prevents activation of the gear pump when the aircraft is on the ground?

orrect Answer

Left main gear

Right main gear

ou Answered

Nose gear

Additional Comments:

Question 34

1 / 1 pts

Assume the landing gear pump circuit breaker has popped and cannot be reset. Which is of the following statements is true?

The landing gear cannot be extended without electrical power. Declare an emergency and plan land gear up.

The aircraft should be slowed to less than 140 KIAS and the emergency hydraulic pump activated.

Correct!

The aircraft should be slowed to less than 100 KIAS and the emergency gear extension handle pulled.

Additional Comments:

Question 35

0 / 1 pts

During a pre-flight inspection of the aircraft you are checking the stall warning system and notice the stall warning horn does not sound when you lift on either of the lift detectors. Which of these statements is true?

ou Answered

The stall warning system is defective and the aircraft should be grounded until repairs can be made.

orrect Answer

The stall warning horn cannot be tested on the ground since the squat switch on the right main landing gear does not allow it.

The stall warning horn cannot be tested on the ground since it only functions when at least one engine is operating.

Additional Comments:

Question 36

0 / 1 pts

If an engine loses oil pressure during flight, how will the propeller system be affected?

ou Answered

The propeller blade angle will be reduced to the high RPM setting; use the throttle to avoid the resulting overspeed condition.

orrect Answer

The propeller blade angle will increase toward the low RPM setting.

The engine oil system has no effect on the propeller system.

Additional Comments:

Question 37

0 / 1 pts

What are the advantages of equipping the propeller system of a multiengine airplane with an accumulator?

orrect Answer

It allows for easier restarting of the engine in flight.

It permits the engine to be placed in the feature position in flight.

ou Answered

It stores oil under pressure for emergency use in the event of an engine oil pump failure.

Additional Comments:

Question 38

0 / 1 pts

The propellers contain feathering locks for what purpose?

ou Answered

- They prevent the propeller from inadvertently feathering in flight.

orrect Answer

- They prevent feathering during engine shutdown on the ground.
- They ensure the propeller remains in the feathered position once selected.

Additional Comments:

Question 39

0 / 1 pts

Which of the following is true if the temperature of the combustion heater exceeds limitations during flight?

orrect Answer

- The overheat safety switch will cause an annunciator to illuminate, and the heater will automatically shut off.

ou Answered

An annunciator will illuminate, and the pilot must manually adjust the temperature control to a lower setting to prevent damage.

The temperature inside the cabin will become excessive, and the pilot should open all cabin vents and deactivate the heater.

Additional Comments:

Question 40

1 / 1 pts

The source of fuel for the cabin heater is:

- The right fuel tank at approximately ½ gallon of fuel per hour.

Correct!

- The left fuel tank at approximately ½ gallon of fuel per hour.
- The left fuel tank at approximately 1 gallon of fuel per hour.

Additional Comments:

Question 41

1 / 1 pts

To prevent excessive temperatures, the heater should be shut down as follows:

- While in the air, the heater can be shut down without limitation. On the ground, the heater control switch should be placed in the fan position for at least one minute to cool down the heater before closing the air intake.

- While in the air, the heater switch should be turned off at least 10 seconds before closing the air intake. On the ground, the heater control switch should be placed in the fan position for at least one minute to cool down before closing the air intake.

Correct!

- While in the air, the heater switch should be turned off at least 15 seconds before closing the air intake. On the ground, the heater control switch should be placed in the fan position for at least two minutes to cool down before closing the air intake.

Additional Comments:

Question 42

1 / 1 pts

Which of the following is the best course of action in the event of an engine fire during start?

Close the affected engine's throttle and pull the mixture control to the idle cut-off position.

Correct!

Move the throttle to the full open position. Move the mixture control to the cut-off position. Continue cranking the engine.

Shut off the Battery switch and Alternator switches and evacuate immediately.

Additional Comments:

Question 43

1 / 1 pts

At sea level, the stall speed and the Vmc speed for the PA44 are nearly the same, but as altitude increases:

The stall speed decreases.

Correct!

The Vmc speed decreases.

The Vmc speed increases.

Additional Comments:

Question 44

1 / 1 pts

The term "Critical Engine" means:

- The engine that results in the most parasite drag in the event of failure.
- The engine that provides the best overall climb performance during single-engine operations.

Correct!

- The engine whose failure would most adversely affect the performance or handling qualities of an aircraft.

Additional Comments:

Question 45

1 / 1 pts

Which engine would be considered critical on a conventional multiengine airplane that is not equipped with counter-rotating propellers?

Correct!

- Left engine
- Right engine
- Neither engine

Additional Comments:

Question 46

1 / 1 pts

The published Vmc airspeed is based upon which of the following conditions?

Correct!

- (selected) Maximum available takeoff power and propeller controls in the recommended takeoff position
- Full power on the operating engine and the failed engine propeller feathered
- Cruise power on the operating engine and the failed engine propeller windmilling

Additional Comments:

Question 47

1 / 1 pts

The published Vmc airspeed is based upon which of the following conditions?

Forward-most CG and average operating weight

Forward-most CG and maximum gross weight

Correct!

Aft-most CG and most unfavorable weight

Additional Comments:

Question 48

1 / 1 pts

The published Vmc airspeed is based upon which of the following conditions?

Correct!

Flaps in the takeoff position and landing gear retracted

Flaps retracted and landing gear extended

Flaps in the most unfavorable position and gear extended

Additional Comments:

Question 49

1 / 1 pts

The published Vmc airspeed is based upon which of the following conditions?

Wings level

Correct!

An angle of bank of not more than 5 degrees

The angle of bank most adversely affecting performance

Additional Comments:

Question 50

0 / 1 pts

What is the proper way to identify and verify a failed engine in flight?

orrect Answer

Identify the failed engine by evaluating the need for rudder pressure. Verify using the throttle.

ou Answered

Identify the failed engine by reducing each throttle one at a time. The pilot not flying then verbally verifies the failed engine.

Identify the failed engine by referencing the RPM and manifold pressure gauge. Verify using either rudder pressure or throttle.

Additional Comments:

Question 51

1 / 1 pts

In the event of an engine failure, how should the airplane be flown to ensure a zero-sideslip condition?

- Wings level and inclinometer ball centered

Correct!

- Shallow bank toward the operating engine and the inclinometer ball slightly off-center

- Shallow bank toward the failed engine and the inclinometer ball centered

Additional Comments:

Question 52

1 / 1 pts

How does the procedure for an engine failure at cruise airspeed differ from an engine failure below Vmc?

- There is no difference in the procedures, but extra attention to aircraft control will be required if below Vmc.

Correct!

- The throttles should be reduced if below Vmc to lessen the effects of asymmetrical thrust.

Due to the reduced controllability below Vmc, the failed engine should be immediately secured.

Additional Comments:

Question 53

1 / 1 pts

In the event of an engine failure after takeoff over the runway in a multiengine airplane, under what circumstances should the airplane be landed straight ahead?

- An altitude of at least 500 AGL has not yet been reached.
- Based on the climb performance as calculated before flight, a positive rate of climb will not be possible.
- Correct! Sufficient runway remains for the airplane to land and come to a complete stop.

Additional Comments:

Question 54

1 / 1 pts

After an engine failure in flight, under which of the following circumstances would it be appropriate to troubleshoot the engine before securing it?

- During climb immediately after departure upon reaching an altitude of at least 1000 AGL

Correct!

- During cruise flight at an altitude above 4000 AGL with a maximum VSI indication of -100 FPM

- Established on an instrument approach outside of the final approach fix

- None of the above

Additional Comments:

Question 55

1 / 1 pts

While on the final approach segment of an instrument approach ending in a circle-to-land maneuver with one engine inoperative, the correct configuration for the aircraft is:

- Gear down; flaps retracted

- Gear down; flaps up to 25 degrees

Correct!

Gear and flaps retracted until the aircraft is in a position where a landing is assured

Additional Comments:

Question 56

1 / 1 pts

"Accelerate-stop distance" is the distance required to:

Correct!

- Accelerate to Vr or Vlof (as specified by the manufacturer), experience an engine failure, and bring the airplane to a complete stop.
- Accelerate to Vmc, abort the takeoff, and bring the airplane to a complete stop.
- Accelerate to Vx or Vy and climb to an altitude of 50 feet, abort the takeoff, and land straight ahead.

Additional Comments:

Question 57

1 / 1 pts

The intentional one engine inoperative speed in the PA-44-180 for flight training purposes is:

Correct!

- (●) Vsse
- ( ) Vyse
- ( ) Vmc

Additional Comments:

Question 58

1 / 1 pts

The definition of a single-engine service ceiling for a multiengine airplane is:

- ( ) The altitude above which the aircraft cannot maintain altitude.

Correct!

- (●) An altitude above which a rate of climb of least a 50 FPM cannot be maintained.
- ( ) An altitude above which a rate of climb of least a 100 FPM cannot be maintained.

Additional Comments:

Fudge Points: --

You can manually adjust the score by adding positive or negative points to this box.

Final Score: 48 out of 58

Update Scores

Performance Indicator Rubric

Course: FSCI 3750 Flight 6

Course Instructor: Ryan Boyer

Semester Taught: Spring 2023

Number of Students in Course: 6

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Percentage of student written exams and stage checks passed on first attempt)	Benchmark achieved? (Benchmark: 70% of student written exams and stage checks passed on first attempt)
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	Written Exam Pass Rate: 100% Stage Check Pass Rate: 90%	Yes
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	Written Exam Pass Rate: 100% Stage Check Pass Rate: 90%	Yes

Description of Assessment: The student assessment consists of multiple-choice module written exams as well as stage check practical exams. Written exams require a minimum score of 70% to pass. Each stage check consists of an oral portion and a flight portion, and satisfactory or unsatisfactory performance is determined in accordance with the Module Completion Standards and/or the appropriate Airmen Certification Standards (ACS)/Practical Test Standards (PTS). Attached are samples of the module completion standards included in the approved Training Course Outline. This document describes the expectations and assessment standards for stage check oral and flight checks. Also attached is a sample of a student’s completed module written exam.

Recommendations: Continue to identify and discuss student stage check deficiencies with the instructional staff each semester. Revisions to course content and/or module completion standards will be made as needed to ensure adequate student preparation.

Module 11

Fundamentals of Instruction

Prerequisites: Prior to beginning this module the student must possess an ATP Certificate with an Airplane Single-Engine Land Rating or Commercial Pilot Certificate with Airplane Single-Engine Land and Instrument Ratings and must possess either a valid FAA medical certificate or meet the Alternative Pilot Physical Examination and Education Requirements under FAR 68 (BasicMed).

Objective: To introduce the student to the Fundamentals of Instruction, to gain proficiency in teaching technical subject areas, and to increase competence in demonstrating and describing Private Pilot procedures and maneuvers.

Completion Standards:

- The student must meet the following minimum training time requirements during this module:

DUAL		OTHER
Airplane	Pre/ Post	Ground
12.7	3.6	21.0

- Prior to completion of the module, students must pass the FAA Fundamentals of Instruction Knowledge Exam and a stage check to evaluate their instructional knowledge of:
  1) The fundamentals of instructing, including human behavior, effective communication, the teaching process, the learning process, assessment and critique, instructor responsibilities and professionalism, techniques of flight instruction, and risk management, as described in the Flight Instructor Practical Test Standards or Airmen Certification Standards.
  2) Technical subject areas, including principles of flight, flight controls, aircraft systems, performance, and weight and balance, as described in the Flight Instructor Practical Test Standards or Airmen Certification Standards.

- Prior to completion of the module, students must pass a stage check to evaluate their ability to:
  1) Demonstrate all procedures and maneuvers in this module from the right seat to the Private Pilot skill level.
  2) Demonstrate a preflight inspection while describing reasons for the inspection, items to check, and recognition of defects.
  3) Demonstrate and simultaneously explain all ground operations, including engine starting procedures, cockpit management, taxiing, airport signs and markings, ATC communication procedures, and before takeoff checks.
  4) Demonstrate and simultaneously explain fundamentals of flight and basic instrument maneuvers.
  5) Demonstrate and simultaneously explain traffic pattern procedures, including normal/crosswind takeoff and landing, short-field takeoff and landing, soft-field takeoff and landing, slip to a landing, and go-arounds.
  6) Demonstrate and simultaneously explain steep turns, slow flight, and stalls.
  7) Demonstrate and simultaneously explain Private Pilot ground reference maneuvers, including turns around a point, s-turns, and rectangular course.
  8) Demonstrate and simultaneously explain emergency operations, including a simulated emergency approach and landing.

Notes:

- Lessons may be completed out of sequence as necessary to meet academic goals set by the instructor.
- Multiple instructional periods may be required to meet lesson requirements.

Module 12

Flight Instructor Practical Test Preparation

Prerequisites: Prior to beginning this module the student must possess an ATP Certificate with an Airplane Single-Engine Land Rating or Commercial Pilot Certificate with Airplane Single-Engine Land and Instrument Ratings.

Objective: To gain proficiency in teaching technical subject areas and demonstrating and describing all required procedures and maneuvers. To complete the aeronautical knowledge and flight training required for the Certified Flight Instructor Practical Exam.

Completion Standards:

- The student must meet the following minimum training time requirements during this module:

DUAL	OTHER	
Airplane	Pre/ Post	Ground
12.3	4.2	20.0

- Prior to completion of the module, students must pass the FAA Flight Instructor Airplane and Advanced Ground Instructor Knowledge Exams.
- Prior to completion of the module, students must pass a stage check to evaluate their:
  1) Ability to demonstrate all applicable tasks as specified in the Flight Instructor Practical Test Standards or Airmen Certification Standards within the established standards.
  2) Knowledge of the fundamentals of instruction, technical subject areas, and instructor responsibilities.
  3) Ability to demonstrate the procedures and maneuvers to at least the Commercial Pilot skill level while giving effective instruction.
  4) Competence in teaching the selected procedures and maneuvers.
  5) Competence in describing, recognizing, analyzing, and correcting common errors.

6) Knowledge of the development and effective use of a course of training, syllabus, and lesson plan.

Notes:

- Lessons may be completed out of sequence as necessary to meet academic goals set by the instructor.
- Multiple instructional periods may be required to meet lesson requirements.

U.S. DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration
Airman Knowledge Test Report

NAME:

FAA TRACKING NUMBER (FTN): A5469453 **EXAM ID:** 90030320230335228

EXAM: Fundamentals of Instructing (FOi)

EXAM DATE: 03/03/2023 **EXAM SITE:** ABS63102

SCORE: 88% **GRADE:** Pass **TAKE:** 1

Learning statement codes listed below represent incorrectly answered questions. Learning statement codes and their associated statements can be found at https://www.faa.gov/training testing/testing/media/LearningStatementReferenceGuide.pdf.

Reference material associated with the learning statement codes can be found in the appropriate knowledge test guide at https://www.faa.gov/training_testing/testing/.

A single code may represent more than one incorrect response.

PLT204 PLT227 PLT230 PLT306 PLT504

~~**EXPIRATION DATE:** 03/31/2025~~

DO NOT LOSE THIS REPORT

AUTHORIZED INSTRUCTOR'S STATEMENT: (if applicable)

On ________ (date) I gave the above named applicant ____ hours of additional instruction, covering each subject area shown to be deficient, and consider the applicant competent to pass the knowledge test.

Name ____________________

Cert. No. ____________________ (print clearly)

Type of instructor certificate ____________________

Signature ____________________

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Flight Science – Data Collected in Support of Student Learning Objective Goals and SLO 2

Performance Indicator Rubric

Course: ASCI 3070 Flight Crew Fundamentals Course Instructor:_____Donald Schmidt___________________

Semester Taught: __spring ‘23___________Number of Students in Course:_____15______

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = “C”)
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	100%	yes

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

The course appeared to be successful. The main goals were class participation, a midterm paper and a final simulation. The paper of which I will attach a copy was intended to explore an aviation event that dovetailed into the discussion topics previously covered in the course. The assignment was not intended to merely rehash the accident itself, but to discuss it in the students' own words from the perspective of class topics. These would include the importance of standard operating procedures, crew resource management, checklist theory and usage, and turbine transport systems. Overall this major project was successful and some of the best work that had been submitted in recent years. The final project was a simulation based exercise, the intention of which was to work through the flows and checklists for the CRJ700. Exercise was to be started with the aircraft sitting on the ramp following through takeoff, culminating in a successful completion of the takeoff profile to altitude. The time limitation was 15 minutes. This was to address the extreme time it was taking students completely new to the platform. Again this final exercise was completely successful with each student taking time throughout the semester to study these procedures on their own and all were able to complete the exercise within the allotted period. The secondary objective of this exercise was to "learn how to learn" a new and complex aircraft, unfamiliar flows, checklists, and profiles. The secondary objective was also a success, with all students proving so by their study habits and successful completion of the scenario in a timely fashion.

**Attach description of assignment used for assessment and samples of student work.*

The assignment description for the paper was as follows:

Provide a discussion and examination of BritAir 5937's accident in Lorient, France. Specifically the issues of the accident as they relate to the work and lecture thus far in class, with explorations into the issues of Standard operating procedures, crew resource management, and checklist usage and how they may have impacted the situation.

Donny Shmidt

30/30 Nice work

Flight Crew Fundamentals
4/10/23

Brit-Air CRJ 700 Accident Analysis

On the 16th of October 2012, an experienced 42-year-old captain and 45-year-old co-pilot flying the CRJ-700 did not carry out their duties properly and overran runway 25 at Lorient Lann Bilhoué. Both had at least 3,000 hours in the CRJ, and their professional levels were qualified as good. It is an unfortunate accident, but it can happen to any pilot when risk factors stack up.

Before the flight even began, the pilots did not have a mental check of their attitudes toward the flight. Both pilots arrived at their trip's fifth and final flight rushed and fatigued. The captain's short turnaround led to meteorological preflight preparation being completed in the cockpit. The pilot saw rain and a crosswind of 15 to 20 kt; he felt there was a risk of wind shear and considered landing on the runway with a flaps 30º configuration. The fatigue and rush amidst the preflight led to the captain having tunnel vision in choosing that configuration, as he never adjusted for the conditions met during the actual flight.

The fatigue factor continued to be a very concerning problem for these pilots throughout the flight. The crew spoke about their fatigue on the ground, while the PM even mentioned his fatigue and weariness before the descent. Moreover, the pilots even talked of their desire to complete the flight as soon as possible in the cockpit. The hazardous attitude displayed due to the fatigue felt by the pilots led to a considerable lack of situational awareness as they approached deteriorating weather conditions in which they needed more experience flying in.

In the prelanding, descent, and landing phase, the errors kept stacking, ultimately leading to the accident. The crew resource management amidst this flight was poorly executed in all phases. The crew inappropriately used their checklists and flows amidst descent and approach. The approach checklist was interrupted by the controller and resumed by the pilots in the wrong place, which shows an apparent lack of care and discipline. As a result of the checklists being used as an "action guide," the crew did not calibrate the altimeter. The captain later asked the first officer if the approach checklist had been completed because the altimeter was incorrectly calibrated.

This phase is where a critical error by the crew occurred. Both pilots were fatigued, trying to complete a checklist, and were interrupted by a controller. The controller states that there is a wind from 160º gusting up to 26kt, a severe squall, and that the previous aircraft encountered difficulties during landing due to "aquaplaning." The fatigued pilots hear the controller, and their mind goes back to completing the checklist at hand (improperly, as a matter of fact). Although the crew had a checklist to complete, the lack of the pilots recognizing the controller's interruption as extremely important led to the danger being improperly perceived, and their situational awareness was not modified.

Really nice development

The moment the crew heard the controller state winds from 160º with gusts up to 26 kts and the previous aircraft encountered "aquaplaning," their minds should have immediately started considering landing distance and standard operating procedures of British Airway's landing techniques. The landing distance calculated by the crew during their rushed ground operation only left a margin of 80m. This was calculated using non-contaminated runway conditions. The pilots should have been aware of the landing distances with a runway contaminated by water. Under calculations, a flaps 45º approach with the airplane's performance would theoretically permit it to land on a contaminated runway, but when tested by manufacturers, the roll distance was 1,358, which is inadequate. Regardless of pin-pointing theoretical landing distances, the pilots should have immediately recognized that their initial calculation of 80m remaining would not be sufficient with a 30º flap configuration, a contaminated runway, and an almost direct crosswind amidst a squall which could, and did, turn into a tailwind.

The controller's phraseology was imperfect, and the pilots did not hear the word contaminated directly. However, the pilots still could have followed the standard operating procedure for a contaminated runway, as there were previous reports of aquaplaning. Following standard operating procedures or even using a similar landing technique in the SOPs would have resulted in a safer result. The British Airway SOPs in section 1.17.1.4.3 Landing Technique state that on a contaminated runway, the pilot should:

1. "Land with flaps in the 45º position
2. Make Firm Landing
3. Landing is prohibited if the XC is greater than 10kt and if braking is poor" (1.17.1.4.3)

ALWAYS DANGEROUS

Unfortunately, none of these measures were met as the captain continued with his preflight decision of a 30º flap configuration approach. A 45º flap configuration approach would have led to a 132 kt approach with a 10 kt gust factor, ultimately a 142 kt approach.

The crew disregarded SOPs and announced they would use an airspeed reading of 140 knots which is not procedural and is not backed by anything more than "personal knowledge." On the actual approach, the airplane's airspeed increased above 150 kts for 10 seconds, even maxing out at 155. The pilots crossed the runway 25 threshold at 56 feet, flying 153 kts with a 4 kt tailwind. Brit Air SOPs state that "deviations on approach below 1,000 ft relate to certain parameters including indicated airspeed which should be between VAPP +10kt… when a deviation occurs, the PM calls it out. If no immediate correction is made, a go-around is imperative" (1.17.1.4.6). The crew disregarded callouts, made no immediate correction to their fast airspeed, and did not make a go-around. It was a direct disregard for SOPs, and unfortunately, this led to the plane overrunning runway 25.

There are many things the pilots could have done differently to avoid this accident. Although uncommon, the fatigued pilots could and should have reported their fatigue. Instead, they continued to rush, failing to recognize the threats and hazards associated with their flight. Whether it be the lack of care for the controller's weather warnings, the misuse of checklists, the

improper approach configuration, the un-sterile cockpit, the disregard for SOPs that would have led to a go-around, or the general lack of situational awareness regarding the runway's conditions, these pilots were risk stacking. The stacking risks ultimately caught up to them as their plane hit the runway 25 localizer antenna before coming to rest approximately 200m past the threshold of runway 07.

It is an unfortunate accident; the pilots could have made better decisions, but we cannot blame it all on them. Other factors were involved, such as the lack of common phraseology between the controllers and crews to understand the true condition of the contaminated runway or the characteristics of runway 25's water logging tendencies not being documented in the Brit Air Operations manual. Brit Air pilots were also unprepared for a situation like this, regardless of being fatigued or rushed. Their training and recurrent training checks only provide one scenario per session, no nighttime scenario, and conditions with runway water contamination cannot be simulated. Their briefings on airplane performance also do not include threat and error management. Threat and error management trains crews to be exposed to threats and to be able to identify errors that happen. Unfortunately, only the captain had been exposed to TEM training as it was newly implemented in 2012, the year of the accident. What can be done is to have all pilots trained to identify threats and manage errors. A pilot should be taught to run a mental checklist on themselves, such as the ADM process of:

"(1) Identifying personal attitudes hazardous to safe flight.
(2) Learning behavior modification techniques.
(3) Learning how to recognize and cope with stress.
(4) Developing risk assessment skills.
(5) Using all resources in a multi-crew situation.
(6) Evaluating the effectiveness of one's ADM skills" (Advisory Circular 60-22)

Whether at Brit Airways or a mom-and-pop Part 61 school, pilots should be trained by a threat and error management course and taught the proper steps of Aeronautical Decision Making to safely rely on their situational awareness, problem recognition, and sound judgment to reduce risks associated with each flight.

BE CAREFUL w/ SLANG

AWESOME JOB SOME OF THE BEST EXPLORATION AND DEVELOPMENT I'VE SEEN.

Donny Schmidt

ASCI 3070

04/10/2023

30/30 Awesome

Reflection on Brit Air DB5937

In fall of 2012, Britair DB5937 overran a runway in Lorient, France which sparked a conversation regarding the formality and use of Standard Operating Procedures (SOPs), safety margins within airlines, and various crew training. While weather most likely played a factor in the overrun, this paper will review the pilot and airline related decisions that resulted in the incident. It'll also review how modern day SOPs and safety margins would have possibly prevented the overrun and the impact modern day SOPs have on operations.

When reviewing the many factors that contributed to the incident, it's important to highlight the main overall reasons discussed in the incident report. The first main point is around fatigue of the pilots. This flight was the fifth of the day and the last. CVR captures the pilots discussing their fatigue and readiness to go home (Hradecky, 2012). The next factor is focused on the lack of safety margins within the pilots decisions and airline standards. This is discussed as the majority of the decisions captured vocally seem to be made with little margin of error. In aviation, it is important to remember that nothing will ever be perfect, including performance. Perhaps threat and error management (TEM) training isn't taught as much at this point in time. With all of this in mind, the final issue brought up throughout the incident report comes around the lack of routine. A lack of routine, which encaptures all the incidences discussed above, comes from a lack of SOPs and other standardizations aviation has developed. As we continue our discussion, we'll now discuss the various issues and where SOPs could have come into play to avoid the situation occurring.

It's important to reflect on the winds and weather for that day with the first point of lack of SOP and standardization. The winds on this day were 160 @ 16 gusting 26 knots. Visibility was 2000 to 3000 meters, most likely due to the rain that was falling. With the amount of rain falling, pilots prior to the accident were reporting difficulty breaking and the runway wet with puddles (to be discussed later). Lastly, the pilots note windshear on the ILS approach. With all this in mind, the captain quickly, with little discussion, notes that they will be keeping their airspeed above the VAPP, set at 140 kts for this flight (Hradecky, 2012). This is the first topic where an SOP could be useful. While it might be general knowledge that keeping the airspeed faster during an approach helps with windshear, it might not be specified as an approved procedure for the airline or might need additional steps when making this decision including increasing runway needed by a certain percentage.. In modern day aviation, Windshear Detection Systems (WSDS) have been able to alert pilots of possible windshear alerts. These systems would be nice to hold as when one goes off, most, if not all airlines have procedures that require a go around (FAA). It is also important to realize the effect this decision has on landing distances, something which isn't discussed by the pilots. Lastly, with a higher approach speed comes an unstable aircraft. This is where the main issue occurs. As discussed in the report, an aircraft doing 10kts or more over the VAPP (DB5937 was doing 15kts over at one point) is defined as unstable and should go around. This is a modern day SOP many airlines follow, as discussed in SKYbrary's article on SOPs. The pilots of this flight didn't do so which risked the aircraft overrunning the runway, floating too much, or flying into the ground with a nose down attitude. Implementing this SOP would make it standard for an unstable approach at VAPP + 10kts or more to go around and either reattempt the approach or divert to a more suitable airport

(SKYbrary). During this incident, that SOP wasn't followed and crew communication was minimal in the decision, leading to an nonstandard, more dangerous approach.

With a faster approach means a longer runway needed. The runway and its analysis from the pilots is the second issue in this report which an SOP and stricter standardization would have possibly prevented this accident. Within the Britair procedures, runway 25 at Lorient isn't explained in detail (highlighting the encouragement to not use this runway?). Due to this, the pilots are unaware exactly how smooth the runway surface is and other important information. In their analysis of the runway, they also give themselves 80 meters of margin (Hradecky, 2012). Had an SOP been developed and used, the pilots would have most likely been forced to reevaluate the runway decision and incorporate a higher margin of error to allow for situations with rain, gusty winds, not using full flaps (the crew uses flaps 30 instead of 45 to allow for passenger comfort which isn't standardized within the company), and puddles on the runway. It's also important to highlight the phraseology used by air traffic controllers and pilots prior to the incident and their use of the word "puddles." There are 4 runway condition standards at this time, which are dry, wet, puddles, and flooded. "Wet with puddles" is what is told to the pilots which is nonstandard and potentially creates issues with the pilots understanding the extent of the runway condition. That, alongside no equipment to measure the puddles, created a nonstandard situation (Hradecky, 2012). Continuing to develop phraseology creates more standardization and allows all aviators to further understand the situations without question. In modern day operations, many airlines require the aircraft to land on a runway that is the calculated landing distance and a certain percentage added from that (Cornell). At Parks our FOM states that student pilots must have enough runway to takeoff times 200% on solo flights. Had a standard

AWESOME
LANDING PERFORMANCE REQUIREMENTS.

been set for Britair on landing distances and runway length requirements, further margin and communication between the crew would have been needed, overturning their previous decision.

The final issues result from the improper use of detailed briefings and the use of flows/checklists. During the investigation, the public learned that checklists used during the approach and landing phase of flight weren't fully completed. While the crew had hopefully all the aspects of the checklist covered in their flows, they had not cross checked their actions with the checklist in full due to an ATC interruption. It is also learned that the pilots had done a shorter than normal brief of the approach and landing, using non standard phraseology within it. With all this in mind, the lack of awareness of the aircraft and lack of planning lead to the accident potential. Had the crew done the checklists and briefs correctly, the issues that followed including phraseology each pilot used, a proper plan of action, error margins, and threats associated with the flight would have all been discussed, covered and agreed upon, creating a plan of action had something gone wrong like a fast approach speed and unstable approach creating a more in depth conversation of the actions they were taking.

Within this paper, we've discussed the main topic of standardizing procedures, phraseology, and actions within flight. Through proper training and enforcement of SOPs, aviation becomes a lot safer and decisions made in flight are decided upon data, resulting in safer flying. Had the pilots of DB5937 done proper briefings and checklists, considered safety margins, followed set proper procedures, and done actions like go around when unstable, the resulting accident would have unlikely occurred. SOPs and the training surrounding them have developed to allow for higher amounts of safety and better, more uniform decision making between pilots and crew. FAA and other aviation regulation agencies continue to develop deep, well-worded regulations to enforce proper aviation actions. Companies further these regulations

with company policies to enforce these regulations and then some, adding further safety related rules. Proper following of these SOPs has been found crucial and when deviating from them, can prove costly and extremely dangerous, as presented in this accident.

Excellent work.

Great Tie ins.

Work Cited

"14 CFR § 121.195 - Airplanes: Turbine Engine Powered: Landing Limitations: Destination Airports." *Legal Information Institute*, Legal Information Institute, https://www.law.cornell.edu/cfr/text/14/121.195.

"Effective Briefings." *SKYbrary Aviation Safety*, https://www.skybrary.aero/articles/effective-briefings.

Hradecky, Simon. "Accident: Britair CRJ7 at Lorient on Oct 16th 2012, Overran Runway on Landing." *Accident: Britair CRJ7 at Lorient on OCT 16th 2012, Overran Runway on Landing*, https://avherald.com/h?article=4579315d.

"Standard Operating Procedures (SOPS)." *SKYbrary Aviation Safety*, https://www.skybrary.aero/articles/standard-operating-procedures-sops.

"Wind Shear Detection Services (WSDS)." *Wind Shear Detection Services (WSDS) | Federal Aviation Administration*, https://www.faa.gov/air_traffic/weather/wsds.

Performance Indicator Rubric

Course: ASCI 4012 Introduction to Flight Crew Operations Course Instructor: John Denando

Semester Taught: Fall 2022 Number of Students in Course: 28

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	(264/308) 86% of the class achieved a 70%	YES
SLO 3: Apply effective oral and written communication skills to function effectively in the aviation environment.	(75/84) 89% of the class achieved a 70%	YES
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	(210/280) 75% of the class achieved a 70%	YES

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

I believe there is still a lack of transfer of material from the classroom to the simulator. The majority of students reported not utilizing the CRJ training room in between simulator lessons. Given the normal maintenance issues this semester, one would assume the PC simulator would be used to maintain proficiency. However, since it was not mandated, it appears that this study resource was not used.

The Decision-making assessment is satisfactory in my opinion.

24 out 28 students began this course with an instrument rating. Evidence shows students have a rote level of learning pertaining to instrument operations in the national aviation environment. This course material sought for deeper understanding and actual application in the simulator of instrument procedures that the students are not able to be exposed to at the flight line. When asked to answer questions pertaining to regulations and whether we could takeoff or land, scores were lower than compared to SLO 1 assessment questions.

- I would suggest noting the initial instrument course that there is a difference between part 91 instrument operations and part 121/135 operations. Perhaps note some of the differences, but do not get into much depth.

All material used to evaluate student learning outcomes for this course were in the form of questions found on quizzes and exams.

SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.

1. **Quiz 1 Question 1 (SLO 1. 27/28 students answered correctly)**
   - The guidance and procedures found in the Billiken Air Express are <u>optional</u> to use when operating Billiken Air Express aircraft.
     - TRUE
     - **FALSE**

2. **Quiz 2 Question 8 (SLO 1. 28/28 students answered correctly)**
   - When a takeoff minimum is not published, the certificate holder may use the applicable standard takeoff minimum and any lower than standard takeoff minimums authorized by the operations specifications.
     - **TRUE**
     - FALSE

3. **Quiz 4 Question 14 (SLO 1. 25/28 students answered correctly)**
   - Current winds are 300 at 11, gusting 17. KSTL is landing runway 12L. Can we accept this?
     - Yes.
     - Yes, if the gusts go away.
     - **No.**

4. **Quiz 4 Question 17 (SLO 1. 28/28 students answered correctly)**
   - You are flying with the company's worst captain. He is high and fast, and at 240 KIAS asks for FLAPS 1, 8 and 20, and gear down to slow down. Can you do this?
     - Yes.
     - **NO**.
     - Yes, but you secretly wait until 230 KIAS to bring down the gear.

5. **Quiz 5 Question 9 (SLO 1. 18/28 students answered correctly)**
   - AT 10,000' MSL, the max airspeed of the CRJ700 is...
     - **335 KIAS**
     - 320 KIAS
     - 250 KIAS
     - 300 KIAS

6. **Mid-Term Question 37 (SLO 1. 28/28 students answered correctly)**
   - During takeoff, an engine failure occurs after V1. The crew should...

- **Regardless of if the aircraft is on the ground or in the air, continue the takeoff since the engine failure occurred after V1.**
- Reject the takeoff if the airplane is still on the runway.
- If airborne and less than 50 feet, reduce the power on the good engine to idle and land on the remaining runway.
- Have a quick discussion about what to do and then make a decision to continue or reject.

7. **Final Question 11 (SLO 1. 12/28 students answered correctly)**
   - Refer to the KMSP ILS RWY 30R. ATIS reports 3/4 mile visibility. Tower reports current RVR for 30R is TDZ 2400, ROLL 3000. Can we proceed past the final approach fix?
     - YES
     - **NO**

8. **Final Question 12 (SLO 1. 24/28 students answered correctly)**
   - Refer to the KMSP ILS RWY 30R. ATIS reports 1/4 mile visibility. Tower reports current RVR for 30R is TDZ 4000, ROLL 1200. Can we proceed past the final approach fix?
     - **YES**
     - NO

9. **Final Question 27 (SLO 1. 24/28 students answered correctly)**
   - You are on an ILS just outside the FAF, the gear is down and flaps 30. We are high and fast, and the PF calls flaps 45 at 180 KIAS. If you don't select flaps at this moment, you won't meet the stabilized approach criteria. As PM, you should...
     - Notify the PF that we are too fast for flaps 45, wait for him to slow, then select flaps 45 and continue.
     - Select flaps 45 and notify the PF we are high, and as long as he says **"CORRECTING"**, it is ok to continue.
     - **Notify the PF that we are too fast for flaps 45 and suggest a missed approach.**
     - Immediately select flaps 45, see if we are stable by 1,000' AFE, then determine whether or not to continue or execute a missed.

10. **Final Question 45 (SLO 1. 28/28 students answered correctly)**
    - Refer to the CLVIN RNAV departure. You are departing runway 4R, and ATC clears you, "Billiken 1012, RNAV to NITRN, runway 4R, cleared for takeoff." At 1,000 feet AFE, the PF commands "SPEED 250, FLAPS UP." As PM, you should...
      - Bug 250 because the PF said so.
      - **Bug 230 because of the speed restriction at NITRN and remind the PF of the speed restriction.**
      - Bug 200 and not tell the PF what or why you are doing that.
      - Do nothing and see if the PF catches it on their own.

11. **Final Question 66 (SLO 5. 22/28 students answered correctly)**
    - Refer to the CLVIN2 RNAV DEPARTURE. If tower says, "BILLIKEN 1012, RUNWAY 4R, RNAV TO NITRN, CLEARED FOR TAKEOFF." Above 10,000' what is the maximum speed we can fly until either 17,000' or advised by ATC.

- **280 KIAS**
- 250 KIAS
- 335 KIAS
- The speed listed in the climb section of the SOP Expanded Checklist

SLO 3: Apply effective oral and written communication skills to function effectively in the aviation environment.

1. **Quiz 1 Question 14 (SLO 3. 25/28 students answered correctly)**
   - In the SOP CHAPTER 2: OPERATIONAL GUIDANCE, there is guidance given on what to say when receiving altitude changes from ATC. Although there is specific wording in the manual, the pilot may change this as they please and put their own "spin" on it as long as they comply with the clearance.
     - TRUE
     - **FALSE**

2. **Quiz 4 Question 28 (SLO 3. 25/28 students answered correctly)**
   - The PF flies the aircraft outside of the Billiken Air Express stabilized approach criteria below 1,000' AFE. The runway is 12,000' long and the condition is dry. You have two thrust reversers and everything is working normally. As PM, you should...
     - say nothing, continue and land normally, then de-brief at the gate.
     - **call "unstable, missed approach".**
     - call "unstable" and ensure he/she corrects.
     - take the controls, then de-brief over Starbucks.
     - allow it to continue, then take the controls if it doesn't get better.

3. **Mid-Term Question 12 (SLO 3. 25/28 students answered correctly)**
   - You are flying with a new First Officer. He is high and behind the aircraft coming in for landing. He asks for flaps 1 at 235 KIAS. You should...
     - give him flaps 1 because there is nothing wrong with this scenario.
     - **tell him he is too fast and will give them to him when he is below the maximum flaps 1 speed.**
     - give him flaps 1 knowing that he is too fast because if you do not give him flaps 1 the approach will result in a go-around.
     - give him flaps 1 and suggest he follow it with flaps 8 and flaps 20 because we are high and fast.

SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.

1. **Quiz 4 Question 26 (SLO 5. 24/28 answered correctly)**
   - You are filed on a STAR (not an RNAV STAR). It has numerous EXPECT crossing restrictions on arrival. Even if ATC does not clear you to cross at this altitude, you must still cross at the altitude listed on the chart.
     - YES
     - **NO**

2. **Quiz 4 Question 27 (SLO 5. 25/28 answered correctly)**
   - On STARs that ARE NOT RNAV STARs, speed restrictions are still mandatory.
     - **TRUE**
     - FALSE

3. **Mid-Term Question 4 (SLO 5. 18/28 students answered correctly)**
   - An RNP approach in a foreign country is the same as a GPS (RNAV) in the United States and does not require any extra training.
     - **TRUE**
     - FALSE

4. **Mid-Term Question 17 (SLO 5. 26/28 students answered correctly)**
   - Standard Instrument Departures (SIDs) require an ATC clearance prior to being flown.
     - **TRUE**
     - FALSE

5. **Quiz 6 Question 7 (SLO 5. 27/28 students answered correctly)**
   - The Single-Engine Takeoff Path is an extension of the Captain's emergency authority and must be stated as such to ATC as soon as practical.
     - **TRUE**
     - FALSE

6. **Final Question 14 (SLO 5. 8/28 students received full credit, 4/28 students received partial credit, 16/28 students received zero credit)**
   - Refer to the KMSP ILS RWY 30R. What is the final approach fix? (This question type was "short answer". Each bullet point represents an example of real answer.)
     - **Glideslope intercept at the lowest published altitude (correct)**
     - Glideslope intercept at the highest altitude (incorrect)

- JACKO (incorrect)

- **Glideslope intercept at 3,000’ (correct)**

7. **Final Question 19 (SLO 5. 28/28 students answered correctly)**
   - Refer to the GOPHER 1 arrival. What speed must we be at crossing the GEP VOR? ATC has not assigned any speed on the arrival.
     - **Pilot's discretion/Billiken Air Express descent profile speed (as long as we are above 10,000', greater than 250 KIAS and less than 335 KIAS. Below 10,000, 250 KIAS)**
     - 300
     - 280
     - 250

8. **Final Question 20 (SLO 5. 14/28 students answered correctly)**
   - Refer to the GOPHER 1 arrival. ATC says, **"DESCEND AND MAINTAIN 11,000, MINNEAPOLIS ALTIMETER IS 29.97"**. You cross the GEP VOR at 12,200. Did you violate ATC's clearance?
     - YES
     - **NO**

9. **Final Question 32 (SLO 5. 10/28 students answered correctly)**
   - Reference KMSP 10-9A. Tower is reporting 1/4 SM visibility. No RVRs are usable. Runway 4 is in use (all other runways closed). Can we depart?
     - **Yes**
     - Yes, but we have to wait to the RVRs become usable or the visibility increase to standard takeoff minimums.
     - No

10. **Final Question 64 (SLO 5. 28/28 students answered correctly)**
    - The primary reason for a departure procedure is to provide obstacle clearance protection information to pilots. A secondary reason is to increase efficiency and reduce communications and departure delays using Standard Instrument Departures.
    - **TRUE**
    - FALSE

Performance Indicator Rubric

Course: ASCI 4013 Introduction to Flight Crew Operations Laboratory Course Instructor: John Denando

Semester Taught: Fall 2022 Number of Students in Course: 28

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	100%	YES
SLO 3: Apply effective oral and written communication skills to function effectively in the aviation environment.	100%	YES
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	100%	YES

Course Assessment (Intended Use of Results)

Since the inception of this course in 2008, this is the first time the first twelve simulator lessons (lab section curriculum) of ASCI 4012 has changed. The material presented in the classroom served as a preview as to what would be covered the subsequent week in the lab. Based on instructor feedback, it did prove beneficial to the students. In the one group where I acted as their instructor, there were still weaknesses in areas that were taught in ASCI 3062 - Turbine Aircraft Transition.

Areas where I believe the simulator section could improve are as follows:

1. Mandate practice or study time in the PC lab with an instructor. I believe an amount of 30 minutes would provide a significant increase in the retention of material that should be retained.
2. Improve standardization among instructors.
3. Request a grading matrix from Bill Irwin who developed a matrix when he was the instructor of the course.
4. The inconsistency of the simulator schedule due to maintenance issues on the simulator continues to be an issue. Students sometimes go for weeks without going in the simulator, thus causing a lot of learning to be forgotten. This does not nullify the students' ability to practice on their own, which needs to improve, however, it has consistently proved detrimental to learning since its beginning.

5. Prepare better study material/course schedule/outline so that students can better prepare for lab each week.

LESSON #5: Flight 1005

CA / PM:

FO / PF:

I. DESCENT
   a. Perform Descent: D
      i. Pilots correctly perform descent checklist procedures.
      ii. Pilots maintain a sterile flight deck below 18,000 ft.
      iii. Pilots correctly use ice protection, radar, and ignition.
      iv. Pilots comply with descent profile speeds.
      v. Pilots comply with STARs and ATC clearances.
      vi. Pilots are aware of their fuel situation and have enough fuel to complete the flight safely.
      vii. Pilots correctly operate the FMS.
      viii. Pilots correctly operate the flight director and autopilot.
      ix. PM correctly calls out deviations and errors.
      x. Pilots comply with airspace and airspeed restrictions during an arrival into a non-radar environment.
      xi. PF maintains airspeed within +/- 10 knots or .02 mach.
      xii. PF maintains heading within +/- 5 degrees.
      xiii. PF maintains altitude within +/- 100 ft.
      xiv. NOTES:
         1. **Both crew members unsure of appropriate "flows" for their respective seats.**
         2. **Situational awareness was weak leading to airspeed deviations.**
         3. **Unsure of how extend the runway centerline on the FMS.**
         4. **PM did not make appropriate callouts when tolerances for airspeed were not maintained.**

   b. Perform PF/PM Tasks: C
      i. Pilots correctly enter approach into FMS.
      ii. Pilots correctly set up navigation frequencies and courses.
      iii. Pilots correctly set approach minimums.
      iv. Pilots correctly calculate landing distance.
      v. PM correctly set landing speeds.
      vi. PF briefs weather.
      vii. PF briefs the arrival, approach, airport, and NOTAMs.
      viii. PF briefs highest threat.
      ix. NOTES:
         1. **Crew unsure what setting to use for minimums on the PFD.**
         2. **Crew did not know how to set landing speeds.**

II. APPROACH:
   a. Perform CAT I ILS Approach: B-
      i. Pilots comply with the published approach procedure.

ii. Pilots correctly configure flaps and gear at appropriate times.

iii. PM correctly makes required callouts.
iv. PF correctly makes required callouts.
v. Pilots correctly perform before landing checklist.
vi. Pilots correctly identify the runway environment before descent below minimums.
vii. Pilots correctly decide to execute a missed approach when appropriate.
viii. Pilots correctly operate the FMS.
ix. Pilots correctly operate the flight director and autopilot.
x. PM correctly calls out deviations and errors.
xi. PF maintains no more than one-quarter deflection of the localizer and glide slope.
xii. PF maintains airspeed within +/- 5 knots.
xiii. PF maintains a stabilized approach.
xiv. NOTES:
1. Due to lack of studying, students behind on situational awareness and appropriate callouts.

III. LANDING:
a. Perform Normal Landing: B
i. PF lands in the touchdown zone, not to exceed one-third of the runway length.
ii. PF executes touchdown on the runway centerline.
iii. PF correctly uses brakes.
iv. PF correctly uses thrust reverse.
v. PM correctly makes required callouts.
vi. PF maintains positive directional control during the landing rollout.
vii. PM correctly calls out deviations and errors.
viii. PF maintains a stabilized flight path.
ix. PF maintains airspeed within +/- 5 knots.
x. NOTES:
1. Landing was performed to the level expected for this lesson.
2. Airspeed control was not within standard.

IV. SYSTEMS:
a. Operate Autopilot: C-
i. Autopilot general knowledge
ii. Autopilot controls and indications
iii. Autopilot limitations
iv. Autopilot operation
v. NOTES:
1. General autopilot knowledge and application is lacking considering this is lesson 5 and numerous modes and usage have been focused on the first four lessons.

V. HUMAN FACTORS:
a. Demonstrate Communication Skills: C-
i. Pilots use standard phraseology and language as specified in the SOP to communicate with other parties and in a manner that is clear to understand.

ii. Listeners seek clarification to unclear plans and communicators clarify ideas that were not clear to the listener.

iii. Pilots pre-brief operational requirements as well as identify threats, develop viable mitigation strategies for them, and communicate expectations to fellow crewmembers.
iv. Pilots debrief threats encountered and assess the outcome of employed mitigation strategies.
v. Pilots demonstrate teamwork by communicating concerns to fellow crewmembers and promptly and positively responding to communication from others.
vi. Pilots demonstrate willingness to receive constructive feedback and accept critiques without becoming defensive.
vii. NOTES:
1. **There was a lot confusion throughout the flight due to lack of studying. This caused a communication breakdown as neither pilot knew their specific role.**

b. Demonstrate Workload Management Skills: C+
i. Pilots prioritize tasks and distribute workload between PF/PM to manage the flight path and prioritize flying the airplane above all other tasks.
ii. Pilots create time to manage threats and make decisions to prevent task saturation.
iii. Pilots adjust automation levels to match situational demands, reduce workload for the crew, and enhance attention management.
iv. Pilots recognize phases of flight where they are most vulnerable to flight path deviations and strategically plan workload to manage distractions by completing non-monitoring tasks during lower areas of vulnerability
v. NOTES:
1. **When asked what tasks were to be accomplished prior to descent, the PM did not know what was supposed to be accomplished. This was covered in the previous lecture.**

c. Demonstrate Problem Solving/Decision Making Skills: NA
i. Captains follow the decision-making process to review assumptions, choose the most viable solution based on the data and continue to evaluate the decision for viability.
ii. Pilots determine the criticality of threats encountered and match decisions to manage the threats.
iii. Pilots use available resources to expand the team as necessary to manage threats and make sound decisions.
iv. First Officers contribute pertinent information to enhance the decision-making process.
NOTES:

d. Demonstrate Situational Awareness Skills: D
i. Pilots recognize potentially distracting situations and develop strategies to mitigate the distraction potential.
ii. Pilots recognize and communicate to other when individual awareness is low and work to raise awareness levels.
iii. Pilots maintain an awareness of the aircraft position and potential hazards associated with it.
iv. NOTES:
1. **Due to the lack of studying and preparation, the crew was consistently**

unaware of the aircraft position and energy state throughout the descent.

e. Demonstrate Monitor and Cross-Checking Skills: C
   i. Pilots demonstrate acceptance of a flight path monitoring responsibility by maintaining constant situational awareness of the aircraft's flight path and immediately bringing any concerns to the PF's attention.
   ii. Pilots communicate effectively with each other to develop and maintain a shared mental model of how to assure the flight path of the aircraft.
   iii. Pilots callout deviations from intended flight path as specified in the SOPM.
   iv. Pilots verify changes to flight path configuration and/or automation.
   v. Pilots monitor AC systems and status for threats to safety and callout observed indications.
   vi. Pilots comply with SOP PM assignments.
   vii. NOTES:
      1. The lack of coordination between the crew enhanced the confusion of the entire flight (from top of descent to landing).

f. Demonstrate Professionalism Skills: C-
   i. Pilots comply with the professional appearance, grooming, and dress standards as specified in the Billiken Air Express Pilot Policy Manual.
   ii. Pilots conduct themselves with an attitude, language, and demeanor aligned with Billiken Air Express guiding principles.
   iii. Pilots adjust leadership styles to match the situational demands and demeanor of the followers.
   iv. Captains assist the chief pilot in mentoring and furthering the progress of the SIC.
   v. First Officers apply the 10 rules of good followership as listed in the enhanced leadership manual.
   vi. Pilots demonstrate a commitment to being fully compliant with procedures.
   vii. Pilots correctly use Threat Management to organize CRM skills and manage anticipated/unanticipated threats.
   viii. NOTES:
      1. The lack of preparation was evident; more evident in one crewmember compared to the other. Such a lack of preparation had a significant negative impact on the other student's performance. When I asked questions and the student didn't know the answer, it caused multiple pauses in the lesson to "teach" material that the student should have had a better knowledge about. The material should have been more of a review, or this is how it is applied compared to having to teach it as it had never been discussed before.

LESSON #10: Flight 1010

CA / PM: [redacted]

FO / PF: [redacted]

I. TAKEOFF:
   a. Perform Engine Failure at V1: A-
      i. PF maintains directional control when the engine fails.
      ii. PF correctly makes required callouts.
      iii. PM correctly makes required callouts.
      iv. Pilots correctly retracts flaps.
      v. Pilots correctly comply with the single engine departure procedure.
      vi. Pilots correctly operate the flight director and autopilot.
      vii. PM correctly calls out deviations and errors.
      viii. PF maintains heading within +/- 10 degrees.
      ix. PF maintains airspeed within - 0/+ 5 knots.
      x. PF maintains acceleration altitude within +/- 100 ft.
      xi. NOTES:
         1.

II. APPROACH:

   a. Perform CAT I ILS Approach: A
      i. Pilots comply with the published approach procedure.
      ii. Pilots correctly configure flaps and gear at appropriate times.
      iii. PM correctly makes required callouts.
      iv. PF correctly makes required callouts.
      v. Pilots correctly perform before landing checklist.
      vi. Pilots correctly identify the runway environment before descent below minimums.
      vii. Pilots correctly decide to execute a missed approach when appropriate.
      viii. Pilots correctly operate the FMS.
      ix. Pilots correctly operate the flight director and autopilot.
      x. PM correctly calls out deviations and errors.
      xi. PF maintains no more than one-quarter deflection of the localizer and glide slope.
      xii. PF maintains airspeed within +/- 5 knots.
      xiii. PF maintains a stabilized approach.
      xiv. NOTES:
         1. PM didn't extend the center line/PF forgot to ask

   b. Perform Single-Engine Approach: B+
      i. Pilots comply with the published approach procedure.
      ii. Pilots correctly configure flaps and gear at appropriate times.
      iii. PM correctly makes required callouts.
      iv. PF correctly makes required callouts.
      v. Pilots correctly perform before landing checklist.

vi. Pilots correctly identify the runway environment before descent below minimums.

vii. Pilots correctly decide to execute a missed approach when appropriate.
viii. Pilots correctly operate the FMS.
ix. Pilots correctly operate the flight director and autopilot.
x. PM correctly calls out deviations and errors.
xi. PF maintains no more than one-quarter deflection of the localizer and glide slope.
xii. PF maintains airspeed within +/- 5 knots.
xiii. PF maintains a stabilized approach.
xiv. NOTES:
1. PF called for flaps 45, but corrected before flaps positioned – not sure PM was going to catch it.

c. Perform Single-Engine Missed Approach: A
i. Pilots correctly comply with the ATC instructions or charted missed approach procedure.
ii. PM correctly makes required callouts.
iii. PF correctly makes required callouts.
iv. Pilots correctly operate the FMS.
v. Pilots correctly operate the flight director and autopilot.
vi. PM correctly calls out deviations and procedure errors.
vii. PF descends no lower than -50 ft. below approach minimums on missed approach.
viii. PF maintains acceleration altitude within +/- 100 ft.
ix. PF maintains altitude within +/- 100 ft.
x. PF maintains heading within +/- 5 degrees.
xi. NOTES:
1. Well done

III. LANDING:
a. Perform Single-Engine Landing: A
i. PF lands in the touchdown zone, not to exceed one-third of the runway length.
ii. PF executes touchdown on the runway centerline.
iii. PF correctly uses brakes.
iv. PF correctly uses thrust reverse.
v. PM correctly makes required callouts.
vi. PF maintains positive directional control during the landing rollout.
vii. PM correctly calls out deviations and errors.
viii. PF maintains a stabilized flight path.
ix. PF maintains airspeed within +/- 5 knots.
x. NOTES:
1. Good

IV. SYSTEMS:
a. Operate Autopilot: A
i. Autopilot general knowledge
ii. Autopilot controls and indications
iii. Autopilot limitations
iv. Autopilot operation

v. **NOTES 1:**

1. Kyle is still clearly more proficient with the functionality of the FMS than Drew is

V. HUMAN FACTORS:

a. Demonstrate Communication Skills: A

i. Pilots use standard phraseology and language as specified in the SOP to communicate with other parties and in a manner that is clear to understand.

ii. Listeners seek clarification to unclear plans and communicators clarify ideas that were not clear to the listener.

iii. Pilots pre-brief operational requirements as well as identify threats, develop viable mitigation strategies for them, and communicate expectations to fellow crewmembers.

iv. Pilots debrief threats encountered and assess the outcome of employed mitigation strategies.

v. Pilots demonstrate teamwork by communicating concerns to fellow crewmembers and promptly and positively responding to communication from others.

vi. Pilots demonstrate willingness to receive constructive feedback and accept critiques without becoming defensive.

vii. NOTES:

1. All communications clear and concise

b. Demonstrate Workload Management Skills: A

i. Pilots prioritize tasks and distribute workload between PF/PM to manage the flight path and prioritize flying the airplane above all other tasks.

ii. Pilots create time to manage threats and make decisions to prevent task saturation.

iii. Pilots adjust automation levels to match situational demands, reduce workload for the crew, and enhance attention management.

iv. Pilots recognize phases of flight where they are most vulnerable to flight path deviations and strategically plan workload to manage distractions by completing non-monitoring tasks during lower areas of vulnerability

v. NOTES:

1. Reminded both to start arrival tasks earlier (ATIS/speeds)

c. Demonstrate Problem Solving/Decision Making Skills: A

i. Captains follow the decision-making process to review assumptions, choose the most viable solution based on the data and continue to evaluate the decision for viability.

ii. Pilots determine the criticality of threats encountered and match decisions to manage the threats.

iii. Pilots use available resources to expand the team as necessary to manage threats and make sound decisions.

iv. First Officers contribute pertinent information to enhance the decision-making process.

v. NOTES:

1.

d. Demonstrate Situational Awareness Skills: A

i. Pilots recognize potentially distracting situations and develop strategies to mitigate the distraction potential.

ii. Pilots recognize and communicate to other when individual awareness is low and work

to raise awareness levels.

iii. Pilots maintain an awareness of the aircraft position and potential hazards associated with it.

iv. NOTES:

1.

e. Demonstrate Monitor and Cross-Checking Skills: A

i. Pilots demonstrate acceptance of a flight path monitoring responsibility by maintaining constant situational awareness of the aircraft's flight path and immediately bringing any concerns to the PF's attention.

ii. Pilots communicate effectively with each other to develop and maintain a shared mental model of how to assure the flight path of the aircraft.

iii. Pilots callout deviations from intended flight path as specified in the SOPM.

iv. Pilots verify changes to flight path configuration and/or automation.

v. Pilots monitor AC systems and status for threats to safety and callout observed indications.

vi. Pilots comply with SOP PM assignments.

vii. NOTES:

1.

f. Demonstrate Professionalism Skills: A

i. Pilots comply with the professional appearance, grooming, and dress standards as specified in the Billiken Air Express Pilot Policy Manual.

ii. Pilots conduct themselves with an attitude, language, and demeanor aligned with Billiken Air Express guiding principles.

iii. Pilots adjust leadership styles to match the situational demands and demeanor of the followers.

iv. Captains assist the chief pilot in mentoring and furthering the progress of the SIC.

v. First Officers apply the 10 rules of good followership as listed in the enhanced leadership manual.

vi. Pilots demonstrate a commitment to being fully compliant with procedures.

vii. Pilots correctly use Threat Management to organize CRM skills and manage anticipated/unanticipated threats.

viii. NOTES:

1.

LESSON #12: Flight 1012

CA / PM: [redacted]

FO / PF: [redacted]

I. TAKEOFF:

a. Perform Normal Takeoff: **A-**

i. Pilots correctly use ice protection, radar, and ignition as required.
ii. Pilots correctly transfer the controls (if applicable).
iii. Pilots correctly set thrust.
iv. PF correctly rotates.
v. PF correctly makes required callouts.
vi. PM correctly makes required callouts.
vii. PM correctly retracts flaps.
viii. Pilots correctly operate the flight director and autopilot.
ix. PM correctly calls out deviations and errors.
x. PF maintains centerline during takeoff roll.
xi. PF maintains heading within +/- 5 degrees.
xii. PF maintains airspeed within -0/+ 10 knots.
xiii. **NOTES:**

b. Perform Engine Failure at V1: **B**

i. PF maintains directional control when the engine fails.
ii. PF correctly makes required callouts.
iii. PM correctly makes required callouts.
iv. Pilots correctly retracts flaps.
v. Pilots correctly comply with the single engine departure procedure.
vi. Pilots correctly operate the flight director and autopilot. **No**
vii. PM correctly calls out deviations and errors.
viii. PF maintains heading within +/- 10 degrees.
ix. PF maintains airspeed within - 0/+ 5 knots.
x. PF maintains acceleration altitude within +/- 100 ft.
xi. **NOTES:**

1. 2 hands on the autopilot at the same time

II. DESCENT

a. Perform Descent: **B+**

i. Pilots correctly perform descent checklist procedures.
ii. Pilots maintain a sterile flight deck below 18,000 ft.
iii. Pilots correctly use ice protection, radar, and ignition.
iv. Pilots comply with descent profile speeds.
v. Pilots comply with STARs and ATC clearances.
vi. Pilots are aware of their fuel situation and have enough fuel to complete the flight safely.
vii. Pilots correctly operate the FMS.

viii. Pilots correctly operate the flight director and autopilot.

ix. PM correctly calls out deviations and errors.
x. Pilots comply with airspace and airspeed restrictions during an arrival into a non-radar environment.
xi. PF maintains airspeed within +/- 10 knots or .02 mach.
xii. PF maintains heading within +/- 5 degrees.
xiii. PF maintains altitude within +/- 100 ft.
xiv. NOTES:
1. Did not assess on lights and anti-ice

b. Perform PF/PM Tasks: **B-**
i. Pilots correctly enter approach into FMS.
ii. Pilots correctly set up navigation frequencies and courses.
iii. Pilots correctly set approach minimums.
iv. Pilots correctly calculate landing distance.
v. PM correctly set landing speeds.
vi. PF briefs weather.
vii. PF briefs the arrival, approach, airport, and NOTAMs.
viii. PF briefs highest threat.
ix. NOTES:
1. Nothing beyond the approach was briefed

III. APPROACH:

a. Perform LOC Approach: **A**
i. Pilots comply with the published approach procedure.
ii. Pilots correctly configure flaps and gear at appropriate times.
iii. PM correctly makes required callouts.
iv. PF correctly makes required callouts.
v. Pilots correctly perform before landing checklist.
vi. Pilots correctly identify the runway environment before descent below minimums.
vii. Pilots correctly decide to execute a missed approach when appropriate.
viii. Pilots correctly operate the FMS.
ix. Pilots correctly operate the flight director and autopilot.
x. PM correctly calls out deviations and errors.
xi. PF maintains no more than one-quarter deflection of the LOC.
xii. PF maintains airspeed within +/- 5 knots.
xiii. PF maintains a stabilized approach.
xiv. NOTES:
1. Did RNAV instead, no issues

b. Perform Missed Approach Procedure: **B-**
i. Pilots correctly comply with the ATC instructions or charted missed approach procedure.
ii. PM correctly makes required callouts.
iii. PF correctly makes required callouts.
iv. Pilots correctly operate the FMS.

v. PM correctly retracts flaps.
vi. Pilots correctly operate the flight director and autopilot.

vii. PM correctly calls out deviations and procedure errors.
viii. PF descends no lower than -50 ft. below approach minimums on missed approach.
ix. PF maintains altitude within +/- 100 ft.
x. PF maintains heading within +/- 5 degrees.
xi. NOTES:
1. Late to go around

c. Perform CAT I ILS Approach: **A**
xv. Pilots comply with the published approach procedure.
xvi. Pilots correctly configure flaps and gear at appropriate times.
xvii. PM correctly makes required callouts.
xviii. PF correctly makes required callouts.
xix. Pilots correctly perform before landing checklist.
xx. Pilots correctly identify the runway environment before descent below minimums.
xxi. Pilots correctly decide to execute a missed approach when appropriate.
xxii. Pilots correctly operate the FMS.
xxiii. Pilots correctly operate the flight director and autopilot.
xxiv. PM correctly calls out deviations and errors.
xxv. PF maintains no more than one-quarter deflection of the localizer and glide slope.
xxvi. PF maintains airspeed within +/- 5 knots.
xxvii. PF maintains a stabilized approach.
xxviii. NOTES:
1. Well executed

d. Perform Single-Engine Approach: **B-**
xxix. Pilots comply with the published approach procedure.
xxx. Pilots correctly configure flaps and gear at appropriate times. **No**
xxxi. PM correctly makes required callouts.
xxxii. PF correctly makes required callouts. **No**
xxxiii. Pilots correctly perform before landing checklist.
xxxiv. Pilots correctly identify the runway environment before descent below minimums.
xxxv. Pilots correctly decide to execute a missed approach when appropriate.
xxxvi. Pilots correctly operate the FMS.
xxxvii. Pilots correctly operate the flight director and autopilot.
xxxviii. PM correctly calls out deviations and errors.
xxxix. PF maintains no more than one-quarter deflection of the localizer and glide slope.
xl. PF maintains airspeed within +/- 5 knots.
xli. PF maintains a stabilized approach.
xlii. **NOTES:**
1. PF tried to configure full flaps before PM stopped him

IV. LANDING:
a. Perform Single-Engine Landing: **B-**
i. PF lands in the touchdown zone, not to exceed one-third of the runway length.
ii. PF executes touchdown on the runway centerline.

iii. PF correctly uses brakes.
iv. PF correctly uses thrust reverse.

v. PM correctly makes required callouts.
vi. PF maintains positive directional control during the landing rollout.
vii. PM correctly calls out deviations and errors.
viii. PF maintains a stabilized flight path.
ix. PF maintains airspeed within +/- 5 knots.
x. NOTES:
1. Trouble keeping centerline

V. SYSTEMS:
a. Operate Autopilot: **A**
i. Autopilot general knowledge
ii. Autopilot controls and indications
iii. Autopilot limitations
iv. Autopilot operation
v. NOTES:
1.

VI. HUMAN FACTORS:
a. Demonstrate Communication Skills: **B**
i. Pilots use standard phraseology and language as specified in the SOP to communicate with other parties and in a manner that is clear to understand.
ii. Listeners seek clarification to unclear plans and communicators clarify ideas that were not clear to the listener.
iii. Pilots pre-brief operational requirements as well as identify threats, develop viable mitigation strategies for them, and communicate expectations to fellow crewmembers.
iv. Pilots debrief threats encountered and assess the outcome of employed mitigation strategies. **No**
v. Pilots demonstrate teamwork by communicating concerns to fellow crewmembers and promptly and positively responding to communication from others.
vi. Pilots demonstrate willingness to receive constructive feedback and accept critiques without becoming defensive.
vii. NOTES LEG 1:
1. PM corrected PF multiple times

b. Demonstrate Workload Management Skills: **A**
i. Pilots prioritize tasks and distribute workload between PF/PM to manage the flight path and prioritize flying the airplane above all other tasks.
ii. Pilots create time to manage threats and make decisions to prevent task saturation.
iii. Pilots adjust automation levels to match situational demands, reduce workload for the crew, and enhance attention management.
iv. Pilots recognize phases of flight where they are most vulnerable to flight path deviations and strategically plan workload to manage distractions by completing non-monitoring tasks during lower areas of vulnerability
v. NOTES:
1.

c. Demonstrate Problem Solving/Decision Making Skills: **B-**

   i. Captains follow the decision-making process to review assumptions, choose the most viable solution based on the data and continue to evaluate the decision for viability.
   ii. Pilots determine the criticality of threats encountered and match decisions to manage the threats.
   iii. Pilots use available resources to expand the team as necessary to manage threats and make sound decisions.
   iv. First Officers contribute pertinent information to enhance the decision-making process.
   v. NOTES:
      1. Captain regularly corrected and prompted first officer into callouts

d. Demonstrate Situational Awareness Skills: B
   i. Pilots recognize potentially distracting situations and develop strategies to mitigate the distraction potential.
   ii. Pilots recognize and communicate to other when individual awareness is low and work to raise awareness levels.
   iii. Pilots maintain an awareness of the aircraft position and potential hazards associated with it.
   iv. NOTES:
      1.

e. Demonstrate Monitor and Cross-Checking Skills: **B**
   i. Pilots demonstrate acceptance of a flight path monitoring responsibility by maintaining constant situational awareness of the aircraft's flight path and immediately bringing any concerns to the PF's attention.
   ii. Pilots communicate effectively with each other to develop and maintain a shared mental model of how to assure the flight path of the aircraft.
   iii. Pilots callout deviations from intended flight path as specified in the SOPM.
   iv. Pilots verify changes to flight path configuration and/or automation.
   v. Pilots monitor AC systems and status for threats to safety and callout observed indications.
   vi. Pilots comply with SOP PM assignments.
   vii. NOTES:
      1. Missed several "check speed" calls

f. Demonstrate Professionalism Skills: **A-**
   i. Pilots comply with the professional appearance, grooming, and dress standards as specified in the Billiken Air Express Pilot Policy Manual.
   ii. Pilots conduct themselves with an attitude, language, and demeanor aligned with Billiken Air Express guiding principles.
   iii. Pilots adjust leadership styles to match the situational demands and demeanor of the followers.
   iv. Captains assist the chief pilot in mentoring and furthering the progress of the SIC.
   v. First Officers apply the 10 rules of good followership as listed in the enhanced leadership manual.
   vi. Pilots demonstrate a commitment to being fully compliant with procedures.

vii. Pilots correctly use Threat Management to organize CRM skills and manage anticipated/unanticipated threats.

viii. **NOTES:**

1.

Performance Indicator Rubric

Course: ASCI 4022 Advanced Flight Crew Operations Course Instructor: John Denando

Semester Taught: Spring 2023 Number of Students in Course: 28

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	100%	Yes
SLO 3: Apply effective oral and written communication skills to function effectively in the aviation environment.	100%	Yes
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	100%	Yes

Course Assessment (Intended Use of Results)

Students do well on quizzes and that does not transfer over to the simulator. Perhaps being in the classroom more than once a week will help.

Students often lack critical thinking skills. It appears that it is not being taught early in their training. Improve this with the flight instructors and on the flight line and you will see improvements in this course.

SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.

Quiz 1, Question 1: 26/28 (93%) answered correctly.

The SOP provides guidance to crews on how to operate Billken Air Express aircraft and compliance within the procedures found in the manual is at the discretion of the captain. For example, captains may develop their takeoff briefing and use that in lieu of using the example found in the Billiken Air Express SOP.

- True
- **False**

Quiz 1, Question 10: 25/28 (89%) answered correctly.

When arriving to the airport from an overnight, crews must be...

- At the gate 35 minutes prior to departure
- At the airport 35 minutes prior to departure
- At the airport 45 minutes prior to departure
- **At the gate 45 minutes prior to departure**

Quiz 1, Question 22: 21/28 (75%) answered correctly.

It is June in Dallas and 95 degrees. We should use the______during power up and boarding.

- Either the GPU or APU
- **APU**
- GPU

Quiz 3, Question 12:

During cruise, you get an ACARS message from dispatch stating the destination weather is 10 miles, with overcast skies at 1800' (10 SM, OVC 018). Select the correct statements from the following...

- Disregard the message and go back to (illegally) playing your saved BROOKLYN CUZZO videos from your phone.
- **If both the PIC and Dispatcher agree the flight can be operated safely, continue to the destination without adding an alternate.** 23/28 answered correctly.
- Sip on some Starbucks before deciding NOT to respond to dispatch.
- **Divert and get more fuel.** 20/28 answered correctly.
- **Add an alternate that is close enough to be within the fuel burn capability of the aircraft. (Alternate is 20 minutes away and we are landing with 30 minutes more than our reserve fuel).** 23/28 answered correctly.

- Do not respond to dispatch at all.

Mid-Term Question 1:

Select the following instances when a missed approach would be appropriate.

- In VMC conditions after the runway in sight call has been made, a malfunction of the navigation equipment. 25/28
- **<u>In IMC conditions after the runway in sight call has been made, a malfunction of the navigation equipment.</u>** 28/28
- **<u>The approach becomes unstable.</u>** 27/28
- **<u>Upon reaching minimums the runway is not in sight.</u>** 26/28

SLO 3: Apply effective oral and written communication skills to function effectively in the aviation environment.

Quiz 1, Question 5: 23/28 (83%) answered correctly.

In flight, who reads the Quick Reference Checklist (QRC)?

- CA
- FO
- PF
- **<u>PM</u>**

Quiz 3, Question 17: 28/28 (100%) answered correctly.

The pilot in command and an authorized aircraft dispatcher shall sign the release only if they both believe that the flight can be made with safety. However, if the dispatcher feels it is safe to go and the captain does not, the flight is still legal to depart.

- True
- **<u>False</u>**

Quiz 4, Question 19: 25/28 (89%) answered correctly.

Use standard ICAO radio phraseology (see Jeppesen, Air Traffic Control section). Be clear and concise and state each digit of a number separately, e.g. “Billiken Air Four One Six Three” instead of “Billiken Air Forty One Sixty Three.”

- **<u>True</u>**
- False

SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.

Mid-Term, Question 5: 28/28 (100%) answered correctly.

During any abnormality in flight, it is more important to get the QRH read immediately, before ensuring the aircraft's flight path is appropriate and stable.

- True
- **False**

Mid-Term Question 25: 20/28 (71%) answered correctly.

During taxi out, the right engine catches fire. The captain reaches over, without communicating anything to the First Officer, and shuts off the engine using the thrust lever. Is the consistent with Billiken Air Express procedures?

- Yes
- **No**

Performance Indicator Rubric

Course: ASCI 4023 Advanced Flight Crew Operations Laboratory Course Instructor: John Denando

Semester Taught: Spring 2023 Number of Students in Course: 28

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	100%	Yes
SLO 3: Apply effective oral and written communication skills to function effectively in the aviation environment.	100%	Yes
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	100%	Yes

Course Assessment (Intended Use of Results)

This semester presented challenges that I have never seen in my 15 years teaching in the simulator. My assumption is that the frustration due to issues with the simulator consistently not working properly bled over to everyone's attitude in accomplishing all lessons with professional instruction. Both students and instructors seemed to prefer not to accomplish lessons rather than find time to make them up. Based on input from other instructors, material from the classroom as well as previous courses did not transfer into the simulator as hoped. Weekly homework may help improve the transfer, but that assumes the student puts in the time to study. Student's grades on quizzes do not correlate with the performance in the simulator. I believe many received higher grades than they should have; this was discussed with instructors before, but between a lack of instructor experience and the simulator not working, my view for this course has a long way to go. In conjunction with my resignation, perhaps it is time to lower the standard and expectations of the students for this course. It is disheartening to write that, but I believe "the sim breaking" only goes so far.

Out of the 9 instructors, only 2 have professional experience in the areas covered during this course. With smaller class sizes, I could be more selective with whom I asked to instruct in the sim. Due to the size of this class, we struggled to get instructors to teach the course, let alone

instructors with professional experience or instructors whom I would have personally asked to teach for me.

I would suggest making this course optional for those who want to put in the effort, increase the amount of time spent studying outside the classroom, or perhaps what will be a significant improvement is having the course 2-3 times a week. As discussed many times, students without an instrument rating have no business in the course. Not only does it negate their learning, but it also hinders the learning of their simulator partner.

Student Debriefing Example 1

- Our eighth simulator was a LOFT from Minneapolis to Cedar Rapids. This lesson was our final one of the semester to evaluate whether or not we could effectively use CRM to get from our origin to our destination.

  The original plan for the LOFT was going to incorporate a scenario that included us coming into a windshear scenario in Cedar Rapids. Upon briefing the scenario on the release and realizing that there was added contingency fuel for an alternate at Des Moines, our plan was to go to Cedar Rapids, shoot the approach, and if we went missed, we would elect to divert because the winds were more favorable in Des Moines.

  Upon briefing our plan with our instructor, he believed that we had the right plan in place and elected to change the lesson to do the planned flight with no windshear, but to make sure that we could go through the flows and callouts correctly for the CRJ-700.

  Both of us did a great job from the start to finish briefing the flight, talking with ATC. I don't believe that we had any major issues other than being rusty with our flows once on the ground.

  I believe that this course has been very helpful in preparing me to become a future pilot for a turbine jet in the future and to work toward operating a safe flight with another person in the seat next to me and knowing how to communicate with them. Although the course didn't have enough time to go through all of the material, it was great to get a glimpse at what I could be experiencing in the next few years after college. I am forever grateful for this opportunity, and I hope to someday apply my learning and knowledge in the aeronautical industry.

Student Debriefing Example 2.

- For the seventh lab, we completed our second LOFT that consisted of traveling to KDEN from KRAP airport. Compared to our first LOFT, I thought that it went a lot smoother for a few reasons. I was acting as captain/PM and Michael was acting as FO/PF. Our startup, taxi out, takeoff, and cruise procedures were very smooth, as our callouts and flows were practiced beforehand and memorized. For the WARTS briefing, we had to ensure that we briefed the weather extra carefully due to thunderstorms arising and forming to the east of Denver, and ensured that, with the given conditions and circumstances relating to fuel, our alternate (KCOS) could be reached.

  Once we reached our cruising altitude, we briefed the upcoming STAR and approach procedures to ensure that we were prepared for what we could expect to happen, as well as get ahead of the airplane. However, we noticed that the fuel situation onboard was below what we anticipated once we flew closer to KDEN. We informed ATC of the situation, and received vectors towards KDEN and successfully completed an instrument approach into the airport. Michael and I's procedures for descent, approach, and landing operations were smooth and portrayed effective CRM, communication, and efficiency skills.

  This LOFT was successful, even though there were minor mistakes with a few flows towards the end of the lesson. Michael and I noticed the fuel situation and followed correct emergency and ATC procedures to correct for it, as well as worked together to ensure the safety of the aircraft was not compromised during any phase of flight. We are confident that we can bring these skills to our next LOFT operation so it will

be safe and successful!

Student Debriefing Example 3

- In today's lesson we went through all the checklist from the gate to the runway. We found out some mistakes we made from Donny's class. For example, we should do the flow independently and silently first, and then do the normal checklist. We also realized that there is a lot of memorization work that needs to be done. Basically, we need to remember all the expansion checklists, especially for things like the FLIGHT INSTRUMENT setup, pilot flying will need to state, "THE AUTOPILOT IS COUPLED TO MY SIDE, ALITITUDE PRE-SELECT ( ), ALTIMETER (_), HEADING BUG SET FOR RUNWAY (__)." Overall, it is not an easy job. We need to work together. Hopefully we can do as complete as possible for the next sim lesson.

CA / PM: Student 1

FO / PF: Student 2

I. PRE-DEPARTURE GROUND OPERATIONS:

a. Report for duty: **A**

i. Pilots report to the aircraft on time.
ii. Pilots report fit for duty.
iii. Pilots report for duty with a flashlight.
iv. Pilots report for duty with a headset.
v. Pilots report for duty with a current company identification badge.
vi. Pilots report for duty with a pilot certificate with appropriate type and class endorsement.
vii. Pilots report for duty with a current FAA medical certificate.
viii. Pilots report for duty with a valid passport.
ix. Pilots report for duty with an FCC radio permit.
x. Pilots report for duty wearing a Billiken Air Express approved uniform.
xi. NOTES:

b. Perform crew briefing: **F**

i. Captain correctly conducts the initial crew briefing.
ii. Captain correctly briefs cabin crew on pertinent items prior to each flight.
iii. NOTES:

1. **Neither crew did not perform the required briefing.**

c. Perform external inspection: **A**

i. Pilots correctly perform an external inspection prior to and after each flight.

d. Perform Originating Checklist: **CA: C+ and FO: B**-

i. Captain correctly performs originating checklist flow.
ii. First Officer correctly performs originating checklist flow.
iii. Pilots correctly perform challenge and response checklist.
iv. NOTES:

1. **CA turned on beacon (should be turned on during ENGINE START flow).**
2. **CA no hydraulic test. When I prompted him to do it, it was done incorrectly. Also left pumps running after test**

complete.

3. FO turned probes ON (should be done during PRE-TAXI flow)

4. **FO did not turn on thrust reversers.**
5. **FO turned emergency lights ON instead of ARMED.**

e. Perform Pre-Start Checklist: **CA: F and FO: A-.**
  i. Captain correctly performs prestart checklist tasks.
  ii. First Officer correctly performs prestart checklist tasks.
  iii. PF correctly performs PF prestart checklist tasks.
  iv. PM correctly performs PM prestart checklist tasks.
  v. Pilots correctly perform challenge and response checklist
  vi. NOTES:
    1. **CA did not know how to set up FMS. Was entering in each fix individually.**
      a. **CA did not set up MFDs correctly.**

f. Perform Takeoff Briefing: **A-**
  i. PF briefs weather.
  ii. PF briefs the airport, rejected takeoff plan, area departure, NOTAMs, and engine out procedure.
  iii. PF verifies the route in the FMS against the clearance PMs.
  iv. PF briefs highest threat.
  v. NOTES:
    1. **Did not verify fixes in FMS against the charts.**
    2. **Flight instruments, "autopilot coupled to my side…" not accomplished.**
    3. **Single-engine departure procedure not briefed.**

g. Perform Weight and Balance: NA
  i. CA ensures weight and balance is calculated

h. Perform Engine Start Checklist and Pushback: **CA:F and FO: D**
  i. Captain correctly performs engine start checklist flow.
  ii. Captain and or First Officer correctly performs engine start checklist tasks.
  iii. Pilots correctly perform challenge and response checklist.
  iv. Pilots correctly perform pushback.
  v. Pilots correctly start engines.
  vi. NOTES:
    1. **Before the checklist, while at the gate putting in takeoff data and cargo door open, CA reached over sets flaps to 20.**

2. CA called for checklist before doing flow.

3. **CA calling metering on ramp frequency.**
4. **Called for push on COMM 1 and no communication with ramp crew established before calling.**
5. **Doing checklist without the flow and CA calling fuel pumps ON when not actually on.**
6. **FO called hydraulic pumps and CA turned off both Hydraulic SOVs.**
7. **CA turned on fuel crossflow before starting engines during pushback.**
8. **CA introduced fuel… FO pressed the start button. Did for #1 engine as well**
    a. **"Good start on engine 1 at 45%"**
9. **FO told ramp it's ok to disconnect.**

i. Perform Aborted Start: NA
   i. Pilots correctly recognize abnormal start indications.
   ii. Pilots correctly perform start abort memory item.
   iii. Pilots correctly complete start abort QRC and QRH procedure.
   iv. NOTES:

j. Perform Pre-Taxi Checklist: **CA: C- and FO: B+**
   i. Captain correctly performs taxi checklist flow.
   ii. First Officer correctly performs taxi checklist flow.
   iii. Pilots correctly perform challenge and response checklist.
   iv. NOTES:
      1. **CA turned on thrust reversers (part of FO's ORIGINATING FLOW)**
      2. **EICAS status messages boxed.**

k. Perform Taxi: **CA: B and FO: B+**
   i. Captain conducts a single engine taxi when conditions permit.
   ii. First Officer correctly performs engine start procedure during taxi.
   iii. First Officer writes down complex taxi instructions.
   iv. Pilots comply with taxi instructions issued by ATC.
   v. Pilots correctly use aircraft deicing/anti-icing equipment during taxi.
   vi. Captain taxis aircraft at a safe speed.
   vii. Pilots use correct procedures when crossing active runways.
   viii. Pilots maintain a sterile flight deck.
   ix. Pilots have the airport diagram chart available for reference during taxi.
   x. First Officer correctly calls out deviations and errors.

xi. NOTES:

1. **Put 121.72 and not 121.75 in frequency.**
2. **CA did not have taxi diagram out and visible.**
3. **Missed taxiway Victor (can be difficult to see in sim).**

l. Perform Before Takeoff Checklist: **CA: and FO: D.**

i. First Officer correctly performs before takeoff checklist to the line flow.
ii. First Officer correctly performs before takeoff checklist to the line tasks.
iii. Captain correctly performs before takeoff below the line checklist flow.
iv. First Officer correctly performs before takeoff checklist below the line flow.
v. Pilots correctly perform challenge and response checklist.
vi. NOTES:
   1. **Transmitted on ground, did not call FAs and get "cabin secure".**
   2. **CA called for "Below the line" part of the checklist before getting cleared to cross the runway**
      a. **CAS "checked/cleared" not done appropriately.**
   3. **Told to monitor tower and FO called tower.**

II. TAKEOFF:

a. Perform Normal Takeoff: **CA/PM: C and FO/PF: B**

i. Pilots correctly use ice protection, radar, and ignition as required.
ii. Pilots correctly transfer the controls (if applicable).
iii. Pilots correctly set thrust.
iv. PF correctly rotates.
v. PF correctly makes required callouts.
vi. PM correctly makes required callouts.
vii. PM correctly retracts flaps.
viii. Pilots correctly operate the flight director and autopilot.
ix. PM correctly calls out deviations and errors.
x. PF maintains centerline during takeoff roll.
xi. PF maintains heading within +/- 5 degrees.
xii. PF maintains airspeed within -0/+ 10 knots.
xiii. NOTES:
   1. **Clearance "turn left heading 180" and cleared for takeoff and FO set the heading to 180 while on the ground. Fixed it before beginning takeoff roll.**
   2. **CA moves up thrust levers and said, "Check thrust" even though he wasn't PF.**
   3. **PF forgot and CA did not recognize TOGA buttons were not pressed.**

4. “Speed mode heading mode” called before V2+20

III. CLIMB:

a. Climb: **CA/PM: B and FO/PF: A-**

i. PM correctly performs after takeoff checklist.
ii. Pilots maintain a sterile flight deck through 10,000 ft.
iii. Pilots correctly use ice protection, radar, and ignition.
iv. Pilots comply with climb profile speeds.
v. Pilots comply with SIDs and ATC clearances.
vi. Pilots correctly operate the FMS.
vii. Pilots correctly operate the flight director and autopilot.
viii. PM correctly calls out deviations and errors.
ix. PF maintains airspeed within +/- 10 knots or .02 mach.
x. PF maintains heading within +/- 5 degrees.
xi. PF maintains altitude within +/- 100 ft
xii. NOTES:

1. **After T/O checklist missed fuel crossflow to MANUAL.**
2. **PM setting altitude alerter with autopilot on.**
3. **At 1,000 to go, CA, "check altitude", FO/PF, "1,000 to go".**

IV. CRUISE: **CA/PM: A- and FO/PF: A-**

a. Cruise

i. Pilots correctly perform top of climb fuel check.
ii. Pilots correctly use ice protection, radar, and ignition as required.
iii. Pilots comply with cruise profile speeds.
iv. Pilots comply with all ATC clearances.
v. Pilots are aware of their fuel situation and have enough fuel to complete the flight safely.
vi. Pilots correctly operate the FMS.
vii. Pilots correctly operate the flight director and autopilot.
viii. PM correctly calls out deviations and errors.
ix. PF maintains airspeed within +/- 10 knots or .02 mach.
x. PF maintains heading within +/-5 degrees.
xi. PF maintains altitude within +/- 100 ft.
xii. NOTES:

b. Respond to a System Failure/Malfunction (IF APPLICABLE, GENERATOR FAILURE)
    i. Pilots correctly identify system failure.

ii. Pilots correctly complete memory items when required.
iii. Pilots correctly complete the QRC procedure when required.
iv. Pilots correctly complete QRH procedures.
v. Pilots correctly confirm thrust levers, generators, and guarded switches.
vi. NOTES:

V. DESCENT: CA/PM: F and FO/PF: F

a. Perform Descent
  i. Pilots correctly perform descent checklist procedures.
  ii. Pilots maintain a sterile flight deck below 18,000 ft.
  iii. Pilots correctly use ice protection, radar, and ignition.
  iv. Pilots comply with descent profile speeds.
  v. Pilots comply with STARs and ATC clearances.
  vi. Pilots are aware of their fuel situation and have enough fuel to complete the flight safely.
  vii. Pilots correctly operate the FMS.
  viii. Pilots correctly operate the flight director and autopilot.
  ix. PM correctly calls out deviations and errors.
  x. Pilots comply with airspace and airspeed restrictions during an arrival into a non-radar environment.
  xi. PF maintains airspeed within +/- 10 knots or .02 mach.
  xii. PF maintains heading within +/- 5 degrees.
  xiii. PF maintains altitude within +/- 100 ft.
  xiv. NOTES:
    1. Given descend via clearance and forgot to set a lower altitude.
      a. PF asked if it was sim or something he's doing.
      b. During this the speed got to 257 KIAS
    2. Called approach and said descending to 11,000 as opposed to "descending via".
    3. Crew missed 3 crossing restrictions during the arrival.

b. Perform PF/PM Tasks
  i. Pilots correctly enter approach into FMS.
  ii. Pilots correctly set up navigation frequencies and courses.
  iii. Pilots correctly set approach minimums.
  iv. Pilots correctly calculate landing distance.
  v. PM correctly set landing speeds.
  vi. PF briefs weather.

vii. PF briefs the arrival, approach, airport, and NOTAMs.

viii. PF briefs highest threat.

ix. NOTES:

1. **FA notification not done properly.**
2. **Strobe lights not on (I noticed now and not sooner).**
3. **Landing data not set.**
    a. **CA/PM does not know how to find landing weight.**
4. **Did not make SKOTT as published. They were at 10,500'**
5. **Checklist interrupted and did not start over**
6. **CA had NO CLUE where the aircraft is on the arrival.**

VI. APPROACH:

a. Perform CAT I ILS Approach **CA/PM: F and FO/PF: D**

i. Pilots comply with the published approach procedure.
ii. Pilots correctly configure flaps and gear at appropriate times.
iii. PM correctly makes required callouts.
iv. PF correctly makes required callouts.
v. Pilots correctly perform before landing checklist.
vi. Pilots correctly identify the runway environment before descent below minimums.
vii. Pilots correctly decide to execute a missed approach when appropriate.
viii. Pilots correctly operate the FMS.
ix. Pilots correctly operate the flight director and autopilot.
x. PM correctly calls out deviations and errors.
xi. PF maintains no more than one-quarter deflection of the localizer and glide slope.
xii. PF maintains airspeed within +/- 5 knots.
xiii. PF maintains a stabilized approach.

xiv. NOTES:

1. **During the first approach, they did not have the appropriate NAV source selected and the aircraft went through the final approach course. They were still going 210 KIAS on a 10-mile file. ATC questioned as to whether or not they were going to be able to get down on the glide slope, to which they responded yes, but they still did not descend and eventually realized this approach was not going to be completed.**
2. **After receiving vectors for a second approach, the FO/PF realized the mistake from the first approach and had the NAV source set appropriately. However, the CA/PM did not, and the crew did not follow procedures at the gate when the autopilot verification was supposed to happen. Therefore, when the FO/PF selected APPR mode, it did not follow the FO/PF's flight control computer since it was coupled to the CA/PM's side.**

b. Perform Missed Approach Procedure: **CA: F and FO: F**

i. Pilots correctly comply with the ATC instructions or charted missed approach procedure.
ii. PM correctly makes required callouts.
iii. PF correctly makes required callouts.
iv. Pilots correctly operate the FMS.
v. PM correctly retracts flaps.
vi. Pilots correctly operate the flight director and autopilot.
vii. PM correctly calls out deviations and procedure errors.
viii. PF descends no lower than -50 ft. below approach minimums on missed approach.
ix. PF maintains altitude within +/- 100 ft.
x. PF maintains heading within +/- 5 degrees.
xi. NOTES:
   1. **No callouts from the profile were made.**
   2. **The crew went past the assigned altitude of 3,000 to 4,000.**
      a. **The PM did not make the required call to notify the PF of the altitude deviation.**
   3. **Pilots did not appropriately retract flaps.**
   4. **Pilots did not retract the gear.**

VII. LANDING:

a. Perform Normal Landing: **NA**

i. PF lands in the touchdown zone, not to exceed one-third of the runway length.
ii. PF executes touchdown on the runway centerline.
iii. PF correctly uses brakes.
iv. PF correctly uses thrust reverse.
v. PM correctly makes required callouts.
vi. PF maintains positive directional control during the landing rollout.
vii. PM correctly calls out deviations and errors.
viii. PF maintains a stabilized flight path.
ix. PF maintains airspeed within +/- 5 knots.
x. NOTES:
   1. **Did not happen due to time constraints.**

b. Perform FO After Landing Flow/Checklist

i. First Officer correctly performs after landing flow.
ii. First Officer correctly performs after landing checklist.
iii. NOTES:

1. **Did not happen due to time constraints.**

c. Perform CA Shutdown Flow/Checklist
    i. Captain correctly performs shutdown checklist flow.
    ii. Pilots correctly perform challenge and response shutdown checklist.
    iii. Pilots debrief flight
    iv. NOTES:
        1. Did not happen due to time constraints.

d. Perform FO Shutdown Flow/Checklist
    i. First Officer correctly performs shutdown checklist flow.
    ii. Pilots correctly perform challenge and response shutdown checklist.
    iii. Pilots debrief flight
    iv. NOTES:
        1. Did not happen due to time constraints.

e. Perform Terminating Checklist (IF APPLICABLE)
    i. Pilots correctly perform terminating/leaving the airplane checklist procedure.
    ii. NOTES:
        1. Did not happen due to time constraints.

VIII. SYSTEMS:
a. Operate Autopilot: **CA: C and FO: B**
    i. Autopilot general knowledge
    ii. Autopilot controls and indications
    iii. Autopilot limitations
    iv. Autopilot operation
    v. NOTES:

IX. ABNORMAL OPERATIONS
a. Perform Fuel Planning
    i. Pilots know minimum and emergency fuel limitations.
    ii. Pilots determine fuel requirements for an unplanned diversion.
    iii. Pilots determine fuel requirements for a planned diversion.
    iv. Pilots make appropriate diversion decision when fuel remaining is insufficient to safely complete the flight.

v. **NOTES:**

1. **During missed approach, crew never discussed fuel situation.**

X. HUMAN FACTORS:

a. Demonstrate Communication Skills
   i. Pilots use standard phraseology and language as specified in the SOP to communicate with other parties and in a manner that is clear to understand.
   ii. Listeners seek clarification to unclear plans and communicators clarify ideas that were not clear to the listener.
   iii. Pilots pre-brief operational requirements as well as identify threats, develop viable mitigation strategies for them, and communicate expectations to fellow crewmembers.
   iv. Pilots debrief threats encountered and assess the outcome of employed mitigation strategies.
   v. Pilots demonstrate teamwork by communicating concerns to fellow crewmembers and promptly and positively responding to communication from others.
   vi. Pilots demonstrate willingness to receive constructive feedback and accept critiques without becoming defensive.
   vii. NOTES:
      1. ATC gave a descent clearance to 3,500 and PM read back 3,000. The PF asked him to question it and they got it correct.

b. Demonstrate Workload Management Skills
   i. Pilots prioritize tasks and distribute workload between PF/PM to manage the flight path and prioritize flying the airplane above all other tasks.
   ii. Pilots create time to manage threats and make decisions to prevent task saturation.
   iii. Pilots adjust automation levels to match situational demands, reduce workload for the crew, and enhance attention management.
   iv. Pilots recognize phases of flight where they are most vulnerable to flight path deviations and strategically plan workload to manage distractions by completing non-monitoring tasks during lower areas of vulnerability
   v. NOTES:

c. Demonstrate Problem Solving/Decision Making Skills
   i. Captains follow the decision-making process to review assumptions, choose the most viable solution based on the data and continue to evaluate the decision for viability.
   ii. Pilots determine the criticality of threats encountered and match decisions to manage the threats.
   iii. Pilots use available resources to expand the team as necessary to manage threats and make sound decisions.
   iv. First Officers contribute pertinent information to enhance the decision-making process.
   v. NOTES:

d. Demonstrate Situational Awareness Skills

i. Pilots recognize potentially distracting situations and develop strategies to mitigate the distraction potential.

ii. Pilots recognize and communicate to other when individual awareness is low and work to raise awareness levels.
iii. Pilots maintain an awareness of the aircraft position and potential hazards associated with it.
iv. NOTES:
1. CA/PM did not use time at cruise to set up appropriately and was behind on descent setting landing data, which helped cause numerous missed crossing restrictions.

e. Demonstrate Monitor and Cross-Checking Skills
i. Pilots demonstrate acceptance of a flight path monitoring responsibility by maintaining constant situational awareness of the aircraft's flight path and immediately bringing any concerns to the PF's attention.
ii. Pilots communicate effectively with each other to develop and maintain a shared mental model of how to assure the flight path of the aircraft.
iii. Pilots callout deviations from intended flight path as specified in the SOPM.
iv. Pilots verify changes to flight path configuration and/or automation.
v. Pilots monitor AC systems and status for threats to safety and callout observed indications.
vi. Pilots comply with SOP PM assignments.
vii. NOTES:
1. CA/PM missed numerous opportunities to catch errors the FO/PF was making and did not.

f. Demonstrate Professionalism Skills
i. Pilots comply with the professional appearance, grooming, and dress standards as specified in the Billiken Air Express Pilot Policy Manual.
ii. Pilots conduct themselves with an attitude, language, and demeanor aligned with Billiken Air Express guiding principles.
iii. Pilots adjust leadership styles to match the situational demands and demeanor of the followers.
iv. Captains assist the chief pilot in mentoring and furthering the progress of the SIC.
v. First Officers apply the 10 rules of good followership as listed in the enhanced leadership manual.
vi. Pilots demonstrate a commitment to being fully compliant with procedures.
vii. Pilots correctly use Threat Management to organize CRM skills and manage anticipated/unanticipated threats.
viii. NOTES:

Performance Indicator Rubric

Course: FSCI 2250 Instrument Flight Foundations

Course Instructor: Stephen Belt

Semester Taught: Fall 2022

Number of Students in Course: 39

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = “C”)
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	76.03% within this category	Yes
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	74.66% within this category	Yes

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

Quarter Exam Level Assessment attached

FAA Written Exam: 79% pass rate (30/38)

Additional FAA-style quizzes and study sessions during course.

Attach description of assignment used for assessment and samples of student work.

FSCI 2250 SLO 1 and 5 Fall 2022

Category Performance Report

At-Risk Categories: 0 | **Total Courses:** 1

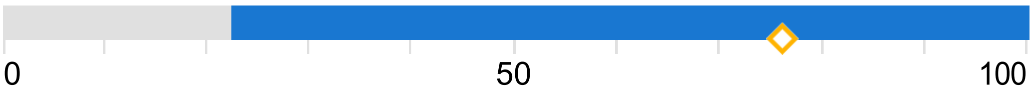
Date Range: **8/1/22 – 12/31/22** | Category At-Risk Threshold: **70%** | Needs Review Threshold: 70%

Flight Science Student Learning Outcomes

At-Risk Categories: **0** | Total Categories: **2**

Average | Score Range | At-Risk | Needs Review | Doing Well

CATEGORY NAME	AVERAGE	ASSESSMENTS	STATUS
SLO 1: Conduct aviation operations in a professional, safe, and efficien…	76.03%	3	



ASSESSMENT NAME	AVERAGE SCORE WITH THIS CATEGORY	QUESTION / CRITERIA WITH THIS CATEGORY
Exam 1	67%	3 questions
FSCI 2250 Exam 2	78%	3 questions
Exam 3	84%	3 questions

SLO 5: An ability to apply the techniques, skills, and modern aviation t…

0 50 100

74.66% 3

ASSESSMENT NAME	AVERAGESCORE WITH THIS CATEGORY	QUESTION / CRITERIA WITH THIS CATEGORY
Exam 1	76%	4 questions
FSCI 2250 Exam 2	66%	2 questions
Exam 3	79%	3 questions

Assessment Performance

AVERAGE SCORE

71%

(71.3/100)

LOW SCORE

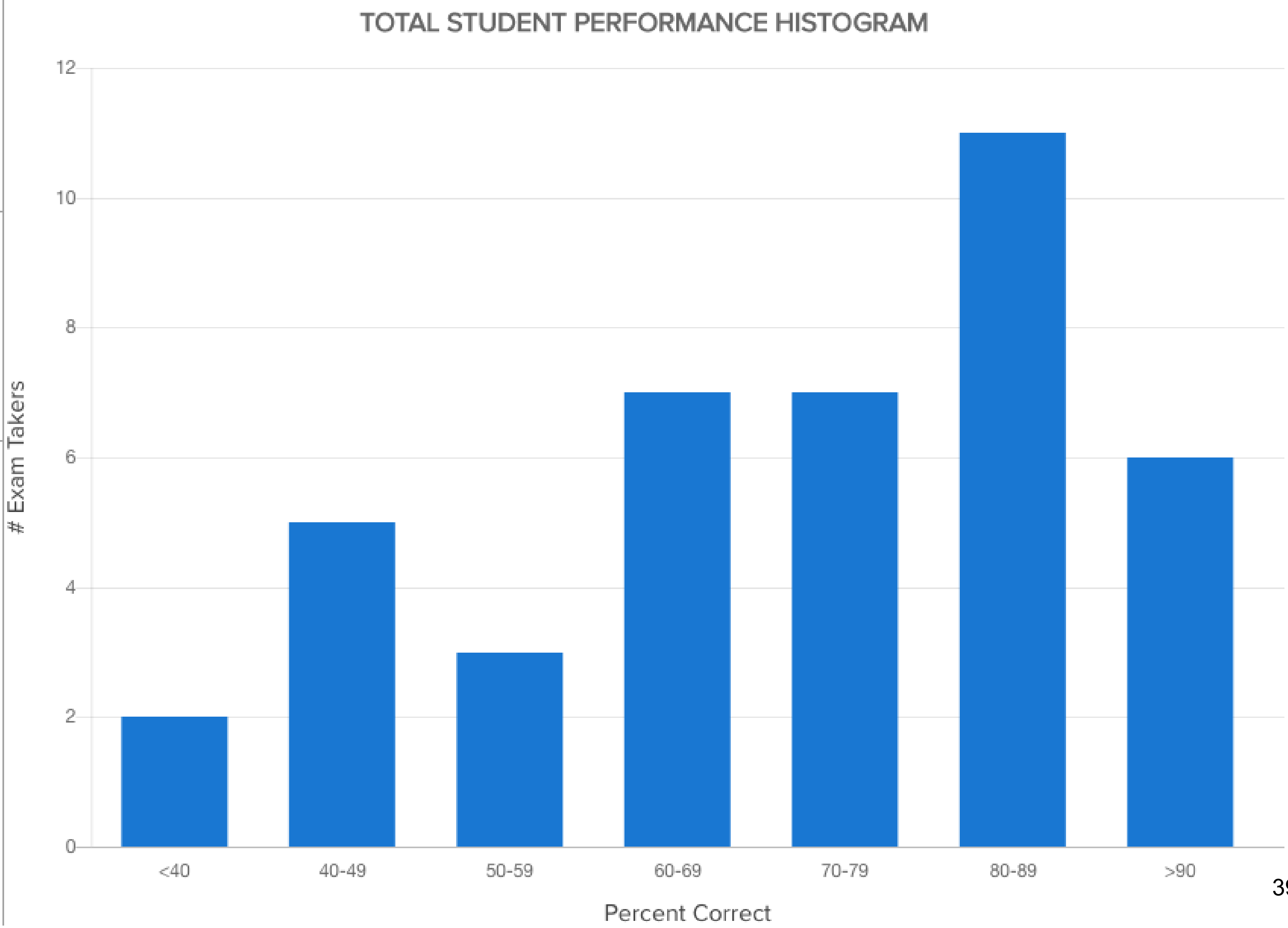
31%

(31.0/100)

HIGH SCORE

98%

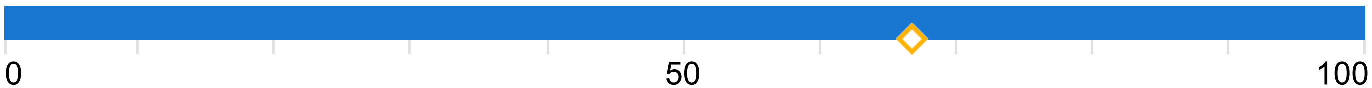
(98.0/100)

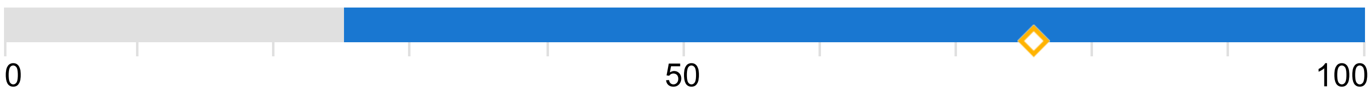


Category Performance

Average | Score Range

CATEGORY NAME	AVERAGE SCORE	QUESTIONS
In Flight Science Student Learning Outcomes SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	66.67%	3
In Flight Science Student Learning Outcomes SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation r	75.61%	4





Assessment Performance

AVERAGE SCORE

88%

(88.5/100)

LOW SCORE

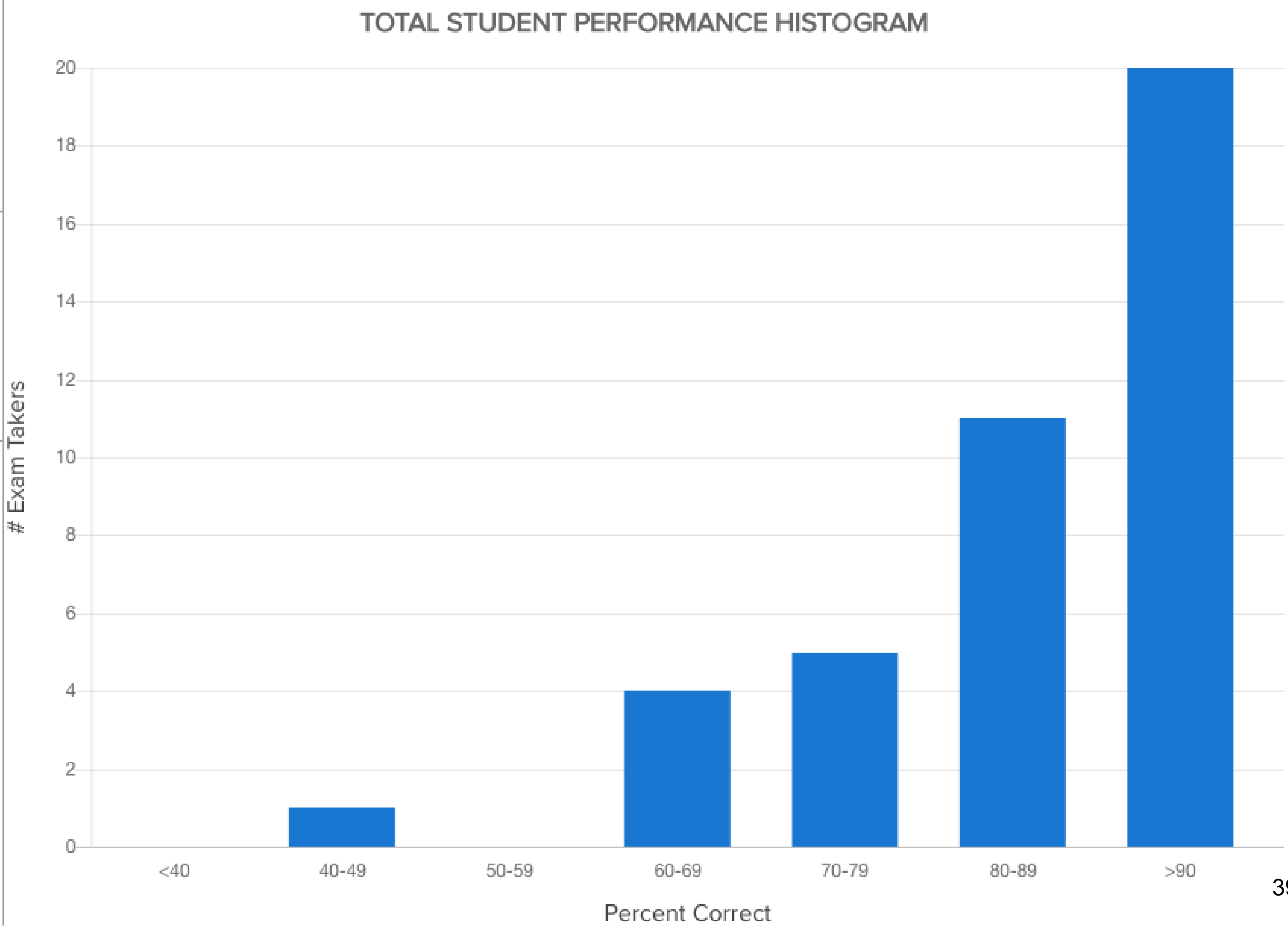
47%

(46.9/100)

HIGH SCORE

110%

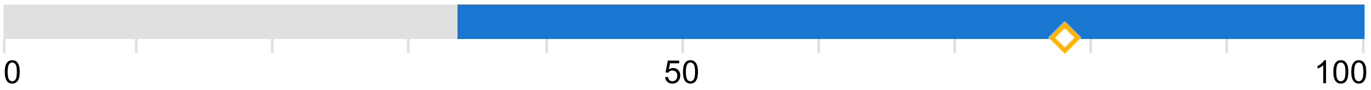
(110.4/100)



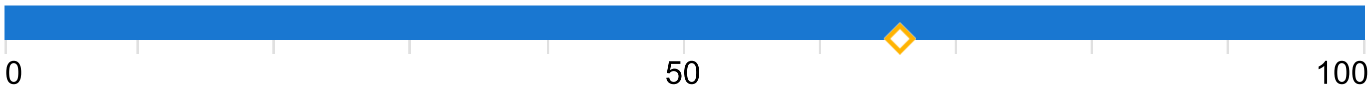
Category Performance

Average Score Range

CATEGORY NAME	AVERAGE SCORE	QUESTIONS
In Flight Science Student Learning Outcomes SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	78.05%	3



CATEGORY NAME	AVERAGE SCORE	QUESTIONS
In Flight Science Student Learning Outcomes SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation r	65.85%	2



FSCI 2250 Exam 3 Fall 2022

Assessment Performance

AVERAGE SCORE

86%

(85.5/100)

LOW SCORE

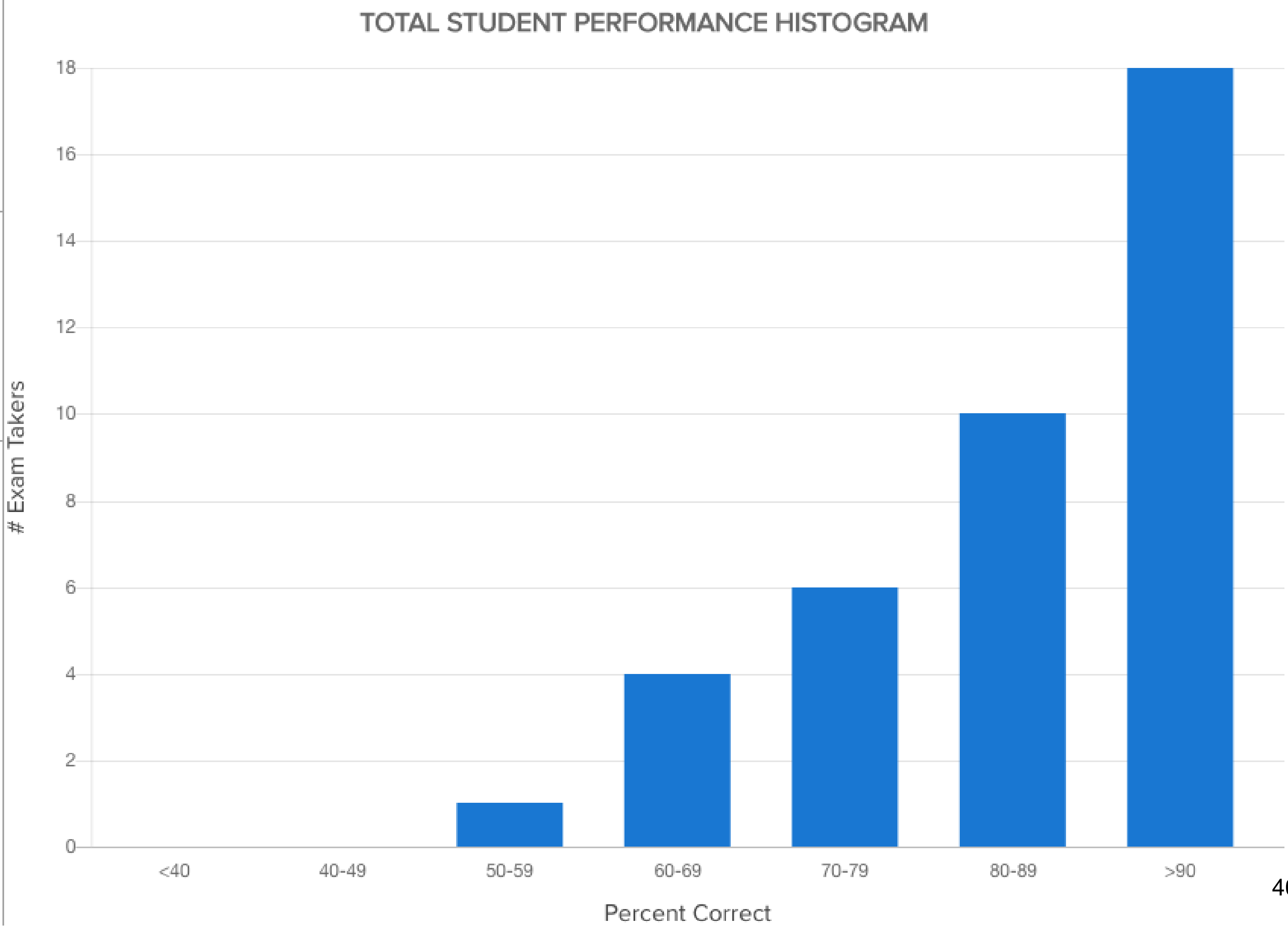
57%

(57.0/100)

HIGH SCORE

104%

(104.0/100)



Category Performance

Would you like to select the categories for this report use the top 25 categories used on this assessment?

SELECT CATEGORIES | USE TOP 25

FSCI 2250 Assessment Report Fall 2022

Date and Time of Exam Creation: 01/11/2022 6:10 PM CST I Total Exam Points: 18 I Est. Completion Time: 15 mins Avg. Point Biserial: 0.35 I Upper 27%: 0.88 I Lower 27%: 0.53 I Disc. Index: **0.35** I Difficulty: **0.75** I Total Questions: 18 I Multiple Choice: 16 I Fill in the Blank: 1 I Essay: 1

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1. Prior to using GPS for IFR operations, what actions must you take?

A. For WAAS-certified GPS equipment, you must verify that RAIM will be available for the intended route and duration of the flight and ensure that your GPS navigational database is current.

✓ **B. For non-WAAS GPS equipment, you must verify that RAIM will be available for the intended route and duration of the flight and ensure that your GPS database is current**

C. For all GPS equipment, you must verify that WAAS will be available for the intended route and duration fo the flight and ensure that your GPS navigational database is current.

D. You do not have to do anything. The system does it for you.

Question ID: 9520 I Point Value: 1 I Categories: AABI Student Learning Outcomes, H. Use the techniques, skills, and modern technology necessary for professional practice, Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.

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2. Preflight tolerance of the Altimeter is +/- ft. When the current local altimeter setting is properly set.

A. 50

B. 100

✓ **C. 75**

D. 25

Question ID: 9388 I Point Value: 1 I Point Biserial: .6 I Difficulty: 0.59 I Categories: AABI Student Learning Outcomes, A. Apply mathematics, science, and applied sciences to aviation related disciplines, AABI A-1, Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.

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3. When performing a VOR operational check who must document the it? What is required to be documented?

A. The pilot-in-command must enter date, place, bearing error in the aircraft log or other record.

B. The pilot-in-command must enter the date, place, bearing error, and sign the aircraft log book

C. The person conducting the check must enter date, place, and bearing error in the aircraft log books.

✓ **D. The person conducting the check must enter the date, place, and bearing error and sign the aircraft log or other record.**

Question ID: 9374 I Point Value: 1 I Point Biserial: .29 I Difficulty: 0.81 I Categories: Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner., FSCI 2250 Course Level Objectives, 6. Recognize applicable federal aviation regulations, and discuss basic applications of these regulations.

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t2lchart.png

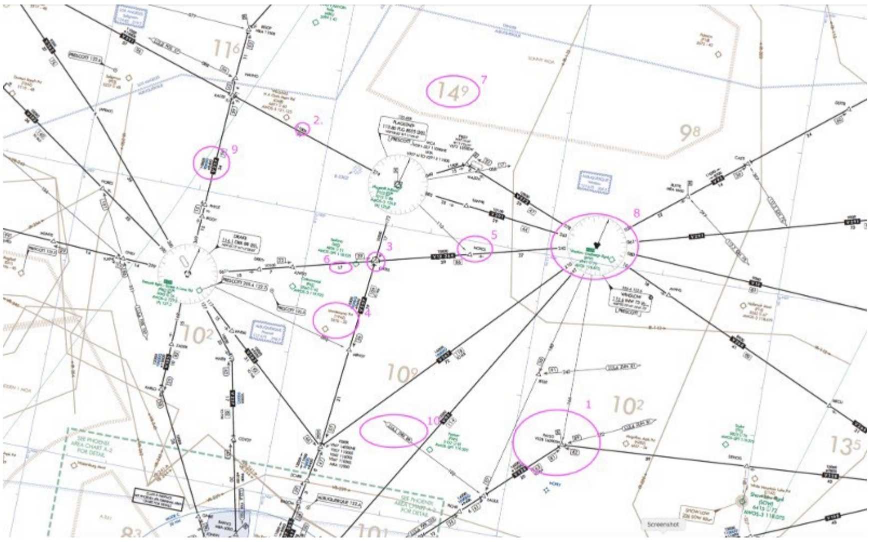
4. (Please use the L-chart excerpt provided to answer this question) What is the significance of the color of Item 4?

A. Non-towered airport

✓ **B. No published IAP**

C. No Voice

D. No good



Question ID: 17094 I Point Value: 1 I Point Biserial: .11 I Difficulty: 0.99 I Categories: Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.

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5. DEPARTURE

You are preparing to depart Santa Fe Municipal SAF on an IFR cross country to Denver. You receive the following clearance: "cleared to Denver International Airport via the Poake Two Departue, Taos transition, then as filed." Once you copy and read back the clearance, you request taxi clearance are cleared to taxi to runway 20. Prior to departure, you review the SID. At what point does the DEPARTURE segment end and the TRANSITION segment begin?

A. CFFDN

B. SAF

✓ **C. POAKE**

D. TAS

Question ID: 10156 I Point Value: 1 I Point Biserial: .21 I Difficulty: 0.79 I Categories: Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner., FSCI 2250 Course Level Objectives, 3. Identify, explain and apply the important elements of instrument departure, enroute and approach procedures.

6. When Cindy receives her IFR clearance to Chicago she hears the phrase "cleared as filed." What does that specific phrase tell her? (Cleared as filed includes _)

A. She may fly the flight plan she has filed, including the altitudes and departure procedures.

B. She may fly the route she has filed, and is automatically cleared to her destination.

C. She may fly the entire flight plan she has filed, and is automatically cleared to her destination.

✓ D. She may fly the route she has filed, but she will still receive a clearance limit, altitudes, and departure procedures.

Question ID: 10149 I Point Value: 1 I Point Biserial: .37 I Difficulty: 0.61 I Categories: Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner., FSCI 2250 Course Level Objectives, 3. Identify, explain and apply the important elements of instrument departure, enroute and approach procedures.

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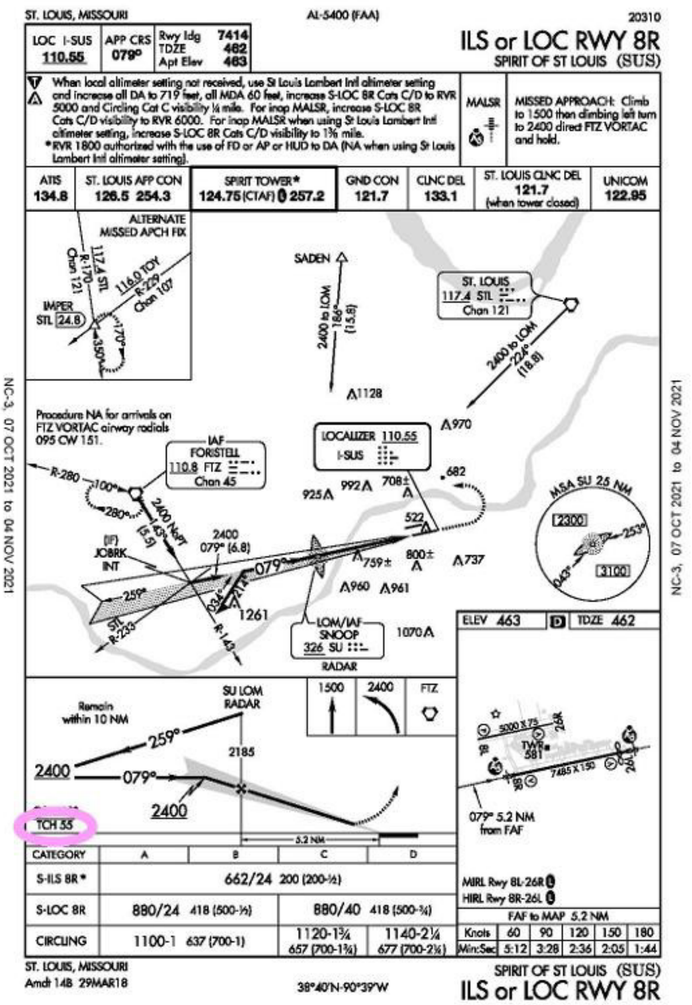
7. Explain item 3. (TCH 55)



✓ A. IF you are on glide slope, you will cross the runway threshold at 55' AGL

B. IF you are on glide slope, you will touch down 55' past the threshold

C. The Tower Clearance Height is 55'

D. The Tower Enroute Clearance is on page 55

Question ID: 10624 I Point Value: 1 I Point Biserial: .51 I Difficulty: 0.88 I Categories: Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.

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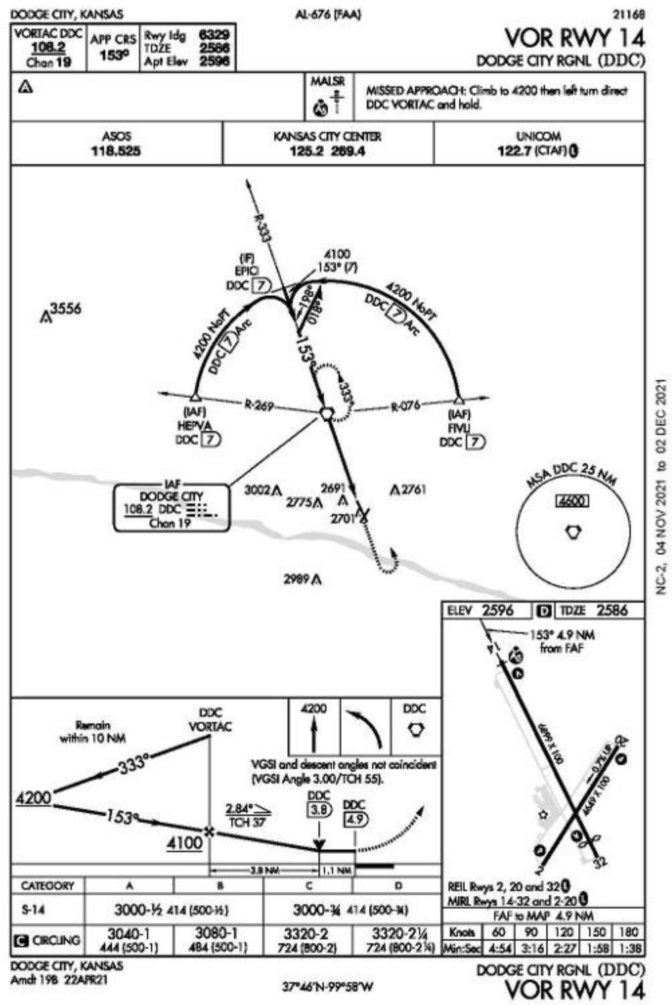
8. What is the Missed Approach Point for this approach?



A. 4 minutes 54 seconds at 60 KIAS

B. **4.9 DME from the Dodge City VORTAC**

C. 1.1 NM

D. DDC 3.8

Question ID: 10621 I Point Value: 1 I Point Biserial: .32 I Difficulty: 0.74 I Categories: AABI Student Learning Outcomes, AABI H-1, Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.

9. How do you determine you are on the intermediate segment if there is no intermediate fix?

A. When you cross the "IAF" outbound toward the procedure turn

B. When you are headed to the airport

C. With a Maltese Cross

D. It is when you are established on the published route and proceeding inbound to the final approach fix, are properly aligned with the final approach course, and are located within the prescribed distance from the FAF.

D. It is when you are established on the published route and proceeding inbound to the final approach fix, are properly aligned with the final approach course, and are located within the prescribed distance from the FAF.

Question ID: 10610 I Point Value: 1 I Point Biserial: .14 I Difficulty: 0.87 I Categories: Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.

10. Only the attitude indicator provides information of pitch and bank.

A. **Direct and immediate**

B. Indirect

C. Derived and interpolated

D. Any

Question ID: 9376 I Point Value: 1 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot., FSCI 2250 Course Level Objectives, 1. Explain the requirements of ICAO/FAA for instrument flight, 5. Recognize and evaluate various conditions effecting the safety of flight, aeronautical decision-making, airmanship, and physiological readiness of instrument flight.

11. How does the blockage of the static port affect each of the pitot-static instruments during a descent from the altitude where the blockage occurred?

A. The airspeed indicator will show lower than actual airspeed, the VSI will read zero, and the altimeter will be frozen at the altitude the blockage occurred.
B. The airspeed indicator will give incorrect readings, the VSI will read zero, and the altimeter will be frozen at the altitude the blockage occurred.
C. The airspeed indicator will show faster than actual airspeed, the VSI will read zero, and the altimeter will be frozen at the altitude the blockage occurred.
D. The airspeed indicator will give incorrect readings, the VSI freeze at the rate of descent it indicated when the blockage occurred, and the altimeter will be frozen at the altitude the blockage occurred.

Question ID: 9391 I Point Value: 1 I Point Biserial: .34 I Difficulty: 0.54 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot., FSCI 2250 Course Level Objectives, 5. Recognize and evaluate various conditions effecting the safety of flight, aeronautical decision-making, airmanship, and physiological readiness of instrument flight.

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12. Describe the proper sequence to recover from a nose-low unusual attitude:

1 ______
2 ______
3 ______

1. Power to Idle, Pull the power, Reduce Power
2. Level the Wings, Wings level
3. Pitch to the horizon, Pitch up, Raise the Nose

Question ID: 9518 I Point Value: 1 I Point Biserial: .28 I Difficulty: 0.71 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot., FSCI 2250 Course Level Objectives, 5. Recognize and evaluate various conditions effecting the safety of flight, aeronautical decision-making, airmanship, and physiological readiness of instrument flight., 7. Assess best practice as it relates to instrument flight.

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13. What does staying on the VASI glide path assure on final approach?

A. Obstruction clearance within 10° the extended runway centerline and out to 4 nautical miles from the threshold
B. That you will land on the runway
C. That you will have enough runway for your rollout
D. Obstruction clearance within 30° of the extended runway centerline and out 1 nautical mile from the threshold

Question ID: 10146 I Point Value: 1 I Point Biserial: .43 I Difficulty: 0.66 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot., FSCI 2250 Course Level Objectives, 3. Identify, explain and apply the important elements of instrument departure, enroute and approach procedures.

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14. In order, what are the 5 T's?

(Please write your essay response on a separate piece of paper)

Question ID: 10184 I Point Value: 1 I Point Biserial: .53 I Difficulty: 0.64 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot., FSCI 2250 Course Level Objectives, 7. Assess best practice as it relates to instrument flight.

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15. What is the standard climb gradient for departure obstacle clearance

A. 200 feet per nautical mile
B. 200 feet per minute
C. 300 feet below traffic pattern altitude
D. 152 feet per minute

Question ID: 10152 I Point Value: 1 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot., FSCI 2250 Course Level Objectives, 3. Identify, explain and apply the important elements of instrument departure, enroute and approach procedures.

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16. Immediately after passing the final approach fix in bound during an ILS approach in IFR conditions, the glide slope warning flag appears. The pilot is

A. permitted to continue the approach and descend to the DH.
B. required to immediately begin the prescribed missed approach procedure.
C. permitted to continue the approach and descend to the localizer MDA.

Question ID: 14829 I Point Value: 1 I Point Biserial: .47 I Difficulty: 0.68 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.

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17. Ryan is flying a sidestep maneuver. At what point may he begin the maneuver?

A. When he is cleared for the approach
B. When he reaches the MDA
C. When he has the runway that he is sidestepping to in sight
D. Only after reaching the DA

Question ID: 10628 I Point Value: 1 I Point Biserial: .46 I Difficulty: 0.95 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.

00632il1.pdf (https://phx004-public-prod-bucket.s3-us-west-2.amazonaws.com/attachments/9/e/9e38e64a-29d8-440f-857a-3099a9be2128.pdf?X-Amz-Security-Token=IQoJb3JpZ2luX2VjEGwaCXVzLXdlc3QtMiJHMEUCIGj%2FyPhgfGGt6RNb8XoHwuUT%2BMXvg0DPGsdtcaip8LfNAiEAwpEtdltXEMqOul6CdOROUlY80Z37a5gDWps3HRSfDd8q1QQIxf%2F%2F%2F%2F%2F Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Date=20230112T212633Z&X-Amz-SignedHeaders=host&X-Amz-Expires=3600&X-Amz-Credential=ASIA4TBQZ2TGNVVCK6H5%2F20230112%2Fus-west-2%2Fs3%2Faws4_request&X-Amz-Signature=6b904b4763c0d985c0173dd471d9211280e82342cde441d55f1d98d3ff9c7049)

18. Austin is flying the ILS RWY 1 approach to WYS. His airplane is equipped with dual Avidyne IFD 440 receivers. ATIS is reporting 1200 overcast with 3/4 mile visibility and calm winds. He turns inbound from the procedure turn, intercepts the final approach course and descends to 9600 msl. He intercepts the glide slope and begins his descent at 90kias. At TARGY, he starts his timer. Shortly after that, he notices that his glide slope receiver has failed. What should he do? Could he continue the approach? How?

A. He should continue the approach to the DA6849
B. He should descend no lower than 7449 and proceed for 4:36 to the MAP
C. He should descend no lower than 7780 and proceed for 4:36 to the MAP
D. He should immediately turn left to enter the hold at TARGY and query the controller

Question ID: 10632 I Point Value: 1 I Point Biserial: .25 I Difficulty: 0.75 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.

Performance Indicator Rubric

Course: FSCI 2550 Flight 4

Course Instructor: Ryan Boyer

Semester Taught: Spring 2023

Number of Students in Course: 19

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Percentage of student written exams and stage checks passed on first attempt)	Benchmark achieved? (Benchmark: 70% of student written exams and stage checks passed on first attempt)
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	Written Exam Pass Rate: 100% Stage Check Pass Rate: 87%	Yes
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	Written Exam Pass Rate: 100% Stage Check Pass Rate: 87%	Yes

Description of Assessment: The student assessment consists of multiple-choice module written exams as well as stage check practical exams. Written exams require a minimum score of 70% to pass. Each stage check consists of an oral portion and a flight portion, and satisfactory or unsatisfactory performance is determined in accordance with the Module Completion Standards and/or the appropriate Airmen Certification Standards (ACS)/Practical Test Standards (PTS). Attached are samples of the module completion standards included in the approved Training Course Outline. This document describes the expectations and assessment standards for stage check oral and flight checks. Also attached is a sample of a student's completed module written exam.

Recommendations: Continue to identify and discuss student stage check deficiencies with the instructional staff each semester. Revisions to course content and/or module completion standards will be made as needed to ensure adequate student preparation.

Module 7

Instrument Cross-Country and Partial Panel Operations

Prerequisites: Prior to beginning this module the student must have successfully completed Module 6.

Objective: To introduce IFR cross-country and partial panel operations and to complete the aeronautical knowledge and flight training required to prepare students to pass the Instrument Rating Airplane Knowledge and Practical Exams.

Completion Standards:

- The student must meet the following minimum training time requirements during this module:

DUAL			OTHER		
Local	XC	Inst. Ref.	ATD	Pre/ Post	Ground
11.5	6.0	13.0	5.5	5.6	18.0

- Prior to completion of the module, students must pass the FAA Instrument Rating Knowledge Exam.
- Prior to completion of the module, students must pass a stage check to evaluate their ability to:
  1) Demonstrate all applicable Tasks as specified in the Instrument Rating Airplane Airmen Certification Standards within the established standards.
  2) Demonstrate mastery of the aircraft by performing each Task successfully.
  3) Demonstrate proficiency and competency in accordance with the standards.
  4) Demonstrate sound judgment and exercise aeronautical decision making and risk management.

Notes:

- Lessons may be completed out of sequence as necessary to meet academic goals set by the instructor.
- Multiple instructional periods may be required to meet lesson requirements.

Module 8

Technically Advanced Airplane Operations

Prerequisites: Prior to beginning this module the student must possess a Private Pilot Airplane Single-engine Land certificate and an Instrument Airplane Rating.

Objective: To introduce the student to Technologically Advanced Airplane (TAA) operations and to gain proficiency in cross-country operations, commercial pilot maneuvers, and commercial aeronautical knowledge.

Completion Standards:

- The student must meet the following minimum training time requirements during this module:

TOTAL				OTHER		
Local	XC	TAA	Airplane	ATD	Pre/ Post	Ground
15.0	8.5	10.0	23.5	4.5	5.6	13.5

- Prior to completion of the module, students must pass a written exam to evaluate their understanding of:
  1) Major aircraft components and systems by describing normal operation of systems such as primary and secondary flight controls and trim, powerplant and propeller, landing gear, fuel, oil, hydraulic, electrical, flight instruments, avionics, and environmental systems.
  2) Use of all performance charts, tables, and data to determine takeoff and landing, climb, and cruise performance.
  3) Weather products required for preflight planning, current and forecast weather for departure, enroute, and arrival phases of flight.
  4) Meteorology applicable for flights conducted in both instrument and Visual Meteorological Conditions to include atmospheric composition and stability, wind, temperature, moisture, precipitation, weather system formation, airmasses, fronts, clouds, turbulence, thunderstorms, microbursts, icing, and fog.

5) Airworthiness, including certificate and document locations and expiration, required inspections, airworthiness directives, equipment requirements, and flight with inoperative equipment.
6) Currency requirements, privileges, limitations, medical certification, and documents related to commercial pilot operations.

- Prior to completion of the module, students must pass a stage check to evaluate their ability to:
  1) Perform steep turns and slow flight in accordance with published procedures while maintaining altitude +/- 100 feet, airspeed +/- 10 knots, and heading +/- 10 degrees.
  2) Perform power-on, power-off, and accelerated stalls in accordance with the Commercial Pilot testing standards.
  3) Perform chandelles in accordance with published procedures, complete the rollout at the 180° point +/- 15 degrees, no more than 10 knots above stall speed.
  4) Perform lazy eights in accordance with published procedures, arrive at each 180° point +/- 15 degrees, at an altitude +/- 150 feet from entry altitude, at an airspeed +/- 15 knots from entry airspeed.
  5) Perform steep spirals in accordance with published procedures, maintain a constant radius with only minor deviations while maintaining specified airspeed +/- 15 knots, and roll out toward specified heading +/- 15 degrees.
  6) Perform eights on pylons in accordance with published procedures, select suitable pylons, determine the approximate pivotal altitude, enter the maneuver at the appropriate altitude and airspeed, and maintain the reference line on each pylon with only minor deviations.
  7) Perform a power-off 180° accuracy approach and touch down -200/+400 feet from the specified touchdown point.
  8) Perform normal takeoffs and landings, short-field takeoffs, soft-field takeoffs, and soft-field landings in accordance with the Commercial Pilot testing standards.

9) Perform short-field landings, establish the recommended approach and landing configuration while maintaining airspeed +/- 5 knots, touchdown within 400 feet beyond a specified point with no side drift and minimum float.

Notes:

- Lessons may be completed out of sequence as necessary to meet academic goals set by the instructor.
- Multiple instructional periods may be required to meet lesson requirements.

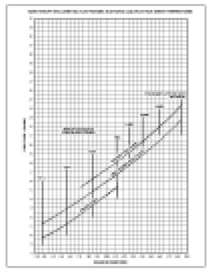
Commercial Pilot, Quiz Module 8 Exam (AQ)

Started: Mar 09, 2023 03:09 PM

Stopped: Mar 09, 2023 03:39 PM

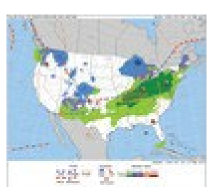
Grade: 98.00

Quiz Deadline: Dec 31, 2023 01:15 PM

Question	Answer
Question **GIVEN:** **Approximately how much flight time would be available with a day VFR fuel reserve remaining?** (/gradebookutility/question.php?queID=45913) (/gradebookutility/question.php?queID=45913)  Figure 8. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=8&tabs=8&asIds[]=123657)	**Correct** Chosen: b
Question **Which chart provides a ready means of locating observed frontal positions and pressure centers?** (/gradebookutility/question.php?queID=52174)	**Correct** Chosen: a
Question **From which measurement of the atmosphere can stability be determined?** (/gradebookutility/question.php?queID=52112)	**Correct** Chosen: b
Question **Unless adjusted, the fuel/air mixture becomes richer with an increase in altitude because the amount of fuel** (/gradebookutility/question.php?queID=52305)	**Correct** Chosen: c
Question **When is preflight action required, relative to alternatives available, if the planned flight cannot be completed?** (/gradebookutility/question.php?queID=45766)	**Correct** Chosen: b
Question **If you are operating under BasicMed, what is the maximum speed at which you may fly?** (/gradebookutility/question.php?queID=45751)	**Correct** Chosen: a
Question **The angle of attack of a cruise propeller is** (/gradebookutility/question.php?queID=52342)	**Correct** Chosen: b

Question The uncontrolled firing of the fuel/air charge in advance of normal spark ignition is known as (/gradebookutility/question.php?queID=52319)	**Correct** Chosen: c

Fuel quantity	**65 gal**
Best power (level ▮ight)	**55 percent**

Question	Answer
Question While in ▮ight a helicopter and an airplane are converging at a 90° angle, and the helicopter is located to the right of the airplane. Which aircraft has the right-of-way, and why? (/gradebookutility/question.php?queID=45787)	**Correct** Chosen: a
Question What is the standard temperature at 10,000 feet? (/gradebookutility/question.php?queID=52070)	**Correct** Chosen: a
Question Hazardous wind shear is commonly encountered (/gradebookutility/question.php?queID=52152)	**Correct** Chosen: c
Question The best power mixture is that fuel/air ratio at which (/gradebookutility/question.php?queID=52310)	**Correct** Chosen: b
Question Unless otherwise authorized or required by air trafic control, what is the maximum indicated airspeed at which a person may operate an aircraft below 10,000 feet MSL? (/gradebookutility/question.php?queID=45788)	**Correct** Chosen: c
Question An airplane is converging with a helicopter. Which aircraft has the right-of-way? (/gradebookutility/question.php?queID=45786)	**Correct** Chosen: b
Question If all index units are positive when computing weight and balance, the location of the datum would be at the (/gradebookutility/question.php?queID=45928)	**Correct** Chosen: b
Question 14 CFR Part 1 defines V_Y as (/gradebookutility/question.php?queID=45711)	**Correct** Chosen: c
Question What type of front is passing through area 1? (/gradebookutility/question.php?queID=52200) (/gradebookutility/question.php?queID=52200)  Figure 70.□ (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=70&tabs=70&asIds[]=123657)	**Correct** Chosen: c

Question **On an instrument approach where a DH or MDA is applicable, the pilot may not operate below, or continue the approach unless the** (/gradebookutility/question.php?queID=45808)	**Correct** Chosen: a

Question	Answer
Question **When turbulence causes changes in altitude and/or attitude, but aircraft control remains positive, that should be reported as** (/gradebookutility/question.php?queID=52140)	**Correct** Chosen: c
Question **What steps must be taken when flying with glass cockpits to ensure safe flight?** (/gradebookutility/question.php?queID=52301)	**Correct** Chosen: c
Question **According to 14 CFR Part 91, at what minimum altitude may an airplane be operated unless necessary for takeoff and landing?** (/gradebookutility/question.php?queID=45794)	**Correct** Chosen: c
Question **While executing a 60° level turn, your aircraft is at a load factor of 2.0. What does this mean?** (/gradebookutility/question.php?queID=52040)	**Correct** Chosen: a
Question **As air temperature increases, density altitude will** (/gradebookutility/question.php?queID=45877)	**Correct** Chosen: b
Question **To act as pilot in command of an airplane towing a glider, a pilot must have accomplished, within the preceding 24 months, at least** (/gradebookutility/question.php?queID=45747)	**Correct** Chosen: b
Question **Before shutdown, while at idle, the ignition key is momentarily turned OFF. The engine continues to run with no interruption; this** (/gradebookutility/question.php?queID=52321)	**Correct** Chosen: b
Question **Who is responsible for filing a Near Midair Collision (NMAC) Report?** (/gradebookutility/question.php?queID=45871)	**Correct** Chosen: c
Question **If the airplane attitude initially tends to return to its original position after the elevator control is pressed forward and released, the airplane displays** (/gradebookutility/question.php?queID=52012)	**Correct** Chosen: b
Question **The ratio of an airplane's true airspeed to the speed of sound in the same atmospheric conditions is** (/gradebookutility/question.php?queID=52043)	**Correct** Chosen: c
Question **Which is required equipment for powered aircraft during VFR night flights?** (/gradebookutility/question.php?queID=45821)	**Correct** Chosen: b
Question **Advection fog has drifted over a coastal airport during the day. What may tend to dissipate or lift this fog into low stratus clouds?** (/gradebookutility/question.php?queID=52091)	**Correct** Chosen: c

<table>
<tr><th>Question</th><th>Answer</th></tr>
<tr><td>Question The pilot in command of an aircraft operated under IFR, in controlled airspace, shall report as soon as practical to ATC when (/gradebookutility/question.php?queID=45813)</td><td>Correct
Chosen: b</td></tr>
<tr><td>Question
GIVEN:
<table>
<tr><td>Temperature</td><td>70°F</td></tr>
<tr><td>Pressure altitude</td><td>Sea level</td></tr>
<tr><td>Weight</td><td>3,400 lb</td></tr>
<tr><td>Headwind</td><td>16 kts</td></tr>
</table>
Determine the approximate ground roll.
(/gradebookutility/question.php?queID=45923)
(/gradebookutility/question.php?queID=45923)

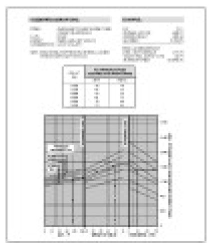
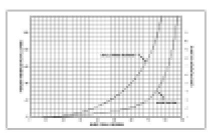
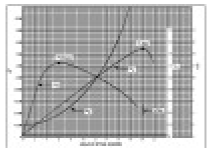



Figure 35.□
(/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=35&tabs=35&asIds[]=123657)</td><td>Incorrect (a)
Chosen: b</td></tr>
<tr><td>Question Authority for approval of a minimum equipment list (MEL) must be obtained from the (/gradebookutility/question.php?queID=45830)</td><td>Correct
Chosen: b</td></tr>
<tr><td>Question In theory, if the airspeed of an airplane is doubled while in level flight, parasite drag will become (/gradebookutility/question.php?queID=51985)</td><td>Correct
Chosen: c</td></tr>
<tr><td>Question A person with a Commercial Pilot certificate may act as pilot in command of an aircraft for compensation or hire, if that person (/gradebookutility/question.php?queID=45754)</td><td>Correct
Chosen: a</td></tr>
<tr><td>Question Unless otherwise authorized, what is the maximum indicated airspeed at which an aircraft may be flown in a satellite airport trafic pattern located within Class B airspace? (/gradebookutility/question.php?queID=45789)</td><td>Correct
Chosen: c</td></tr>
<tr><td>Question As the angle of bank is increased, the vertical component of lift (/gradebookutility/question.php?queID=51981)</td><td>Correct
Chosen: a</td></tr>
</table>

Question	Answer
Question **A pilot reporting turbulence that momentarily causes slight, erratic changes in altitude and/or attitude should report it as** (/gradebookutility/question.php?queID=52139)	**Correct** Chosen: b
Question **Commercial pilots are required to have a valid and appropriate pilot certificate in their physical possession or readily accessible in the aircraft when** (/gradebookutility/question.php?queID=45717)	**Correct** Chosen: b
Question **Which would increase the stability of an air mass?** (/gradebookutility/question.php?queID=52100)	**Correct** Chosen: b
Question **You are flying an aircraft equipped with an electronic flight display and the air data computer fails. What instrument is affected?** (/gradebookutility/question.php?queID=52300)	**Correct** Chosen: b
Question **In order to qualify for BasicMed, you must have received a comprehensive examination from:** (/gradebookutility/question.php?queID=45729)	**Correct** Chosen: c
Question **What is the stall speed of an airplane under a load factor of 2.5 Gs if the unaccelerated stall speed is 60 knots?** (/gradebookutility/question.php?queID=52033) (/gradebookutility/question.php?queID=52033)  Figure 4. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=4&tabs=4&asIds[]=123657)	**Correct** Chosen: c
Question **What flight time may a pilot log as second in command?** (/gradebookutility/question.php?queID=45737)	**Correct** Chosen: c
Question **Which is true with respect to formation flights? Formation flights are** (/gradebookutility/question.php?queID=45780)	**Correct** Chosen: c

Question	Answer
Question **How much altitude will this airplane lose in 3 statute miles of gliding at an angle of attack of 8°?** (/gradebookutility/question.php?queID=51997) (/gradebookutility/question.php?queID=51997)  Figure 3. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=3&tabs=3&asIds[]=123657)	**Correct** Chosen: c
Question **If not equipped with required position lights, an aircraft must terminate flight** (/gradebookutility/question.php?queID=45825)	**Correct** Chosen: a
Question **You are conducting your preflight of an aircraft and notice that the last inspection of the emergency locator transmitter was 11 calendar months ago. You may** (/gradebookutility/question.php?queID=45824)	**Correct** Chosen: b
Question **Which list accurately reflects some of the documents required to be current and carried in a U.S. registered civil airplane flying in the United States under day Visual Flight Rules (VFR)?** (/gradebookutility/question.php?queID=45814)	**Correct** Chosen: c
Question **What is the base of the ceiling in the following pilot report?** **KMOB UA /OV APE230010/TM 1515/FL085/TP BE20/SK BKN065/WX FV03SM HZ FU/TA 20/TB LGT** (/gradebookutility/question.php?queID=52166)	**Correct** Chosen: c

Performance Indicator Rubric

Course: FSCI 2650 Navigation Foundations Course Instructor: Jack Schwarz

Semester Taught: Spring 2023 Number of Students in Course: 35

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	Final Exam - #4: 88.57%	Yes.
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	Final Exam - #5: 85.71%	Yes.

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

Recommendation is to continue the current methods of presenting the course materials to the class.

**Attach description of assignment used for assessment and samples of student work.*

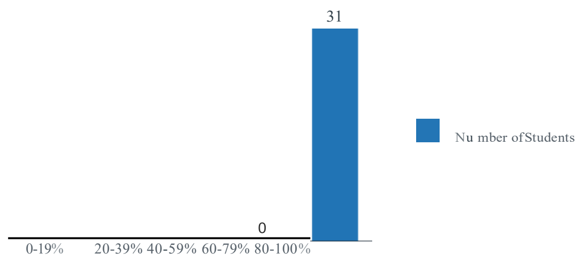
Es.s:.1Y 11 p::>ints pos:s ib le

G

An air craft is flying TAS 260 Ids a nd tracking 085"T.The *WN* is 045/50. How f.lr can the air cra ft fl y out from its b.lse .lnd re tu rn w it hin 1 hour ?

0.89	0.05	1.00	0.8 9tt pts
Difficulty Index	Discr iminat ion Inde x	RPB	Mea n Ea rn ed Score

Perf ormance by Quintile



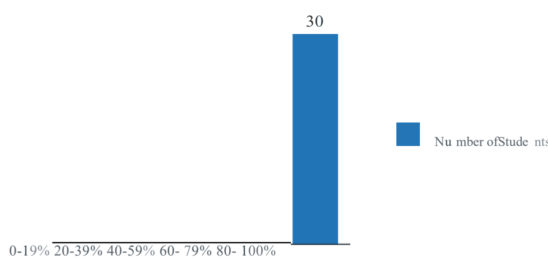
Es.say 12 p::>ints poss ib le

W

An aircraft is at FL340 with 280 KCAS and a tr ue -18°C OAT. The wi nd component is a tailwind of 35 kts. When the aircraft is at 120 nm from• reporting point.ATC reques ts the crew to arrive 2 minutes later than plan t he re port ing po i nt How much do they need to reduce KCAS?

0.86	0.25	1.00	1.7112pts
Difficulty Inde x	Disc rim in .1t ion Index	RPB	Mea n Ea rned Score

Performance by Quintile



Performance Indicator Rubric

Course: FSCI 3550 Flight 5 — Course Instructor: Ryan Boyer

Semester Taught: Spring 2023 — Number of Students in Course: 25

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Percentage of student written exams and stage checks passed on first attempt)	Benchmark achieved? (Benchmark: 70% of student written exams and stage checks passed on first attempt)
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	Written Exam Pass Rate: 100% Stage Check Pass Rate: 90%	Yes
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	Written Exam Pass Rate: 100% Stage Check Pass Rate: 90%	Yes

Description of Assessment: The student assessment consists of multiple-choice module written exams as well as stage check practical exams. Written exams require a minimum score of 70% to pass. Each stage check consists of an oral portion and a flight portion, and satisfactory or unsatisfactory performance is determined in accordance with the Module Completion Standards and/or the appropriate Airmen Certification Standards (ACS)/Practical Test Standards (PTS). Attached are samples of the module completion standards included in the approved Training Course Outline. This document describes the expectations and assessment standards for stage check oral and flight checks. Also attached is a sample of a student's completed module written exam.

Recommendations: Continue to identify and discuss student stage check deficiencies with the instructional staff each semester. Revisions to course content and/or module completion standards will be made as needed to ensure adequate student preparation.

Module 9

Commercial Pilot ASEL Course Completion

Prerequisites: Prior to beginning this module the student must have successfully completed Module 8.

Objective: To complete the aeronautical knowledge and flight training required to prepare students to pass the Commercial Pilot Knowledge and Practical Exams.

Completion Standards:

- The student must meet the following minimum training time requirements during this module:

DUAL		SOLO	TOTAL	OTHER		
Local	XC	Airplane	Airplane	ATD	Pre/ Post	Ground
10.8	2.0	11.7	24.5	4.5	4.4	12.0

- Prior to completion of the module, students must pass the FAA Commercial Pilot Knowledge Exam.
- Prior to completion of the module, students must pass a stage check to evaluate their ability to:
  1) Demonstrate all applicable Tasks as specified in the Commercial Pilot Airplane Airmen Certification Standards within the established standards.
  2) Demonstrate mastery of the aircraft by performing each Task successfully.
  3) Demonstrate proficiency and competency in accordance with the standards.
  4) Demonstrate sound judgment and exercise aeronautical decision making and risk management.

Notes:

- Lessons may be completed out of sequence as necessary to meet academic goals set by the instructor.
- Multiple instructional periods may be required to meet lesson requirements.

Module 10

Multiengine Aircraft Operations

Prerequisites: Prior to beginning this module the student must be enrolled in the Commercial Pilot Added Rating Course, must hold a Commercial Pilot Airplane Single-engine Land certificate and must possess a valid Medical Certificate.

Objective: To complete the aeronautical knowledge and flight training required to prepare students to pass the Commercial Pilot Airplane Multiengine Land Added Class Rating Practical Exam.

Completion Standards:

- The student must meet the following minimum training time requirements during this module:

DUAL				**TOTAL**	OTHER		
Local Total	XC Total	XC Night	Inst. Ref.	**AMEL**	ATD	Pre/ Post	Ground
9.5	4.0	2.0	5.0	**13.5**	6.0	5.6	15.5

- Prior to completion of the module, students must pass a written exam to evaluate their understanding of the required knowledge areas included in the Commercial Pilot Airmen Certification Standards for an added Airplane Multiengine Land class rating.
- Prior to completion of the module, students must pass a stage check to evaluate their ability to:
  1) Demonstrate all applicable Tasks as specified in the Commercial Pilot Airplane Airmen Certification Standards within the established standards.
  2) Demonstrate mastery of the aircraft by performing each Task successfully.
  3) Demonstrate proficiency and competency in accordance with the standards.
  4) Demonstrate sound judgment and exercise aeronautical decision making and risk management.

Notes:

- Lessons may be completed out of sequence as necessary to meet academic goals set by the instructor.
- Multiple instructional periods may be required to meet lesson requirements.

Module 10 Exam Results for ---------------------

Score for this quiz: **48** out of 58
Submitted Mar 20 at 8:32am
This attempt took 54 minutes.

Question 1

1 / 1 pts

For the following questions on airspeeds, please ensure your answer includes NUMBERS ONLY.

What airspeed (in knots) represents Vso in the PA44?

Correct!

55

orrect Answers

55

Additional Comments:

Question 2

1 / 1 pts

What airspeed (in knots) represents Vs1 in the PA44?

Correct!

57

orrect Answers 57

Additional Comments:

Question 3

1 / 1 pts

What airspeed (in knots) represents Vmc in the PA44?

Correct! 56

orrect Answers 56

Additional Comments:

Question 4

1 / 1 pts

What airspeed (in knots) represents Vfe in the PA44?

Correct! 111

orrect Answers 111

Additional Comments:

Question 5

1 / 1 pts

What airspeed (in knots) represents Vx in the PA44?

Correct!

82

orrect Answers 82

Additional Comments:

Question 6

1 / 1 pts

What airspeed (in knots) represents Vy in the PA44?

Correct!

88

orrect Answers 88

Additional Comments:

Question 7

1 / 1 pts

What airspeed (in knots) represents Vxse in the PA44?

Correct!

82

orrect Answers

82

Additional Comments:

Question 8

1 / 1 pts

What airspeed (in knots) represents Vyse in the PA44?

Correct!

88

orrect Answers

88

Additional Comments:

Question 9

1 / 1 pts

What airspeed (in knots) represents Vlo (retraction) in the PA44?

Correct!

109

orrect Answers

109

Additional Comments:

Question 10

1 / 1 pts

What airspeed (in knots) represents Vlo (extension) in the PA44?

Correct!

140

orrect Answers

140

Additional Comments:

Question 11

1 / 1 pts

What airspeed (in knots) represents Vle in the PA44?

Correct!

140

orrect Answers

140

Additional Comments:

Question 12

0 / 1 pts

What airspeed (in knots) represents Va in the PA44?

ou Answered

112 for 2700lbs / 135 for 3800lbs

orrect Answers

135

Additional Comments:

Question 13

1 / 1 pts

What airspeed (in knots) represents Vno in the PA44?

Correct!

169

orrect Answers 169

Additional Comments:

Question 14

1 / 1 pts

What airspeed (in knots) represents Vne in the PA44?

Correct!

202

orrect Answers 202

Additional Comments:

Question 15

1 / 1 pts

At what airspeed (in knots) should the PA44 rotate during a normal takeoff?

Correct!

75

orrect Answers

75

Additional Comments:

Question 16

1 / 1 pts

At what airspeed (in knots) should you conduct a short field approach in the PA44 (assume maximum gross weight)?

Correct!

75

orrect Answers

75

Additional Comments:

Question 17

1 / 1 pts

What is the maximum demonstrated crosswind component (in knots)?

Correct!

17

orrect Answers

17

Additional Comments:

Question 18

1 / 1 pts

What is the maximum ramp weight for the PA44 (in pounds)?

Correct!

3816

orrect Answers

3816

3,816

Additional Comments:

Question 19

1 / 1 pts

What is the maximum takeoff weight for the PA44 (in pounds)?

Correct!

3800

orrect Answers

3800

3,800

Additional Comments:

Question 20

1 / 1 pts

What is the maximum permissible weight in the baggage compartment in the PA44?

Correct!

200

orrect Answers

200

Additional Comments:

Question 21

1 / 1 pts

What is the maximum total fuel quantity (in gallons)?

Correct!

110

orrect Answers

110

Additional Comments:

Question 22

1 / 1 pts

What is the maximum usable fuel quantity (in gallons)?

Correct!

108

orrect Answers

108

Additional Comments:

Question 23

1 / 1 pts

What is the model of the right engine on the PA-44-180?

- O-360-A1H6
- Correct! LO-360-A1H6
- IO-360-A1H6

Additional Comments:

Question 24

1 / 1 pts

The engines on the PA-44-180 are fuel injected and horizontally opposed.

- True
- Correct! False

Additional Comments:

Question 25

1 / 1 pts

The PA-44-180 is considered a high performance aircraft since the total horsepower is 360.

- True
- Correct! False

Additional Comments:

Question 26

1 / 1 pts

Cylinder head temperatures may be lowered during a climb by:

- Increasing airspeed.
- Opening the cowl flap.
- Enrichening the mixture.
- Correct! All of the above

Additional Comments:

Question 27

1 / 1 pts

In the PA-44-180, carburetor ice can be first detected by:

- ○ A slow decrease in engine RPM.
- Correct! ◉ A slow decrease in manifold pressure.
- ○ A slow decrease in cylinder head temperature.

Additional Comments:

Question 28

1 / 1 pts

If the aircraft's battery is depleted, one way to get the aircraft started is to:

Connect a 28 volt power source to the external power receptacle located on the lower right side of the nose section.

Connect a 14 volt power source to the external power receptacle located near the step on the right side near the baggage door.

Correct!

Connect a 14 volt power source to the external power receptacle located on the lower right side of the nose section.

Additional Comments:

Question 29

0 / 1 pts

The purpose for the overvoltage relays are to prevent damage to the electrical and avionics equipment should an alternator's output cause the bus voltage to exceed_________volts.

ou Answered

14

orrect Answer

17

28

Additional Comments:

Question 30

1 / 1 pts

How would a pilot notice if an alternator has failed in flight in the PA-44-180?

- The voltmeter will drop below 12 volts and the ammeter will show a discharge.
- The voltmeter will drop below 14 volts and the ammeter will show a discharge.

Correct!

- The ALT light will illuminate and the ammeter for the failed alternator will show zero.

Additional Comments:

Question 31

0 / 1 pts

If one alternator fails in flight, what are the proper initial steps to restore operation of the affected alternator?

- Turn both alternator switches OFF, wait at least one second and then turn both alternators back on, one at a time.

orrect Answer

Turn the affected alternator switch OFF, then after one or more seconds, turn the affected alternator switch ON.

ou Answered

Turn off all non-essential electrical equipment and pull and reset the circuit breaker for the failed alternator.

Additional Comments:

Question 32

1 / 1 pts

Under which conditions will the "Gear Warning Horn Mute Switch" silence the horn?

Correct!

- Only if the horn was triggered by the power lever position.
- Only if the horn was triggered by the flap setting.
- Any time the horn is sounding and the gear is not down and locked.

Additional Comments:

Question 33

0 / 1 pts

The squat switch located on which gear prevents activation of the gear pump when the aircraft is on the ground?

orrect Answer

Left main gear

Right main gear

ou Answered

Nose gear

Additional Comments:

Question 34

1 / 1 pts

Assume the landing gear pump circuit breaker has popped and cannot be reset. Which is of the following statements is true?

The landing gear cannot be extended without electrical power. Declare an emergency and plan land gear up.

The aircraft should be slowed to less than 140 KIAS and the emergency hydraulic pump activated.

Correct!

The aircraft should be slowed to less than 100 KIAS and the emergency gear extension handle pulled.

Additional Comments:

Question 35

0 / 1 pts

During a pre-flight inspection of the aircraft you are checking the stall warning system and notice the stall warning horn does not sound when you lift on either of the lift detectors. Which of these statements is true?

ou Answered

The stall warning system is defective and the aircraft should be grounded until repairs can be made.

orrect Answer

The stall warning horn cannot be tested on the ground since the squat switch on the right main landing gear does not allow it.

The stall warning horn cannot be tested on the ground since it only functions when at least one engine is operating.

Additional Comments:

Question 36

0 / 1 pts

If an engine loses oil pressure during flight, how will the propeller system be affected?

ou Answered

The propeller blade angle will be reduced to the high RPM setting; use the throttle to avoid the resulting overspeed condition.

orrect Answer

The propeller blade angle will increase toward the low RPM setting.

The engine oil system has no effect on the propeller system.

Additional Comments:

Question 37

0 / 1 pts

What are the advantages of equipping the propeller system of a multiengine airplane with an accumulator?

orrect Answer

It allows for easier restarting of the engine in flight.

It permits the engine to be placed in the feature position in flight.

ou Answered

It stores oil under pressure for emergency use in the event of an engine oil pump failure.

Additional Comments:

Question 38

0 / 1 pts

The propellers contain feathering locks for what purpose?

ou Answered

- They prevent the propeller from inadvertently feathering in flight.

orrect Answer

- They prevent feathering during engine shutdown on the ground.
- They ensure the propeller remains in the feathered position once selected.

Additional Comments:

Question 39

0 / 1 pts

Which of the following is true if the temperature of the combustion heater exceeds limitations during flight?

orrect Answer

- The overheat safety switch will cause an annunciator to illuminate, and the heater will automatically shut off.

ou Answered

An annunciator will illuminate, and the pilot must manually adjust the temperature control to a lower setting to prevent damage.

The temperature inside the cabin will become excessive, and the pilot should open all cabin vents and deactivate the heater.

Additional Comments:

Question 40

1 / 1 pts

The source of fuel for the cabin heater is:

The right fuel tank at approximately ½ gallon of fuel per hour.

Correct!

The left fuel tank at approximately ½ gallon of fuel per hour.

The left fuel tank at approximately 1 gallon of fuel per hour.

Additional Comments:

Question 41

1 / 1 pts

To prevent excessive temperatures, the heater should be shut down as follows:

While in the air, the heater can be shut down without limitation. On the ground, the heater control switch should be placed in the fan position for at least one minute to cool down the heater before closing the air intake.

While in the air, the heater switch should be turned off at least 10 seconds before closing the air intake. On the ground, the heater control switch should be placed in the fan position for at least one minute to cool down before closing the air intake.

Correct!

While in the air, the heater switch should be turned off at least 15 seconds before closing the air intake. On the ground, the heater control switch should be placed in the fan position for at least two minutes to cool down before closing the air intake.

Additional Comments:

Question 42

1 / 1 pts

Which of the following is the best course of action in the event of an engine fire during start?

- Close the affected engine's throttle and pull the mixture control to the idle cut-off position.

Correct!

Move the throttle to the full open position. Move the mixture control to the cut-off position. Continue cranking the engine.

Shut off the Battery switch and Alternator switches and evacuate immediately.

Additional Comments:

Question 43

1 / 1 pts

At sea level, the stall speed and the Vmc speed for the PA44 are nearly the same, but as altitude increases:

The stall speed decreases.

Correct!

The Vmc speed decreases.

The Vmc speed increases.

Additional Comments:

Question 44

1 / 1 pts

The term "Critical Engine" means:

- The engine that results in the most parasite drag in the event of failure.
- The engine that provides the best overall climb performance during single-engine operations.

Correct!

- The engine whose failure would most adversely affect the performance or handling qualities of an aircraft.

Additional Comments:

Question 45

1 / 1 pts

Which engine would be considered critical on a conventional multiengine airplane that is not equipped with counter-rotating propellers?

Correct!

- Left engine
- Right engine
- Neither engine

Additional Comments:

Question 46

1 / 1 pts

The published Vmc airspeed is based upon which of the following conditions?

Correct!

- Maximum available takeoff power and propeller controls in the recommended takeoff position
- Full power on the operating engine and the failed engine propeller feathered
- Cruise power on the operating engine and the failed engine propeller windmilling

Additional Comments:

Question 47

1 / 1 pts

The published Vmc airspeed is based upon which of the following conditions?

Forward-most CG and average operating weight

Forward-most CG and maximum gross weight

Correct!

Aft-most CG and most unfavorable weight

Additional Comments:

Question 48

1 / 1 pts

The published Vmc airspeed is based upon which of the following conditions?

Correct!

Flaps in the takeoff position and landing gear retracted

Flaps retracted and landing gear extended

Flaps in the most unfavorable position and gear extended

Additional Comments:

Question 49

1 / 1 pts

The published Vmc airspeed is based upon which of the following conditions?

Wings level

Correct!

An angle of bank of not more than 5 degrees

The angle of bank most adversely affecting performance

Additional Comments:

Question 50

0 / 1 pts

What is the proper way to identify and verify a failed engine in flight?

orrect Answer

Identify the failed engine by evaluating the need for rudder pressure. Verify using the throttle.

ou Answered

Identify the failed engine by reducing each throttle one at a time. The pilot not flying then verbally verifies the failed engine.

Identify the failed engine by referencing the RPM and manifold pressure gauge. Verify using either rudder pressure or throttle.

Additional Comments:

Question 51

1 / 1 pts

In the event of an engine failure, how should the airplane be flown to ensure a zero-sideslip condition?

- Wings level and inclinometer ball centered

Correct!

- Shallow bank toward the operating engine and the inclinometer ball slightly off-center

- Shallow bank toward the failed engine and the inclinometer ball centered

Additional Comments:

Question 52

1 / 1 pts

How does the procedure for an engine failure at cruise airspeed differ from an engine failure below Vmc?

- There is no difference in the procedures, but extra attention to aircraft control will be required if below Vmc.

Correct!

- The throttles should be reduced if below Vmc to lessen the effects of asymmetrical thrust.

Due to the reduced controllability below Vmc, the failed engine should be immediately secured.

Additional Comments:

Question 53

1 / 1 pts

In the event of an engine failure after takeoff over the runway in a multiengine airplane, under what circumstances should the airplane be landed straight ahead?

- An altitude of at least 500 AGL has not yet been reached.
- Based on the climb performance as calculated before flight, a positive rate of climb will not be possible.

Correct!

- Sufficient runway remains for the airplane to land and come to a complete stop.

Additional Comments:

Question 54

1 / 1 pts

After an engine failure in flight, under which of the following circumstances would it be appropriate to troubleshoot the engine before securing it?

- During climb immediately after departure upon reaching an altitude of at least 1000 AGL

Correct!

- During cruise flight at an altitude above 4000 AGL with a maximum VSI indication of -100 FPM
- Established on an instrument approach outside of the final approach fix
- None of the above

Additional Comments:

Question 55

1 / 1 pts

While on the final approach segment of an instrument approach ending in a circle-to-land maneuver with one engine inoperative, the correct configuration for the aircraft is:

- Gear down; flaps retracted
- Gear down; flaps up to 25 degrees

Correct!

Gear and flaps retracted until the aircraft is in a position where a landing is assured

Additional Comments:

Question 56

1 / 1 pts

"Accelerate-stop distance" is the distance required to:

Correct!

Accelerate to Vr or Vlof (as specified by the manufacturer), experience an engine failure, and bring the airplane to a complete stop.

Accelerate to Vmc, abort the takeoff, and bring the airplane to a complete stop.

Accelerate to Vx or Vy and climb to an altitude of 50 feet, abort the takeoff, and land straight ahead.

Additional Comments:

Question 57

1 / 1 pts

The intentional one engine inoperative speed in the PA-44-180 for flight training purposes is:

Correct!

- (selected) Vsse
- Vyse
- Vmc

Additional Comments:

Question 58

1 / 1 pts

The definition of a single-engine service ceiling for a multiengine airplane is:

- The altitude above which the aircraft cannot maintain altitude.

Correct!

- (selected) An altitude above which a rate of climb of least a 50 FPM cannot be maintained.
- An altitude above which a rate of climb of least a 100 FPM cannot be maintained.

Additional Comments:

Fudge Points: --

You can manually adjust the score by adding positive or negative points to this box.

Final Score: 48 out of 58

Update Scores

Performance Indicator Rubric

Course: FSCI 3750 Flight 6

Course Instructor: Ryan Boyer

Semester Taught: Spring 2023

Number of Students in Course: 6

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Percentage of student written exams and stage checks passed on first attempt)	Benchmark achieved? (Benchmark: 70% of student written exams and stage checks passed on first attempt)
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	Written Exam Pass Rate: 100% Stage Check Pass Rate: 90%	Yes
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	Written Exam Pass Rate: 100% Stage Check Pass Rate: 90%	Yes

Description of Assessment: The student assessment consists of multiple-choice module written exams as well as stage check practical exams. Written exams require a minimum score of 70% to pass. Each stage check consists of an oral portion and a flight portion, and satisfactory or unsatisfactory performance is determined in accordance with the Module Completion Standards and/or the appropriate Airmen Certification Standards (ACS)/Practical Test Standards (PTS). Attached are samples of the module completion standards included in the approved Training Course Outline. This document describes the expectations and assessment standards for stage check oral and flight checks. Also attached is a sample of a student's completed module written exam.

Recommendations: Continue to identify and discuss student stage check deficiencies with the instructional staff each semester. Revisions to course content and/or module completion standards will be made as needed to ensure adequate student preparation.

Module 11

Fundamentals of Instruction

Prerequisites: Prior to beginning this module the student must possess an ATP Certificate with an Airplane Single-Engine Land Rating or Commercial Pilot Certificate with Airplane Single-Engine Land and Instrument Ratings and must possess either a valid FAA medical certificate or meet the Alternative Pilot Physical Examination and Education Requirements under FAR 68 (BasicMed).

Objective: To introduce the student to the Fundamentals of Instruction, to gain proficiency in teaching technical subject areas, and to increase competence in demonstrating and describing Private Pilot procedures and maneuvers.

Completion Standards:

- The student must meet the following minimum training time requirements during this module:

DUAL		OTHER
Airplane	Pre/ Post	Ground
12.7	3.6	21.0

- Prior to completion of the module, students must pass the FAA Fundamentals of Instruction Knowledge Exam and a stage check to evaluate their instructional knowledge of:
  1) The fundamentals of instructing, including human behavior, effective communication, the teaching process, the learning process, assessment and critique, instructor responsibilities and professionalism, techniques of flight instruction, and risk management, as described in the Flight Instructor Practical Test Standards or Airmen Certification Standards.
  2) Technical subject areas, including principles of flight, flight controls, aircraft systems, performance, and weight and balance, as described in the Flight Instructor Practical Test Standards or Airmen Certification Standards.

- Prior to completion of the module, students must pass a stage check to evaluate their ability to:
  1) Demonstrate all procedures and maneuvers in this module from the right seat to the Private Pilot skill level.
  2) Demonstrate a preflight inspection while describing reasons for the inspection, items to check, and recognition of defects.
  3) Demonstrate and simultaneously explain all ground operations, including engine starting procedures, cockpit management, taxiing, airport signs and markings, ATC communication procedures, and before takeoff checks.
  4) Demonstrate and simultaneously explain fundamentals of flight and basic instrument maneuvers.
  5) Demonstrate and simultaneously explain traffic pattern procedures, including normal/crosswind takeoff and landing, short-field takeoff and landing, soft-field takeoff and landing, slip to a landing, and go-arounds.
  6) Demonstrate and simultaneously explain steep turns, slow flight, and stalls.
  7) Demonstrate and simultaneously explain Private Pilot ground reference maneuvers, including turns around a point, s-turns, and rectangular course.
  8) Demonstrate and simultaneously explain emergency operations, including a simulated emergency approach and landing.

Notes:

- Lessons may be completed out of sequence as necessary to meet academic goals set by the instructor.
- Multiple instructional periods may be required to meet lesson requirements.

Module 12

Flight Instructor Practical Test Preparation

Prerequisites: Prior to beginning this module the student must possess an ATP Certificate with an Airplane Single-Engine Land Rating or Commercial Pilot Certificate with Airplane Single-Engine Land and Instrument Ratings.

Objective: To gain proficiency in teaching technical subject areas and demonstrating and describing all required procedures and maneuvers. To complete the aeronautical knowledge and flight training required for the Certified Flight Instructor Practical Exam.

Completion Standards:

- The student must meet the following minimum training time requirements during this module:

DUAL	OTHER	
Airplane	Pre/ Post	Ground
12.3	4.2	20.0

- Prior to completion of the module, students must pass the FAA Flight Instructor Airplane and Advanced Ground Instructor Knowledge Exams.
- Prior to completion of the module, students must pass a stage check to evaluate their:
  1) Ability to demonstrate all applicable tasks as specified in the Flight Instructor Practical Test Standards or Airmen Certification Standards within the established standards.
  2) Knowledge of the fundamentals of instruction, technical subject areas, and instructor responsibilities.
  3) Ability to demonstrate the procedures and maneuvers to at least the Commercial Pilot skill level while giving effective instruction.
  4) Competence in teaching the selected procedures and maneuvers.
  5) Competence in describing, recognizing, analyzing, and correcting common errors.

6) Knowledge of the development and effective use of a course of training, syllabus, and lesson plan.

Notes:

- Lessons may be completed out of sequence as necessary to meet academic goals set by the instructor.
- Multiple instructional periods may be required to meet lesson requirements.

U.S. DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration
Airman Knowledge Test Report

NAME:

FAA TRACKING NUMBER (FTN): A5469453 **EXAM ID:** 90030320230335228

EXAM: Fundamentals of Instructing (FOi)

EXAM DATE: 03/03/2023 **EXAM SITE:** ABS63102

SCORE: 88% **GRADE:** Pass **TAKE:** 1

Learning statement codes listed below represent incorrectly answered questions. Learning statement codes and their associated statements can be found at https://www.faa.gov/training testing/testing/media/LearningStatementReferenceGuide.pdf.

Reference material associated with the learning statement codes can be found in the appropriate knowledge test guide at https://www.faa.gov/training_testing/testing/.

A single code may represent more than one incorrect response.

PLT204 PLT227 PLT230 PLT306 PLT504

EXPIRATION DATE: 03/31/2025

DO NOT LOSE THIS REPORT

AUTHORIZED INSTRUCTOR'S STATEMENT: (if applicable)
On ________ (date) I gave the above named applicant ____ hours of additional instruction, covering each subject area shown to be deficient, ~~and consider the applicant competent to pass the knowledge test.~~

Name____

Cert. No.____ (print clearly)

Type of instructor certificate ____________________________

Signature ____

FRAUDULENT ALTERATION OF THIS FORM BY ANY PERSON IS A BASIS FOR SUSPENSION OR REVOCATION OF ANY CERTIFICATES OR RATINGS HELD BY THAT PERSON.
ISSUED BY: PSI Services LLC
FEDERAL AVIATION ADMINISTRATION

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Aviation Management – Data Collected in Support of Curriculum Goals and SLO 2

Performance Indicator Rubric

Course: ASCI 1300 Aviation Weather Course Instructor: Alec Albright

Semester Taught: Fall 2022 Number of Students in Course: 60

AVIATION MANAGEMENT CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	96%	Yes

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

**Attach description of assignment used for assessment and samples of student work.*

Performance Indicator Rubric

Course: ASCI 1300 Aviation Weather Course Instructor: Alec Albright

Semester Taught: Fall 2022 Number of Students in Course: 60

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	96%	Yes
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	96%	Yes

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

Attach description of assignment used for assessment and samples of student work.

[redacted]
Aviation Weather
10/10/2022

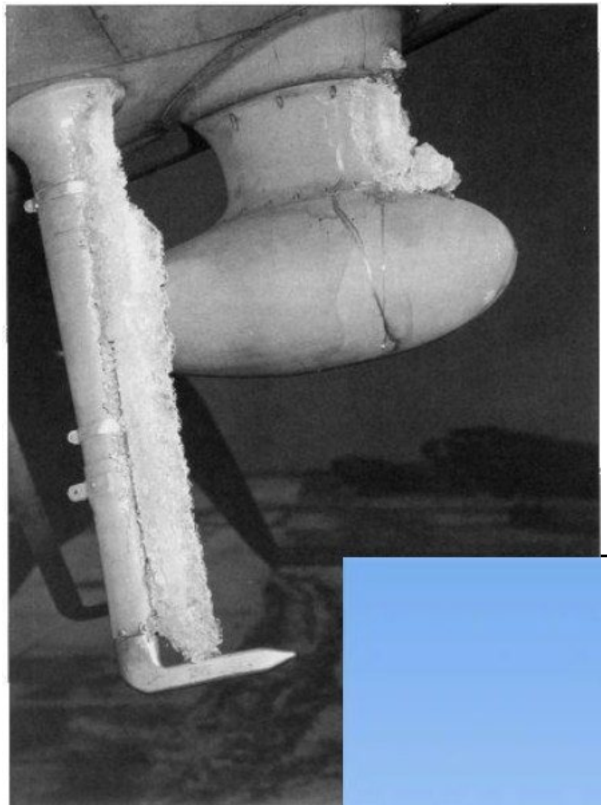
1. ASRS Report Number: 1786936
2. Date: February, 2021
3. Aircraft Type: Cessna 172
4. Summary: The pilot was flying at 7,000 feet when ATC requested that they fly at an even altitude. They requested to fly at 4,000 feet but changed their mind and stopped at 6,000 feet. This altitude was between two layers that eventually merged, and ice began to develop. The pilot lost airspeed indication and the stall horn began to sound. The pilot could not figure out what was happening because they were in the clouds, so they pushed the yoke forward. They then had to perform a recovery from a rapid descent and a 180-degree turn. Afterwards the ice melted, and the pilot continued on their course beneath the clouds.

ACN: 1786936

[redacted]

Skyhawk 172

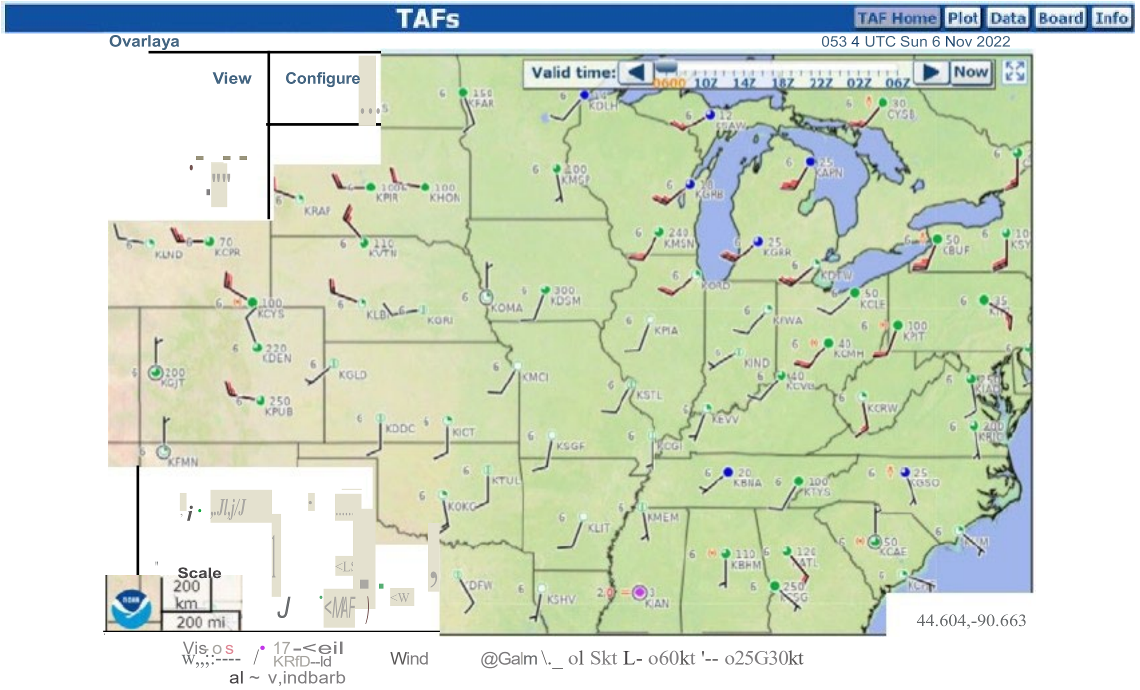
- IFR flight between layers at 7,000 feet
- Layers merged forcing the pilot into the clouds where icing developed



Pitot-static Icing caused the airspeed indicator to fail and indicated a false stall

- The pilot pushed the nose down to prevent this and was forced to recover from a rapid descent and turn 180-degrees

AWC Planning Tools



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Current Icing Sigmets

Clickonimagetoaccess plots

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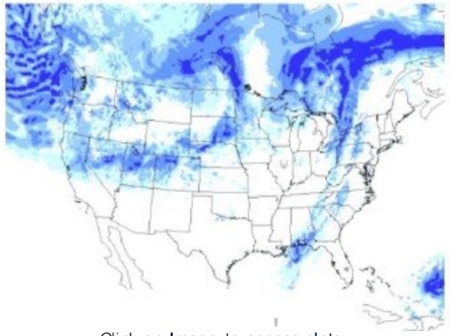
Current Icing Aircraft Reports

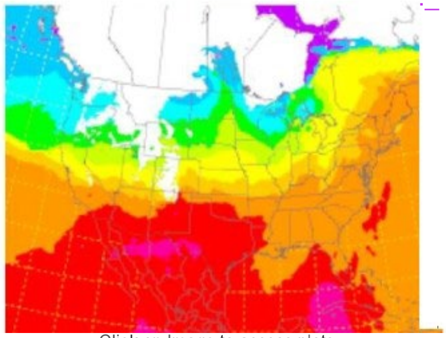
Click on region names to access plots

Fore ca st I ci ng



Cli ek on Image to access plots

Fre ez i n g Leve l



Cliek on Image to access plots

[redacted]

Aviation Weather

11/6/2022

ACN: 1786936

In ACN 1786936, during February of 2021, the pilot of a Cessna 172 was flying between two cloud layers when they merged and caused rime icing on the pitot-static system. Icing like this causes significant problems for pilots because the instruments required for IFR begin to fail.

While flying at 7,000 feet the pilot of ACN 1786936 was flying between layers when ATC requested that he fly at an even thousand instead. The pilot had the choice of up or down. The pilot chose to come down to 4,000 feet to stay below the freezing level. However, to avoid the clouds at 4,000 feet the pilot requested to stay at 6,000 feet which put them in between two layers of clouds. As the pilot continued on their course, the clouds merged and forced the pilot into them. Due to 6,000 feet being above the freezing level, rime ice began to form on the aircraft. This icing covered the pitot tube and the pilot's airspeed indicator failed. This caused the stall warning indication to appear. The pilot requested a descent to ATC on account of icing and began descending to 2,000 feet. Still, the pilot was unable to figure out what was happening, and just to be safe, they pushed forward on the yoke. When they finally realized no stall was occurring, they began a recovery from the rapid descent and performed a 180-degree turn. After activating the pitot heat the airspeed indicated came back online, and they continued on their previous course safely.

Icing such as the kind seen in this example can be extremely hazardous for any pilot, regardless of whether they are VFR or IFR. Not only can icing clog the pitot-static system and render flight instruments useless until the icing is removed. It can also cause engine problems by covering the air intake. Secondary air helps counter this, but it can still cause a dangerous situation. On top of that icing on the wings will disrupt the laminar flow over the wings causing separation and potential stalling. Luckily pilots can predict icing and prevent it in many cases. For icing to occur there must be precipitation and below-freezing temperatures at the altitude that the pilot chose. Thus, pilots must avoid altitudes where both freezing temperatures and moisture are present.

In this ASRS Report, it seems that the pilot already knew the freezing levels and clearly knew of the precipitation, as they were actively avoiding it. However, as I stated above both below-freezing temperatures and precipitation are required for icing to accumulate. In this example, the pilot chose to stay above the freezing level but out of the clouds rather than descend into the clouds. The pilot would most likely not have run into any issues if they had descended to their original intended altitude of 4,000 feet. They would have been in the clouds for a longer time, but they would have avoided the freezing temperatures altogether. The best way to find out if your flight has a chance of icing is to use the tools provided by the Aviation Weather Center. On their website, pilots can find the Freezing Level Graphic as well as terminal aerodrome forecasts. These allow pilots to find both the chance of precipitation on their flight path as well as icing levels to prevent accidentally running into a hazardous situation.

Diligent flight planning could have prevented this pilot from running into hazardous icing. No matter the conditions that appear on the surface pilots should always check the weather to prevent situations like the one seen in this example.

Final Project: NASA ASRS Report Assessment

To complete this assignment, students will find a NASA ASRS report where the primary factor contributing to the error was Weather. Students will write a short report about why the incident occurred, the weather associated with the incident, how a pilot can anticipate the weather which caused the problem, and how to avoid such errors in the future. Students will also prepare a short presentation (2-4 minutes) on their report, and share this in class, in front of their colleagues.

Students who are attending the class remotely or from foreign countries will still be required to present their findings to the class. This can be accomplished over Zoom, and you will be able to share your screen with the rest of the class.

Students will conduct a search of the ASRS database. In conducting this search, students will select 'Weather' as the Primary Factor. Students will also use the ASRS search function to limit results to 'Part 91' Flight Rules. This will pull reports only from general aviation, and exclude those reports from airlines, charter operators, military flight operations, and other flight operations that are not directly relevant to the type of flying that students are currently engaged in.

Due Dates:

1. 10/20/22 11:59 PM CDT - submit your chosen ASRS report, date of occurrence, aircraft type, and a short summary in a PDF document via Canvas
2. 11/6/22, 11:59 PM CDT - submit your completed assignment (short essay and powerpoint presentation) in PDF formats via Canvas

Aviation Weather
Parks College of Engineering, Aviation and Technology
Fall 2022

Short Essay Format Requirements

1. Times New Roman, 12-pt., double spaced
2. Title should be the ACN, centered in **bold**, at the top of the page
3. 400-700 words

Short Essay Content Requirements

Answer the following questions:

1. What occurred? Provide a detailed description.
2. What was the weather phenomenon? Describe the weather occurrence using your knowledge of weather theory from our class.
3. How could this situation be avoided in the future? Use your knowledge of aviation weather products and preflight planning to describe how you might avoid this type of occurrence in the future.

As with any writing assignment, please consider proper grammar, punctuation and spelling. Please include a short introduction and conclusion at the beginning and end of your assignment.

Presentation Requirements:

1. 2-4 minute presentation
2. Create a short powerpoint presentation
3. Present your essay in an oral format to the class

Performance Indicator Rubric

Course: ASCI 2200 Concepts in Aerodynamics   Course Instructor: Terrence Kelly

Semester Taught: Fall 2022   Number of Students in Course: 46

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	Test #1 - Average score 82% 40 out of 46 students scored above 70% (87%) Test #2 – Average Score 81% 43 out of 46 students scored above 70% (93%) Homework #3 Average score 94.8% 46 0f 46 students scored above 70% (100%)	Test #1 Benchmark Achieved 40 of 46 scored above 70% (87%) Test #2 Benchmark Achieved 43 of 46 scored above 70% (93%) Homework #2 Benchmark Achieved 46 of 46 scored above 70% (100%)

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

SLO 1 - Conduct aviation operations in a professional, safe, and efficient manner.

Student Learning Outcome 1 assesses the ability of students to conduct aviation operations in a professional, safe, and efficient manner. While no single assignment in the aerodynamics course covers professionalism, safety, and efficiency, a composite of test 1 and test 2 and Homework #3 reflect the components identified in SLO 1 (professionalism, safety and efficiency). Test #1 and Test #2 covered materials related to terminology used in the descriptions and understanding of stability and control and the major components of the aircraft. The use of appropriate terminology and fundamental understanding is a key component in engendering professionalism. Additionally, the understanding of stability and control provides the student with a conceptual understanding of how flight control deployment and stabilizer (stabilizer trim) operation allow for efficient flight operations. Homework #3 included aircraft performance related problems requiring students to use angle of attack graphs and density tables. An understanding performance capabilities and limitations helps students to fly within the capabilities (safety) of the vehicle. Overall, I am pleased with student efforts and results related to SLO #1. As a means of continuous improvement, rather than using composite assignments for assessment, I plan to create a singular assignment (either a test or homework assignment) that measures SLO 1.

Tlile

Aero dyn am ics Test #1 Fal l 2022

Ins t ruc t ions

le ,3se indicate/ provide t he best anSY1er _

Good luck'

- Multpi el AmMra 3points

Pit c h is ?

II Mov e ment alo ng and th ro ugh the lo ngit udinal ax is

Mov e ment alo ng and th ro ugh the la te rall ax is

Mov e ment around and ab o ut the d irect io nal axis

Mov e ment aro und and ab o ut the lo ng it udin al a xis

Multiple Choic,, 3 points

Ro ll i s?

Movement alo ng and through the lo ngitud ina l a xis

0 Movement a ro und and a bout the lo ngitu di na l ax is

Movement alo ng and through the direc tion al axis

Movement a ro und and a bout the lateral axis

- Multiple Choic,, 3points

Pit c h is provid ed by t he'

Ru oder

0 Elevator

Ai le ro n s

- Multiple Choic,, 3points

Ro ll is provided by th e'

Ruoder

0 Ai le ro ns

Elevator

- Multiple Choic,, 3points

Yaw is provided by t he

0 Ru oder

Ai lero n s

Elevator

.. Multiple Choic:e 3 points

Aile rons are generally located?

Wi ng root. le ading edge

Wing tip. lea ding edge

Wing root. traili ng,edge

0 Wilng tip. trailing edge

0

- TrueorF.alse 3 int:s

Th e s t.;ignat io n point ,3 nd t he w ing le .3ding ed ge w i l l be t he s,3m e fo r d symmet ric .31 .3i r io i l .3t zero ,3 ngle o f ,3tt ,3c k

0 True

False

Multiple Choice 3 points

I n norma l o pe ra t io n. t he ce nt e r of g ra v ity is ge nera lly fo u nd?

Aft of t he ce nte r of lift

Forwa rd olt he 1 5 %co rd l e n gt h

0 At aroun dl t he qua rt e r co rd po int

Forwa rd of t he win g

- TrueorF.al:se 3points

Th e ce nt er of gr av ity is fixed .3nd does not move

True

0 False

- TrueorF.al:se 3points

Th e ce nt er of lift/ pres s u re is fixed a nd does not mo ve.

True

0 False

Ill Multiple Choice 3 points

In norma l flight, the re la t ive posit io ns of the ce nte r of grav ity to th e ce nte r of lift im p,3r ts .3?

0 A nose -<iown p itc hing mo me nt

A nose· up pit c hing mo me nt

Ifl TrueorF.al:se 3points

Ca m be r is ge ner ,3lly des cribed as t hee c u rva t u re d iffer ence be tw ee n t he to p .3nd bott o m of t he wi ng

0 True

False

Test 1 (cont.)

13 True or False 3 points

The stagnation point near the leading edge changes with angle of attack.

- ● True
- ○ False

14 True or False 3 points

Asymmetrical airfoils require a positive angle of attack to produce lift.

- ○ True
- ● False

15 Multiple Choice 3 points

An aircraft with a wing-span of 20ft and an average cord of 5 ft has an aspect ratio of?

- ○ 100
- ● 4
- ○ 5
- ○ 10

16 Multiple Choice 3 points

Angle of attack is generally defined as the angular difference between?

- ● The extended average cord and the relative wind
- ○ The extended average cord and the longitudinal axis
- ○ The extended camber line cord and the relative wind
- ○ The extended average camber line and the longitudinal axis

17 Multiple Choice 3 points

Of the following, which is not part of the primary flight control group?

- ○ The ailerons
- ○ The elevator
- ● The flaps
- ○ The rudder

18 Multiple Choice 3 points

The ___________ is generally located closer to the skins of the aircraft

- ● boundary layer
- ○ free stream

19 Multiple Choice 3 points

Generally, airspeed is faster in the _____________ during cruise flight.

- ○ boundary layer
- ● free stream

20 True or False 3 points

The angle of attack and the ange[illegible] incidence can never be the same

- ○ True
- ● False

21 Multiple Choice 3 points

The point at which the wing is said to stall is called?

- ○ Angle of incidence
- ○ Angle of incident
- ○ Angle of attack
- ● Critical angle of attack

22 Multiple Choice 3 points

Longitudinal stability as discussed in class is generally provided by?

- ● The horizontal stabilizer
- ○ The vertical stabilizer
- ○ Wing dihedral
- ○ The elevator

23 Multiple Choice 3 points

Lateral stability as discussed in class is generally provided by?

- ○ The horizontal stabilizer
- ○ The vertical stabilizer
- ● Wing dihedral
- ○ The elevator

24 Multiple Choice 3 points

Directional stability as discussed in class is generally provided by?

- ○ The horizontal stabilizer
- ● The vertical stabilizer
- ○ Wing diheral
- ○ The elevator

Test 1 (cont.)

25 Multiple Choice 3 points

_______________ are fixed and do not change position

- ○ Slats
- ● Slots

26 Multiple Choice 3 points

_______________ are generally deployed when the flaps are lowered

- ○ Slots
- ● Slats
- ○ Spoilers
- ○ Ground spoilers

27 Multiple Choice 3 points

Slats are generally located

- ○ Wing root, leading edge
- ○ Wing root, trailing edge
- ● Wing tip, leading edge
- ○ Wing tip, trailing edge

28 True or False 3 points

Slots are designed to bleed air from the top of the wing to the bottom of the wing

- ○ True
- ● False

29 Multiple Choice 3 points

___________ flaps increase wing area

- ○ Plain
- ○ Split
- ○ Slotted
- ● Fowler

30 Multiple Choice 3 points

Deploying flaps generally causes a change in angle of attack

- ● True
- ○ False

30 Multiple Choice 3 points

Deploying flaps generally causes a change in angle of attack

- ● True
- ○ False

31 Multiple Choice 3 points

Typically, slotted fowler flaps are located?

- ○ Leading edge, wing root
- ○ Leading edge, wing tip
- ● Trailing edge, wing root
- ○ Trailing edge, wing tip

32 Multiple Choice 3 points

Generally, flaps are located __________ of the ailerons

- ● Inboard
- ○ Outboard
- ○ Forward

Test # 2

Title

Aerodynamics Test #2 Fall 2022

Instructions

Please select the best answer for the questions provided.

Good luck!

1 Multiple Choice 1 point

Longitudinal stability is generally provided by?

- ● The horizontal stabilizer
- ○ The vertical stabilizer
- ○ Wing dihedral

2 Multiple Choice 1 point

Lateral stability is generally provided by?

- ○ The horizontal stabilizer
- ○ The vertical stabilizer
- ● Wing dihedral

3 Multiple Choice 1 point

Directional stability is generally provided by?

- ○ The horizontal stabilizer
- ● The vertical stabilizer
- ○ Wing dihedral

4 Multiple Choice 1 point

Pitch is generally provided by?

- ● The elevator
- ○ The rudder
- ○ The ailerons
- ○ The flaps

5 Multiple Choice 1 point

Roll is generally provided by?

- ○ The elevator
- ○ The rudder
- ● The ailerons
- ○ The flaps

6 Multiple Choice 1 point

Yaw is generally provided by?

- ○ The elevator
- ● The rudder
- ○ The ailerons
- ○ The flaps

7 Multiple Choice 1 point

Movement of the elevator down will generally cause the nose of the aircraft to move?

- ○ Up
- ● Down

8 Multiple Choice 1 point

Deflection of the ruder to the right will generally cause the nose of the aircraft to turn to the?

- ● Right
- ○ Left

9 Multiple Choice 1 point

Movement of the left aileron to down will generally result on the aircraft rolling to the?

- ● Right
- ○ Left

10 Multiple Choice 1 point

Generally, the primary purpose of winglets is to compensate for?

- ● Induced drag
- ○ Parasite drag
- ○ Form drag
- ○ Friction drag

11 Multiple Choice 1 point

Adverse yaw is generally compensated with?

- ● Rudder input
- ○ Aileron input
- ○ Elevator input

12 Multiple Choice 1 point

The left-wing tip vortices generally spin on a _______ direction?

- [x] Clockwise
- [ ] Counterclockwise

13 Multiple Choice 1 point

At the wingtip, air generally flows from the _______ side of the wing to the _______ side of the wing.

- [ ] top, bottom
- [x] bottom, top

14 Multiple Choice 1 point

The Boeing 737MAX aircraft uses __________ winglets

- [x] Split Scimitar
- [ ] Blended
- [ ] Canted
- [ ] Raked

15 Multiple Choice 1 point

Swept wing aircraft are more generally found on _________ subsonic aircraft.

- [x] Faster
- [ ] Slower

16 Multiple Choice 1 point

At what point on the wing, in speed of the airflow (over the wing) the greatest?

- [ ] The stagnation point
- [ ] The leading edge
- [ ] The trailing edge
- [x] The point of maximum thickness

17 Multiple Choice 1 point

"Mach tuck" is a phenomenon generally causing the nose of the aircraft to?

- [ ] Move up
- [x] Move down
- [ ] Move to the right
- [ ] Move to the left

18 True or False 1 point

Swept wing aircraft generally introduce a spanwise component to flow over the wing.

- [x] True
- [ ] False

19 Multiple Choice 1 point

Newton's First Law of Motion is most closely associated with?

- [x] Inertia
- [ ] Acceleration
- [ ] Time
- [ ] Space

20 Multiple Choice 1 point

Aircraft acceleration is generally __________ to thrust.

- [x] Proportional
- [ ] Inversely proportional

21 Multiple Choice 1 point

Aircraft acceleration is generally ________ to its weight (aircraft weight).

- [x] Proportional
- [ ] Inversely proportional

22 True or False 1 point

Pressure and altitude are inversely related

- [x] True
- [ ] False

23 True or False 1 point

The relationship between altitude and ambient pressure is linear.

- [ ] True
- [x] False

24 True or False 1 point

Generally speaking, density increases with increasing altitude.

- [ ] True
- [x] False

24 True or False 1 point

Generally speaking, density increases with increasing altitude.

- True
- False

25 Multiple Choice 1 point

The so-called action/reaction relationship amongst an object and a force is b

- Newtons First Law of Motion
- Newtons Second Law of Motion
- Newtons Third Law of Motion

26 Multiple Choice 1 point

A slug is the unit of mass in the imperial system and is expressed as.

- lbs sec^2/ft
- lbs sec^4/ft^2
- ft lbs/sec^2
- sec^2/ft^2 lbs

27 Multiple Choice 1 point

Density is generally defined as?

- mass/volume
- mass/area
- force/area
- area/volume

28 Multiple Choice 1 point

What is the density of 1 ft3 of air weighing 0.0765 lbs?

- Approximately 2.378×10^{-3} lbs sec^2/ft^4
- Approximately 2.254 lbs sec^2/ft^4
- Approximately 2.378×10^{-3} lbs sec^4/ft^2
- Approximately 2.254 lbs sec^4/ft^2

29 Multiple Choice 1 point

100 lbs/in^2 (psi) is an expression of?

- Kinetic energy
- Potential energy

30 Multiple Choice 1 point

100 m/h (mph) (miles per hour) is an expression of?

- Kinetic energy
- Potential energy

31 Multiple Choice 1 point

The density of the air generally ________ with an increase in altitude.

- Increases
- Decreases

32 Multiple Choice 1 point

When an aircraft is disturbed laterally, the stabilizing forces of wing dihedral will result in a ________ angle of att

- Increased
- Decreased

Homework Assignment #3

ASCI 2220 Concepts in Aerodynamics Homework 3 Name___________________________________

Please complete the following problems. Show all your work. Circle your final answers.

Given the following:

Aircraft Weight	12,499 lbs
Airspeed	235 m/h
Chord Length	6 ft
Wingspan	65 ft
Density	2.147 X 10^{-3} slugs/ft³
Coefficient of Parasite Drag	0.095

Calculate the aspect ratio for this aircraft

Calculate the parasite drag

$ar = {}^{span}/_{chord}$

$D_P = {}^{1}/_{2}\, pv^2 S C_{DP}$

ar = aspect ratio
p = density
v = velocity
S = wing area
D_P = Parasite Drag
C_{DP} = coefficient of parasite drag

Given the following:

Parasite Drag	2, 048 lbs
Airspeed	185 m/h
Aspect Ratio	6.5
Wingspan	32.75 ft
Altitude	35,000 ft

What is the wing area for this aircraft?

What is the parasite drag coefficient ?

$ar = \frac{b^2}{s}$

$s = \frac{b^2}{ar}$

$C_{D_P} = \frac{2D_P}{pv^2 s}$

ar = aspect ratio
b = wingspan
p = density
v = velocity
S = wing area
C_{DP} = coefficient of parasite drag

Given the following:

Elliptical Wing

Aspect Ratio	11	
Aircraft Weight	2200	lbs
Altitude	10,000	ft
Airspeed	100	knots
Wing Area	165	ft²

Calculate the induced drag.

$D_i = k\frac{w^2}{{}^{1}/_{2}\, pv^2 b^2}$

D_i = induced drag
k = constant of proportionality $(1/\pi)$
w = aircraft weight
v = airspeed/velocity
b = wingspan

Given the following:

Aircraft Weight	33,499 lbs
Airspeed	205 m/h
Chord Length	6 ft
Wingspan	48 ft
Density	2.147 X 10^{-3} lbs sec ²/ft⁴
Angle of Attack	10 degrees
Assume Zero Flaps	
Assume Elliptical Wing	

Calculate the coefficient of induced drag.

Calculate the induced drag.

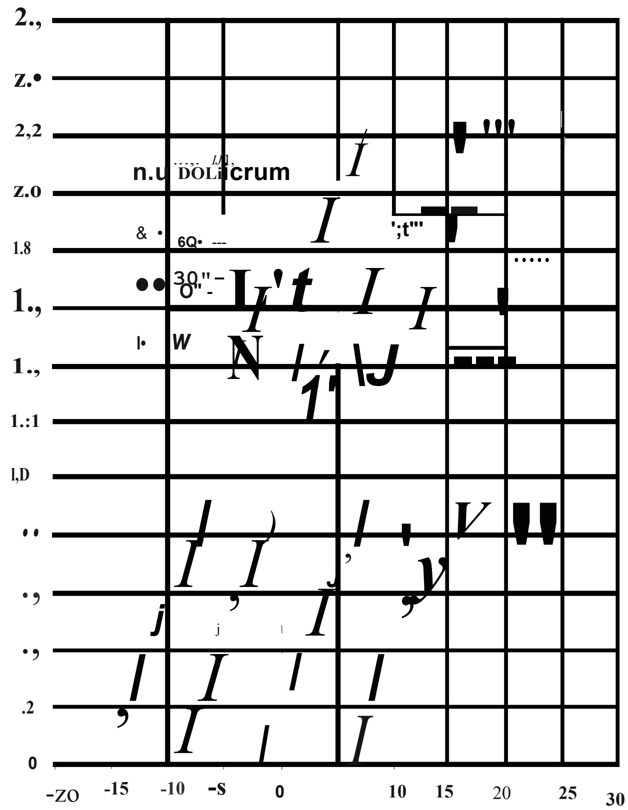
$C_{D_i} = k\frac{C_L^2}{ar}$

$D_i = {}^{1}/_{2}\, pv^2 S C_{D_i}$

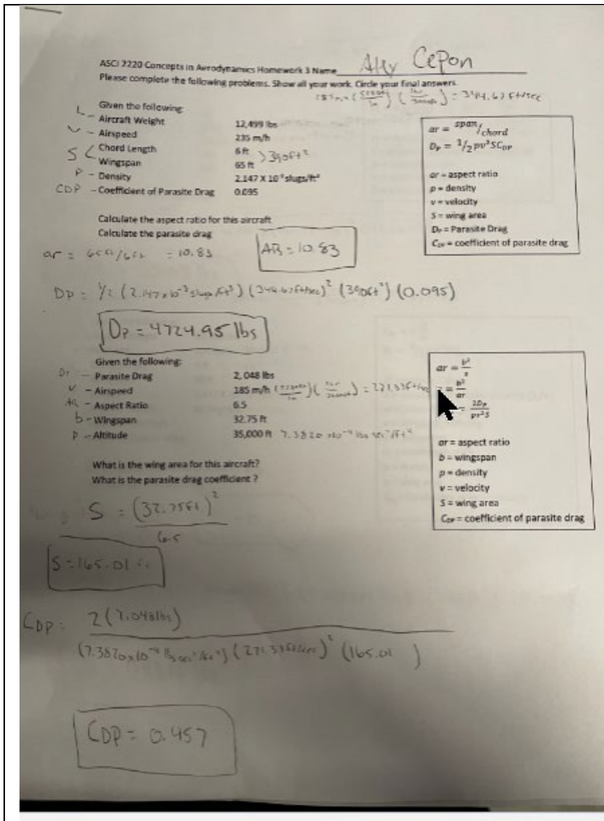
D_i = induced drag
k = constant of proportionality $(1/\pi)$
w = aircraft weight
v = airspeed/velocity
b = wingspan
C_L = coefficient of lift
p = density
S = wing area
C_{D_i} = Coefficient of induced drag

De.nslt111 on a St;md;ud D.1iy

Altitude	,A r DenSitv
SeaLevel	2.3769 X 10 'lbs sec'/ft'
[:i. 2500fl	1.20/9 X m-' lbs ,ec'/(t'
5000ft	2.0482)(10' lbs sec'/ft'
750011	1.8975 X to-' lbssec²/ft'
10,IIOOlt	1.75S6 X lo-' lbs sec'/ft'
12,SOOlt	1.6219X lo-' lbsse<:2/ft'
15.IIOO ft	1.4962)(m-' lbs sec²/ft'
17,500ft	1.3781 X 1 0-³ lbs soc'/ ft'
20 ,IIOO ft	1.2671)(10-' lbs "" :¹/ft'
22,500ft	1.16H lC lo-' lbs s.c'/fl'
27,500 ft	9.7544)c !er' lb"e<'/tt'
.JO,oom rt	8 .'lll68 x. m• lb«ec'/fl'
32,5001[	8.1169X.10• lbsse<'/rt'
35,000ft	7.3820X !er' lbssec'/ft'
37,500 IL	6.619&)(lo-' lbs sec'/11'
40,IIOOlt	5.8727)(10' lbs SK ² / ft'
42,500 ft	5.2103)(lo-' lbssec'/ft'
45,IIOO fl	4.6227 X !er' lbs se<'/ft'
47,SOO It	d.1015 X 10' lbssec2/ft'
50.IIOO ft	3.6391)(!er' lb.,e<'/ft'



Student Work Examples Homework #3



ASCI 2220 Concepts in Aerodynamics Homework 3 Name Alex Cepon

Please complete the following problems. Show all your work. Circle your final answers.

Given the following:

Aircraft Weight	12,499 lbs
Airspeed	235 m/h
Chord Length	6 ft
Wingspan	65 ft
Density	2.147 X 10⁻³ slugs/ft³
Coefficient of Parasite Drag	0.095

$ar = \frac{span}{chord}$

$D_P = \frac{1}{2}\rho v^2 S C_{DP}$

ar = aspect ratio, ρ = density, v = velocity, S = wing area, D_P = Parasite Drag, C_{DP} = coefficient of parasite drag

Calculate the aspect ratio for this aircraft

Calculate the parasite drag

ar = 65ft/6ft = 10.83 $\boxed{AR = 10.83}$

$D_P = \frac{1}{2}(2.147\times10^{-3})(344.67)^2(390)(0.095)$

$\boxed{D_P = 4724.95 \text{ lbs}}$

Given the following:

Parasite Drag	2,048 lbs
Airspeed	185 m/h
Aspect Ratio	6.5
Wingspan	32.75 ft
Altitude	35,000 ft

$ar = \frac{b^2}{S}$, $S = \frac{b^2}{ar}$, $C_{DP} = \frac{2D_P}{\rho v^2 S}$

ar = aspect ratio, b = wingspan, ρ = density, v = velocity, S = wing area, C_{DP} = coefficient of parasite drag

What is the wing area for this aircraft?

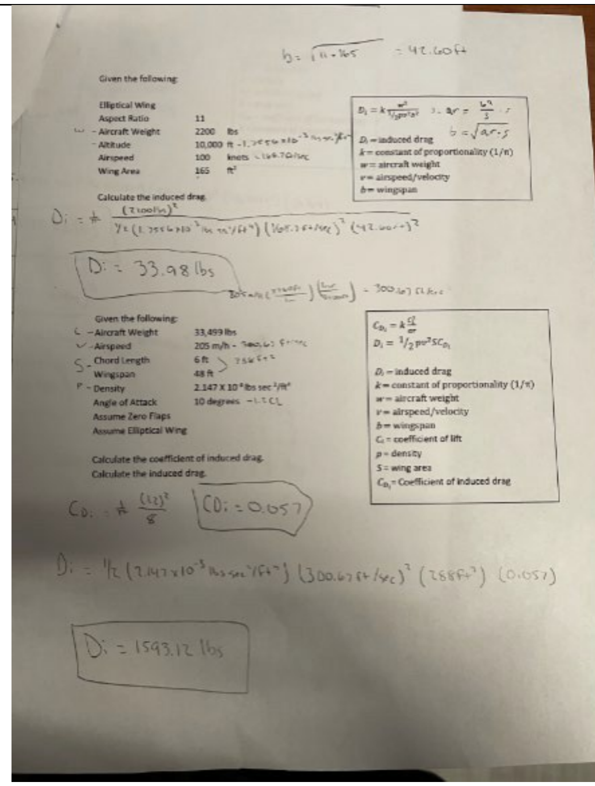
What is the parasite drag coefficient ?

$S = \frac{(32.7561)^2}{6.5}$

$\boxed{S = 165.01 \text{ ft}^2}$

$C_{DP} = \frac{2(2048)}{(7.3820\times10^{-4})(271.33)^2(165.01)}$

$\boxed{C_{DP} = 0.457}$



$b = \sqrt{11 \cdot 165} = 42.60 \text{ ft}$

Given the following:

Elliptical Wing	
Aspect Ratio	11
Aircraft Weight	2200 lbs
Altitude	10,000 ft
Airspeed	100 knots
Wing Area	165 ft²

$D_i = k\frac{w^2}{\frac{1}{2}\rho v^2 b^2}$, $ar = \frac{b^2}{S}$, $b = \sqrt{ar \cdot S}$

D_i = induced drag, k = constant of proportionality (1/π), w = aircraft weight, v = airspeed/velocity, b = wingspan

Calculate the induced drag.

$\boxed{D_i = 33.98 \text{ lbs}}$

Given the following:

Aircraft Weight	33,499 lbs
Airspeed	205 m/h
Chord Length	6 ft
Wingspan	48 ft
Density	2.147 X 10⁻³ lbs sec²/ft⁴
Angle of Attack	10 degrees
Assume Zero Flaps	
Assume Elliptical Wing	

$C_{D_i} = k\frac{C_L^2}{ar}$, $D_i = \frac{1}{2}\rho v^2 S C_{D_i}$

D_i = induced drag, k = constant of proportionality (1/π), w = aircraft weight, v = airspeed/velocity, b = wingspan, C_L = coefficient of lift, ρ = density, S = wing area, C_{D_i} = Coefficient of induced drag

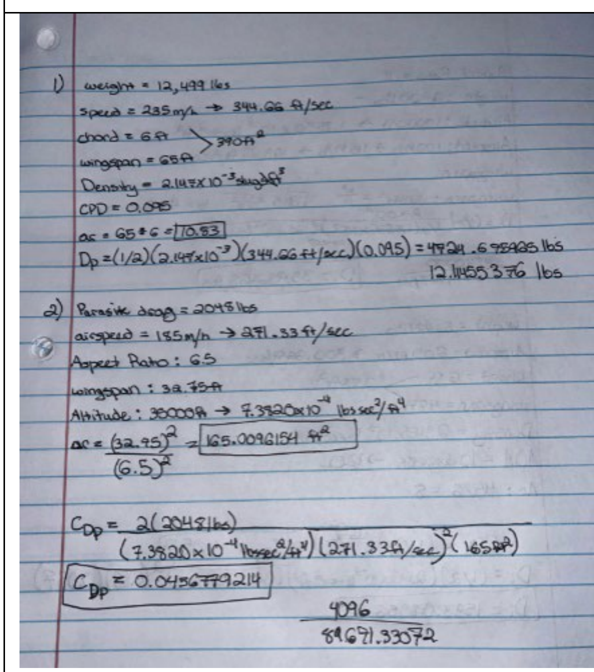
Calculate the coefficient of induced drag.

Calculate the induced drag.

$C_{D_i} = \frac{1}{\pi}\frac{(1.2)^2}{8}$ $\boxed{C_{D_i} = 0.057}$

$D_i = \frac{1}{2}(2.147\times10^{-3})(300.67)^2(288)(0.057)$

$\boxed{D_i = 1593.12 \text{ lbs}}$



1) weight = 12,499 lbs

speed = 235 m/h → 344.66 ft/sec

chord = 6 ft, wingspan = 65 ft → 390 ft²

Density = 2.147×10⁻³ slugs/ft³

CPD = 0.095

ar = 65 ÷ 6 = $\boxed{10.83}$

$D_p = (1/2)(2.147\times10^{-3})(344.66\text{ ft/sec})(0.095) = 4724.695485$ lbs

12.1455376 lbs

2) Parasite drag = 2048 lbs

airspeed = 185 m/h → 271.33 ft/sec

Aspect Ratio: 6.5

wingspan: 32.75 ft

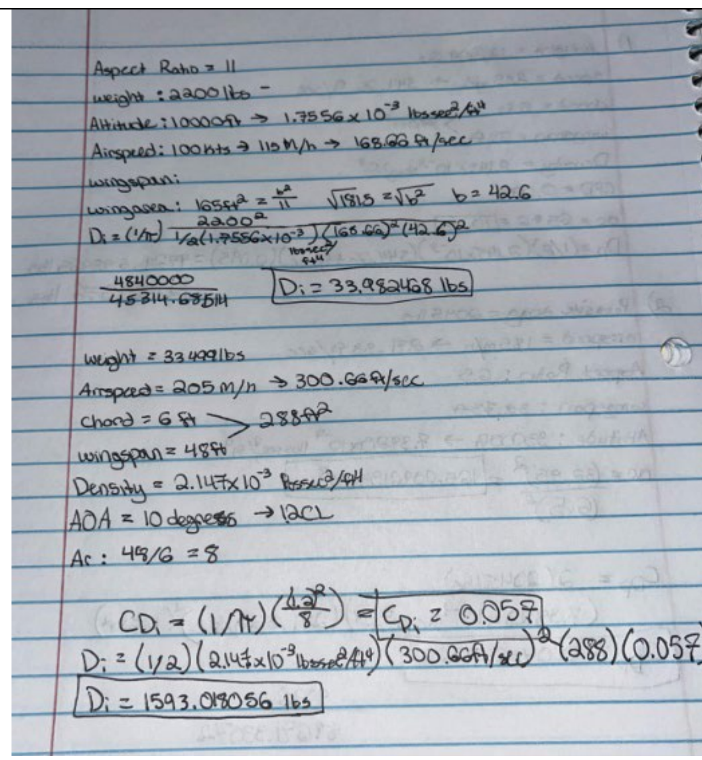
Altitude: 35000 ft → 7.3820×10⁻⁴ lbs sec²/ft⁴

$ar = \frac{(32.75)^2}{(6.5)} = \boxed{165.0096154 \text{ ft}^2}$

$C_{Dp} = \frac{2(2048 \text{ lbs})}{(7.3820\times10^{-4})(271.33 \text{ ft/sec})^2(165 \text{ ft}^2)}$

$\boxed{C_{Dp} = 0.04567792 14}$

$\frac{4096}{89671.33072}$



Aspect Ratio = 11

weight: 2200 lbs

Altitude: 10000 ft → 1.7556×10⁻³ lbs sec²/ft⁴

Airspeed: 100 kts → 115 M/h → 168.66 ft/sec

wingspan:

wingarea: 165 ft² = $\frac{b^2}{11}$, $\sqrt{1815} = \sqrt{b^2}$, b = 42.6

$D_i = (1/\pi)\frac{2200^2}{1/2(1.7556\times10^{-3})(168.66)^2(42.6)^2}$

$\frac{4840000}{45314.68514}$ $\boxed{D_i = 33.982468 \text{ lbs}}$

weight = 33499 lbs

Airspeed = 205 M/h → 300.66 ft/sec

Chord = 6 ft, wingspan = 48 ft → 288 ft²

Density = 2.147×10⁻³ lbs sec²/ft⁴

AOA = 10 degrees → 1.2 CL

Ar: 48/6 = 8

$C_{D_i} = (1/\pi)\left(\frac{1.2^2}{8}\right) = \boxed{C_{D_i} = 0.057}$

$D_i = (1/2)(2.147\times10^{-3} \text{ lbs sec}^2/\text{ft}^4)(300.66\text{ ft/sec})^2(288)(0.057)$

$\boxed{D_i = 1593.018056 \text{ lbs}}$

Performance Indicator Rubric

Course: ASCI 2750 Accident Investigation   Course Instructor: Terrence Kelly

Semester Taught: Spring 2023   Number of Students in Course: 36

AVIATION MANAGEMENT CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	Homework Assignment #2 – Qantas Flight 32 Average 89.3% 97.2% of students scored above 70%	Benchmark was achieved
	Homework Assignment #3 – British Airways Flight 268 Average 85.51% 94% of students scored above 70%	Benchmark was achieved

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

Homework Assignment #2 included a discussion Qantas Airways Flight 32. Flight 32 involved a significant engine failure (uncontained) that led to multiple system failures and airworthiness issues. The crew worked together to methodically address all adverse situations eventually resulting in a safe landing. Qantas Airways Flight 32 is a testament to the flight deck crew operating in a professional, efficient, and safe manner. Crew coordination and resource management were discussed in class as a model for flight crew activities. British Airways Flight 268 involved a wide-body aircraft flying from Los Angeles, California to the United Kingdom. The quad-engine aircraft experienced an engine failure after takeoff. The carrier and the crew made the decision to continue the transatlantic flight with a failed engine. Due to the requirement flying at a lower altitude, the fuel burn was higher than anticipated and aircraft had to make an emergency landing prior to reaching its destination. Homework assignment #2 and #3 provide the students a contrast between good decision-making and poor decision-making.

I was satisfied with student performance on these two assignments and plan to use them again in the future. That said, while in class discussion certainly supports the importance of professional, safe, efficient flight operations, the homework assignments themselves do not adequately support the SLO. Consequently, as a means of continuous improvement I will alter the language in the assignment to better reflect the SLO.

Assignment Details

ASCI 2750 Accident Investigation – Homework # 2 Name:

Qantas Flight 32

Please review the video linked below and respond to the questions provided.

Here is a link to the video:

This Airliner Was Doomed To Crash (But It Didn't) | Qantas 32 - YouTube

Here are the questions:

1. What is ECAM?

2. What are the four main issues the Qantas 32 crew faced after the engine failure?

3. Why was the evacuation of Qantas 32 delayed?

4. Investigation following the landing of Qantas 32 revealed the engine failure was caused by?

ASCI 2750 Accident Investigation – Homework # 3 Name:

British Airways Flight 268

Please review the video linked below and respond to the questions provided. The video has no conversation but I would like you to read the postings as it (the video) progresses. I have also provided a link to a report for your review.

This assignment should be uploaded to Canvas no later than Friday, February 24th by the end of the day

Here is a link to the video:

Low Fuel Over The Atlantic | British Airways Flight 268 - YouTube

Here is a link to the report:

British Airways Flight 268

Here are the questions:

1. Why did thew crew choose to continue the flight?

2. Do you think a decision like this could occur today? Why or why not?

3. Which do you consider a bigger problem, the engine failure or the fuel situation? Why?

4. Flight 268 did not violate regulations. Was the decision to continue the flight the right thing to do?

Examples of Student Work

ASCI 2750 Accident Investigation – Homework # 2 Name: Rhee Sung Min
Qantas Flight 32
Please review the video linked below and respond to the questions provided.
Here is a link to the video:
This Airliner Was Doomed To Crash (But It Didn't) | Qantas 32 - YouTube
Here are the questions:

1. What is ECAM?

ECAM stands for Electronic Centralized Aircraft Monitoring. It monitors the aircraft with the help of thousands of sensors to provide necessary information and warnings during the flight whether it is normal or abnormal to the pilot. It will also provide the appropriate checklists for the pilot in each flight procedure.

2. What are the four main issues the Qantas 32 crew faced after the engine failure?

The first issue they were facing was the fuel system. There was a rapid leak of fuel on the left wing, from 105 tons decreased to 93.9 tons in just 10 minutes. Even if they do have enough fuel to fly back to Singapore Changi Airport, the fuel was not able to reach the engines because several transfer pipes between fuel tanks were damaged after the explosion. Besides, both fuel quantity management computers, fuel pumps, and the jettison system failed as well.

a. Since there was a rapid leak of fuel on the left wing, the right wing is becoming relatively heavier, which further creates a roll force on the aircraft. When the ECAM notice the pilots to do an emergency fuel transfer from the outer tanks into the feed tanks, they were not able to transfer the fuel on the left wing, but only on the right wing. This further worsens the lateral imbalance, which may be a threat when the plane approach to final.

b. The ECAM also sent out an error in calculating the aircraft's center of gravity. This will be problematic as the aircraft's center of gravity must be within a specific limit to land. The second officer later calculated that the CG is within the acceptable limits for landing, which tells us that there are some faulty sensors in the ECAM.

c. Lastly, the hydraulic system was severely affected by the explosion. The aircraft was performing just 25% of the total hydraulic power. Pilots were concerned about it as it controls the most important aircraft components like flaps, rudders, and elevators. The ailerons specifically degraded down to 35%, which is more challenging for pilots to roll the aircraft. Furthermore, pilots may need to extend landing gear manually before landing.

3. Why was the evacuation of Qantas 32 delayed?

First, the fuel was still leaking on the white-hot brakes after the harsh landing. When the fire services arrived near the plane, they saw that engine 1 of the aircraft had not shut down. Even though the crew did shut down all the engines, it was still running. To make sure the aircraft won't start to fire, the fire crews started spraying water and foam all over the plane. To stop the engine, they spray foam directly into the core of the engine. After it is completely stopped and safe, they then start the evacuation procedures.

3. Investigation following the landing of Qantas 32 revealed the engine failure was caused by?

They found that in the engine, there is a fatigue crack in the oil stub feed pipe that led to the result of oil leakage. The oil was so hot that auto ignite and caused an internal oil fire in the engine. The fire then led to the intermediate pressure turbine disc moving rearward and created a surge in the engine. The intermediate turbine disc then fractured into 3 sections and exit at a very high speed, causing engine failure and damage to the aircraft systems. The root cause was later found that the oil stub feed pipe was misaligned, leading to a fatigue crack and engine failure.

ASCI 2750 Accident Investigation – Homework # 2 Name: Redacted
Qantas Flight 32
Please review the video linked below and respond to the questions provided.
Here is a link to the video:
This Airliner Was Doomed To Crash (But It Didn't) | Qantas 32 - YouTube
Here are the questions:

1. What is ECAM?

ECAM stands for electronic centralized aircraft monitoring and is a device in the A380 that continuously monitors sensors over the entire aircraft and provides the crew with the necessary information and warning signals from normal and abnormal flight. Because the aircraft was equipped with the ECAM, instead of having to do an after-takeoff checklist

on paper the first officer just needed to check the ECAM to ensure there were no problems.
2.What are the four main issues the Qantas 32 crew faced after the engine failure?

1- Fuel system. There was a rapid leak in the left wing which resulted in a loss of fuel. Additionally, much of the fuel that was left was unusable because some of the transfer pipes between fuel tanks were taken out in the explosion. The captain was also struggling to figure out the fuel display.
2- Lateral imbalance. Because the left wing was leaking fuel rapidly, the right-wing was becoming heavier causing a roll force and lateral imbalance. The plane started leaning towards the right.
3- Center of gravity- The ECAM produced an error when it tried to calculate the aircraft's longitudinal center of gravity. Therefore, the second officer had to din the paper graphs to calculate the center of gravity. He determined their center of gravity was in range for landing.
4- Hydraulics. There were 2 independent hydraulic systems on this aircraft. One was completely taken out by the engine explosion, and the other one needed to have 2 pumps turned off to engine 4. When taken out, this would mean that the aircraft would only be running on 25% of hydraulic power. The flight crew determined to turn off the two pumps, and the autopilot helped compensate for the less control by moving the working ailerons.
2. Why was the evacuation of Qantas 32 delayed?
Once the plane landed, it needed to be hosed down to prevent a fire from occurring due to the fuel leak and hot brake pads. The emergency services were unable to hose down the aircraft because the 1st engine was still running. Despite the crew turning off the engine it was still turning. Eventually, the emergency services hosed and foamed down the engines until they stopped. The passengers were unable to evacuate the plane until they knew there was no fire.
3. Investigation following the landing of Qantas 32 revealed the engine failure was caused by?
In the investigation it was found that the reason for the engine failure was due to a fatigue crack in the oil stub feed pipe in the engine. The crack led to a rapid leak of hot oil which auto-ignited, pushing the intermediate pressure turbine disc to the back which created a surge in the engine. This surge resulted in extra force being added to the disc and cracked the disc into 3 sections. These 3 sections exited at high speed, damaging other parts of the aircraft.
ASCI 2750 Accident Investigation – Homework # 2 Name: Redacted
Qantas Flight 32
Please review the video linked below and respond to the questions provided.
Here is a link to the video:
This Airliner Was Doomed To Crash (But It Didn't) | Qantas 32 - YouTube
Here are the questions:

1. What is ECAM?

ECAM is the electronic centralized aircraft monitor. It is a system that displays mission critical information to the pilots about the aircrafts systems. It has the added benefit of also giving the pilots recommended mitigation procedures and aircraft limitations after the failure. This is only found on Airbus aircraft.

2. What are the four main issues the Qantas 32 crew faced after the engine failure?

Fuel system
Lateral Imbalance
Center of Gravity
Hydraulic system(s)

3. Why was the evacuation of Qantas 32 delayed?

The evacuation was delayed because the pilots were unable to shut down the #1 engine. Fuel was leaking from the wing onto the ground near the hot brakes. The crew determined the safest place for everyone was on the plane until the brakes could be cooled and the engine could be shut down.

4. Investigation following the landing of Qantas 32 revealed the engine failure was caused by?

The cause of the engine failure was the Rolls Royce Trent 900 engines. There was cracking on an oil stub feed pipe in the engine that caused an oil leak, followed by an oil fire which caused the core IPT to explode. The cracking was caused by a slight misalignment of the stub feed pipe.

ASCI 2750 Accident Investigation – Homework # 2 Name: Redacted
British Airways Flight 268

Please review the video linked below and respond to the questions provided. The video has no conversation but I would like you to read the postings as it (the video) progresses. I have also provided a

link to a report for your review.
This assignment should be uploaded to Canvas no later than Friday, February 24th by the end of the day
Here is a link to the video:
Low Fuel Over The Atlantic | British Airways Flight 268 - YouTube
Here is a link to the report:
British Airways Flight 268
Here are the questions:
1. Why did thew crew choose to continue the flight?
There were multiple factors that led the crew to continue the flight. One of the main ones was that their headquarters in Heathrow recommended that it would be preferable to continue with the flight. They also considered that they would have 2.5 more tons of fuel required for reserve upon landing at Heathrow with an engine out. They also considered that if they lost another engine, their aircraft performance would still make it safe to continue. Their routing along the continental US allowed them to have any diversion airports in case something went wrong. With their present situation, it would not have justified to burn the fuel for 40 minutes just to land safely. The windmilling condition was normal for the number two engine during the time of the shutdown. The 747 QRH also didn't say that it was necessary to find the nearest suitable airfield for an engine surge. Finally, company policy said that they flight could continue to its destination if the aircraft was safe, in which the captain believed it was.
2. Do you think a decision like this could occur today? Why or why not?
I believe a decision could be made like this today, but I don't believe that it would occur for a distance as drastic as BAW268. I have watched videos from CitationMax on YouTube where he briefs what would happen if they experienced an engine failure after takeoff on short repositioning flights and he would continue the flight to his nearby destination. I also have heard of situations in the last few years where planes have been holding for an hour or so to avoid any other risks they may face during their long haul flight. I believe they may do this as a response to how this flight was operated.
3. Which do you consider a bigger problem, the engine failure or the fuel situation? Why?
I thought that it was impressive that they were able to fly "across the pond" with their engine situation, but I think the more concerning part of the incident was how the fuel was handled during their flight. It is apparent that the 747 can safely fly for an extended period on three engines; however, the fuel management is concerning because if the aircraft did crash, the root cause would be fuel starvation rather than the plane unable to fly on three engines. The fuel should have been the ha See you on the boys next to the house of SKIERS ndled better in
this situation. I think the safer option to avoid more potential risks in a flight like this was to land back at the originating airport.

ASCI 2750 Accident Investigation – Homework # 2 Name: Name Redacted

British Airways Flight 268

Please review the video linked below and respond to the questions provided. The video has no conversation but I would like you to read the postings as it (the video) progresses. I have also provided a link to a report for your review.
This assignment should be uploaded to Canvas no later than Friday, February 24th by the end of the day
Here is a link to the video:
Low Fuel Over The Atlantic | British Airways Flight 268 - YouTube
Here is a link to the report:
British Airways Flight 268
Here are the questions:

1. **Why did the crew choose to continue the flight?**

The plane would land with 7 tonnes of fuel, it was deemed safe to fly even with additional engine failure, routing showed multiple suitable diversion airfields, the situation didn't present justification for overweight landing and it would take about 40 minutes to land, windmilling parameters were deemed normal, company policy said flight should be continued if plane was in safe condition, and the manufacturer's procedure regarding engine limit/surge/stall didn't require the crew to land at a nearest airport. That is why they chose to continue the flight, the overall safety of the plane was deemed acceptable to continue the flight as long as the situation was monitored throughout the flight.

2. **Do you think a decision like this could occur today? Why or why not?**

I don't believe that a decision like this could occur today, I think there is too much social media that either way both decisions would be wrong. If a flight crew decides to continue with the flight and there are people who stream or start sending out false information because they do not know what is going on fully then the pilots would be in a drastic position of endangering the passengers lives, though flight 268 was deemed air worthy. If a flight crew were to stop the fight and land to ensure safety, they would undergo slander for stopping a flight that could have been done and there would still have been backlash. So in my opinion, I would hope this does not happen or could occur today, or not for long distance flights because of the fuel situation. Understandable the Boeing 747 can fly on one engine though there were other parameters that were also part of this whole equation that simply did not push safety first but customer satisfaction.

Interestingly enough, there was a recent event where a Boeing 777 plummeted 1,400 18 seconds right after take off from Kahului Airport and then climbing back to 33,000 ft. While there was no engine surge or severe loss of fuel, this accident proved to me that a similar accident like flight 268 could happen again. There is so much focus on cheap flights that are "reliable" and get you to your destination without any layovers or cancellations. That is where I believe lots of customer focus is on so something like a flight that has shown that it was able to make the leg from Los Angeles to London makes me believe that a decision like this would occur today.

3. **Which do you consider a bigger problem, the engine failure or the fuel situation? Why?**

The fuel situation, the engine failure, was supposedly common, since there were 389 surges between 1989 and May 2005. A plane with 4 engines, certifiable to fly with only 3, and in dire instances with only 2. Meaning with only engine 2 out due to surge, the fuel situation becomes a more critical factor than engine failure. Due to drag caused from flying at a low altitude over the Atlantic that was not a calculated factor in the fuel situation. So I believe that the fuel would have caused a bigger safety concern because if the fuel depleted faster than they imagine there would have been a loss of hundreds of lives in the ocean. Flight 268 did not even reach their original location, landing at Manchester airport due to the lack of usable fuel. So I think the plane was safer in regards to engine failure since this is something that is accounted for during engineering, fuel situations are up to decisions of management, pilots and air traffic controllers while in use.

4. **Flight 268 did not violate regulations. Was the decision to continue the flight the right thing to do?**

Technically, on paper it was the right decision, it seems illogical but if all parameters were within company policy, and assessed that there was just enough fuel to make it across to Europe, then yes. Though I think ethically there were questionable decisions made, in regards to not only human safety but also safety of the machine. The lives of the people were put into a slight safety risk, not to mention the aircraft was damaged and there was instruction from ATC to return to the airport. There was also a discovery that one of the eight flight data recording tools was erased. So I think there are questionable decisions since the FAA deemed this flight was not airworthy, though the CAA disagreed. The flight followed regulations and policies, nobody died or injured and the plane was repaired and continued to be used for sometime. There are discrepancies between right and wrong for various organizations, if the FAA and CAA can not agree on certain terms, as well as British Airways organizational considerations there is so more worry on future accidents and decisions like these where safety controversies are not allowed. All in all, taking into consideration everything, due to the training of the pilots, assessments done, as well as lack of violating regulations, the decision to continue the flight was right, though I think there were other variables that should have made the decision the wrong thing to do.

ASCI 2750 Accident Investigation – Homework # 3 Name: Alex Sandoval
British Airways Flight 268
Please review the video linked below and respond to the questions provided. The video has no conversation but I would like you to read the postings as it (the video) progresses. I have also provided a link to a report for your review.
This assignment should be uploaded to Canvas no later than Friday, February 24th by the end of the day
Here is a link to the video:
Low Fuel Over The Atlantic | British Airways Flight 268 - YouTube
Here is a link to the report:
British Airways Flight 268
Here are the questions:
1. Why did the crew choose to continue the flight?
After speaking with the airline's base at Heathrow by radio, the captain of BA flight 268 had been advised that it would be preferable to continue the flight. The flight crew considered many factors that would ultimately decide for them to continue the flight. The first reason the crew continued the flight was because the fuel prediction indicated a landing at Heathrow with 7 tons of fuel which is above the minimum required (4.5 Tons). The captain had suspected that because the plane had sufficient fuel and performance to continue the flight safely with no indication of other abnormalities within the aircraft, an overweight landing in a nearby airport was not required. In addition, The QRH procedure for an engine surge does not require the pilots to consider landing at the nearest suitable airfield. It was also company policy that stated that the flight should continue to the destination if the aircraft is in safe condition, which the pilots found the state of the aircraft to be safe after engine no. 2 was shut down.
2. Do you think a decision like this could occur today? Why or why not?
After reviewing this accident, I think that a decision like this would not occur today simply because the risk of putting people's lives in danger is too high. Had this accident happened today, I believe that the pilots would be required to land immediately since there are many factors that can contribute to a catastrophe such as an additional engine failure or potentially running out of fuel. Overall, a decision like this would not occur today since the risk of an accident ,which puts people's life in danger, is too high.
3. Which do you consider a bigger problem, the engine failure or the fuel situation? Why?
Although both an engine failure and lack of fuel can be potentially harmful, in this accident, I consider the fuel situation to be a bigger problem. The reason why I believe this to be a bigger issue is because the 747 is able to operate with one engine completely shut down and is still considered airworthy, however considering that the flight is flying over the North Atlantic with very limited suitable airports to be able to land the 747 in the event of the plane running out of fuel, I believe that the airplane running out of fuel over the vast ocean can is a serious problem regarding safety especially if a worst case scenario happened where the crew would be forced to ditch the plane.
4. Flight 268 did not violate regulations. Was the decision to continue the flight the right thing to do?
From an ethical standpoint, I think that the decision to continue the flight was not the right thing to do since human lives are put in jeopardy considering that the crew of the aircraft made the decision to continue the flight over the Atlantic. In this situation, I think the risk was not worth the reward of getting the plane to land in its destination, hence why the crew decided to divert to

Manchester. The best option would have been to land the aircraft at least before making the crossover above the North Atlantic Ocean.

Performance Indicator Rubric

Course: ASCI 3010 Jet Transport Systems I

Course Instructor: Stephen G. Magoc

Semester Taught: Fall 2022

Number of Students in Course: 28

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = “C”)
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	100% of the students achieved a minimum of 70%.	Yes; 100% of the students scored a minimum of 70%.

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

No recommendations at this time.

**Attach description of assignment used for assessment and samples of student work.*

ASCI 3010 Jet Transport Systems I – Fall 2022 Assessment of Course Tests.

TEST 1

In a constant speed parallel operation AC generator system:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
All AC generators are driven by the same engine at the same speed., (Incorrect answer)All AC generators are driven by the same engine at the same speed.	2 respondents	7 %
Each AC generator is driven at the same speed as the other AC generators by its own CSD unit., (Correct answer)Each AC generator is driven at the same speed as the other AC generators by its own CSD unit.	23 respondents	**79 %**
All AC generators are driven at the same speed by one CSD unit., (Incorrect answer)All AC generators are driven at the same speed by one CSD unit.	4 respondents	14 %

Which AC-powered electrical services connected to which CRJ700 electrical bus might be shed in the event of an engine driven generator failure?

Answer Text	Number of Respondents	Percent of respondents selecting this answer
Both main buses., (Incorrect answer)Both main buses.	5 respondents	17 %
The essential bus., (Incorrect answer)The essential bus.	1 respondent	3 %
The service bus., (Correct answer)The service bus.	23 respondents	**79 %**

What is used to move the blades to the feather position in a propeller installed on a turboprop engine?

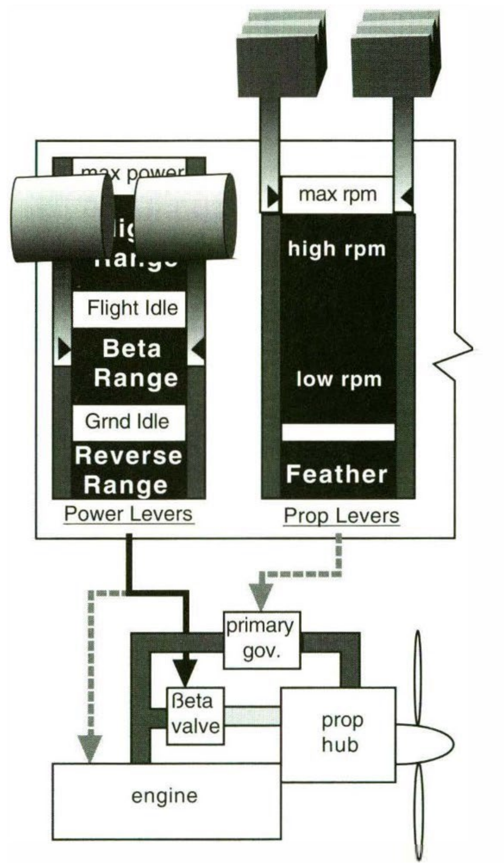
Answer Text	Number of Respondents	Percent of respondents selecting this answer
Spring force and a compressed nitrogen pressure., (Correct answer)Spring force and a compressed nitrogen pressure.	18 respondents	**62** %
Beta valve oil pressure., (Incorrect answer)Beta valve oil pressure.	1 respondent	3 %
Propeller governor oil pressure., (Incorrect answer)Propeller governor oil pressure.	10 respondents	34 %

Which of the following power lever and propeller lever positions will allow the aircraft to be taxied with the propeller creating a minimum amount of thrust?

Answer Text	Number of Respondents	Percent of respondents selecting this answer
Power levers in Beta range Ground Idle, propeller controls full forward (max RPM)., (Correct answer)Power levers in Beta range Ground Idle, propeller controls full forward (max RPM).	17 respondents	**59** %
Power levers in Beta range, propeller controls in a mid-range position., (Incorrect answer)Power levers in Beta range, propeller controls in a mid-range position.	4 respondents	14 %
Power levers in Beta range, propeller controls full back (feather)., (Incorrect answer)Power levers in Beta range, propeller controls full back (feather).	8 respondents	28 %

Refer to the figure. Based on the power and propeller lever positions shown in the figure, the reversing propeller is in which range of operation?

Answer Text	Number of Respondents	Percent of respondents selecting this answer	Answer Distribution
The Beta full reverse pitch range., (Incorrect answer)The Beta full reverse pitch range.	4 respondents	14 %	
The Beta Ground Idle range., (Correct answer)The Beta Ground Idle range.	23 respondents	**79 %**	
The Alpha range., (Incorrect answer)The Alpha range.	2 respondents	7 %	



When the power lever of a turboprop aircraft is in the Beta Reverse range, the power lever controls:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
The engine's torque (power) output only., (Incorrect answer)The engine's torque (power) output only.	5 respondents	17 %
The engine's torque (power) output and the propeller's pitch., (Correct answer)The engine's torque (power) output and the propeller's pitch.	18 respondents	**62 %**
The propeller's pitch only., (Incorrect answer)The propeller's pitch only.	6 respondents	21 %

Towards which direction will the blades of a turboprop propeller move if the propeller rpm becomes lower than the value pre-determined by the flight crew (underspeed condition)?

Answer Text	Number of Respondents	Percent of respondents selecting this answer
The propeller blade pitch will move to a lower blade angle to increase the propeller rpm back to the pre-determined value., (Correct answer)The propeller blade pitch will move to a lower blade angle to increase the propeller rpm back to the pre-determined value.	23 respondents	**79 %**
The propeller blade pitch does not change in this situation., (Incorrect answer)The propeller blade pitch does not change in this situation.	1 respondent	3 %
The propeller blade pitch will move to a higher blade angle to increase the propeller rpm back to the pre-determined value., (Incorrect answer)The propeller blade pitch will move to a higher blade angle to increase the propeller rpm back to the pre-determined value.	5 respondents	17 %

TEST 2

The effect of air flowing through a convergent duct is:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
Velocity increases and pressure decreases., (Correct answer)Velocity increases and pressure decreases.	23 respondents	**79 %**
Velocity and pressure decrease., (Incorrect answer)Velocity and pressure decrease.	3 respondents	10 %
Velocity decreases and pressure increases., (Incorrect answer)Velocity decreases and pressure increases.	3 respondents	10 %

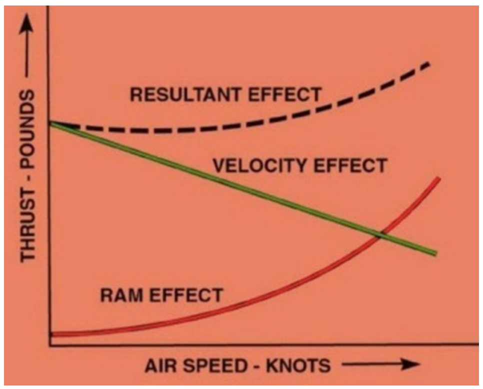
Which section of a turbine engine determines the amount of heat, and therefore the amount of thrust that can be developed by the engine?

Answer Text	Number of Respondents	Percent of respondents selecting this answer
The inlet section., (Incorrect answer)The inlet section.	5 respondents	17 %
The combustion section., (Correct answer)The combustion section.	23 respondents	**79 %**
The exhaust section., (Incorrect answer)The exhaust section.	1 respondent	3 %

Which component of a turboprop reverse-flow engine is used to drive the propeller reduction gear assembly and the propeller shaft?

Answer Text	Number of Respondents	Percent of respondents selecting this answer	Answer Distribution
The compressor turbine., (Incorrect answer)The compressor turbine.	3 respondents	10 %	
The free or power turbine., (Correct answer)The free or power turbine.	18 respondents	**62 %**	
Neither of the above., (Incorrect answer)Neither of the above.	8 respondents	28 %	

Refer to the figure. The resultant effect of the ram effect and the velocity effect on a turbine engine in flight results in:



Answer Text	Number of Respondents	Percent of respondents selecting this answer
An overall decrease in thrust as airspeed increases., (Incorrect answer)An overall decrease in thrust as airspeed increases.	5 respondents	17 %
A relatively constant thrust no matter what the airspeed is., (Incorrect answer)A relatively constant thrust no matter what the airspeed is.	2 respondents	7 %

Answer Text	Number of Respondents	Percent of respondents selecting this answer
An overall increase in thrust as airspeed increases., (Correct answer)An overall increase in thrust as airspeed increases.	22 respondents	**76 %**

The General Electric CF43-3B1 engine used on the CRJ 700 aircraft incorporates a variable geometry (VG) system regulates airflow across the compressor by changing the position of the compressor inlet guide vanes and the first five stages of the stator vanes.

Answer Text	Number of Respondents	Percent of respondents selecting this answer
True, (Correct answer)True	22 respondents	**76 %**
False, (Incorrect answer)False	7 respondents	24 %

TEST 3

The propelling exhaust nozzle is designed to increase thrust by:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
Increasing the velocity and decreasing the pressure of the gas stream., (Correct answer)Increasing the velocity and decreasing the pressure of the gas stream.	19 respondents	68%
Decreasing the velocity and the pressure of the gas stream., (Incorrect answer)Decreasing the velocity and the pressure of the gas stream.	0 respondents	0%
Increasing the velocity and the pressure of the gas stream., (Incorrect answer)Increasing the velocity and the pressure of the gas stream.	9 respondents	32%

The convergent shape of the exhaust nozzle is designed to:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
Decrease the velocity and pressure of the gas stream., (Incorrect answer)Decrease the velocity and pressure of the gas stream.	4 respondents	14%
Increase the velocity and the pressure of the gas stream., (Incorrect answer)Increase the velocity and the pressure of the gas stream.	5 respondents	18%
Increase the velocity and decrease the pressure of the gas stream., (Correct answer)Increase the velocity and decrease the pressure of the gas stream.	19 respondents	68%

An Engine Pressure Ratio (EPR) gauge measures:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
The turbine inlet pressure to the turbine outlet pressure., (Incorrect answer)The turbine inlet pressure to the turbine outlet pressure.	11 respondents	
The engine inlet pressure to the engine outlet pressure., (Correct answer)The engine inlet pressure to the engine outlet pressure.	8 respondents	
The compressor inlet to compressor outlet pressure., (Incorrect answer)The compressor inlet to compressor outlet pressure.	9 respondents	

The specific fuel consumption (SFC) of an engine is an indication of:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
The number of gallons of fuel burned in an hour to produce one horsepower., (Correct answer)The number of gallons of fuel burned in an hour to produce one horsepower.	12 respondents	43%
The number of pounds of fuel burned in an hour to produce 100% thrust power., (Incorrect answer)The number of pounds of fuel burned in an hour to produce 100% thrust power.	10 respondents	36%
The number of pounds of fuel burned in an hour to produce 50% N1 rpm. , (Incorrect answer)The number of pounds of fuel burned in an hour to produce 50% N1 rpm.	6 respondents	21%

FINAL EXAM

The warnings provided to the flight crew of a CRJ700 when notified of the presence of smoke in the lavatory is by:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
A red "smoke" switchlight illuminates and an aural "SMOKE" message from the EICAS system is sounded on the flight deck and an alarm sounds in the lavatory., (Correct answer)A red "smoke" switchlight illuminates and an aural "SMOKE" message from the EICAS system is sounded on the flight deck and an alarm sounds in the lavatory.	21 respondents	**95 %**
A yellow "smoke switchlight illuminates and an aural "SMOKE" message from the EICAS system is sounded on the flight deck and an alarm sounds in the lavatory., (Incorrect answer)A yellow "smoke switchlight illuminates and an aural "SMOKE" message from the EICAS system is sounded on the flight deck and an alarm sounds in the lavatory.		0 %
A red "smoke" switchlight illuminates in the lavatory along with an alarm sounding in the lavatory., (Incorrect answer)A red "smoke" switchlight illuminates in the lavatory along with an alarm sounding in the lavatory.	1 respondent	5 %

In a draw-through type of smoke detector, what percent of smoke particles in the air will trigger an alarm?

Answer Text	Number of Respondents	Percent of respondents selecting this answer
75%., (Incorrect answer)75%.		0 %
40%., (Incorrect answer)40%.	2 respondents	9 %
10%., (Correct answer)10%.	20 respondents	**91 %**

A flight deck indication that a fixed fire extinguisher has been fired is:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
A green colored disc has burst., (Incorrect answer)A green colored disc has burst.	4 respondents	18 %
A low pressure warning lamp indication for the associated fire extinguisher bottle., (Correct answer)A low pressure warning lamp indication for the associated fire extinguisher bottle.	13 respondents	**59 %**
A thermal discharge indicating disc is visible., (Incorrect answer)A thermal discharge indicating disc is visible.	5 respondents	23 %

An engine fire extinguisher has been discharged due to an over temperature condition occurring in its vicinity. The indication for this type of discharge is:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
An externally mounted warning light illuminates., (Incorrect answer)An externally mounted warning light illuminates.	6 respondents	27 %
An externally mounted red discharge disc is not visible., (Correct answer)An externally mounted red discharge disc is not visible.	12 respondents	**55 %**
An aural warning sound is heard., (Incorrect answer)An aural warning sound is heard.	4 respondents	18 %

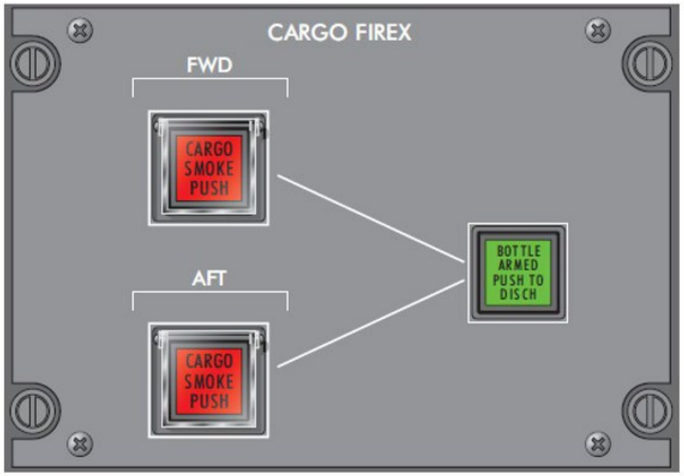
If an engine fire warning is received on the flight deck, the correct procedure to be followed will be:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
Pull the fire handle, discharge the fire extinguisher, and shut down the affected engine., (Incorrect answer)Pull the fire handle, discharge the fire extinguisher, and shut down the affected engine.	1 respondent	5 %
Shut down the affected engine, pull the fire handle, and discharge the fire extinguisher., (Correct answer)Shut down the affected engine, pull the fire handle, and discharge the fire extinguisher.	21 respondents	**95 %**
Discharge the first fire extinguisher, pull the fire handle, and shut down the affected engine., (Incorrect answer)Discharge the first fire extinguisher, pull the fire handle, and shut down the affected engine.		0 %

Which type of system does the CRJ700 utilize in the cargo bay for fire detection and protection?

Answer Text	Number of Respondents	Percent of respondents selecting this answer
A spot-type temperature detector and a conventional CO2 fire extinguisher bottle., (Incorrect answer)A spot-type temperature detector and a conventional CO2 fire extinguisher bottle.	2 respondents	9 %
A smoke detection system and a high rate of discharge fire extinguisher system., (Correct answer)A smoke detection system and a high rate of discharge fire extinguisher system.	20 respondents	**91 %**
A visual cargo smoke camera system., (Incorrect answer)A visual cargo smoke camera system.		0 %

Refer to the figure. If a FWD cargo fire is indicated by a red light, in what order are the switchlights pressed to arm and then discharge the fire extinguisher bottle installed in the FWD cargo compartment?



Answer Text	Number of Respondents	Percent of respondents selecting this answer
First press the green BOTTLE ARMED, PUSH TO DISCHARGE switchlight and then press the red FWD CARGO SMOKE PUSH switchlight., (Incorrect answer)First press the green BOTTLE ARMED, PUSH TO DISCHARGE switchlight and then press the red FWD CARGO SMOKE PUSH switchlight.	3 respondents	14 %
First press the red FWD CARGO SMOKE PUSH switchlight and then press the green BOTTLE ARMED, PUSH TO DISCHARGE switchlight., (Correct answer)First press the red FWD CARGO SMOKE PUSH switchlight and then press the green BOTTLE ARMED, PUSH TO DISCHARGE switchlight.	19 respondents	**86** %
Press the green BOTTLE ARMED, PUSH TO DISCHARGE switchlight two times in succession., (Incorrect answer)Press the green BOTTLE ARMED, PUSH TO DISCHARGE switchlight two times in succession.		0 %

Performance Indicator Rubric

Course: ASCI 3020 Jet Transport Systems II

Course Instructor: **Stephen G. Magoc**

Semester Taught: **Spring 2023**

Number of Students in Course: **28**

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	**Assessment Results: (Indicate what % of class achieved a minimum 70%)**	**Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")**
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	Test 1: 100% Test 2: 100% Test 3: 96.4% Test 4: 96.4% Final Exam: 96.4%	Yes, the benchmark has been achieved with 97.84% of the students achieving a minimum of 70% in the course.

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

My recommendation for improvement in this course is to continue to find the class time to show adequate video links to convey the operational characteristics of gas turbine engines into the course.

**Attach description of assignment used for assessment and samples of student work.*

ASCI 3020 Spring 2023 TEST 1 Review

Summary

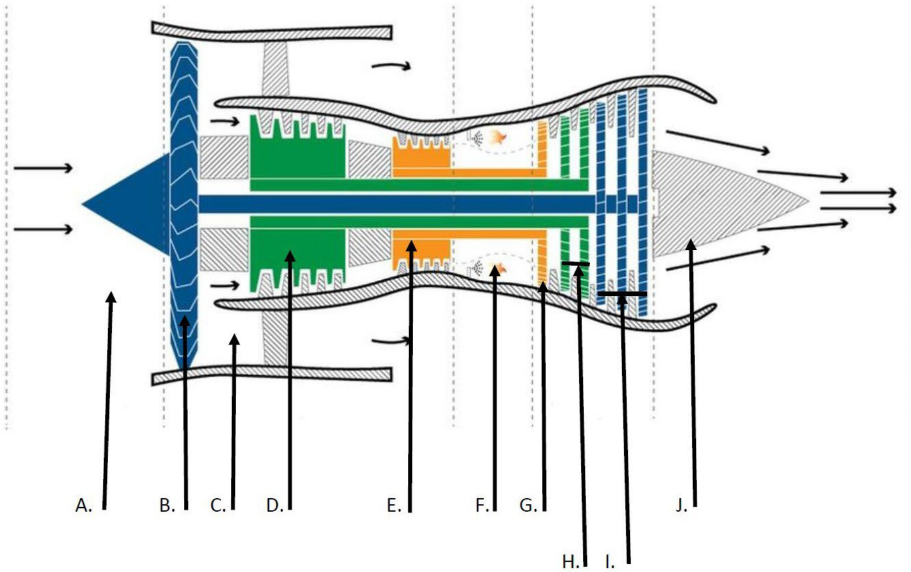
Average Score: 86%   High Score: 104%   Low Score: 57%   Standard Deviation 12.76

2. Which of the following are considered as unique properties of the gases (air) used in gas turbine engines?

Answer Frequency Summary

Is Correct?	**Answer**	**Respondents**	**%**
Correct Answer	**All of the above.**	25	83%
Incorrect Answer	**Volume (V).**	1	3%
Incorrect Answer	**Mass (m)**	2	7%
Incorrect Answer	**Temperature (T).**	0	0%
Incorrect Answer	**Pressure (P).**	0	0%

3. Refer to the figure. Identify each section of the gas turbine engine shown in the figure. (2 points for each correct answer.)


A.
B.
C.
D.
E.
F.
G.
H.
I.
J.

A. Inlet

B. Fan

C. Fan duct

D. Intermediate compressor

E. High-pressure compressor

F. Combustion

G. High-pressure turbine

H. Intermediate-pressure turbines

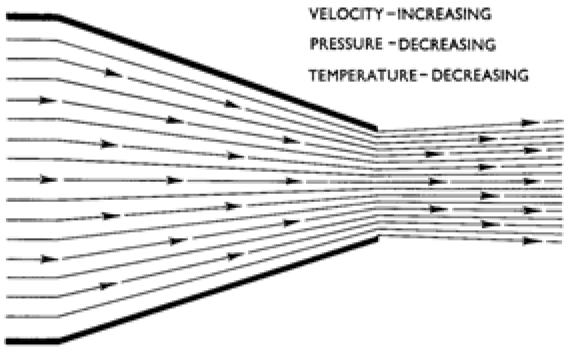
I. Low-pressure turbines

J. Exhaust

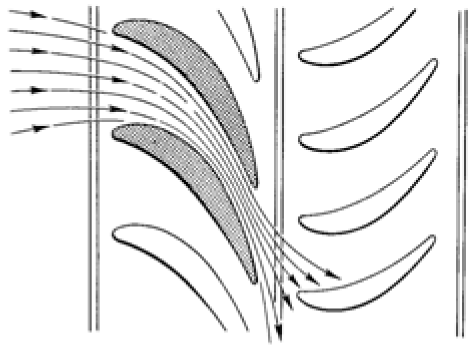
7. Refer to the figure. The duct shown in the figure is referred to as a:

Answer Frequency Summary

Is Correct?	**Answer**	**Respondents**	**%**
Correct Answer	**Convergent duct.**	24	83%
Incorrect Answer	**Convergent-divergent duct.**	4	14%
Incorrect Answer	**Divergent duct.**	0	0%



PRINCIPLE



EXAMPLE - FLOW THROUGH TURBINE NOZZLE GUIDE VANES

13. The ratio of a gas turbine engine's net work output compared to its fuel energy input is referred to as:

Answer Frequency Summary

Is Correct?	Answer	Respondents	%
Incorrect Answer	**Cycle efficiency.**	2	7%
Correct Answer	**Thermal efficiency.**	19	66%
Incorrect Answer	**Thrust specific fuel consumption.**	7	24%

14. Which type of gas turbine compressor is turned perpendicular to its axis of rotation and moves the air from the center outward?

Answer Frequency Summary

Is Correct?	Answer	Respondents	%
Correct Answer	**Centrifugal flow compressor.**	26	87%
Incorrect Answer	**Axial flow compressor.**	2	7%
Incorrect Answer	**(No answer)**	2	7%

15. Which type of gas turbine compressor is turned parallel to its axis of rotation and moves the air from the front to the rear?

Answer Frequency Summary

Is Correct?	Answer	Respondents	%
Incorrect Answer	**Centrifugal flow compressor.**	2	7%
Correct Answer	**Axial flow compressor.**	26	87%

18. The turbofan engine station number usually used to describe the air pressure at the entrance to the fan is

Answer Frequency Summary

Is Correct?	Answer	Respondents	%
Correct Answer	**P2.**	9	30%
Incorrect Answer	**P0.**	18	60%
Incorrect Answer	**P4.**	1	3%

20. The bypass ratio of a gas turbine engine is:

Answer Frequency Summary

Is Correct?	Answer	Respondents	%
Correct Answer	**The total mass of airflow through the fan duct divided by the total mass of airflow through the core of the engine.**	22	76%

Incorrect Answer	**The ratio of the airflow through the compressor to the airflow through the turbine.**	4	14%

Answer Frequency Summary

Is Correct?	Answer	Respondents	%
Incorrect Answer	**The amount of air that bypasses the combustion section.**	2	7%

21. The type of jet propulsion engines are:

Answer Frequency Summary

Is Correct?	**Answer**	**Respondents**	**%**
Correct Answer	**Rocket, ramjet, pulsejet, and gas turbine.**	21	72%
Incorrect Answer	**Turboprop and turboshaft.**	2	7%
Incorrect Answer	**Ramjet and pulsejet.**	5	17%

23. A gas turbine engine that ducts the fan airstream through longer passages to direct the fan airstream around the outside of the engine core is referred to as a:

Answer Frequency Summary

Is Correct?	**Answer**	**Respondents**	**%**
Incorrect Answer	**Turboprop engine.**	3	10%
Incorrect Answer	**Fixed-turbine engine.**	2	7%
Correct Answer	**Ducted fan engine.**	23	77%
Incorrect Answer	**(No answer)**	2	7%

24. A free (or power) turbine is one that:

Answer Frequency Summary

Is Correct?	Answer	Respondents	%
Incorrect Answer	Is directly connected to a propeller.	3	10%

Incorrect Answer	Does not extract energy from the turbine.	3	10%

Answer Frequency Summary

Is Correct?	Answer	Respondents	%
Correct Answer	Has no mechanical connection between the engine compressor and the power section.	22	76%

25. Turboshaft engines are commonly used as:

Answer Frequency Summary

Is Correct?	Answer	Respondents	%
Incorrect Answer	Afterburners.	2	7%
Correct Answer	Auxiliary power units.	24	80%
Incorrect Answer	High-torque pneumatic air supply.	2	7%

ASCI 3020 Spring 2023 Test 2 Review

Summary

Average Score: 84% High Score: 103% Low Score: 72% Standard Devia�on 22.847

2. The purpose of the gas turbine engine air inlet is to provide a relatively....... supply of air to the ....of the ...... compressor.

Answer Frequency Summary

Is Correct?	Answer	Respondents	%
Incorrect Answer	**Turbulent free........rear....... low pressure.**	4	12%
Correct Answer	**Turbulent free........face........low pressure.**	24	73%
Incorrect Answer	**Turbulent free........face........high pressure.**	3	9%
Incorrect Answer	**(No answer)**	2	6%

9. In-flight air turbulence can cause which of the following to occur in a gas turbine engine?

Answer Frequency Summary

Is Correct?	Answer	Respondents	%
Correct Answer	**The engine to develop a flame-out condition.**	26	79%
Incorrect Answer	**Increased exhaust gas temperature developed in the engine.**	3	9%
Incorrect Answer	**Increased thrust developed by the engine.**	2	6%
Incorrect Answer	**(No answer)**	2	6%

12. The ring of blades that sometimes precede the first rotor stage of a gas turbine engine's axial flow

compressor are referred to as:

Answer Frequency Summary

Is Correct?	Answer	Respondents	%
Incorrect Answer	**The first stage stator blades.**	6	18%
Incorrect Answer	**Nozzle guide vanes.**	2	6%
Correct Answer	**The inlet guide vanes.**	23	70%
Incorrect Answer	**(No answer)**	2	6%

17. What is the primary factor that controls the compressor pressure ratio (CPR) of a gas turbine engine's axial flow compressor?

Answer Frequency Summary

Is Correct?	Answer	Respondents	%
Correct Answer	**The number of stages in the compressor.**	24	73%
Incorrect Answer	**The compressor inlet pressure.**	6	18%
Incorrect Answer	**The airfoil placement of the stator blades.**	1	3%
Incorrect Answer	**(No answer)**	2	6%

20. The result of a gas turbine engine compressor stall can be:

Answer Frequency Summary

Is Correct?	Answer	Respondents	%
Correct Answer	**An increase in the turbine gas temperature and the vibration level.**	23	70%
Incorrect Answer	**The vibration level to increase with a decrease in the turbine gas temperature.**	6	18%
Incorrect Answer	**An increase in the mass airflow through the engine.**	2	6%
Incorrect Answer	**(No answer)**	2	6%

24. Active Clearance Control (ACC) is used the size of the annulus in the compressors of some gas turbine

engines is controlled by:

Answer Frequency Summary

Is Correct?	Answer	Respondents	%
Correct Answer	**Directing cooling air flow at the compressor casing.**	21	64%
Incorrect Answer	**Mechanically connecting the compressor case to the fuel control unit.**	2	6%
Incorrect Answer	**Hydraulically actuating the compressor case by commands sent from the fuel control unit.**	8	24%
Incorrect Answer	**(No answer)**	2	6%

32. Of the total gas generator mass air flow in a gas turbine engine:

Answer Frequency Summary

Is Correct?	Answer	Respondents	%
Correct Answer	**25% is used for the combustion process and 75% is used for cooling.**	12	43%
Incorrect Answer	**50% is used for the combustion process and 50% is used for cooling.**	5	18%
Incorrect Answer	**75% is used for the combustion process and 25% is used for cooling.**	11	39%

33. The General Electric CF34 turbofan engine used in the CRJ700 uses which type of combustion chamber?

Answer Frequency Summary

Is Correct?	Answer	Respondents	%
Correct Answer	**Annular.**	25	76%
Incorrect Answer	**Can.**	0	0%
Incorrect Answer	**Can-annular.**	6	18%
Incorrect Answer	**(No answer)**	2	6%

Summary

Average Score: 81% High Score: 104% Low Score: 52% Standard Devia�on 18.021

1. The turbine sec�on of a gas turbine engine:

Answer Frequency Summary

Is Correct?	Answer	Respondents	%
Incorrect Answer	**Uses heat energy of the gas flow to expand and accelerate the incoming gas flow.**	1	3%
Incorrect Answer	**Increases the velocity of the exhaust gas flow to the final velocity used to generate thrust.**	10	31%
Correct Answer	**Drives the compressor or fan of the engine.**	20	63%
Incorrect Answer	**(No answer)**	1	3%

4. Which part of the turbine section is subjected to the greatest amount of heat during gas turbine engine operation?

Answer Frequency Summary

Is Correct?	Answer	Respondents	%
Incorrect Answer	**The turbine nozzle (inlet guide vanes).**	2	67%
Correct Answer	**The turbine disk, or rotor.**	0	0%
Incorrect Answer	**The turbine blades.**	0	0%
Incorrect Answer	**(No answer)**	1	33%

11. The Active Clearance Control (ACC) utilizes which of the following to maintain the clearance between the turbine blade tip and the inside of the turbine case?

Answer Frequency Summary

Is Correct?	Answer	Respondents	%
Incorrect Answer	**Ambient air.**	2	6%
Correct Answer	**Fan air controlled by the FADEC.**	8	25%
Incorrect Answer	**Compressor discharge air.**	21	66%
Incorrect Answer	**(No answer)**	1	3%

14. The propelling exhaust nozzle is designed to increase thrust by:

Answer Frequency Summary

Is Correct?	Answer	Respondents	%
Correct Answer	**Increasing the exhaust gas velocity to a speed greater than the velocity of the ambient inlet air and decreasing the pressure of the exhaust gas stream back to the pressure of the ambient inlet air.**	18	56%
Incorrect Answer	**Increasing the exhaust gas velocity to a speed greater than the velocity of the ambient inlet air and increasing the pressure of the exhaust gas stream to a pressure than the ambient inlet air.**	4	13%
Incorrect Answer	**Increasing the exhaust gas velocity to a speed greater than the velocity of the ambient inlet air and decreasing the pressure of the exhaust gas stream to a pressure less than the ambient inlet air.**	9	28%
Incorrect Answer	**(No answer)**	1	3%

15. Refer to the figure. The type of exhaust nozzle used on the turbofan engine in the figure is referred to as:

Answer Frequency Summary

Is Correct?	Answer	Respondents	%
Correct Answer	**A separate nozzle.**	9	28%
Incorrect Answer	**A mixed (or integrated) nozzle.**	17	53%
Incorrect Answer	**An augmented nozzle.**	5	16%
Incorrect Answer	**(No answer)**	1	3%

Summary

Average Score: 84% High Score: 103% Low Score: 54% Standard Deviation 10.35

7. Use of the Engine Synchronization system during operation of the CRJ700:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
Will keep the turbine disk speeds of both engines equal to reduce noise levels in flight., (Incorrect answer)	4 respondents	15 %
Will keep either the N1 or N2 engine speeds equal to reduce noise levels in flight., (Correct answer)	22 respondents	**81** %
Will keep both the N1 and N2 engine speeds equal to each other during the climb profile., (Incorrect answer)	1 respondent	4 %

81% answered correctly

8. Oil seals used in gas turbine engines are pressurized with compressor bleed air to:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
Minimize the amount of heat loss in the bearing housing., (Incorrect answer)	4 respondents	15 %
Ensure oil is drains into the interior cavities of the engine., (Incorrect answer)	2 respondents	7 %
Ensure a minimum oil loss in the lubrication system., (Correct answer)	21 respondents	**78** %

10. A modern turbofan engine utilizes which type of oil cooler as the main unit and which type to supplement the main unit when needed?

Answer Text	Number of Respondents	Percent of respondents selecting this answer
The fuel-cooled oil cooler is the main unit supplemented by the air-cooled oil cooler., (Correct answer)	14 respondents	**52 %**
An air-cooled oil cooler is the main unit supplemented by a second air cooled oil cooler., (Incorrect answer)	1 respondent	4 %
The air-cooled oil cooler is the main unit supplemented by the fuel-cooled oil cooler., (Incorrect answer)	12 respondents	44 %

13. The main difference between the turbine engine pressure relief valve lubrication system and the full flow lubrication system is:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
The full flow lubrication system does not use oil filters in the system., (Incorrect answer)	1 respondent	4 %
The pressure relief valve is adjustable in the pressure relief valve lubrication system but is not adjustable in the full flow lubrication system., (Incorrect answer)	8 respondents	30 %
The full flow lubrication system does not incorporate a pressure relief valve in the system., (Correct answer)	17 respondents	**63 %**

14. In a gas turbine engine, the oil temperature is measured:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
After it leaves the engine and before it enters the engine's oil cooler., (Incorrect answer)	4 respondents	15 %
Anywhere within the engine., (Incorrect answer)		0 %
After it leaves the engine's oil cooler and before it re-enters the oil tank., (Correct answer)	22 respondents	**81 %**

16. Gas turbine engine oil reservoirs are pressurized to:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
Aid the engine oil pressure pump in pressurizing the oil., (Incorrect answer)	5 respondents	19 %
Prevent oil pump cavitation., (Correct answer)	20 respondents	**74 %**
Minimize oil pressure loss.		4%

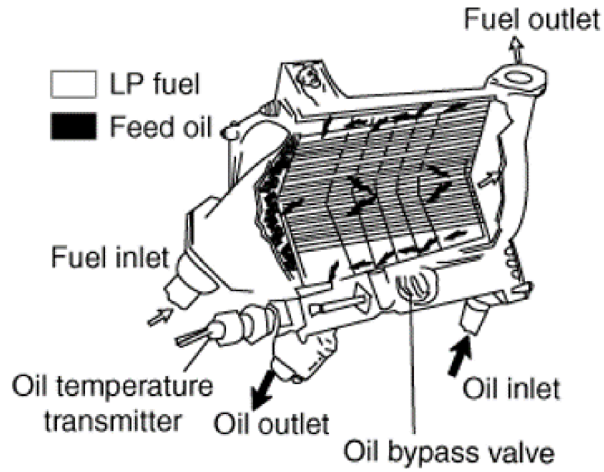
17. What is the purpose of the last-chance oil filters in a gas turbine engine?

Answer Text	Number of Respondents	Percent of respondents selecting this answer
To filter the oil immediately before it enters the main bearings., (Correct answer)	22 respondents	**81** %
To prevent damage to the oil spray nozzle., (Incorrect answer)	2 respondents	7 %
To filter the oil immediately after it leaves the main bearings., (Incorrect answer)	2 respondents	7 %

18. The Engine Oil Level Replenishment System in the CRJ700 is used to:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
Maintain the oil quantity in the engine tanks during flight., (Incorrect answer)	5 respondents	19 %
Recover the oil that has flowed to the low spots of the engines and return it to the respective nacelle tank., (Incorrect answer)	3 respondents	11 %
Allow ground personnel to remotely fill the nacelle tanks from a replenishment tank located in the aft equipment bay., (Correct answer)	18 respondents	**67** %

19. Refer to the figure. How does the oil-to-fuel heat exchanger (oil cooler) depicted in the figure operate?



Answer Text	Number of Respondents	Percent of respondents selecting this answer
Fuel flows through tubes and as the oil flows around the fuel tubes, the oil is cooled by transferring its heat to the fuel., (Correct answer)	20 respondents	**74 %**
Fuel, air, and oil flow through a breather unit, exchanging heat/cool., (Incorrect answer)	4 respondents	15 %
Fuel and oil intermingle, exchange heat/cool, and are separated before leaving the oil cooler., (Incorrect answer)	2 respondents	7 %

21. If a full-flow oil filter is used on a gas turbine engine, and the filter becomes completely clogged, the:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
Flow of oil to the engine is reduced by half., (Incorrect answer)	5 respondents	19 %
Bypass valve opens and the oil pump supplies unfiltered oil to the engine., (Correct answer)	17 respondents	**63 %**

Answer Text	Number of Respondents	Percent of respondents selecting this answer
Oil supply to the engine is blocked., (Incorrect answer)	5 respondents	19 %

25. The CRJ700 aircraft’s ignition system is turned on during an engine start by:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
Pressing in on the ENGINE START switchlight in the ENGINE START/IGNITION panel for the associated engine., (Correct answer)	21 respondents	**78 %**
Pressing in on the CONT IGNITION switchlight in the ENGINE START/IGNITION panel., (Incorrect answer)	6 respondents	22 %
Turning on the aircraft’s master switch., (Incorrect answer)		0 %

27. The type of starter unit typically used on small gas turbine, turboprop, and turboshaft engines is the:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
Pneumatic air turbine starter., (Incorrect answer)	10 respondents	37 %
Combustion starter., (Incorrect answer)		0 %
Electric starter., (Correct answer)	17 respondents	**63 %**

31. Which type of fire extinguishing agent is normally associated with a high-rate-of-discharge (HRD) system:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
Freon., (Correct answer)	13 respondents	**48 %**
Carbon dioxide., (Incorrect answer)	10 respondents	37 %
Argon., (Incorrect answer)	4 respondents	15 %

32. A typical flight deck indication for an engine fire warning system of a transport category aircraft is:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
Flashing red warning light for each engine and a common warning horn for all engines., (Correct answer)	16 respondents	**59** %
Flashing red warning light and a different tone bell for each engine., (Incorrect answer)	3 respondents	11 %
Steady red warning light for each engine and a common warning horn for all engines., (Incorrect answer)	8 respondents	30 %

33. If an engine fire warning is received on the flight deck, the correct procedure to be followed to extinguish the fire will be:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
Shut down the affected engine, pull the fire handle, and activate the fire extinguisher., (Correct answer)	19 respondents	**70** %
Pull the fire handle, activate the fire extinguisher, and shut down the affected engine., (Incorrect answer)	3 respondents	11 %
Activate the fire extinguisher, pull the fire handle, and shut down the affected engine., (Incorrect answer)	4 respondents	15 %

38. How are most gas turbine engine fire extinguisher bottles used in a typical gas turbine engine high rate of discharge (HRD) fire extinguishing system activated?

Answer Text	Number of Respondents	Percent of respondents selecting this answer
Activating an electrically operated squib., (Correct answer)	15 respondents	**56 %**
Activating a pneumatically operated squib., (Incorrect answer)	9 respondents	33 %
Opening an electrically operated shut off valve., (Incorrect answer)	3 respondents	11 %

39. Which external indicator is used to indicate to personnel that an HRD fire extinguisher bottle has been discharged normally by the flight crew?

Answer Text	Number of Respondents	Percent of respondents selecting this answer
An externally visible yellow discharge disc is showing., (Correct answer)	20 respondents	**74 %**
An externally visible red discharge disc is showing., (Incorrect answer)	5 respondents	19 %
An aural warning is heard by the ground crew., (Incorrect answer)	1 respondent	4 %

Question 40

Attempts: 27 out of 27

40. Which external indicator is used to indicate to personnel that an HRD fire extinguisher bottle has been discharged because of excessive pressure in the

bottle caused by the bottle being in close proximity to a source of high heat?

Answer Text	Number of Respondents	Percent of respondents selecting this answer
An externally visible red discharge disc is showing., (Correct answer)	20 respondents	**74** %
An externally visible yellow discharge disc is showing., (Incorrect answer)	6 respondents	22 %
An aural warning is heard by the ground crew., (Incorrect answer)	1 respondent	4 %

ASCI 3020 Soring 2023 Final Exam Review

Summary

Average Score: 84%   High Score: 103%   Low Score: 54%   Standard Deviation 10.35

1. When the clamshell doors of a thrust reverser system are stowed, or in the forward thrust position, the clamshell doors:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
(Correct answer)Allow the exhaust gas stream to flow through the exhaust nozzle.	18 respondents	**64** %
(Incorrect answer)Cause the exhaust gas stream to flow through a set of cascade vanes to allow the stream to flow through the exhaust nozzle.	7 respondents	25 %
(Incorrect answer)Direct the flow of the exhaust gas stream in a forward direction.	3 respondents	11 %

6. The term “self-sustaining speed” means that:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
(Incorrect answer)The speed at which the engine can accelerate to full power within 5 seconds.		0 %
(Incorrect answer)The engine will run independently of external help.	10 respondents	36 %
(Correct answer)The speed at which the engine can accelerate without the help of the starter motor.	18 respondents	**64** %

11. Which of the following engine variables is the most critical during the operation of a gas turbine engine?

Answer Text	Number of Respondents	Percent of respondents selecting this answer
(Incorrect answer)Compressor inlet air temperature.	5 respondents	18 %
(Correct answer)Turbine inlet temperature.	22 respondents	**79 %**
(Incorrect answer)Ambient air pressure.	1 respondent	4 %

12. Which of the following is used to monitor the mechanical integrity of the turbines?

Answer Text	Number of Respondents	Percent of respondents selecting this answer
(Incorrect answer)Engine oil pressure.	4 respondents	14 %
(Correct answer)Exhaust gas temperature.	14 respondents	**50 %**
(Incorrect answer)Engine pressure ratio.	10 respondents	36 %

13. Consider this statement: Engine pressure ratio (EPR) is a ratio of the exhaust gas pressure to the engine inlet air pressure, and it indicates the volumetric efficiency of the turbofan engine. The statement is:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
(Incorrect answer)True	17 respondents	61 %

(Correct answer)False	11 respondents	**39** %

16. Which of the following types of gas turbine engines provide the best specific fuel consumption during normal operation?

Answer Text	Number of Respondents	Percent of respondents selecting this answer
(Incorrect answer)Turbojet engine.	1 respondent	4 %
(Incorrect answer)Turbofan engine.	11 respondents	39 %
(Correct answer)Turboprop engine.	16 respondents	**57 %**

21. What is used to move the blades to the feather position in a propeller installed on a turboprop engine?

Answer Text	Number of Respondents	Percent of respondents selecting this answer
(Incorrect answer)Propeller governor oil pressure.	11 respondents	39 %
(Correct answer)Spring force and a compressed nitrogen pressure.	15 respondents	**54 %**
(Incorrect answer)Beta valve oil pressure.	2 respondents	7 %

24. Consider this statement: In a turboshaft engine, the compressor turbine drives the gas generator compressor. This statement is:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
(Correct answer)True	12 respondents	**43 %**
(Incorrect answer)False	16 respondents	57 %

26. Which of the following power lever and propeller lever positions will allow the aircraft to be taxied with the propeller creating a minimum amount of thrust?

Answer Text	Number of Respondents	Percent of respondents selecting this answer
(Incorrect answer)Power levers in Beta range, propeller controls full back (feather).	8 respondents	29 %
(Incorrect answer)Power levers in Beta range, propeller controls in a mid-range position.	7 respondents	25 %
(Correct answer)Power levers in Beta range Ground Idle, propeller controls full forward (max RPM).	13 respondents	**46 %**

27. When the power lever of a turboprop aircraft is in the Beta Reverse range, the power lever controls:

Answer Text	Number of Respondents	Percent of respondents selecting this answer
(Incorrect answer)The propeller’s pitch only.	8 respondents	29 %
(Incorrect answer)The engine’s torque (power) output only.	3 respondents	11 %
(Correct answer)The engine’s torque (power) output and the propeller’s pitch.	17 respondents	**61 %**

34. The switch used by the CRJ700 aircraft's flight crew to connect APU electrical generator power to the aircraft's buses is located in:

.

Answer Text	Number of Respondents	Percent of respondents selecting this answer
(Incorrect answer)The APU control panel.	10 respondents	36 %
(Incorrect answer)The circuit breaker panel which is located behind the copilot's seat.		0 %
(Correct answer)The ELECTRICAL POWER SERVICES control panel.	18 respondents	**64 %**

Performance Indicator Rubric

Course: ASCI 3070 Flight Crew Fundamentals Course Instructor:____Donald Schmidt_______________

Semester Taught: __spring ‘23__________Number of Students in Course:_____15_____

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = “C”)
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	100%	yes

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

The course appeared to be successful. The main goals were class participation, a midterm paper and a final simulation. The paper of which I will attach a copy was intended to explore an aviation event that dovetailed into the discussion topics previously covered in the course. The assignment was not intended to merely rehash the accident itself, but to discuss it in the students' own words from the perspective of class topics. These would include the importance of standard operating procedures, crew resource management, checklist theory and usage, and turbine transport systems. Overall this major project was successful and some of the best work that had been submitted in recent years. The final project was a simulation based exercise, the intention of which was to work through the flows and checklists for the CRJ700. Exercise was to be started with the aircraft sitting on the ramp following through takeoff, culminating in a successful completion of the takeoff profile to altitude. The time limitation was 15 minutes. This was to address the extreme time it was taking students completely new to the platform. Again this final exercise was completely successful with each student taking time throughout the semester to study these procedures on their own and all were able to complete the exercise within the allotted period. The secondary objective of this exercise was to “learn how to learn” a new and complex aircraft, unfamiliar flows, checklists, and profiles. The secondary objective was also a success, with all students proving so by their study habits and successful completion of the scenario in a timely fashion.

**Attach description of assignment used for assessment and samples of student work.*

The assignment description for the paper was as follows:

Provide a discussion and examination of BritAir 5937's accident in Lorient, France. Specifically the issues of the accident as they relate to the work and lecture thus far in class, with explorations into the issues of Standard operating procedures, crew resource management, and checklist usage and how they may have impacted the situation.

Donny Shmidt

30/30 Nice work

Flight Crew Fundamentals
4/10/23

Brit-Air CRJ 700 Accident Analysis

On the 16th of October 2012, an experienced 42-year-old captain and 45-year-old co-pilot flying the CRJ-700 did not carry out their duties properly and overran runway 25 at Lorient Lann Bilhoué. Both had at least 3,000 hours in the CRJ, and their professional levels were qualified as good. It is an unfortunate accident, but it can happen to any pilot when risk factors stack up.

Before the flight even began, the pilots did not have a mental check of their attitudes toward the flight. Both pilots arrived at their trip's fifth and final flight rushed and fatigued. The captain's short turnaround led to meteorological preflight preparation being completed in the cockpit. The pilot saw rain and a crosswind of 15 to 20 kt; he felt there was a risk of wind shear and considered landing on the runway with a flaps 30º configuration. The fatigue and rush amidst the preflight led to the captain having tunnel vision in choosing that configuration, as he never adjusted for the conditions met during the actual flight.

The fatigue factor continued to be a very concerning problem for these pilots throughout the flight. The crew spoke about their fatigue on the ground, while the PM even mentioned his fatigue and weariness before the descent. Moreover, the pilots even talked of their desire to complete the flight as soon as possible in the cockpit. The hazardous attitude displayed due to the fatigue felt by the pilots led to a considerable lack of situational awareness as they approached deteriorating weather conditions in which they needed more experience flying in.

In the prelanding, descent, and landing phase, the errors kept stacking, ultimately leading to the accident. The crew resource management amidst this flight was poorly executed in all phases. The crew inappropriately used their checklists and flows amidst descent and approach. The approach checklist was interrupted by the controller and resumed by the pilots in the wrong place, which shows an apparent lack of care and discipline. As a result of the checklists being used as an "action guide," the crew did not calibrate the altimeter. The captain later asked the first officer if the approach checklist had been completed because the altimeter was incorrectly calibrated.

This phase is where a critical error by the crew occurred. Both pilots were fatigued, trying to complete a checklist, and were interrupted by a controller. The controller states that there is a wind from 160º gusting up to 26kt, a severe squall, and that the previous aircraft encountered difficulties during landing due to "aquaplaning." The fatigued pilots hear the controller, and their mind goes back to completing the checklist at hand (improperly, as a matter of fact). Although the crew had a checklist to complete, the lack of the pilots recognizing the controller's interruption as extremely important led to the danger being improperly perceived, and their situational awareness was not modified. Really nice development

The moment the crew heard the controller state winds from 160º with gusts up to 26 kts and the previous aircraft encountered "aquaplaning," their minds should have immediately started considering landing distance and standard operating procedures of British Airway's landing techniques. The landing distance calculated by the crew during their rushed ground operation only left a margin of 80m. This was calculated using non-contaminated runway conditions. The pilots should have been aware of the landing distances with a runway contaminated by water. Under calculations, a flaps 45º approach with the airplane's performance would theoretically permit it to land on a contaminated runway, but when tested by manufacturers, the roll distance was 1,358, which is inadequate. Regardless of pin-pointing theoretical landing distances, the pilots should have immediately recognized that their initial calculation of 80m remaining would not be sufficient with a 30º flap configuration, a contaminated runway, and an almost direct crosswind amidst a squall which could, and did, turn into a tailwind.

The controller's phraseology was imperfect, and the pilots did not hear the word contaminated directly. However, the pilots still could have followed the standard operating procedure for a contaminated runway, as there were previous reports of aquaplaning. Following standard operating procedures or even using a similar landing technique in the SOPs would have resulted in a safer result. The British Airway SOPs in section 1.17.1.4.3 Landing Technique state that on a contaminated runway, the pilot should:

1. "Land with flaps in the 45º position
2. Make Firm Landing
3. Landing is prohibited if the XC is greater than 10kt and if braking is poor" (1.17.1.4.3)

ALWAYS DANGEROUS

Unfortunately, none of these measures were met as the captain continued with his preflight decision of a 30º flap configuration approach. A 45º flap configuration approach would have led to a 132 kt approach with a 10 kt gust factor, ultimately a 142 kt approach.

The crew disregarded SOPs and announced they would use an airspeed reading of 140 knots which is not procedural and is not backed by anything more than "personal knowledge." On the actual approach, the airplane's airspeed increased above 150 kts for 10 seconds, even maxing out at 155. The pilots crossed the runway 25 threshold at 56 feet, flying 153 kts with a 4 kt tailwind. Brit Air SOPs state that "deviations on approach below 1,000 ft relate to certain parameters including indicated airspeed which should be between VAPP +10kt… when a deviation occurs, the PM calls it out. If no immediate correction is made, a go-around is imperative" (1.17.1.4.6). The crew disregarded callouts, made no immediate correction to their fast airspeed, and did not make a go-around. It was a direct disregard for SOPs, and unfortunately, this led to the plane overrunning runway 25.

There are many things the pilots could have done differently to avoid this accident. Although uncommon, the fatigued pilots could and should have reported their fatigue. Instead, they continued to rush, failing to recognize the threats and hazards associated with their flight. Whether it be the lack of care for the controller's weather warnings, the misuse of checklists, the

improper approach configuration, the un-sterile cockpit, the disregard for SOPs that would have led to a go-around, or the general lack of situational awareness regarding the runway's conditions, these pilots were risk stacking. The stacking risks ultimately caught up to them as their plane hit the runway 25 localizer antenna before coming to rest approximately 200m past the threshold of runway 07.

It is an unfortunate accident; the pilots could have made better decisions, but we cannot blame it all on them. Other factors were involved, such as the lack of common phraseology between the controllers and crews to understand the true condition of the contaminated runway or the characteristics of runway 25's water logging tendencies not being documented in the Brit Air Operations manual. Brit Air pilots were also unprepared for a situation like this, regardless of being fatigued or rushed. Their training and recurrent training checks only provide one scenario per session, no nighttime scenario, and conditions with runway water contamination cannot be simulated. Their briefings on airplane performance also do not include threat and error management. Threat and error management trains crews to be exposed to threats and to be able to identify errors that happen. Unfortunately, only the captain had been exposed to TEM training as it was newly implemented in 2012, the year of the accident. What can be done is to have all pilots trained to identify threats and manage errors. A pilot should be taught to run a mental checklist on themselves, such as the ADM process of:

"(1) Identifying personal attitudes hazardous to safe flight.
(2) Learning behavior modification techniques.
(3) Learning how to recognize and cope with stress.
(4) Developing risk assessment skills.
(5) Using all resources in a multi-crew situation.
(6) Evaluating the effectiveness of one's ADM skills" (Advisory Circular 60-22)

Whether at Brit Airways or a mom-and-pop Part 61 school, pilots should be trained by a threat and error management course and taught the proper steps of Aeronautical Decision Making to safely rely on their situational awareness, problem recognition, and sound judgment to reduce risks associated with each flight.

BE CAREFUL W/ SLANG

AWESOME JOB SOME OF THE BEST EXPLORATION AND DEVELOPMENT I'VE SEEN.

Donny Schmidt 30/30 Awesome

ASCI 3070

04/10/2023

Reflection on Brit Air DB5937

In fall of 2012, Britair DB5937 overran a runway in Lorient, France which sparked a conversation regarding the formality and use of Standard Operating Procedures (SOPs), safety margins within airlines, and various crew training. While weather most likely played a factor in the overrun, this paper will review the pilot and airline related decisions that resulted in the incident. It'll also review how modern day SOPs and safety margins would have possibly prevented the overrun and the impact modern day SOPs have on operations.

When reviewing the many factors that contributed to the incident, it's important to highlight the main overall reasons discussed in the incident report. The first main point is around fatigue of the pilots. This flight was the fifth of the day and the last. CVR captures the pilots discussing their fatigue and readiness to go home (Hradecky, 2012). The next factor is focused on the lack of safety margins within the pilots decisions and airline standards. This is discussed as the majority of the decisions captured vocally seem to be made with little margin of error. In aviation, it is important to remember that nothing will ever be perfect, including performance. Perhaps threat and error management (TEM) training isn't taught as much at this point in time. With all of this in mind, the final issue brought up throughout the incident report comes around the lack of routine. A lack of routine, which encaptures all the incidences discussed above, comes from a lack of SOPs and other standardizations aviation has developed. As we continue our discussion, we'll now discuss the various issues and where SOPs could have come into play to avoid the situation occurring.

It's important to reflect on the winds and weather for that day with the first point of lack of SOP and standardization. The winds on this day were 160 @ 16 gusting 26 knots. Visibility was 2000 to 3000 meters, most likely due to the rain that was falling. With the amount of rain falling, pilots prior to the accident were reporting difficulty breaking and the runway wet with puddles (to be discussed later). Lastly, the pilots note windshear on the ILS approach. With all this in mind, the captain quickly, with little discussion, notes that they will be keeping their airspeed above the VAPP, set at 140 kts for this flight (Hradecky, 2012). This is the first topic where an SOP could be useful. While it might be general knowledge that keeping the airspeed faster during an approach helps with windshear, it might not be specified as an approved procedure for the airline or might need additional steps when making this decision including increasing runway needed by a certain percentage.. In modern day aviation, Windshear Detection Systems (WSDS) have been able to alert pilots of possible windshear alerts. These systems would be nice to hold as when one goes off, most, if not all airlines have procedures that require a go around (FAA). It is also important to realize the effect this decision has on landing distances, something which isn't discussed by the pilots. Lastly, with a higher approach speed comes an unstable aircraft. This is where the main issue occurs. As discussed in the report, an aircraft doing 10kts or more over the VAPP (DB5937 was doing 15kts over at one point) is defined as unstable and should go around. This is a modern day SOP many airlines follow, as discussed in SKYbrary's article on SOPs. The pilots of this flight didn't do so which risked the aircraft overrunning the runway, floating too much, or flying into the ground with a nose down attitude. Implementing this SOP would make it standard for an unstable approach at VAPP + 10kts or more to go around and either reattempt the approach or divert to a more suitable airport

(SKYbrary). During this incident, that SOP wasn't followed and crew communication was minimal in the decision, leading to an nonstandard, more dangerous approach.

With a faster approach means a longer runway needed. The runway and its analysis from the pilots is the second issue in this report which an SOP and stricter standardization would have possibly prevented this accident. Within the Britair procedures, runway 25 at Lorient isn't explained in detail (highlighting the encouragement to not use this runway?). Due to this, the pilots are unaware exactly how smooth the runway surface is and other important information. In their analysis of the runway, they also give themselves 80 meters of margin (Hradecky, 2012). Had an SOP been developed and used, the pilots would have most likely been forced to reevaluate the runway decision and incorporate a higher margin of error to allow for situations with rain, gusty winds, not using full flaps (the crew uses flaps 30 instead of 45 to allow for passenger comfort which isn't standardized within the company), and puddles on the runway. It's also important to highlight the phraseology used by air traffic controllers and pilots prior to the incident and their use of the word "puddles." There are 4 runway condition standards at this time, which are dry, wet, puddles, and flooded. "Wet with puddles" is what is told to the pilots which is nonstandard and potentially creates issues with the pilots understanding the extent of the runway condition. That, alongside no equipment to measure the puddles, created a nonstandard situation (Hradecky, 2012). Continuing to develop phraseology creates more standardization and allows all aviators to further understand the situations without question. In modern day operations, many airlines require the aircraft to land on a runway that is the calculated landing distance and a certain percentage added from that (Cornell). At Parks our FOM states that student pilots must have enough runway to takeoff times 200% on solo flights. Had a standard

Awesome
Landing performance requirements.

been set for Britair on landing distances and runway length requirements, further margin and communication between the crew would have been needed, overturning their previous decision.

The final issues result from the improper use of detailed briefings and the use of flows/checklists. During the investigation, the public learned that checklists used during the approach and landing phase of flight weren't fully completed. While the crew had hopefully all the aspects of the checklist covered in their flows, they had not cross checked their actions with the checklist in full due to an ATC interruption. It is also learned that the pilots had done a shorter than normal brief of the approach and landing, using non standard phraseology within it. With all this in mind, the lack of awareness of the aircraft and lack of planning lead to the accident potential. Had the crew done the checklists and briefs correctly, the issues that followed including phraseology each pilot used, a proper plan of action, error margins, and threats associated with the flight would have all been discussed, covered and agreed upon, creating a plan of action had something gone wrong like a fast approach speed and unstable approach creating a more in depth conversation of the actions they were taking.

Within this paper, we've discussed the main topic of standardizing procedures, phraseology, and actions within flight. Through proper training and enforcement of SOPs, aviation becomes a lot safer and decisions made in flight are decided upon data, resulting in safer flying. Had the pilots of DB5937 done proper briefings and checklists, considered safety margins, followed set proper procedures, and done actions like go around when unstable, the resulting accident would have unlikely occurred. SOPs and the training surrounding them have developed to allow for higher amounts of safety and better, more uniform decision making between pilots and crew. FAA and other aviation regulation agencies continue to develop deep, well-worded regulations to enforce proper aviation actions. Companies further these regulations

with company policies to enforce these regulations and then some, adding further safety related rules. Proper following of these SOPs has been found crucial and when deviating from them, can prove costly and extremely dangerous, as presented in this accident.

Excellent work.

Great tie ins.

Work Cited

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Hradecky, Simon. "Accident: Britair CRJ7 at Lorient on Oct 16th 2012, Overran Runway on Landing." *Accident: Britair CRJ7 at Lorient on OCT 16th 2012, Overran Runway on Landing*, https://avherald.com/h?article=4579315d.

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Performance Indicator Rubric

Course: ASCI 3100 Air Carrier Operations   Course Instructor: Ken Weinberg

Semester Taught: Spring 2023   Number of Students in Course: 34

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	82	Y
SLO 2: Describe historical trends, current issues, and emerging opportunities in aviation.	88	Y
SLO 4: Articulate the value of integrity, lifelong learning, and building diverse teams in serving and leading others.	97	Y
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	94	Y

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

The course just underwent a full review during the semester. I plan to go back and review the study time and will try to add more assessments built in to the presentations. There were weekly and at times daily updates on my work in the industry including a visit to United Airlines Aviate Program in Goodyear AZ. This content was posted to the students for them to read in addition to required curriculum.

**Attach description of assignment used for assessment and samples of student work.*

1.29.2023

Week #2 Findings

TO
Board of Directors of Magis Air

FROM
Consultant Team 5

CC
Kenneth Weinburg

RE
Candidate Recommendation for Chief Pilot

Selecting someone for a Chief Pilot position is important so all candidates should be considered based on their qualifications. Bob and Shirley both have great experience in the airline industry, but their different experiences certainly set them apart. Captain Bob has more hours, and has previous experience as a Chief Pilot, but he retired from that position after the previous airline had its air carrier certificate revoked. This is not a great sign especially because the cause was related to safety which is a priority for Magis. He also has experience with regional airlines as he was the training and standards manager at Eastsky Airlines. He has extensive experience flying a 747, but that is not what Magis flies, and 747's are being phased out of passenger operations. While this experience is good to have, 14 CFR 119.67 (b) says that to be a Chief Pilot the person must be an ATP and hold ratings for at least 1 of the airplanes used in the certificate holder's operations. Magis operates the EMB-175 which is a different type rating than the 747. Bob also retired 7 years ago, and if he hasn't flown in a 121 carrier since, he will not be adjusted to current operations.

Captain Shirley on the other hand, also has an ATP but has fewer hours than Captain Bob. However, her type rating on the EMB-175 and 5 years PIC more than make up for it. Referring back to 14 CFR 119.67 (b) that type rating she has qualifies her to be a Chief Pilot for that fleet. While she has never been in the position of Chief Pilot, she is well respected and has worked from the ground up. Fellow pilots would respect a Chief Pilot that has more experience in their aircraft, and someone who has worked hard to get to where they are. Captain Bob has been out of the industry for 7 years, and Captain Shirley is fresh and clearly a hard worker. Since this would be her first time, we need to look again at 14 CFR 119.67, but this time we need to look at paragraph (b)(1). This says that if someone is becoming a Chief Pilot for the first time, they need 3 years of experience within the last 6 as PIC of a large airplane under 121 or 135. She has experience in the exact plane that Magis flies she fits this requirement. Another thing to consider for a first time Chief Pilot is an experience rating worksheet. This worksheet needs FAA approval and Captain Shirley would need a minimum of 360 points to qualify. A good resource to get additional information on this would be in 8901.1 CHG 815 2-162 D2. In addition to just meeting the PIC requirements for her airline, it mentions that she was also a check airman. This is a title Captain Bob does not have and shows she can be trusted to train and check new Magis pilots. Her additional experience in the KC-46 is also helpful because it is the same airframe as the Boeing 767. Magis plans to expand their fleet and move to international operations, and if they decide to add Boeing 767's to their fleet, her experience will prove to be valuable.

When seriously considering both candidates I think the best decision for Magis would be to hire Captain Shirley. She has much more experience on the type Magis flies which Captain Bob does not. Having this experience on your company's airplanes is very important for a Chief Pilot. Captain Bob has not worked with an airline for 7 years, and the airline he previously worked for had its certificate revoked due to safety concerns. Captain Shirley's clear drive and motivation to keep climbing the company ladder has been apparent and noticed by her peers. This would make her more personable and relatable to the pilots under her. Magis needs someone with the drive and specific experience Captain Shirley has. I think she is a strong candidate and if she continues working as hard as she has in the past, she will be a great Chief Pilot.

Thank you,

Ben Niederer

Consultant Team 5 Member

Week 2 Discussion - Key Personnel item options

You are part of a team of consultants hired by the Board of Directors of Magis Air, a Part 121 air carrier that has operated regional jets as a partner airline for Span America Airlines a legacy major airline. Span America has had its air carrier certificate revoked by the FAA and ceased operations.

The Board of Directors of Magis has decided to fill the void left by Span America and would like to grow the airline. They are focused on being the best airline in the industry for employees, customers and the general public. They strive to design the airline with an eye for "quamplurimi et quam apptissimi", that is "as many as possible of the very best". Unlike Span America, safety and compliance are paramount for them and the foundation of their operation. As ethical executives they expect sound moral judgement in the guidance you will provide to them even if it seems to conflict with their initial proposals.

Over the next 8 weeks you will be consulting them on decisions that they post to your team. You must provide them with sound advice from the content covered in that week from lectures, the text book, online references, material learned from other courses outside this, life experiences and possibly guest speakers. Discuss that advice on the discussion board and then make your final recommendation to Magis Air in bold type.

Week 2: Required Personnel, Airline Organization, Operations Manuals

Issue:

Capt. Chuck Reliable has just retired and Magis Air needs to hire a new Chief Pilot. Nothing else has changed at Magis yet. They are down to two options for candidates. Compare the two, make your recommendations and highlight any concerns you may have based on material covered in the text, lecture or other relevant information.

Option 1:

Captain Bob Bigwatch is a very experienced pilot who has an ATP rating and 15,000 hours with most of his time flying domestic, international and supplemental operations in the 747-400 for which he also holds a type rating. Some on the Board are very impressed by this because of the eventual hope to fly international long-haul flights. Although the current Magis fleet now consists of EMB 175 regional jets. Captain Bob was the former Chief Pilot at Wingingit Airlines for 10 years up until 7 years ago when he retired. This occurred shortly after Wingingit's air carrier certificate was revoked by the FAA for Safety Concerns regarding flight operations. Prior to Wingingit Airlines, Captain Bob was the manager of training and standards and Eastsky Airlines, a Part 121 air carrier that provided regional domestic service for Wingingit, as well as Span America Airlines. He is also a decorated, retired US Navy fighter pilot flying the F-18 Hornet.

Option 2:

Captain Shirley Ujest has an ATP rating and 9,000 hours, is type rated in the EMB-175 which is part of the Magis fleet, and for the last 5 years has experience as PIC of EMB-175. This would be her first time as a Chief Pilot. Captain Shirley is well respected by her fellow pilots at Magis having worked her way up from the bottom of seniority and proven to be an excellent pilot. She has been a check airman for Magis for two years. Captain Ujest is also a USAF ANG pilot, flying the KC-46 Pegaus as aircraft commander with the 157^{th} Air Refueling Wing out of Pease ANGB.

Team 4 Consulting

1 North Grand Blvd
St. Louis, MO 63103
harry.he@slu.edu | sebastian.valenzuela@slu.edu | mallory.machala@slu.edu | bojian.yu@slu.edu

February 4th 2023

The Board of Directors of Magis Air,

Our team has reviewed and discussed this event, and we have reached the following conclusions and suggestions.

First of all, Magis needs to ground the aircraft involved. Although these errors were made by Flemco Tecknec, 14 CFR 121.363 (a) stipulates that the carrier Magis shall be mainly responsible for the airworthiness of its aircraft, including the fuselage, aircraft engine, propeller, equipment and parts, and emergency equipment and parts shall comply with its manual. Because Magis has realized that the parts may not come from an approved source. Therefore, the aircraft involved is no longer airworthy and it should be grounded immediately.

As for the action after the aircraft is grounded, magis can evaluate the cost and decide whether to retire the aircraft in advance. If it decides not to retire the aircraft in advance, magis needs to find out whether uncalibrated tools and/or illegal parts are used on the aircraft through the maintenance log of the lake chasing mechanic. If uncalibrated tools or illegal parts are not used, the aircraft may be put into service again. If uncalibrated tools or illegal parts are used, Magis should find another part 145 MRO audited by CASE to conduct independent inspection of Flemco Technik's work. If it is decided to retire the aircraft in advance and sell it to other airlines, the above procedures need to be repeated. After the aircraft recovers its airworthiness, it can be sold. At the same time, the maintenance records and airworthiness release of the aircraft shall be transferred to the buyer at the time of sale. Finally, magis can also scrap the aircraft in advance, which will depend on the remaining life of the aircraft and its assessment of economic costs.

For Flemco Tecknec, we recommend that Megis immediately terminate all relations with Flemco Tecknec and continue to cooperate with companies using counterfeit parts, which will cause more potential safety problems and affect the company's reliability in the public. And we suggest that magis seek legal action against Flemco. Because according to the provisions of CFR 121.368, each maintenance provider must perform all covered work in accordance with the maintenance manual of the certificate holder. Flemco Tecknec's use of counterfeit parts violates this provision, so magis can claim compensation from Flemco through legal channels.

In general, we recommend that Magis terminate its cooperation with Flemco and ground the aircraft involved. After the aircraft recovers its airworthiness, it is decided to sell it or continue flying. Magis must not conceal the information that the aircraft uses fake parts to sell the aircraft. At the same time, Magis should sue Flemco through legal channels to obtain compensation.

Team 4

2/19/2023

TO
Board of Directors, Magis Air

From
Consultant Team 5

CC
Kenneth Weinburg

RE
Transitioning to join IATA

RECIPIENT NAME

Greetings,

As Magis air consultants, we feel that a number of issues, such as crew scheduling, training, limits, rules, and more will change after studying the concerns that Magis air sent to us. For Magis to go to the next significant stage of the company, the board of directors will need to abide by new regulations. According to CFR 121.463, Magis will have to meet additional requirements for its dispatchers. beginning with the initial dispatcher training (Except that someone who has successfully completed similar training for another type of airplane in the same group merely has to complete the appropriate transition training.) Moreover, operational familiarization entails spending at least 5 hours watching operations included in CFR 121.463.
As far as selecting alternates for flag operations in accordance with 121.621, the ceiling must be at least 1,500 feet above the circling MDA if it as a circling approach required, at least 1,500 feet above the lowest published instrument approach minimum or 2,000 feet above the airport elevation, and the visibility at the airport must be at least 3 SM or 2 SM above the lowest applicable visibility minimums (whichever is greater). There is also a concern that the flight can be along a route approved without an alternate if the aircraft meets the fuel requirements of 121.641(b) or 121.645(c). The weather at the alternate airport must be suitable for the operations specified by the certificate holder. In essence, the standards for visibility and ceiling for alternate airports in flag operations are stricter than those for domestic operations, as stated in 121.619.
Diversion to an airport that Magis does not frequently utilize could result in a few problems. Fuel, maintenance, baggage, equipment, and passenger care would be a significant problem. Generally, airlines have their ground crew ready to take care of the aircraft waiting for them at the destination airport. But if an aircraft had to divert for any reason to an airport that they do not usually operate in, Alliances can be useful in such situation as they can take care of the aircraft and use their ground crew. In addition, Magis need to rent out a gate of there are passengers involved in the flight.
The concerns that may encounter the crew from longer flights could be the necessity to use a new aircraft, which would necessitate new training. Due to this, pilots will need to undergo new type rating training after being removed from the current existing fleet which may take months to develop. Moreover, the rules for flying time and crew rest are extensively covered in 14 CFR 121.471. For example, it states that if a pilot is to fly for more than 8 hours during a period of 4 hours, they must have a rest period that is at least twice the number of hours flown since the preceding rest period at a or before the eight scheduled hours of duty. The rest period must be at least twice as long as the preceding rest period, but not less than 8 hours. The pilot must be relieved of all duty during this rest period. It also states that if flying more than 8

hours during 24 consecutive hours, the pilot must be given at least 18 hours of rest before being assigned to further duty.

High minimums captain basically indicates that some aircraft procedures and regulations have higher minimums since the pilot of the aircraft has less expertise flying the aircraft that they are operating. For example, a pilot who has not flown the kind of aircraft they will be flying for at least 100 hours as PIC. According to 14 CF 121.652, this increases the minimum ceiling and visibility criteria for landing by 100 feet and half a mile.

Ops Spec D.095 permits the certificate holder to replace a more specified MEL with an FAA-approved MMEL. The MMEL for the aircraft would then be used by aviation routers to route aircraft to maintenance facilities capable of complying with each of the repair categories.

Thank you,
Mohammed Alfawaz
Consultant Team 5 Member

2

Group Discussion: Week 5 Discussion

You are part of a team of consultants hired by the Board of Directors of Magis Air, a Part 121 air carrier that has operated regional jets as a partner airline for Span America Airlines a legacy major airline. Span America has had its air carrier certificate revoked by the FAA and ceased operations.

The Board of Directors of Magis has decided to fill the void left by Span America and would like to grow the airline. They are focused on being the best airline in the industry for employees, customers and the general public. They strive to design the airline with an eye for "quamplurimi et quam apptissimi", that is "as many as possible of the very best". Unlike Span America, safety and compliance are paramount for Magis and the foundation of their operation. As ethical executives they expect sound moral judgement in the guidance you will provide to them even if it seems to conflict with their initial proposals.

Over the next 8 weeks you will be consulting them on decisions that they post to your team. You must provide them with sound advice from the content covered in that week from lectures, the text book, online references, material learned from other courses outside this, life experiences and possibly guest speakers. Discuss that advice on the discussion board among your team during the week. Decide on your final recommendations and answers to the questions. Then, ONE teammember posts your final recommendation to Magis Air in a proper business response, before it is due. (I will review discussions to ensure everyone contributes fairly. Your team only needs one submission from a scribe.)

WEEK 5 - Operational Control

The Board at Magis has decided to follow your earlier advice regarding supplemental operations as well as joining IATA as part of their long-term strategy. Regardless of whether they expand or not they feel this can assist them in additional revenue significantly. Captain Shirley Ujest has been hired as the new Chief Pilot and is working with the Director of Operations on a strategy to train pilots for which they will reach out to you again in about a week. In the meantime, accomplishing the growth they expect will obviously require a new fleet, new routes and some significant changes to their Operations Center.

With this in mind they have the following questions:

1. What do they need to do to comply with 14 CFR 121.463 for this transition?
    1. What training do their dispatchers need?
2. For flight planning purposes how does flag operations differ when selecting alternates?

3. What might be some of the concerns with off-line alternate airports if they have to divert?
4. With these longer flights what concerns might crew scheduling now be faced with?
5. Changing fleets may result in "high minimums" captains. What does that mean? How might this impact planning purposes in relation to landing in bad weather?
6. Since Magis doesn't have line or base maintenance in every location that they fly to, how might aircraft routers be impacted when trying to comply with the repair categories A, B, C and D required in Ops Spec D.095 the approved minimum equipment list?

Week 6: Flight and Cabin Operations

Issue:

Recently at Magis a gate agent required a customer to gate check a bag that did not meet the size requirements in Magis' FAA approved Carry-On Baggage Program. The customer was a famous and influential politician from the airline's home district and an elite customer who voiced his displeasure. The Senior Flight Attendant and First Officer intervened and wanted to let the customer on with the bag because they determined there was room for the bag in the overhead bins so that it could be securely stowed. The gate agent explained that while there might be room the bag exceeded the approved size from Magis' FAA approved program.

What is the correct resolution to this issue that is safe and regulatorily compliant? Are there options? Cite your references in your response.

Follow up Policy Question

Post 9/11 at the creation of the TSA, the TSA established a requirement for carry-on baggage allowing only one carry on and a small personal item such as a purse or briefcase, which became known as 1+1. This was done to ensure efficiency in scanning and reduce the population of bags that could conceal weapons. If this restriction were to be lifted, Magis would have freedom to revise its carry-on baggage program. The program would still need FAA approval.

With this in mind if Magis were to consider revising their carry-on bag program from 1+1 and limiting the size to 9"x14"x22", what does your group suggest as a more effective way to manage carry-on bags?

1. Should they allow passengers to bring what they want until bins are full and too bad for late boarders?
2. Should they not allow any carry-on bags?
3. Should they charge for carry-on bags?
4. Should they be unlimited?

Consider the repercussions of your recommendation on safety as well as customer satisfaction and provide Magis leadership with options to select from and your recommended option.

Group Discussion: Week 7 Discussion

You are part of a team of consultants hired by the Board of Directors of Magis Air, a Part 121 air carrier that has operated regional jets as a partner airline for Span America Airlines a legacy major airline. Span America has had its air carrier certificate revoked by the FAA and ceased operations.

The Board of Directors of Magis has decided to fill the void left by Span America and would like to grow the airline. They are focused on being the best airline in the industry for employees, customers and the general public. They strive to design the airline with an eye for "quamplurimi et quam apptissimi", that is "as many as possible of the very best". Unlike Span America, safety and compliance are paramount for Magis and the foundation of their operation. As ethical executives they expect sound moral judgement in the guidance you will provide to them even if it seems to conflict with their initial proposals.

Over the next 8 weeks you will be consulting them on decisions that they post to your team. You must provide them with sound advice from the content covered in that week from lectures, the text book, online references, material learned from other courses outside this, life experiences and possibly guest speakers. Discuss that advice on the discussion board among your team during the week. Decide on your final recommendations and answers to the questions. Then, ONE teammember posts your final recommendation to Magis Air in a proper business response, before it is due. (I will review discussions to ensure everyone contributes fairly. Your team only needs one submission from a scribe.)

Magis leadership has decided that since they will be becoming a major airline they wish to become a "will carry" airline in regards to Hazmat/Dangerous Goods. They have several questions.

1. Which of their Ops Specs will be impacted by this change?
2. How will their Hazmat manual need to change?
3. How will this add to the pilot's training requirements if they now have to accept hazmat?
4. How will this benefit mechanics and storekeepers who need to move AOG parts that are considered hazmat?
5. The airplanes they plan to use don't have tie down points like military airplanes. Provide some options and recommendations. What is your team's recommendation for the best, most logical and cost efficient way to ensure they comply with 49CFR175.88 in regards to securing hazmat?

Performance Indicator Rubric

Course: ASCI 4012 Introduction to Flight Crew Operations Course Instructor: John Denando

Semester Taught: Fall 2022 Number of Students in Course: 28

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	(264/308) 86% of the class achieved a 70%	YES
SLO 3: Apply effective oral and written communication skills to function effectively in the aviation environment.	(75/84) 89% of the class achieved a 70%	YES
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	(210/280) 75% of the class achieved a 70%	YES

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

I believe there is still a lack of transfer of material from the classroom to the simulator. The majority of students reported not utilizing the CRJ training room in between simulator lessons. Given the normal maintenance issues this semester, one would assume the PC simulator would be used to maintain proficiency. However, since it was not mandated, it appears that this study resource was not used.

The Decision-making assessment is satisfactory in my opinion.

24 out 28 students began this course with an instrument rating. Evidence shows students have a rote level of learning pertaining to instrument operations in the national aviation environment. This course material sought for deeper understanding and actual application in the simulator of instrument procedures that the students are not able to be exposed to at the flight line. When asked to answer questions pertaining to regulations and whether we could takeoff or land, scores were lower than compared to SLO 1 assessment questions.

- I would suggest noting the initial instrument course that there is a difference between part 91 instrument operations and part 121/135 operations. Perhaps note some of the differences, but do not get into much depth.

All material used to evaluate student learning outcomes for this course were in the form of questions found on quizzes and exams.

SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.

1. **Quiz 1 Question 1 (SLO 1. 27/28 students answered correctly)**
   - The guidance and procedures found in the Billiken Air Express are <u>optional</u> to use when operating Billiken Air Express aircraft.
     - TRUE
     - **FALSE**

2. **Quiz 2 Question 8 (SLO 1. 28/28 students answered correctly)**
   - When a takeoff minimum is not published, the certificate holder may use the applicable standard takeoff minimum and any lower than standard takeoff minimums authorized by the operations specifications.
     - **TRUE**
     - FALSE

3. **Quiz 4 Question 14 (SLO 1. 25/28 students answered correctly)**
   - Current winds are 300 at 11, gusting 17. KSTL is landing runway 12L. Can we accept this?
     - Yes.
     - Yes, if the gusts go away.
     - **No.**

4. **Quiz 4 Question 17 (SLO 1. 28/28 students answered correctly)**
   - You are flying with the company's worst captain. He is high and fast, and at 240 KIAS asks for FLAPS 1, 8 and 20, and gear down to slow down. Can you do this?
     - Yes.
     - **NO**.
     - Yes, but you secretly wait until 230 KIAS to bring down the gear.

5. **Quiz 5 Question 9 (SLO 1. 18/28 students answered correctly)**
   - AT 10,000' MSL, the max airspeed of the CRJ700 is...
     - **335 KIAS**
     - 320 KIAS
     - 250 KIAS
     - 300 KIAS

6. **Mid-Term Question 37 (SLO 1. 28/28 students answered correctly)**
   - During takeoff, an engine failure occurs after V1. The crew should...

- **Regardless of if the aircraft is on the ground or in the air, continue the takeoff since the engine failure occurred after V1.**
- Reject the takeoff if the airplane is still on the runway.
- If airborne and less than 50 feet, reduce the power on the good engine to idle and land on the remaining runway.
- Have a quick discussion about what to do and then make a decision to continue or reject.

7. **Final Question 11 (SLO 1. 12/28 students answered correctly)**
   - Refer to the KMSP ILS RWY 30R. ATIS reports 3/4 mile visibility. Tower reports current RVR for 30R is TDZ 2400, ROLL 3000. Can we proceed past the final approach fix?
     - YES
     - **NO**

8. **Final Question 12 (SLO 1. 24/28 students answered correctly)**
   - Refer to the KMSP ILS RWY 30R. ATIS reports 1/4 mile visibility. Tower reports current RVR for 30R is TDZ 4000, ROLL 1200. Can we proceed past the final approach fix?
     - **YES**
     - NO

9. **Final Question 27 (SLO 1. 24/28 students answered correctly)**
   - You are on an ILS just outside the FAF, the gear is down and flaps 30. We are high and fast, and the PF calls flaps 45 at 180 KIAS. If you don't select flaps at this moment, you won't meet the stabilized approach criteria. As PM, you should...
     - Notify the PF that we are too fast for flaps 45, wait for him to slow, then select flaps 45 and continue.
     - Select flaps 45 and notify the PF we are high, and as long as he says **"CORRECTING"**, it is ok to continue.
     - **Notify the PF that we are too fast for flaps 45 and suggest a missed approach.**
     - Immediately select flaps 45, see if we are stable by 1,000' AFE, then determine whether or not to continue or execute a missed.

10. **Final Question 45 (SLO 1. 28/28 students answered correctly)**
    - Refer to the CLVIN RNAV departure. You are departing runway 4R, and ATC clears you, "Billiken 1012, RNAV to NITRN, runway 4R, cleared for takeoff." At 1,000 feet AFE, the PF commands "SPEED 250, FLAPS UP." As PM, you should...
      - Bug 250 because the PF said so.
      - **Bug 230 because of the speed restriction at NITRN and remind the PF of the speed restriction.**
      - Bug 200 and not tell the PF what or why you are doing that.
      - Do nothing and see if the PF catches it on their own.

11. **Final Question 66 (SLO 5. 22/28 students answered correctly)**
    - Refer to the CLVIN2 RNAV DEPARTURE. If tower says, "BILLIKEN 1012, RUNWAY 4R, RNAV TO NITRN, CLEARED FOR TAKEOFF." Above 10,000' what is the maximum speed we can fly until either 17,000' or advised by ATC.

- **280 KIAS**
- 250 KIAS
- 335 KIAS
- The speed listed in the climb section of the SOP Expanded Checklist

SLO 3: Apply effective oral and written communication skills to function effectively in the aviation environment.

1. **Quiz 1 Question 14 (SLO 3. 25/28 students answered correctly)**
   - In the SOP CHAPTER 2: OPERATIONAL GUIDANCE, there is guidance given on what to say when receiving altitude changes from ATC. Although there is specific wording in the manual, the pilot may change this as they please and put their own "spin" on it as long as they comply with the clearance.
     - TRUE
     - **FALSE**

2. **Quiz 4 Question 28 (SLO 3. 25/28 students answered correctly)**
   - The PF flies the aircraft outside of the Billiken Air Express stabilized approach criteria below 1,000' AFE. The runway is 12,000' long and the condition is dry. You have two thrust reversers and everything is working normally. As PM, you should...
     - say nothing, continue and land normally, then de-brief at the gate.
     - **call "unstable, missed approach".**
     - call "unstable" and ensure he/she corrects.
     - take the controls, then de-brief over Starbucks.
     - allow it to continue, then take the controls if it doesn't get better.

3. **Mid-Term Question 12 (SLO 3. 25/28 students answered correctly)**
   - You are flying with a new First Officer. He is high and behind the aircraft coming in for landing. He asks for flaps 1 at 235 KIAS. You should...
     - give him flaps 1 because there is nothing wrong with this scenario.
     - **tell him he is too fast and will give them to him when he is below the maximum flaps 1 speed.**
     - give him flaps 1 knowing that he is too fast because if you do not give him flaps 1 the approach will result in a go-around.
     - give him flaps 1 and suggest he follow it with flaps 8 and flaps 20 because we are high and fast.

SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.

1. **Quiz 4 Question 26 (SLO 5. 24/28 answered correctly)**
   - You are filed on a STAR (not an RNAV STAR). It has numerous EXPECT crossing restrictions on arrival. Even if ATC does not clear you to cross at this altitude, you must still cross at the altitude listed on the chart.
     - YES
     - **NO**

2. **Quiz 4 Question 27 (SLO 5. 25/28 answered correctly)**
   - On STARs that ARE NOT RNAV STARs, speed restrictions are still mandatory.
     - **TRUE**
     - FALSE

3. **Mid-Term Question 4 (SLO 5. 18/28 students answered correctly)**
   - An RNP approach in a foreign country is the same as a GPS (RNAV) in the United States and does not require any extra training.
     - **TRUE**
     - FALSE

4. **Mid-Term Question 17 (SLO 5. 26/28 students answered correctly)**
   - Standard Instrument Departures (SIDs) require an ATC clearance prior to being flown.
     - **TRUE**
     - FALSE

5. **Quiz 6 Question 7 (SLO 5. 27/28 students answered correctly)**
   - The Single-Engine Takeoff Path is an extension of the Captain’s emergency authority and must be stated as such to ATC as soon as practical.
     - **TRUE**
     - FALSE

6. **Final Question 14 (SLO 5. 8/28 students received full credit, 4/28 students received partial credit, 16/28 students received zero credit)**
   - Refer to the KMSP ILS RWY 30R. What is the final approach fix? (This question type was “short answer”. Each bullet point represents an example of real answer.)
     - **Glideslope intercept at the lowest published altitude (correct)**
     - Glideslope intercept at the highest altitude (incorrect)

- JACKO (incorrect)

- **Glideslope intercept at 3,000’ (correct)**

7. **Final Question 19 (SLO 5. 28/28 students answered correctly)**
   - Refer to the GOPHER 1 arrival. What speed must we be at crossing the GEP VOR? ATC has not assigned any speed on the arrival.
     - **Pilot's discretion/Billiken Air Express descent profile speed (as long as we are above 10,000', greater than 250 KIAS and less than 335 KIAS. Below 10,000, 250 KIAS)**
     - 300
     - 280
     - 250

8. **Final Question 20 (SLO 5. 14/28 students answered correctly)**
   - Refer to the GOPHER 1 arrival. ATC says, **"DESCEND AND MAINTAIN 11,000, MINNEAPOLIS ALTIMETER IS 29.97"**. You cross the GEP VOR at 12,200. Did you violate ATC's clearance?
     - YES
     - **NO**

9. **Final Question 32 (SLO 5. 10/28 students answered correctly)**
   - Reference KMSP 10-9A. Tower is reporting 1/4 SM visibility. No RVRs are usable. Runway 4 is in use (all other runways closed). Can we depart?
     - **Yes**
     - Yes, but we have to wait to the RVRs become usable or the visibility increase to standard takeoff minimums.
     - No

10. **Final Question 64 (SLO 5. 28/28 students answered correctly)**
    - The primary reason for a departure procedure is to provide obstacle clearance protection information to pilots. A secondary reason is to increase efficiency and reduce communications and departure delays using Standard Instrument Departures.
    - **TRUE**
    - FALSE

Performance Indicator Rubric

Course: ASCI 4013 Introduction to Flight Crew Operations Laboratory Course Instructor: John Denando

Semester Taught: Fall 2022 Number of Students in Course: 28

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = “C”)
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	100%	YES
SLO 3: Apply effective oral and written communication skills to function effectively in the aviation environment.	100%	YES
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	100%	YES

Course Assessment (Intended Use of Results)

Since the inception of this course in 2008, this is the first time the first twelve simulator lessons (lab section curriculum) of ASCI 4012 has changed. The material presented in the classroom served as a preview as to what would be covered the subsequent week in the lab. Based on instructor feedback, it did prove beneficial to the students. In the one group where I acted as their instructor, there were still weaknesses in areas that were taught in ASCI 3062 - Turbine Aircraft Transition.

Areas where I believe the simulator section could improve are as follows:

1. Mandate practice or study time in the PC lab with an instructor. I believe an amount of 30 minutes would provide a significant increase in the retention of material that should be retained.
2. Improve standardization among instructors.
3. Request a grading matrix from Bill Irwin who developed a matrix when he was the instructor of the course.
4. The inconsistency of the simulator schedule due to maintenance issues on the simulator continues to be an issue. Students sometimes go for weeks without going in the simulator, thus causing a lot of learning to be forgotten. This does not nullify the students’ ability to practice on their own, which needs to improve, however, it has consistently proved detrimental to learning since its beginning.

5. Prepare better study material/course schedule/outline so that students can better prepare for lab each week.

LESSON #5: Flight 1005

CA / PM: ____

FO / PF: ____

I. DESCENT

a. Perform Descent: D

i. Pilots correctly perform descent checklist procedures.
ii. Pilots maintain a sterile flight deck below 18,000 ft.
iii. Pilots correctly use ice protection, radar, and ignition.
iv. Pilots comply with descent profile speeds.
v. Pilots comply with STARs and ATC clearances.
vi. Pilots are aware of their fuel situation and have enough fuel to complete the flight safely.
vii. Pilots correctly operate the FMS.
viii. Pilots correctly operate the flight director and autopilot.
ix. PM correctly calls out deviations and errors.
x. Pilots comply with airspace and airspeed restrictions during an arrival into a non-radar environment.
xi. PF maintains airspeed within +/- 10 knots or .02 mach.
xii. PF maintains heading within +/- 5 degrees.
xiii. PF maintains altitude within +/- 100 ft.
xiv. NOTES:

1. **Both crew members unsure of appropriate "flows" for their respective seats.**
2. **Situational awareness was weak leading to airspeed deviations.**
3. **Unsure of how extend the runway centerline on the FMS.**
4. **PM did not make appropriate callouts when tolerances for airspeed were not maintained.**

b. Perform PF/PM Tasks: C

i. Pilots correctly enter approach into FMS.
ii. Pilots correctly set up navigation frequencies and courses.
iii. Pilots correctly set approach minimums.
iv. Pilots correctly calculate landing distance.
v. PM correctly set landing speeds.
vi. PF briefs weather.
vii. PF briefs the arrival, approach, airport, and NOTAMs.
viii. PF briefs highest threat.
ix. NOTES:

1. **Crew unsure what setting to use for minimums on the PFD.**
2. **Crew did not know how to set landing speeds.**

II. APPROACH:

a. Perform CAT I ILS Approach: B-

i. Pilots comply with the published approach procedure.

ii. Pilots correctly configure flaps and gear at appropriate times.

iii. PM correctly makes required callouts.
iv. PF correctly makes required callouts.
v. Pilots correctly perform before landing checklist.
vi. Pilots correctly identify the runway environment before descent below minimums.
vii. Pilots correctly decide to execute a missed approach when appropriate.
viii. Pilots correctly operate the FMS.
ix. Pilots correctly operate the flight director and autopilot.
x. PM correctly calls out deviations and errors.
xi. PF maintains no more than one-quarter deflection of the localizer and glide slope.
xii. PF maintains airspeed within +/- 5 knots.
xiii. PF maintains a stabilized approach.
xiv. NOTES:
1. Due to lack of studying, students behind on situational awareness and appropriate callouts.

III. LANDING:
a. Perform Normal Landing: B
i. PF lands in the touchdown zone, not to exceed one-third of the runway length.
ii. PF executes touchdown on the runway centerline.
iii. PF correctly uses brakes.
iv. PF correctly uses thrust reverse.
v. PM correctly makes required callouts.
vi. PF maintains positive directional control during the landing rollout.
vii. PM correctly calls out deviations and errors.
viii. PF maintains a stabilized flight path.
ix. PF maintains airspeed within +/- 5 knots.
x. NOTES:
1. Landing was performed to the level expected for this lesson.
2. Airspeed control was not within standard.

IV. SYSTEMS:
a. Operate Autopilot: C-
i. Autopilot general knowledge
ii. Autopilot controls and indications
iii. Autopilot limitations
iv. Autopilot operation
v. NOTES:
1. General autopilot knowledge and application is lacking considering this is lesson 5 and numerous modes and usage have been focused on the first four lessons.

V. HUMAN FACTORS:
a. Demonstrate Communication Skills: C-
i. Pilots use standard phraseology and language as specified in the SOP to communicate with other parties and in a manner that is clear to understand.

ii. Listeners seek clarification to unclear plans and communicators clarify ideas that were not clear to the listener.

iii. Pilots pre-brief operational requirements as well as identify threats, develop viable mitigation strategies for them, and communicate expectations to fellow crewmembers.
iv. Pilots debrief threats encountered and assess the outcome of employed mitigation strategies.
v. Pilots demonstrate teamwork by communicating concerns to fellow crewmembers and promptly and positively responding to communication from others.
vi. Pilots demonstrate willingness to receive constructive feedback and accept critiques without becoming defensive.
vii. NOTES:
1. **There was a lot confusion throughout the flight due to lack of studying. This caused a communication breakdown as neither pilot knew their specific role.**

b. Demonstrate Workload Management Skills: C+
i. Pilots prioritize tasks and distribute workload between PF/PM to manage the flight path and prioritize flying the airplane above all other tasks.
ii. Pilots create time to manage threats and make decisions to prevent task saturation.
iii. Pilots adjust automation levels to match situational demands, reduce workload for the crew, and enhance attention management.
iv. Pilots recognize phases of flight where they are most vulnerable to flight path deviations and strategically plan workload to manage distractions by completing non-monitoring tasks during lower areas of vulnerability
v. NOTES:
1. **When asked what tasks were to be accomplished prior to descent, the PM did not know what was supposed to be accomplished. This was covered in the previous lecture.**

c. Demonstrate Problem Solving/Decision Making Skills: NA
i. Captains follow the decision-making process to review assumptions, choose the most viable solution based on the data and continue to evaluate the decision for viability.
ii. Pilots determine the criticality of threats encountered and match decisions to manage the threats.
iii. Pilots use available resources to expand the team as necessary to manage threats and make sound decisions.
iv. First Officers contribute pertinent information to enhance the decision-making process.
NOTES:

d. Demonstrate Situational Awareness Skills: D
i. Pilots recognize potentially distracting situations and develop strategies to mitigate the distraction potential.
ii. Pilots recognize and communicate to other when individual awareness is low and work to raise awareness levels.
iii. Pilots maintain an awareness of the aircraft position and potential hazards associated with it.
iv. NOTES:
1. **Due to the lack of studying and preparation, the crew was consistently**

unaware of the aircraft position and energy state throughout the descent.

e. Demonstrate Monitor and Cross-Checking Skills: C
   i. Pilots demonstrate acceptance of a flight path monitoring responsibility by maintaining constant situational awareness of the aircraft's flight path and immediately bringing any concerns to the PF's attention.
   ii. Pilots communicate effectively with each other to develop and maintain a shared mental model of how to assure the flight path of the aircraft.
   iii. Pilots callout deviations from intended flight path as specified in the SOPM.
   iv. Pilots verify changes to flight path configuration and/or automation.
   v. Pilots monitor AC systems and status for threats to safety and callout observed indications.
   vi. Pilots comply with SOP PM assignments.
   vii. NOTES:
      1. The lack of coordination between the crew enhanced the confusion of the entire flight (from top of descent to landing).

f. Demonstrate Professionalism Skills: C-
   i. Pilots comply with the professional appearance, grooming, and dress standards as specified in the Billiken Air Express Pilot Policy Manual.
   ii. Pilots conduct themselves with an attitude, language, and demeanor aligned with Billiken Air Express guiding principles.
   iii. Pilots adjust leadership styles to match the situational demands and demeanor of the followers.
   iv. Captains assist the chief pilot in mentoring and furthering the progress of the SIC.
   v. First Officers apply the 10 rules of good followership as listed in the enhanced leadership manual.
   vi. Pilots demonstrate a commitment to being fully compliant with procedures.
   vii. Pilots correctly use Threat Management to organize CRM skills and manage anticipated/unanticipated threats.
   viii. NOTES:
      1. The lack of preparation was evident; more evident in one crewmember compared to the other. Such a lack of preparation had a significant negative impact on the other student's performance. When I asked questions and the student didn't know the answer, it caused multiple pauses in the lesson to "teach" material that the student should have had a better knowledge about. The material should have been more of a review, or this is how it is applied compared to having to teach it as it had never been discussed before.

LESSON #10: Flight 1010

CA / PM: [redacted]

FO / PF: [redacted]

I. TAKEOFF:
   a. Perform Engine Failure at V1: A-
      i. PF maintains directional control when the engine fails.
      ii. PF correctly makes required callouts.
      iii. PM correctly makes required callouts.
      iv. Pilots correctly retracts flaps.
      v. Pilots correctly comply with the single engine departure procedure.
      vi. Pilots correctly operate the flight director and autopilot.
      vii. PM correctly calls out deviations and errors.
      viii. PF maintains heading within +/- 10 degrees.
      ix. PF maintains airspeed within - 0/+ 5 knots.
      x. PF maintains acceleration altitude within +/- 100 ft.
      xi. NOTES:
         1.

II. APPROACH:

   a. Perform CAT I ILS Approach: A
      i. Pilots comply with the published approach procedure.
      ii. Pilots correctly configure flaps and gear at appropriate times.
      iii. PM correctly makes required callouts.
      iv. PF correctly makes required callouts.
      v. Pilots correctly perform before landing checklist.
      vi. Pilots correctly identify the runway environment before descent below minimums.
      vii. Pilots correctly decide to execute a missed approach when appropriate.
      viii. Pilots correctly operate the FMS.
      ix. Pilots correctly operate the flight director and autopilot.
      x. PM correctly calls out deviations and errors.
      xi. PF maintains no more than one-quarter deflection of the localizer and glide slope.
      xii. PF maintains airspeed within +/- 5 knots.
      xiii. PF maintains a stabilized approach.
      xiv. NOTES:
         1. PM didn't extend the center line/PF forgot to ask

   b. Perform Single-Engine Approach: B+
      i. Pilots comply with the published approach procedure.
      ii. Pilots correctly configure flaps and gear at appropriate times.
      iii. PM correctly makes required callouts.
      iv. PF correctly makes required callouts.
      v. Pilots correctly perform before landing checklist.

vi. Pilots correctly identify the runway environment before descent below minimums.

- vii. Pilots correctly decide to execute a missed approach when appropriate.
- viii. Pilots correctly operate the FMS.
- ix. Pilots correctly operate the flight director and autopilot.
- x. PM correctly calls out deviations and errors.
- xi. PF maintains no more than one-quarter deflection of the localizer and glide slope.
- xii. PF maintains airspeed within +/- 5 knots.
- xiii. PF maintains a stabilized approach.
- **xiv. NOTES:**
    1. **PF called for flaps 45, but corrected before flaps positioned – not sure PM was going to catch it.**

c. Perform Single-Engine Missed Approach: A
- i. Pilots correctly comply with the ATC instructions or charted missed approach procedure.
- ii. PM correctly makes required callouts.
- iii. PF correctly makes required callouts.
- iv. Pilots correctly operate the FMS.
- v. Pilots correctly operate the flight director and autopilot.
- vi. PM correctly calls out deviations and procedure errors.
- vii. PF descends no lower than -50 ft. below approach minimums on missed approach.
- viii. PF maintains acceleration altitude within +/- 100 ft.
- ix. PF maintains altitude within +/- 100 ft.
- x. PF maintains heading within +/- 5 degrees.
- **xi. NOTES:**
    1. Well done

III. LANDING:

a. Perform Single-Engine Landing: A
- i. PF lands in the touchdown zone, not to exceed one-third of the runway length.
- ii. PF executes touchdown on the runway centerline.
- iii. PF correctly uses brakes.
- iv. PF correctly uses thrust reverse.
- v. PM correctly makes required callouts.
- vi. PF maintains positive directional control during the landing rollout.
- vii. PM correctly calls out deviations and errors.
- viii. PF maintains a stabilized flight path.
- ix. PF maintains airspeed within +/- 5 knots.
- **x. NOTES:**
    1. Good

IV. SYSTEMS:

a. Operate Autopilot: A
- i. Autopilot general knowledge
- ii. Autopilot controls and indications
- iii. Autopilot limitations
- iv. Autopilot operation

v. **NOTES 1:**

1. Kyle is still clearly more proficient with the functionality of the FMS than Drew is

V. HUMAN FACTORS:

a. Demonstrate Communication Skills: A

i. Pilots use standard phraseology and language as specified in the SOP to communicate with other parties and in a manner that is clear to understand.

ii. Listeners seek clarification to unclear plans and communicators clarify ideas that were not clear to the listener.

iii. Pilots pre-brief operational requirements as well as identify threats, develop viable mitigation strategies for them, and communicate expectations to fellow crewmembers.

iv. Pilots debrief threats encountered and assess the outcome of employed mitigation strategies.

v. Pilots demonstrate teamwork by communicating concerns to fellow crewmembers and promptly and positively responding to communication from others.

vi. Pilots demonstrate willingness to receive constructive feedback and accept critiques without becoming defensive.

vii. NOTES:

1. All communications clear and concise

b. Demonstrate Workload Management Skills: A

i. Pilots prioritize tasks and distribute workload between PF/PM to manage the flight path and prioritize flying the airplane above all other tasks.

ii. Pilots create time to manage threats and make decisions to prevent task saturation.

iii. Pilots adjust automation levels to match situational demands, reduce workload for the crew, and enhance attention management.

iv. Pilots recognize phases of flight where they are most vulnerable to flight path deviations and strategically plan workload to manage distractions by completing non-monitoring tasks during lower areas of vulnerability

v. NOTES:

1. Reminded both to start arrival tasks earlier (ATIS/speeds)

c. Demonstrate Problem Solving/Decision Making Skills: A

i. Captains follow the decision-making process to review assumptions, choose the most viable solution based on the data and continue to evaluate the decision for viability.

ii. Pilots determine the criticality of threats encountered and match decisions to manage the threats.

iii. Pilots use available resources to expand the team as necessary to manage threats and make sound decisions.

iv. First Officers contribute pertinent information to enhance the decision-making process.

v. NOTES:

1.

d. Demonstrate Situational Awareness Skills: A

i. Pilots recognize potentially distracting situations and develop strategies to mitigate the distraction potential.

ii. Pilots recognize and communicate to other when individual awareness is low and work

to raise awareness levels.

iii. Pilots maintain an awareness of the aircraft position and potential hazards associated with it.

iv. NOTES:

1.

e. Demonstrate Monitor and Cross-Checking Skills: A

i. Pilots demonstrate acceptance of a flight path monitoring responsibility by maintaining constant situational awareness of the aircraft's flight path and immediately bringing any concerns to the PF's attention.

ii. Pilots communicate effectively with each other to develop and maintain a shared mental model of how to assure the flight path of the aircraft.

iii. Pilots callout deviations from intended flight path as specified in the SOPM.

iv. Pilots verify changes to flight path configuration and/or automation.

v. Pilots monitor AC systems and status for threats to safety and callout observed indications.

vi. Pilots comply with SOP PM assignments.

vii. NOTES:

1.

f. Demonstrate Professionalism Skills: A

i. Pilots comply with the professional appearance, grooming, and dress standards as specified in the Billiken Air Express Pilot Policy Manual.

ii. Pilots conduct themselves with an attitude, language, and demeanor aligned with Billiken Air Express guiding principles.

iii. Pilots adjust leadership styles to match the situational demands and demeanor of the followers.

iv. Captains assist the chief pilot in mentoring and furthering the progress of the SIC.

v. First Officers apply the 10 rules of good followership as listed in the enhanced leadership manual.

vi. Pilots demonstrate a commitment to being fully compliant with procedures.

vii. Pilots correctly use Threat Management to organize CRM skills and manage anticipated/unanticipated threats.

viii. NOTES:

1.

LESSON #12: Flight 1012

CA / PM:

FO / PF:

I. TAKEOFF:

a. Perform Normal Takeoff: **A-**

i. Pilots correctly use ice protection, radar, and ignition as required.
ii. Pilots correctly transfer the controls (if applicable).
iii. Pilots correctly set thrust.
iv. PF correctly rotates.
v. PF correctly makes required callouts.
vi. PM correctly makes required callouts.
vii. PM correctly retracts flaps.
viii. Pilots correctly operate the flight director and autopilot.
ix. PM correctly calls out deviations and errors.
x. PF maintains centerline during takeoff roll.
xi. PF maintains heading within +/- 5 degrees.
xii. PF maintains airspeed within -0/+ 10 knots.
xiii. NOTES:

b. Perform Engine Failure at V1: **B**

i. PF maintains directional control when the engine fails.
ii. PF correctly makes required callouts.
iii. PM correctly makes required callouts.
iv. Pilots correctly retracts flaps.
v. Pilots correctly comply with the single engine departure procedure.
vi. Pilots correctly operate the flight director and autopilot. **No**
vii. PM correctly calls out deviations and errors.
viii. PF maintains heading within +/- 10 degrees.
ix. PF maintains airspeed within - 0/+ 5 knots.
x. PF maintains acceleration altitude within +/- 100 ft.
xi. NOTES:
1. 2 hands on the autopilot at the same time

II. DESCENT

a. Perform Descent: **B+**

i. Pilots correctly perform descent checklist procedures.
ii. Pilots maintain a sterile flight deck below 18,000 ft.
iii. Pilots correctly use ice protection, radar, and ignition.
iv. Pilots comply with descent profile speeds.
v. Pilots comply with STARs and ATC clearances.
vi. Pilots are aware of their fuel situation and have enough fuel to complete the flight safely.
vii. Pilots correctly operate the FMS.

viii. Pilots correctly operate the flight director and autopilot.

ix. PM correctly calls out deviations and errors.
x. Pilots comply with airspace and airspeed restrictions during an arrival into a non-radar environment.
xi. PF maintains airspeed within +/- 10 knots or .02 mach.
xii. PF maintains heading within +/- 5 degrees.
xiii. PF maintains altitude within +/- 100 ft.
xiv. NOTES:
1. Did not assess on lights and anti-ice

b. Perform PF/PM Tasks: **B-**
i. Pilots correctly enter approach into FMS.
ii. Pilots correctly set up navigation frequencies and courses.
iii. Pilots correctly set approach minimums.
iv. Pilots correctly calculate landing distance.
v. PM correctly set landing speeds.
vi. PF briefs weather.
vii. PF briefs the arrival, approach, airport, and NOTAMs.
viii. PF briefs highest threat.
ix. NOTES:
1. Nothing beyond the approach was briefed

III. APPROACH:

a. Perform LOC Approach: **A**
i. Pilots comply with the published approach procedure.
ii. Pilots correctly configure flaps and gear at appropriate times.
iii. PM correctly makes required callouts.
iv. PF correctly makes required callouts.
v. Pilots correctly perform before landing checklist.
vi. Pilots correctly identify the runway environment before descent below minimums.
vii. Pilots correctly decide to execute a missed approach when appropriate.
viii. Pilots correctly operate the FMS.
ix. Pilots correctly operate the flight director and autopilot.
x. PM correctly calls out deviations and errors.
xi. PF maintains no more than one-quarter deflection of the LOC.
xii. PF maintains airspeed within +/- 5 knots.
xiii. PF maintains a stabilized approach.
xiv. NOTES:
1. Did RNAV instead, no issues

b. Perform Missed Approach Procedure: **B-**
i. Pilots correctly comply with the ATC instructions or charted missed approach procedure.
ii. PM correctly makes required callouts.
iii. PF correctly makes required callouts.
iv. Pilots correctly operate the FMS.

v. PM correctly retracts flaps.
vi. Pilots correctly operate the flight director and autopilot.

vii. PM correctly calls out deviations and procedure errors.
viii. PF descends no lower than -50 ft. below approach minimums on missed approach.
ix. PF maintains altitude within +/- 100 ft.
x. PF maintains heading within +/- 5 degrees.
xi. NOTES:
1. Late to go around

c. Perform CAT I ILS Approach: **A**
xv. Pilots comply with the published approach procedure.
xvi. Pilots correctly configure flaps and gear at appropriate times.
xvii. PM correctly makes required callouts.
xviii. PF correctly makes required callouts.
xix. Pilots correctly perform before landing checklist.
xx. Pilots correctly identify the runway environment before descent below minimums.
xxi. Pilots correctly decide to execute a missed approach when appropriate.
xxii. Pilots correctly operate the FMS.
xxiii. Pilots correctly operate the flight director and autopilot.
xxiv. PM correctly calls out deviations and errors.
xxv. PF maintains no more than one-quarter deflection of the localizer and glide slope.
xxvi. PF maintains airspeed within +/- 5 knots.
xxvii. PF maintains a stabilized approach.
xxviii. NOTES:
1. Well executed

d. Perform Single-Engine Approach: **B-**
xxix. Pilots comply with the published approach procedure.
xxx. Pilots correctly configure flaps and gear at appropriate times. **No**
xxxi. PM correctly makes required callouts.
xxxii. PF correctly makes required callouts. **No**
xxxiii. Pilots correctly perform before landing checklist.
xxxiv. Pilots correctly identify the runway environment before descent below minimums.
xxxv. Pilots correctly decide to execute a missed approach when appropriate.
xxxvi. Pilots correctly operate the FMS.
xxxvii. Pilots correctly operate the flight director and autopilot.
xxxviii. PM correctly calls out deviations and errors.
xxxix. PF maintains no more than one-quarter deflection of the localizer and glide slope.
xl. PF maintains airspeed within +/- 5 knots.
xli. PF maintains a stabilized approach.
xlii. **NOTES:**
1. PF tried to configure full flaps before PM stopped him

IV. LANDING:
a. Perform Single-Engine Landing: **B-**
i. PF lands in the touchdown zone, not to exceed one-third of the runway length.
ii. PF executes touchdown on the runway centerline.

iii. PF correctly uses brakes.
iv. PF correctly uses thrust reverse.

v. PM correctly makes required callouts.
vi. PF maintains positive directional control during the landing rollout.
vii. PM correctly calls out deviations and errors.
viii. PF maintains a stabilized flight path.
ix. PF maintains airspeed within +/- 5 knots.
x. NOTES:
1. Trouble keeping centerline

V. SYSTEMS:
a. Operate Autopilot: **A**
i. Autopilot general knowledge
ii. Autopilot controls and indications
iii. Autopilot limitations
iv. Autopilot operation
v. NOTES:
1.

VI. HUMAN FACTORS:
a. Demonstrate Communication Skills: **B**
i. Pilots use standard phraseology and language as specified in the SOP to communicate with other parties and in a manner that is clear to understand.
ii. Listeners seek clarification to unclear plans and communicators clarify ideas that were not clear to the listener.
iii. Pilots pre-brief operational requirements as well as identify threats, develop viable mitigation strategies for them, and communicate expectations to fellow crewmembers.
iv. Pilots debrief threats encountered and assess the outcome of employed mitigation strategies. **No**
v. Pilots demonstrate teamwork by communicating concerns to fellow crewmembers and promptly and positively responding to communication from others.
vi. Pilots demonstrate willingness to receive constructive feedback and accept critiques without becoming defensive.
vii. NOTES LEG 1:
1. PM corrected PF multiple times

b. Demonstrate Workload Management Skills: **A**
i. Pilots prioritize tasks and distribute workload between PF/PM to manage the flight path and prioritize flying the airplane above all other tasks.
ii. Pilots create time to manage threats and make decisions to prevent task saturation.
iii. Pilots adjust automation levels to match situational demands, reduce workload for the crew, and enhance attention management.
iv. Pilots recognize phases of flight where they are most vulnerable to flight path deviations and strategically plan workload to manage distractions by completing non-monitoring tasks during lower areas of vulnerability
v. NOTES:
1.

c. Demonstrate Problem Solving/Decision Making Skills: **B-**

i. Captains follow the decision-making process to review assumptions, choose the most viable solution based on the data and continue to evaluate the decision for viability.
ii. Pilots determine the criticality of threats encountered and match decisions to manage the threats.
iii. Pilots use available resources to expand the team as necessary to manage threats and make sound decisions.
iv. First Officers contribute pertinent information to enhance the decision-making process.
v. NOTES:
1. Captain regularly corrected and prompted first officer into callouts

d. Demonstrate Situational Awareness Skills: B
i. Pilots recognize potentially distracting situations and develop strategies to mitigate the distraction potential.
ii. Pilots recognize and communicate to other when individual awareness is low and work to raise awareness levels.
iii. Pilots maintain an awareness of the aircraft position and potential hazards associated with it.
iv. NOTES:
1.

e. Demonstrate Monitor and Cross-Checking Skills: **B**
i. Pilots demonstrate acceptance of a flight path monitoring responsibility by maintaining constant situational awareness of the aircraft's flight path and immediately bringing any concerns to the PF's attention.
ii. Pilots communicate effectively with each other to develop and maintain a shared mental model of how to assure the flight path of the aircraft.
iii. Pilots callout deviations from intended flight path as specified in the SOPM.
iv. Pilots verify changes to flight path configuration and/or automation.
v. Pilots monitor AC systems and status for threats to safety and callout observed indications.
vi. Pilots comply with SOP PM assignments.
vii. NOTES:
1. Missed several "check speed" calls

f. Demonstrate Professionalism Skills: **A-**
i. Pilots comply with the professional appearance, grooming, and dress standards as specified in the Billiken Air Express Pilot Policy Manual.
ii. Pilots conduct themselves with an attitude, language, and demeanor aligned with Billiken Air Express guiding principles.
iii. Pilots adjust leadership styles to match the situational demands and demeanor of the followers.
iv. Captains assist the chief pilot in mentoring and furthering the progress of the SIC.
v. First Officers apply the 10 rules of good followership as listed in the enhanced leadership manual.
vi. Pilots demonstrate a commitment to being fully compliant with procedures.

vii. Pilots correctly use Threat Management to organize CRM skills and manage anticipated/unanticipated threats.

viii. NOTES:

1.

Performance Indicator Rubric

Course: ASCI 4022 Advanced Flight Crew Operations Course Instructor: John Denando

Semester Taught: Spring 2023 Number of Students in Course: 28

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	100%	Yes
SLO 3: Apply effective oral and written communication skills to function effectively in the aviation environment.	100%	Yes
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	100%	Yes

Course Assessment (Intended Use of Results)

Students do well on quizzes and that does not transfer over to the simulator. Perhaps being in the classroom more than once a week will help.

Students often lack critical thinking skills. It appears that it is not being taught early in their training. Improve this with the flight instructors and on the flight line and you will see improvements in this course.

<u>SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.</u>

Quiz 1, Question 1: 26/28 (93%) answered correctly.

The SOP provides guidance to crews on how to operate Billken Air Express aircraft and compliance within the procedures found in the manual is at the discretion of the captain. For example, captains may develop their takeoff briefing and use that in lieu of using the example found in the Billiken Air Express SOP.

- True
- **<u>False</u>**

Quiz 1, Question 10: 25/28 (89%) answered correctly.

When arriving to the airport from an overnight, crews must be...

- At the gate 35 minutes prior to departure
- At the airport 35 minutes prior to departure
- At the airport 45 minutes prior to departure
- **<u>At the gate 45 minutes prior to departure</u>**

Quiz 1, Question 22: 21/28 (75%) answered correctly.

It is June in Dallas and 95 degrees. We should use the______during power up and boarding.

- Either the GPU or APU
- **APU**
- GPU

Quiz 3, Question 12:

During cruise, you get an ACARS message from dispatch stating the destination weather is 10 miles, with overcast skies at 1800' (10 SM, OVC 018). <u>Select the correct statements</u> from the following...

- Disregard the message and go back to (illegally) playing your saved BROOKLYN CUZZO videos from your phone.
- **<u>If both the PIC and Dispatcher agree the flight can be operated safely, continue to the destination without adding an alternate.</u>** 23/28 answered correctly.
- Sip on some Starbucks before deciding NOT to respond to dispatch.
- **<u>Divert and get more fuel.</u>** 20/28 answered correctly.
- **<u>Add an alternate that is close enough to be within the fuel burn capability of the aircraft. (Alternate is 20 minutes away and we are landing with 30 minutes more than our reserve fuel).</u>** 23/28 answered correctly.

- Do not respond to dispatch at all.

Mid-Term Question 1:

Select the following instances when a missed approach would be appropriate.

- In VMC conditions after the runway in sight call has been made, a malfunction of the navigation equipment. 25/28
- **In IMC conditions after the runway in sight call has been made, a malfunction of the navigation equipment.** 28/28
- **The approach becomes unstable.** 27/28
- **Upon reaching minimums the runway is not in sight.** 26/28

SLO 3: Apply effective oral and written communication skills to function effectively in the aviation environment.

Quiz 1, Question 5: 23/28 (83%) answered correctly.

In flight, who reads the Quick Reference Checklist (QRC)?

- CA
- FO
- PF
- **PM**

Quiz 3, Question 17: 28/28 (100%) answered correctly.

The pilot in command and an authorized aircraft dispatcher shall sign the release only if they both believe that the flight can be made with safety. However, if the dispatcher feels it is safe to go and the captain does not, the flight is still legal to depart.

- True
- **False**

Quiz 4, Question 19: 25/28 (89%) answered correctly.

Use standard ICAO radio phraseology (see Jeppesen, Air Traffic Control section). Be clear and concise and state each digit of a number separately, e.g. "Billiken Air Four One Six Three" instead of "Billiken Air Forty One Sixty Three."

- **True**
- False

SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.

Mid-Term, Question 5: 28/28 (100%) answered correctly.

During any abnormality in flight, it is more important to get the QRH read immediately, before ensuring the aircraft's flight path is appropriate and stable.

- True
- **False**

Mid-Term Question 25: 20/28 (71%) answered correctly.

During taxi out, the right engine catches fire. The captain reaches over, without communicating anything to the First Officer, and shuts off the engine using the thrust lever. Is the consistent with Billiken Air Express procedures?

- Yes
- **No**

Performance Indicator Rubric

Course: ASCI 4023 Advanced Flight Crew Operations Laboratory Course Instructor: John Denando

Semester Taught: Spring 2023 Number of Students in Course: 28

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	100%	Yes
SLO 3: Apply effective oral and written communication skills to function effectively in the aviation environment.	100%	Yes
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	100%	Yes

Course Assessment (Intended Use of Results)

This semester presented challenges that I have never seen in my 15 years teaching in the simulator. My assumption is that the frustration due to issues with the simulator consistently not working properly bled over to everyone's attitude in accomplishing all lessons with professional instruction. Both students and instructors seemed to prefer not to accomplish lessons rather than find time to make them up. Based on input from other instructors, material from the classroom as well as previous courses did not transfer into the simulator as hoped. Weekly homework may help improve the transfer, but that assumes the student puts in the time to study. Student's grades on quizzes do not correlate with the performance in the simulator. I believe many received higher grades than they should have; this was discussed with instructors before, but between a lack of instructor experience and the simulator not working, my view for this course has a long way to go. In conjunction with my resignation, perhaps it is time to lower the standard and expectations of the students for this course. It is disheartening to write that, but I believe "the sim breaking" only goes so far.

Out of the 9 instructors, only 2 have professional experience in the areas covered during this course. With smaller class sizes, I could be more selective with whom I asked to instruct in the sim. Due to the size of this class, we struggled to get instructors to teach the course, let alone

instructors with professional experience or instructors whom I would have personally asked to teach for me.

I would suggest making this course optional for those who want to put in the effort, increase the amount of time spent studying outside the classroom, or perhaps what will be a significant improvement is having the course 2-3 times a week. As discussed many times, students without an instrument rating have no business in the course. Not only does it negate their learning, but it also hinders the learning of their simulator partner.

Student Debriefing Example 1

- Our eighth simulator was a LOFT from Minneapolis to Cedar Rapids. This lesson was our final one of the semester to evaluate whether or not we could effectively use CRM to get from our origin to our destination.

  The original plan for the LOFT was going to incorporate a scenario that included us coming into a windshear scenario in Cedar Rapids. Upon briefing the scenario on the release and realizing that there was added contingency fuel for an alternate at Des Moines, our plan was to go to Cedar Rapids, shoot the approach, and if we went missed, we would elect to divert because the winds were more favorable in Des Moines.

  Upon briefing our plan with our instructor, he believed that we had the right plan in place and elected to change the lesson to do the planned flight with no windshear, but to make sure that we could go through the flows and callouts correctly for the CRJ-700.

  Both of us did a great job from the start to finish briefing the flight, talking with ATC. I don't believe that we had any major issues other than being rusty with our flows once on the ground.

  I believe that this course has been very helpful in preparing me to become a future pilot for a turbine jet in the future and to work toward operating a safe flight with another person in the seat next to me and knowing how to communicate with them. Although the course didn't have enough time to go through all of the material, it was great to get a glimpse at what I could be experiencing in the next few years after college. I am forever grateful for this opportunity, and I hope to someday apply my learning and knowledge in the aeronautical industry.

Student Debriefing Example 2.

- For the seventh lab, we completed our second LOFT that consisted of traveling to KDEN from KRAP airport. Compared to our first LOFT, I thought that it went a lot smoother for a few reasons. I was acting as captain/PM and Michael was acting as FO/PF. Our startup, taxi out, takeoff, and cruise procedures were very smooth, as our callouts and flows were practiced beforehand and memorized. For the WARTS briefing, we had to ensure that we briefed the weather extra carefully due to thunderstorms arising and forming to the east of Denver, and ensured that, with the given conditions and circumstances relating to fuel, our alternate (KCOS) could be reached.

  Once we reached our cruising altitude, we briefed the upcoming STAR and approach procedures to ensure that we were prepared for what we could expect to happen, as well as get ahead of the airplane. However, we noticed that the fuel situation onboard was below what we anticipated once we flew closer to KDEN. We informed ATC of the situation, and received vectors towards KDEN and successfully completed an instrument approach into the airport. Michael and I's procedures for descent, approach, and landing operations were smooth and portrayed effective CRM, communication, and efficiency skills.

  This LOFT was successful, even though there were minor mistakes with a few flows towards the end of the lesson. Michael and I noticed the fuel situation and followed correct emergency and ATC procedures to correct for it, as well as worked together to ensure the safety of the aircraft was not compromised during any phase of flight. We are confident that we can bring these skills to our next LOFT operation so it will

be safe and successful!

Student Debriefing Example 3

- In today's lesson we went through all the checklist from the gate to the runway. We found out some mistakes we made from Donny's class. For example, we should do the flow independently and silently first, and then do the normal checklist. We also realized that there is a lot of memorization work that needs to be done. Basically, we need to remember all the expansion checklists, especially for things like the FLIGHT INSTRUMENT setup, pilot flying will need to state, "THE AUTOPILOT IS COUPLED TO MY SIDE, ALITITUDE PRE-SELECT ( ), ALTIMETER (_), HEADING BUG SET FOR RUNWAY (__)." Overall, it is not an easy job. We need to work together. Hopefully we can do as complete as possible for the next sim lesson.

CA / PM: Student 1

FO / PF: Student 2

I. PRE-DEPARTURE GROUND OPERATIONS:

a. Report for duty: **A**

i. Pilots report to the aircraft on time.
ii. Pilots report fit for duty.
iii. Pilots report for duty with a flashlight.
iv. Pilots report for duty with a headset.
v. Pilots report for duty with a current company identification badge.
vi. Pilots report for duty with a pilot certificate with appropriate type and class endorsement.
vii. Pilots report for duty with a current FAA medical certificate.
viii. Pilots report for duty with a valid passport.
ix. Pilots report for duty with an FCC radio permit.
x. Pilots report for duty wearing a Billiken Air Express approved uniform.
xi. NOTES:

b. Perform crew briefing: **F**

i. Captain correctly conducts the initial crew briefing.
ii. Captain correctly briefs cabin crew on pertinent items prior to each flight.
iii. NOTES:

1. Neither crew did not perform the required briefing.

c. Perform external inspection: **A**

i. Pilots correctly perform an external inspection prior to and after each flight.

d. Perform Originating Checklist: **CA: C+ and FO: B**-

i. Captain correctly performs originating checklist flow.
ii. First Officer correctly performs originating checklist flow.
iii. Pilots correctly perform challenge and response checklist.
iv. NOTES:

1. CA turned on beacon (should be turned on during ENGINE START flow).
2. CA no hydraulic test. When I prompted him to do it, it was done incorrectly. Also left pumps running after test

complete.

3. **FO turned probes ON (should be done during PRE-TAXI flow)**

4. **FO did not turn on thrust reversers.**
5. **FO turned emergency lights ON instead of ARMED.**

e. Perform Pre-Start Checklist: **CA: F and FO: A-.**

i. Captain correctly performs prestart checklist tasks.
ii. First Officer correctly performs prestart checklist tasks.
iii. PF correctly performs PF prestart checklist tasks.
iv. PM correctly performs PM prestart checklist tasks.
v. Pilots correctly perform challenge and response checklist
vi. NOTES:

1. **CA did not know how to set up FMS. Was entering in each fix individually.**
    a. **CA did not set up MFDs correctly.**

f. Perform Takeoff Briefing: **A-**

i. PF briefs weather.
ii. PF briefs the airport, rejected takeoff plan, area departure, NOTAMs, and engine out procedure.
iii. PF verifies the route in the FMS against the clearance PMs.
iv. PF briefs highest threat.
v. NOTES:

1. **Did not verify fixes in FMS against the charts.**
2. **Flight instruments, "autopilot coupled to my side…" not accomplished.**
3. **Single-engine departure procedure not briefed.**

g. Perform Weight and Balance: NA

i. CA ensures weight and balance is calculated

h. Perform Engine Start Checklist and Pushback: **CA:F and FO: D**

i. Captain correctly performs engine start checklist flow.
ii. Captain and or First Officer correctly performs engine start checklist tasks.
iii. Pilots correctly perform challenge and response checklist.
iv. Pilots correctly perform pushback.
v. Pilots correctly start engines.
vi. NOTES:

1. **Before the checklist, while at the gate putting in takeoff data and cargo door open, CA reached over sets flaps to 20.**

2. CA called for checklist before doing flow.

3. **CA calling metering on ramp frequency.**
4. **Called for push on COMM 1 and no communication with ramp crew established before calling.**
5. **Doing checklist without the flow and CA calling fuel pumps ON when not actually on.**
6. **FO called hydraulic pumps and CA turned off both Hydraulic SOVs.**
7. **CA turned on fuel crossflow before starting engines during pushback.**
8. **CA introduced fuel… FO pressed the start button. Did for #1 engine as well**
   a. **"Good start on engine 1 at 45%"**
9. **FO told ramp it's ok to disconnect.**

i. Perform Aborted Start: NA
   i. Pilots correctly recognize abnormal start indications.
   ii. Pilots correctly perform start abort memory item.
   iii. Pilots correctly complete start abort QRC and QRH procedure.
   iv. NOTES:

j. Perform Pre-Taxi Checklist: **CA: C- and FO: B+**
   i. Captain correctly performs taxi checklist flow.
   ii. First Officer correctly performs taxi checklist flow.
   iii. Pilots correctly perform challenge and response checklist.
   iv. NOTES:
      1. **CA turned on thrust reversers (part of FO's ORIGINATING FLOW)**
      2. **EICAS status messages boxed.**

k. Perform Taxi: **CA: B and FO: B+**
   i. Captain conducts a single engine taxi when conditions permit.
   ii. First Officer correctly performs engine start procedure during taxi.
   iii. First Officer writes down complex taxi instructions.
   iv. Pilots comply with taxi instructions issued by ATC.
   v. Pilots correctly use aircraft deicing/anti-icing equipment during taxi.
   vi. Captain taxis aircraft at a safe speed.
   vii. Pilots use correct procedures when crossing active runways.
   viii. Pilots maintain a sterile flight deck.
   ix. Pilots have the airport diagram chart available for reference during taxi.
   x. First Officer correctly calls out deviations and errors.

xi. NOTES:

1. **Put 121.72 and not 121.75 in frequency.**
2. **CA did not have taxi diagram out and visible.**
3. **Missed taxiway Victor (can be difficult to see in sim).**

l. Perform Before Takeoff Checklist: **CA: and FO: D.**

i. First Officer correctly performs before takeoff checklist to the line flow.
ii. First Officer correctly performs before takeoff checklist to the line tasks.
iii. Captain correctly performs before takeoff below the line checklist flow.
iv. First Officer correctly performs before takeoff checklist below the line flow.
v. Pilots correctly perform challenge and response checklist.
vi. NOTES:
   1. **Transmitted on ground, did not call FAs and get "cabin secure".**
   2. **CA called for "Below the line" part of the checklist before getting cleared to cross the runway**
      a. **CAS "checked/cleared" not done appropriately.**
   3. **Told to monitor tower and FO called tower.**

II. TAKEOFF:

a. Perform Normal Takeoff: **CA/PM: C and FO/PF: B**

i. Pilots correctly use ice protection, radar, and ignition as required.
ii. Pilots correctly transfer the controls (if applicable).
iii. Pilots correctly set thrust.
iv. PF correctly rotates.
v. PF correctly makes required callouts.
vi. PM correctly makes required callouts.
vii. PM correctly retracts flaps.
viii. Pilots correctly operate the flight director and autopilot.
ix. PM correctly calls out deviations and errors.
x. PF maintains centerline during takeoff roll.
xi. PF maintains heading within +/- 5 degrees.
xii. PF maintains airspeed within -0/+ 10 knots.
xiii. NOTES:
   1. **Clearance "turn left heading 180" and cleared for takeoff and FO set the heading to 180 while on the ground. Fixed it before beginning takeoff roll.**
   2. **CA moves up thrust levers and said, "Check thrust" even though he wasn't PF.**
   3. **PF forgot and CA did not recognize TOGA buttons were not pressed.**

4. “Speed mode heading mode” called before V2+20

III. CLIMB:

a. Climb: **CA/PM: B and FO/PF: A-**

  i. PM correctly performs after takeoff checklist.
  ii. Pilots maintain a sterile flight deck through 10,000 ft.
  iii. Pilots correctly use ice protection, radar, and ignition.
  iv. Pilots comply with climb profile speeds.
  v. Pilots comply with SIDs and ATC clearances.
  vi. Pilots correctly operate the FMS.
  vii. Pilots correctly operate the flight director and autopilot.
  viii. PM correctly calls out deviations and errors.
  ix. PF maintains airspeed within +/- 10 knots or .02 mach.
  x. PF maintains heading within +/- 5 degrees.
  xi. PF maintains altitude within +/- 100 ft
  xii. NOTES:
    1. **After T/O checklist missed fuel crossflow to MANUAL.**
    2. **PM setting altitude alerter with autopilot on.**
    3. **At 1,000 to go, CA, “check altitude”, FO/PF, “1,000 to go”.**

IV. CRUISE: **CA/PM: A- and FO/PF: A-**

a. Cruise

  i. Pilots correctly perform top of climb fuel check.
  ii. Pilots correctly use ice protection, radar, and ignition as required.
  iii. Pilots comply with cruise profile speeds.
  iv. Pilots comply with all ATC clearances.
  v. Pilots are aware of their fuel situation and have enough fuel to complete the flight safely.
  vi. Pilots correctly operate the FMS.
  vii. Pilots correctly operate the flight director and autopilot.
  viii. PM correctly calls out deviations and errors.
  ix. PF maintains airspeed within +/- 10 knots or .02 mach.
  x. PF maintains heading within +/-5 degrees.
  xi. PF maintains altitude within +/- 100 ft.
  xii. NOTES:

b. Respond to a System Failure/Malfunction (IF APPLICABLE, GENERATOR FAILURE)
    i. Pilots correctly identify system failure.

ii. Pilots correctly complete memory items when required.
iii. Pilots correctly complete the QRC procedure when required.
iv. Pilots correctly complete QRH procedures.
v. Pilots correctly confirm thrust levers, generators, and guarded switches.
vi. NOTES:

V. DESCENT: CA/PM: F and FO/PF: F

a. Perform Descent
  i. Pilots correctly perform descent checklist procedures.
  ii. Pilots maintain a sterile flight deck below 18,000 ft.
  iii. Pilots correctly use ice protection, radar, and ignition.
  iv. Pilots comply with descent profile speeds.
  v. Pilots comply with STARs and ATC clearances.
  vi. Pilots are aware of their fuel situation and have enough fuel to complete the flight safely.
  vii. Pilots correctly operate the FMS.
  viii. Pilots correctly operate the flight director and autopilot.
  ix. PM correctly calls out deviations and errors.
  x. Pilots comply with airspace and airspeed restrictions during an arrival into a non-radar environment.
  xi. PF maintains airspeed within +/- 10 knots or .02 mach.
  xii. PF maintains heading within +/- 5 degrees.
  xiii. PF maintains altitude within +/- 100 ft.
  xiv. NOTES:
    1. Given descend via clearance and forgot to set a lower altitude.
      a. PF asked if it was sim or something he's doing.
      b. During this the speed got to 257 KIAS
    2. Called approach and said descending to 11,000 as opposed to "descending via".
    3. Crew missed 3 crossing restrictions during the arrival.

b. Perform PF/PM Tasks
  i. Pilots correctly enter approach into FMS.
  ii. Pilots correctly set up navigation frequencies and courses.
  iii. Pilots correctly set approach minimums.
  iv. Pilots correctly calculate landing distance.
  v. PM correctly set landing speeds.
  vi. PF briefs weather.

vii. PF briefs the arrival, approach, airport, and NOTAMs.

viii. PF briefs highest threat.

ix. NOTES:

1. **FA notification not done properly.**
2. **Strobe lights not on (I noticed now and not sooner).**
3. **Landing data not set.**
    a. **CA/PM does not know how to find landing weight.**
4. **Did not make SKOTT as published. They were at 10,500’**
5. **Checklist interrupted and did not start over**
6. **CA had NO CLUE where the aircraft is on the arrival.**

VI. APPROACH:

a. Perform CAT I ILS Approach **CA/PM: F and FO/PF: D**

i. Pilots comply with the published approach procedure.
ii. Pilots correctly configure flaps and gear at appropriate times.
iii. PM correctly makes required callouts.
iv. PF correctly makes required callouts.
v. Pilots correctly perform before landing checklist.
vi. Pilots correctly identify the runway environment before descent below minimums.
vii. Pilots correctly decide to execute a missed approach when appropriate.
viii. Pilots correctly operate the FMS.
ix. Pilots correctly operate the flight director and autopilot.
x. PM correctly calls out deviations and errors.
xi. PF maintains no more than one-quarter deflection of the localizer and glide slope.
xii. PF maintains airspeed within +/- 5 knots.
xiii. PF maintains a stabilized approach.

xiv. NOTES:

1. **During the first approach, they did not have the appropriate NAV source selected and the aircraft went through the final approach course. They were still going 210 KIAS on a 10-mile file. ATC questioned as to whether or not they were going to be able to get down on the glide slope, to which they responded yes, but they still did not descend and eventually realized this approach was not going to be completed.**
2. **After receiving vectors for a second approach, the FO/PF realized the mistake from the first approach and had the NAV source set appropriately. However, the CA/PM did not, and the crew did not follow procedures at the gate when the autopilot verification was supposed to happen. Therefore, when the FO/PF selected APPR mode, it did not follow the FO/PF’s flight control computer since it was coupled to the CA/PM’s side.**

b. Perform Missed Approach Procedure: **CA: F and FO: F**

i. Pilots correctly comply with the ATC instructions or charted missed approach procedure.
ii. PM correctly makes required callouts.
iii. PF correctly makes required callouts.
iv. Pilots correctly operate the FMS.
v. PM correctly retracts flaps.
vi. Pilots correctly operate the flight director and autopilot.
vii. PM correctly calls out deviations and procedure errors.
viii. PF descends no lower than -50 ft. below approach minimums on missed approach.
ix. PF maintains altitude within +/- 100 ft.
x. PF maintains heading within +/- 5 degrees.
xi. NOTES:
1. **No callouts from the profile were made.**
2. **The crew went past the assigned altitude of 3,000 to 4,000.**
    a. **The PM did not make the required call to notify the PF of the altitude deviation.**
3. **Pilots did not appropriately retract flaps.**
4. **Pilots did not retract the gear.**

VII. LANDING:

a. Perform Normal Landing: **NA**
i. PF lands in the touchdown zone, not to exceed one-third of the runway length.
ii. PF executes touchdown on the runway centerline.
iii. PF correctly uses brakes.
iv. PF correctly uses thrust reverse.
v. PM correctly makes required callouts.
vi. PF maintains positive directional control during the landing rollout.
vii. PM correctly calls out deviations and errors.
viii. PF maintains a stabilized flight path.
ix. PF maintains airspeed within +/- 5 knots.
x. NOTES:
1. **Did not happen due to time constraints.**

b. Perform FO After Landing Flow/Checklist
i. First Officer correctly performs after landing flow.
ii. First Officer correctly performs after landing checklist.
iii. NOTES:

1. **Did not happen due to time constraints.**

c. Perform CA Shutdown Flow/Checklist
    i. Captain correctly performs shutdown checklist flow.
    ii. Pilots correctly perform challenge and response shutdown checklist.
    iii. Pilots debrief flight
    iv. NOTES:
        1. Did not happen due to time constraints.

d. Perform FO Shutdown Flow/Checklist
    i. First Officer correctly performs shutdown checklist flow.
    ii. Pilots correctly perform challenge and response shutdown checklist.
    iii. Pilots debrief flight
    iv. NOTES:
        1. Did not happen due to time constraints.

e. Perform Terminating Checklist (IF APPLICABLE)
    i. Pilots correctly perform terminating/leaving the airplane checklist procedure.
    ii. NOTES:
        1. Did not happen due to time constraints.

VIII. SYSTEMS:

a. Operate Autopilot: **CA: C and FO: B**
    i. Autopilot general knowledge
    ii. Autopilot controls and indications
    iii. Autopilot limitations
    iv. Autopilot operation
    v. NOTES:

IX. ABNORMAL OPERATIONS

a. Perform Fuel Planning
    i. Pilots know minimum and emergency fuel limitations.
    ii. Pilots determine fuel requirements for an unplanned diversion.
    iii. Pilots determine fuel requirements for a planned diversion.
    iv. Pilots make appropriate diversion decision when fuel remaining is insufficient to safely complete the flight.

v. NOTES:

1. **During missed approach, crew never discussed fuel situation.**

X. HUMAN FACTORS:

a. Demonstrate Communication Skills
   i. Pilots use standard phraseology and language as specified in the SOP to communicate with other parties and in a manner that is clear to understand.
   ii. Listeners seek clarification to unclear plans and communicators clarify ideas that were not clear to the listener.
   iii. Pilots pre-brief operational requirements as well as identify threats, develop viable mitigation strategies for them, and communicate expectations to fellow crewmembers.
   iv. Pilots debrief threats encountered and assess the outcome of employed mitigation strategies.
   v. Pilots demonstrate teamwork by communicating concerns to fellow crewmembers and promptly and positively responding to communication from others.
   vi. Pilots demonstrate willingness to receive constructive feedback and accept critiques without becoming defensive.
   vii. NOTES:
      1. ATC gave a descent clearance to 3,500 and PM read back 3,000. The PF asked him to question it and they got it correct.

b. Demonstrate Workload Management Skills
   i. Pilots prioritize tasks and distribute workload between PF/PM to manage the flight path and prioritize flying the airplane above all other tasks.
   ii. Pilots create time to manage threats and make decisions to prevent task saturation.
   iii. Pilots adjust automation levels to match situational demands, reduce workload for the crew, and enhance attention management.
   iv. Pilots recognize phases of flight where they are most vulnerable to flight path deviations and strategically plan workload to manage distractions by completing non-monitoring tasks during lower areas of vulnerability
   v. NOTES:

c. Demonstrate Problem Solving/Decision Making Skills
   i. Captains follow the decision-making process to review assumptions, choose the most viable solution based on the data and continue to evaluate the decision for viability.
   ii. Pilots determine the criticality of threats encountered and match decisions to manage the threats.
   iii. Pilots use available resources to expand the team as necessary to manage threats and make sound decisions.
   iv. First Officers contribute pertinent information to enhance the decision-making process.
   v. NOTES:

d. Demonstrate Situational Awareness Skills

i. Pilots recognize potentially distracting situations and develop strategies to mitigate the distraction potential.

ii. Pilots recognize and communicate to other when individual awareness is low and work to raise awareness levels.
iii. Pilots maintain an awareness of the aircraft position and potential hazards associated with it.
iv. NOTES:
   1. **CA/PM did not use time at cruise to set up appropriately and was behind on descent setting landing data, which helped cause numerous missed crossing restrictions.**

e. Demonstrate Monitor and Cross-Checking Skills
   i. Pilots demonstrate acceptance of a flight path monitoring responsibility by maintaining constant situational awareness of the aircraft's flight path and immediately bringing any concerns to the PF's attention.
   ii. Pilots communicate effectively with each other to develop and maintain a shared mental model of how to assure the flight path of the aircraft.
   iii. Pilots callout deviations from intended flight path as specified in the SOPM.
   iv. Pilots verify changes to flight path configuration and/or automation.
   v. Pilots monitor AC systems and status for threats to safety and callout observed indications.
   vi. Pilots comply with SOP PM assignments.
   vii. NOTES:
      1. **CA/PM missed numerous opportunities to catch errors the FO/PF was making and did not.**

f. Demonstrate Professionalism Skills
   i. Pilots comply with the professional appearance, grooming, and dress standards as specified in the Billiken Air Express Pilot Policy Manual.
   ii. Pilots conduct themselves with an attitude, language, and demeanor aligned with Billiken Air Express guiding principles.
   iii. Pilots adjust leadership styles to match the situational demands and demeanor of the followers.
   iv. Captains assist the chief pilot in mentoring and furthering the progress of the SIC.
   v. First Officers apply the 10 rules of good followership as listed in the enhanced leadership manual.
   vi. Pilots demonstrate a commitment to being fully compliant with procedures.
   vii. Pilots correctly use Threat Management to organize CRM skills and manage anticipated/unanticipated threats.
   viii. NOTES:

Performance Indicator Rubric

Course: ASCI 4250 Professional Ethics and Standards Course Instructor:_____Jan McCall________________________________

Semester Taught:_______Fall 2020_____________________ Number of Students in Course:____47_____

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	98%	Yes

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

**Attach description of assignment used for assessment and samples of student work.*

DISCUSSION BOARD ASSIGNMENT

Learning Module 2: Ethical issues in AVN Maintenance, Outsourcing, and Whistleblowers

LM2 Q2: Outsourcing (20 points)

Due 18 SEP

All students should **choose two of the three questions** below to answer.

Then, do a little internet searching and see what you can offer the class but be sure to provide a weblink or APA citation and reference. You may use 1-2 paragraphs or bullet points to list your answers (10 pts x 2 questions = 20 points).

1. What are some of the key differences in FAA regulatory oversight of domestic and foreign outsourced airline maintenance?
2. Chapter 6 provides a union perspective on outsourcing maintenance. Claiming the union protection provided to mechanics ensures safety compared to outsourced non-union labor; how would a non-union mechanic, such as Delta, compare to an outsourced mechanic?
3. Other than saving money, are there other benefits to outsourcing maintenance?

Student Response to Discussion Board Question: LM2 Q2

Question 1: No matter the intention of the FAA, they have been falling behind in oversight over both domestic and foreign outsourced maintenance, and the agency is aware of the issues (Federal Aviation Administration, p. iii). According to Jin (2021), the FAA struggles to hire and retain aviation safety inspectors (Jin, p. 49) as a result of the numerous nuances of government work: inflexible bureaucracy, lack of funding, and government shutdowns leaving employees without a paycheck (Jin, p. 38) It is no wonder potential inspectors defect to other forms of employment, likely in the private sector. The lack of inspectors leaves all MROs with a lack of government oversight including domestic repair stations, but especially foreign ones, relying on each air carrier's Continuing Analysis and Surveillance System. Stakeholders can rest assured that certified domestic repair stations (certified under 14 CFR 145) are required to hold an FAA certificate, maintain a drug and alcohol testing system, and must employ certified mechanics (certified under 14 CFR 65 Subpart D). A myriad of inspections and reports are required on an at-least annual basis. Foreign, off-shore repair stations are subject to less scrutiny than their domestic counterparts: the only parallel is they are required to hold an FAA certificate (if they are certified) that can be renewed every 1-2 years. (Jin, p. 42) Due to the lack of FAA funding for travel, inspectors often cannot reach far-flung repair stations, let alone make follow-up visits on discrepancies flagged on previous visits. In one instance, an inspector was expected to cover 165 certified foreign repair stations when his colleague took sick leave (Jin, p. 49) The FAA is not required to visit any non-certified repair stations, no matter where they are located on our globe.

Question 2: Delta is unique and accompanied by declining competition using a similar business model. Delta TechOps is certified by the FAA plus many foreign aviation regulatory agencies (Delta TechOps) and is subject to the requirements of a domestic repair station (Jin, p. 42) They must employ certified mechanics and supervisory personnel certified under 14 CFR 65. The repair station certification requires the facility to maintain and use a repair station manual which indicates duties of each position employed by the certificate holder (14 CFR 145.209) The mechanics, as a result of their own certifications as maintenance technicians, must abide by the policies and procedures outlined in their employer's manual (14 CFR 65.81, 14 CFR 65.95).

In contrast, a mechanic working for an outsourced repair station may not hold an FAA certification. If they work in a foreign country that requires a mechanic certificate, they may be certified under that country's regulatory agency. It is possible that the country does not have such a requirement for mechanics to hold that certification (Hoppe, p. 67.) There is hardly an official method to tell if that uncertified mechanic has the skills and knowledge necessary to complete a repair properly. The outsourced mechanic is likely working for a contractor who is willing to pay the bottom dollar. This discrepancy in pay between in-house and outsourced mechanics puts the latter at a disadvantage: their employer is more willing to take advantage of them with long hours and irregular shifts, plus coercion to sign off on an improperly completed repair (Hoppe, p. 67, Jin, p. 41.) In all, there is less accountability when looking at outsourced mechanics compared to in-house mechanics.

Performance Indicator Rubric

Course: ASCI 4350 Team Resource Management Course Instructor: Terrence Kelly

Semester Taught: Spring 2023 Number of Students in Course: 42

AVIATION MANAGEMENT CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 3: Apply effective oral and written communication skills to function effectively in the aviation environment.	Overall Project Avg – 89.47% Overall Paper Avg – 89.2% Overall Poster Avg - 89.7% Overall Presentation Avg – 89.5%	Benchmark Achieved
SLO 4: Articulate the value of integrity, lifelong learning, and building diverse teams in serving and leading others.	Homework #1 Avg – 88.93%	Benchmark Achieved

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

SLO #3

All students enrolled in Team Resource Management are required to participate in a team-based project. The project includes a paper, poster, and in-class presentation. Additionally, all teams were required to participate in the School of Science and Engineering Senior Showcase. The overall project average was 89.5% with paper averages at 89.2%, poster averages at 89.7%, and in-class presentations at 89.5%. The grading on the project was generous. As a means of continuous improvement, I plan to require more incremental deliverables throughout the semester rather than having everything due at the end of the semester. A growing concern is the use of artificial intelligence (AI) (i.e. Chat GPT) to assist in preparing some of the course materials. Using a web-based tool for determining the use of AI, the results came back as inconclusive. I plan to speak at length about the use of AI in course deliverables and include in the project guidance material a prohibition on its use.

SLO #4

The assessment of SLO #4 was accomplished using a homework assignment that explicitly asked students to reflect on the importance of integrity, lifelong learning, and building diverse teams. I was pleased with the results of the assignment. The average grade for the assignment was 88.93%.

Performance Indicator Rubric

Course: ASCI 4350 Team Resource Management Course Instructor: Terrence Kelly

Semester Taught: Spring 2023 Number of Students in Course: 42

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	**Assessment Results: (Indicate what % of class achieved a minimum 70%)**	**Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")**
SLO 2: Describe historical trends, current issues, and emerging opportunities in aviation.	*<u>Test #1 – Overall Test Avg. 87%</u>* *<u>Historical Trend Questions</u>* Teamwork in history – 79% Military use of teams – 67% UAL Resource Management – 87% Tenerife Accident – 77% Overall Question Avg – 77.5% *<u>Current Issue Questions</u>* Cockpit to Crew Resource Management -92% Line Operations Flight Training (LOFT) – 79% Current Sector Failures – 87% Groupthink – 95% Overall Question Avg – 88.25% *<u>Emerging Opportunity Questions</u>* Importance of Diversity – 95% Crew to Team Resource Management – 95% Leveling Organizational Hierarchies – 85% Overall Question Avg – 91.6%	Benchmark Achieved
SLO 3: Apply effective oral and written communication skills to function effectively in the aviation environment.	Overall Project Avg – 89.47% Overall Paper Avg – 89.2% Overall Poster Avg - 89.7% Overall Presentation Avg – 89.5%	Benchmark Achieved
SLO 4: Articulate the value of integrity, lifelong learning, and building diverse teams in serving and leading others.	Homework #1 Avg – 88.93%	Benchmark Achieved

Course Assessment (Intended Use of Results)

The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

SLO #2
SLO #2 was measured using questions from Test #1. Outcome 2 seeks to assess a student's ability to describe historical trends, current issues, and emerging opportunities in aviation. In order to measure SLO #2 I created three categories of test questions including historical trends, current issues and emerging opportunities. The benchmark of 70% was met in all three categories, consequently the overall SLO #2 benchmark was achieved. Next year, I plan to make a change in measuring SLO #2. I do not think multiple choice test question adequately assess the student's ability to "describe" the criteria in the SLO. While the test including some open-ended questions, a majority were multiple choice. Consequently, I plan to create a written assignment (which I do regularly) that is not limited to multiple [le choice responses and will allow students to create a narrative that provides a better mechanism for indicating their grasp on historical trends, current issues and emerging opportunities in aviation.

SLO #3
All students enrolled in Team Resource Management are required to participate in a team-based project. The project includes a paper, poster, and in-class presentation. Additionally, all teams were required to participate in the School of Science and Engineering Senior Showcase. The overall project average was 89.5% with paper averages at 89.2%, poster averages at 89.7%, and in-class presentations at 89.5%. The grading on the project was generous. As a means of continuous improvement, I plan to require more incremental deliverables throughout the semester rather than having everything due at the end of the semester. A growing concern is the use of artificial intelligence (AI) (i.e. Chat GPT) to assist in preparing some of the course materials. Using a web-based tool for determining the use of AI, the results came back as inconclusive. I plan to speak at length about the use of AI in course deliverables and include in the project guidance material a prohibition on its use. As another means of continuous improvement, I plan to do a better/more consistent job in grading the paper. I was inconsistent this semester in my grading of the submitted papers. In some cases I examined papers with an eye toward detail while in some other cases my review was less detailed.

SLO #4

The assessment of SLO #4 was accomplished using a homework assignment that explicitly asked students to reflect on the importance of integrity, lifelong learning, and building diverse teams. I was pleased with the results of the assignment. The average grade for the assignment was 88.93%.

Assignment Guidance
SLO #2 Test Questions from Test #1

The assessment of SLO #2 was accomplished with test questions.

Each student's perceptive on historical trends were assessed using the following questions:
The notion of team is fairly new, with teamwork essentially beginning in the 1600s.
The military began studying how to best use crews/teams in?
What United States airline started the first resource management program for pilots.
Of the following, which accident is not considered an antecedent to the start of resource management in commercial aviation.

Each student's perceptive on current issues in aviation were assessed using the following questions:
Differentiate between Cockpit resource Management and Crew resource Management.
Define the acronym LOFT used in simulator training.
Differentiate between Cockpit resource Management and Crew resource Management.
What sector of aviation has the highest percentage of accidents related to flight crew failures?

Each student's perceptive on emerging opportunities in aviation were assessed using the following questions:
Describe the importance of diversity in the context of high-consequence teams. 95%
Differentiate between Team Resource Management and Crew Resource Management. 95%
Good teamwork generally will level organizational hierarchies. 85%

SLO #3 Initial Project Guidance

ASCI 4350 Team Resource Management Research Project
Capstone Project – Poster, Presentation, and Paper

(Aspects of the presentation are subject to change)

Overview:

Successful completion of ASCI 4350 requires each student to participate in a research project that includes a comprehensive written report, accompanying academic poster and presentation. This assignment provides a significant contribution to the final grade in the course and everyone must participate. In addition to other requirements, each student must achieve a passing grade on the capstone project (including the written research report, the poster, and a presentation) in order to pass the course. Everyone must participate in the SSE Student Showcase scheduled for Wednesday, April 26, 2023, from 4:00 PM-6:00 PM. Please clear your schedules.

Purpose:

The purpose of Capstone project to highlight your undergraduate experience through a comprehensive research project aimed at a topic related to aviation. The project should showcase important findings from the research and/or analysis performed and provide clearly outlined recommendations. The poster and presentation will demonstrate the critical outcomes associated with your work

Process:

Each team will prepare a written report, poster and oral presentation based on an undergraduate research endeavor. Poster will be displayed in a public forum (SSE Student Showcase) and faculty (and others in the community) will be asked to provide feedback on the work.

A presentation session will be scheduled toward the end of the semester and all teams will present. All team members are expected to be present for the poster presentation and stay throughout the scheduled presentation time. The work will be peer-reviewed by our classmates and contribute to Dr. Kelly's final evaluation of your work. Posters will eventually be displayed in the Hallways of McDonnell Douglas Hall.

Teams will be visited by Faculty evaluators and asked to provide feedback on their project. The format of your oral presentation must be delivered by all team members, and Q&A will commence after presentations.

Selecting a Research Topic

Discussion of your groups aviation research topic should start immediately. The topic must fill a gap in the existing literature. Therefore, it should be sufficiently unique to address a topic that is not adequality discussed in the literature. The topic should be something the group can achieve consensus on with respect to being a) interesting; b) timely, and; c) researchable.

Selecting a Topic - Purdue OWL

Selecting a Research Topic (MIT)

The Research Report

The research report will include the following:

Title Page

Abstract
Introduction
Literature
Review
Results
Discussion
Conclusion
References

Title Page (APA)

The title should reflect the phenomena under study. The title page should be consistent with APA formatting and include a) the name of the project; b) team member names; c) department name (Aviation Science); d) college and university name; d) course number and name

Setting up a Title Page

Abstract (from the American Psychological Association (APA))
The abstract addresses the following (usually 1–2 sentences per topic):

- Key aspects of the literature review
- Problem under investigation or research question(s)
- Clearly stated research questions (sub-questions) and any hypothesis or hypotheses
- Methods used (including brief descriptions of the study design, sample, and sample size)
- Study results
- Implications (i.e., why this study is important, applications of the results or findings)

Writing an Abstract

Introduction (University of Southern California)
The introduction leads the reader from a general subject area to a topic of inquiry. It establishes the scope, context, and significance of the research being conducted by summarizing current understanding and background information about the topic, stating the purpose of the work in the form of the research problem supported by a hypothesis or a set of questions, explaining briefly the methodological approach used to examine the research problem, highlighting the potential outcomes your study can reveal, and outlining the remaining structure and organization of the paper.

Writing an Introduction
Literature Review (Adapted from Purdue OWL)
A literature review requires the group perform extensive research on published work in the aviation field in order to explain how one's own work fits into the larger conversation regarding a topic. This task requires the writers to spend time reading, managing, and conveying information; the complexity of literature reviews can make this section one of the most challenging parts of writing about one's research.

Because literature reviews convey so much information in a condensed space, it is crucial to organize the review in a way that helps readers make sense of the studies be reported. Two common approaches to literature reviews are chronological—ordering studies from oldest to most recent—and topical— grouping studies by subject or theme.

Along with deliberately choosing an overarching structure that fits the writer's topic, the writer should assist readers by using headings, incorporating brief summaries throughout the review, and using language that explicitly names the scope of particular studies within the field of inquiry, the studies under review, and the domain of the writer's own research.

Writing a Literature Review

Methodology (USC)

The methods section describes actions to be taken to investigate a research problem and the rationale for the application of specific procedures or techniques used to identify, select, process, and analyze information applied to understanding the problem, thereby, allowing the reader to critically evaluate a study's overall validity and reliability.

The methodology section of a research paper answers two main questions: How was the data collected or generated? And, how was it analyzed? The writing should be direct and precise and always written in the past tense.

Writing a Methodology

Conclusions (UNC)
Just as your introduction acts as a bridge that transports your readers from their own lives into the "place" of your analysis, your conclusion can provide a bridge to help your readers make the transition back to their daily lives. Such a conclusion will help them see why all your analysis and information should matter to them after they put the paper down.

Your conclusion is your chance to have the last word on the subject. The conclusion allows you to have the final say on the issues you have raised in your paper, to synthesize your thoughts, to demonstrate the importance of your ideas, and to propel your reader to a new view of the subject. It is also your opportunity to make a good final impression and to end on a positive note.

Your conclusion can go beyond the confines of the assignment. The conclusion pushes beyond the boundaries of the prompt and allows you to consider broader issues, make new connections, and elaborate on the significance of your findings.

Your conclusion should make your readers glad they read your paper. Your conclusion gives your reader something to take away that will help them see things differently or appreciate your topic in personally relevant ways. It can suggest broader implications that will not only interest your reader, but also enrich your reader's life in some way. It is your gift to the reader.

Writing a Conclusion

Poster Requirements

The poster must include:

1. Project Title
    a. The title should reflect a clear and concise description of the project
2. Introduction Section
    a. Executive summary of the work performed
3. Scope Section
    a. The scope (breadth and depth) of the project should be detailed. Scope must include methodology and theoretical framework used in the research. The scope section should conclude with key deliverables associated with the project.

4. Research Results Section
   a. A description of the outcomes of the research
5. Recommendations Section
   a. A summary of the recommendations emerging from the research including suggestions on further research
6. Reference Section
   a. A reference section will be included detailing the literature contributing to

the work Poster Observations & Suggestions:

- Space is limited in a poster - keep it simple and to the point. Think about conveying a message
- Be concise and factual in your writing, do not use overly complicated or technical terminology, and remember your Poster is used to supplement your oral presentation
- Avoid using italicized or fancy script-font – these are harder to read
- Ensure you bold, underline, or strategically use colors to highlight important information
- Avoid the use of entire paragraphs on the poster – That is what the paper is intended to demonstrate
- Utilize a consistent font throughout the poster (although consider using differing font sizes to highlight information)
- Avoid using all capital letters except for your title
- Pictures and graphs are expected in poster sessions. Think illustrations, flow charts, diagrams, graphs, etc. Make sure the originals are high quality and acceptable for scaling to a poster
- All pictures and graphics should include a label and properly attributed
- Your poster should be readable from up to 10-feet. Ensure your text and images are well- balanced, use your space wisely

Presentation

The presentation should effectively summarize your poster. The presentation will use PowerPoint and cover/discuss each element contained in your poster.
The presentation should last (no more than) 15 minutes in length followed by questions from

the class. Each member of the group must participate in the presentation.

The presentation will be peer-reviewed by our classmates.

A copy of the presentation will be emailed to Dr. Kelly in Adobe pdf format

<u>SLO #4 Homework Assignment #1</u>

ASCI 4350 - Homework Assignment 1 - Name ____________________________________
This assignment should be uploaded to Canvas no later than Wednesday, February 8th by the end of the day. Please respond to the following four questions. (SLO 4)

1. Describe the importance of a positive attitude toward lifelong learning when working in a high-consequence field. (300 word minimum)

2. Describe the importance of personal integrity when working in a high-consequence field. (300 word minimum)

3. Describe the importance of embracing diversity when serving on a high-consequence team. (300 word minimum)

4. Describe the importance of embracing diversity when leading a high-consequence team. (300 word minimum)

Work Examples
Test question examples from Test #1

Differentiate between Cockpit resource Management and Crew resource Management.

Crew Resource Management is an outgrowth of Cockpit Resource Management. Crew resource management (CRM) can be defined as utilizing effective communication, all resources (both human and automated cockpit) available to an individual, and including other factors (i.e. human factors) for deciding the best strategies to uphold safety within the aviation environment and ensuring that all individuals are on the "same page" as one another. Cockpit resource management can be defined as utiliziing only those resources in the cockpit and considering only a small number of outside impactful factors that may contribute to the overall safety of each flight, but may not include all of the available resources that are available to each crew member.

Cockpit resource management refers to how specifically the flight deck crew (typically captain and first officer) interacts with one another in the cockpit environment, whereas crew resource management zooms out a little bit and can include how everyone on the crew, pilots, flight attendants, etc. interacts and behaves with one another.

Crew Resource Management is an outgrowth of Cockpit Resource Management. Crew resource management (CRM) can be defined as utilizing effective communication, all resources (both human and automated cockpit) available to an individual, and including other factors (i.e. human factors) for deciding the best strategies to uphold safety within the aviation environment and ensuring that all individuals are on the "same page" as one another. Cockpit resource management can be defined as utilizing only those resources in the cockpit and considering only a small number of outside impactful factors that may contribute to the overall safety of each flight, but may not include all of the available resources that are available to each crew member.

Describe the importance of diversity in the context of high-consequence teams.

By emphasizing and maintaining diversity within the context of a high-consequence team, all team members - regardless of their race, sex, religious background, ideas, etc. - will continually feel welcomed by others and empowered to contribute their unique thoughts and opinions towards solving a particular problem. No one should feel excluded because they do not fit the narrative of a single individual's "preferred teammate." Rather, by dedicating time to get to know each team member and recognizing their strengths, the team can grow in a positive manner and utilize interdependency between all members so complex tasks can be better achieved.

Diversity is critical in a high-consequence team environment because it allows for a wide variety of ideas and opinions to be brought to the table. When you have a diverse group of people who all come from many different backgrounds and who all have many different experiences, one person may be able to contribute something that the person sitting next to them might not, but that person then might be able to contribute something else.

By emphasizing and maintaining diversity within the context of a high-consequence team, all team members - regardless of their race, sex, religious background, ideas, etc. - will continually feel welcomed by others and empowered to contribute their unique thoughts and opinions towards solving a particular problem. No one should feel excluded because they do not fit the narrative of a single individual's "preferred teammate." Rather, by dedicating time to get to know each team member and recognizing their strengths, the team can grow in a positive manner and utilize interdependency between all members so complex tasks can be better achieved.

Differentiate between Team Resource Management and Crew Resource Management.

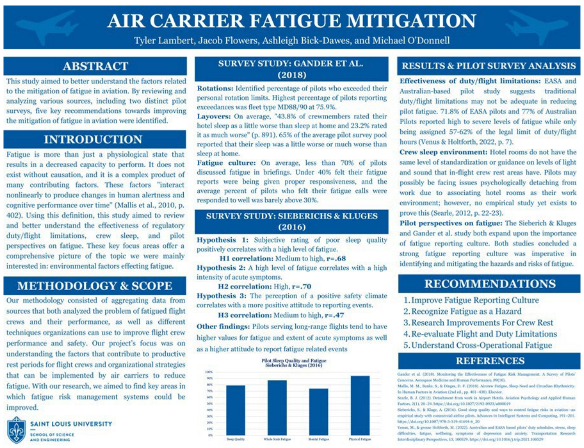
Team Resource Management is an outgrowth of Crew Resource Management, and can be defined as utilizing each team member to hold each other accountable for given tasks, communicating effectively and efficiently with involved parties, and using all resources available to attain success within a high-consequence field like aviation. Crew Resource Management can be defined as incorporating other elements (i.e. human factors, advice and information from other individuals, etc.), besides automated cockpit resources, into the cockpit environment, and then using those elements to create the best possible strategy and outcome to maintain success and prevent catastrophic events from unfolding.

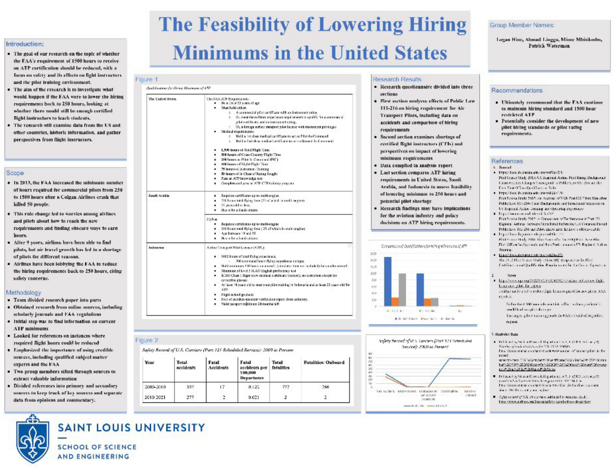
Team resource management is a general term that can be applied to all industries where team members work together, where crew resource management is a subset of team resource management that typically applies to high consequence environments, like aviation.

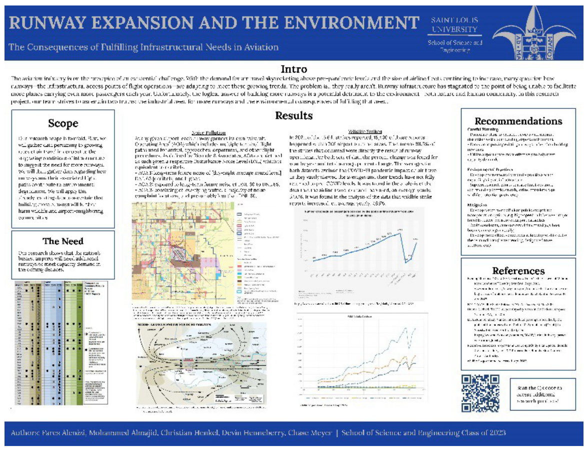
Team Resource Management is an outgrowth of Crew Resource Management, and can be defined as utilizing each team member to hold each other accountable for given tasks, communicating effectively and efficiently with involved parties, and using all resources available to attain success within a high-consequence field like aviation. Crew Resource Management can be defined as incorporating other elements (i.e. human factors, advice and information from other individuals, etc.), besides automated cockpit resources, into the cockpit environment, and then using those elements to create the best possible strategy and outcome to maintain success and prevent catastrophic events from unfolding.

Work Examples - Project

Poster







Papers:

The Feasibility of Lowering Hiring Minimums in the United States: A Comparative Analysis

Logan Hine, Ahmad Lingga, Mince Mbisikmbo, Patrick Waterman

Aviation Science

Parks College; Saint Louis University

ASCI-4350 Team Resource Management

Commented [TK1]: Not formatted per APA

Abstract

Commented [TK2]: not formatted per APA

The number of pilots in America is constantly growing, and the need for professional pilots is projected to continue to grow at a steady rate moving forward. We aimed to look at whether or not the FAA's requirement of 1500 hours to receive an ATP certification should be upheld or whether or not it is possible to be reduced. We aimed to

Commented [TK3]: reference?

Commented [TK4]: it's certainly possible look at aspects of both safety as well as the effects on pilot training and the number of instructor pilots. With group members from overseas nations we wanted to compare and contrast how those countries fill job openings, and how their pilots are trained.

We hypothesized that an hour reduction could be possible, but were unsure as to whether or not it is likely. We believed that with the sheer number of student pilots and the already existing lack of instructors and other resources, that any drop in hour requirements would lead to flight instructors fleeing to the airlines. When it came to safety, we thought that an hour increase had in fact made commercial airline operations safer, but were unsure at what rate.

When it came to researching this project we decided to locate studies done by other university affiliated flight programs and took a look at their operations. We were also able to look at safety surveys done by and about the FAA as to whether airline safety was increased or decreased post hour increase. , we had opportunities to locate international sources on flight training requirements and safety records which gave us good insight and comparison data.

Following our research, our hypotheses were mostly correct and we found that both safety was increased and that it is very unlikely that flight schools could survive post hour reduction. We had a few other additional unrelated, but applicable discoveries and were surprised by some of the information that we had found.

Ultimately this topic has been somewhat hot lately as there have been efforts by airlines to try and get these numbers reevaluated in order to increase the number of pilots available to work for them. We felt as if the airlines became desperate enough they could make a strong enough case to the FAA, although we would strongly advise against it.

Commented [TK5]: Team not group

Commented [TK6]: research papers are generally written in the third person

Commented [TK7]: studies of what?

Commented [TK8]: they were correct or you believed them to be correct?

Commented [TK9]: too casual for a research paper

Commented [TK10]: what numbers

Commented [TK11]: third person, i won't comment on this any longer

Numbers have shown that this would likely not be a good move and could lead to a decrease in airline safety.

Commented [TK12]: the language is way too casual

Introduction

In the year 2013 after a Colgan Airlines crash killed 50 people, the FAA (Federal Aviation Administration) introduced new policies which required commercial pilots to reach 1500 hours in order to be able to fly commercial airliners. Prior to this accident, the FAA only required pilots needed 250 hours which was obviously significantly less. Airlines and pilots alike began to get worried that they would never reach the airlines, and that they would have to spend thousands of dollars to reach their goal. Additionally, this rule change led to pilots finding obscure ways to earn their hours with jobs like banner towing, sky dive pilot, and many other jobs. The CFI (certified flight instructor) market also gained significant traction as this was another way for pilots to gain hours towards the 1500 mark. Airlines became worried because they were unsure how they would find any pilots with the new requirements. Nine years down the road the picture has begun to shift and while airlines have been able to find pilots, air travel has grown significantly which has led to a shortage for different reasons. Airlines have begun to lobby the FAA for reduced hour requirements saying that the one accident was not a good indicator for the rule change, and that lowering the hour requirement would not lead to any less safe of operations.

Commented [TK13]: poor sentence structure

Commented [TK14]: this is not true. The commercial certificate (250 hours) was all the first officer needed for part 121 operations. The captain still needed the ATP and 1500 hours

Commented [TK15]: no citations or references supporting the conjectures made in this section

Ultimately, we aim to look at what would happen if the airlines were to succeed and the FAA were to lower the hiring requirements back to 250We want to see whether or not there would still be enough CFI’s left to teach the amount of students who want to flight train; even under today's circumstances there still seems to be a shortage of people who can

Commented [TK16]: be more explicit

Commented [TK17]: too casual

instruct. We want to know if this would cause a pilot shortage in the opposite direction that it's currently going.

Commented [TK18]: reference?

Commented [TK19]: The opposite direction of what?

In order to answer these questions, we must look at data not only from the United States, but also from around the world. Many countries do not have the high hour requirements that the United States does, so we must take a look at how students get trained and how many people are flight instructing. We will also take a look at historic information. Obviously this rule change only took place 9 years ago; what is different in today's training landscape? An additional way we would like to produce information is through asking questions. We aim to ask instructors how they feel the market would be impacted. We want to find out what they would do if there were different hour requirements. Ultimately, we aim to look at a large scope of information to give us the best idea of what may change.

Commented [TK20]: too casual

Commented [TK21]: look at a large scope?

Literature review

The 2012 Pilot Source Study (Phase III): Response to the Pilot Certification and Qualification Requirements for Air Carrier Operations.

https://docs.lib.purdue.edu/jate/vol2/iss2/2/

Commented [TK22]: I have no idea with this sentence and hyperlink are meant to convey?

Reading this article talks about the relationship between the requirements of certified flight instructors (CFI), the requirements for Airline Transport pilot (ATP), and enrollment and safety at flight schools. It is clear that the number of students enrolling in flight schools, especially larger flight schools, was significantly affected by the introduction of ATP and CFI Certification requirements. The effect was an increase in both the number of students enrolling in flight training programs and CFI's being trained. The study also shows that the implementation of ATP and CFI requirements impacted flight safety and consistency of

Commented [TK23]: Reading this article talks?

Commented [TK24]: what CFI certification requirement are you talking about

Commented [TK25]: Reference?

Commented [TK26]: What study?

flight training positively, and that led to a decrease in the number of accidents caused by pilot error.

The conclusion of this study is that the implementation of ATP and CFI certification requirements impacted the development of the aviation industry positively with an improvement in safety and an increase in flight school enrollment.

Commented [TK27]: What study?

Commented [TK28]: Presumably the study you're referring to is what is referenced at the start of the paragraph. Is a 13 year old study still relevant today? When writing a research report, the authors convey information to the reader, you don't just simply link information

Pilot Source Study 2015: *"A Comparison of Performance at Part 121 Regional Airlines Between Pilots Hired Before the U.S. Congress Passed Public Law 111-216 and Pilots Hired After the Law's Effective Date"* https://commons.und.edu/avi-fac/22/

In this paper, the ATP (Airline Transport Pilot) qualification is not mentioned particularly. However, it does touch on the significance of a pilot's training and expertise in preventing general aviation accidents. The study emphasizes the significance of continuing training and knowledge accumulation over the course of a pilot's career. The paper suggested that in order to maintain knowledge and skills, continuous learning, training, and improvement is required. The document emphasizes the significance of pilot training and experience in preventing accidents in general aviation, even though it does not expressly address ATP certification. The most advanced level of pilot certification in the US is the ATP, which necessitates extensive training and experience. The demanding requirements for ATP certification are intended to ensure that pilots have the abilities and information required to fly complex aircraft.

Commented [TK29]: Is this information relevant to your study?

Commented [TK30]: The paper your team authored or the paper you are referencing above?

Commented [TK31]: does the paper you reference above explicitly state this or is it your team's conjecture?

Commented [TK32]: I don't really understand how this particular paper applies to your study

Pilot Source Study 2015: *"Airline Transport Pilot Certification and Training: A Review of Relevant Research and Recommendations"* https://docs.lib.purdue.edu/jate/vol5/iss2/1/

This article focuses on the importance and necessity of ATP certification, the article contains research connected to ATP certification and training with some of the most important findings and results being;

Commented [TK33]: Frankly this is not a research report, you are simply listing what you are finding and assorted articles

1. ATP certification decreased accident rates in commercial aviation
2. ATP certification and training are an important part of commercial aviation safety, and in response to changes in Technology, safety concerns and the aviation industry in general, ATP certification standards changed as well.
3. the latest changes or updates to the ATP certification requirements were introduced due to the need better training and better preparation for airline pilots, changes were in the Transport Pilot Certification Training Program (ATP CTP) and the Multi-crew Pilot License (MPL)
4. These changes have had a big effect on CFIs since they now have to modify their training programs to guarantee that their students are learning the skills and knowledge needed to pass the new ATP certification standards.

Commented [TK34]: too casual

The article's overall thesis is that, because CFIs are always required to adjust to changes in the market and regulations, the expansion of ATP certification requirements and standards has had a major effect on aviation and CFIs. Yet, in order to decrease the risk and lower the possibility of accidents in aviation, and to always guarantee that the pilots that obtain an ATP have the required skills and Knowledge to be able to safely operate large, complex, commercial aircrafts, the adjustment and updates to the ATP certification requirements are needed

Commented [TK35]: Why is the word “knowledge” capitalized?

Commented [TK36]: What adjustments and updates are you talking about. You must be explicit

Pilot source study(2022): *"Airline Bid To Reduce Flight Hours For New Pilots Rejected By FAA"* https://www.npr.org/2022/09/21/1124201271/airline-bid-reduce-flight-hours-new-pilots-faa-rejects

According to this article, a group of airlines proposed to lower the number of flight hours necessary for obtaining an Airline Transport Pilot (ATP). Following are some essential points about ATP from the article:

1. The ATP certification is the highest certificate for pilots, and it is required for large, complex, commercial aircraft operation
2. The FAA, or Federal Aviation Administration, establishes requirements for ATP certification, which at the moment call for an absolute minimum of 1,500 hours of flight time in addition to additional training and experience prerequisites.
3. the airlines' proposal to the FAA was to reduce the required flight time hours for ATP certification down to 1,000 hours, in response to the shortage of qualified pilots to face workforce challenges in the aviation and airline industry, the proposal was faced with rejection due to safety concerns and the need for maintaining high standards for pilots by the FAA.
4. Pilot advocates and experts in the field expressed their concern about reducing or lowering the requirements and standard for obtaining an ATP because it may compromise safety and increase the risk of accidents related to pilot error.

In summary, the article makes the case that ATP certification is still an important part of safe operation in aviation and that the FAA cautiously establishes and upholds the requirements for ATP certification. Even though the aviation industry may face difficulties and labor shortages, keeping high standards for pilot training and certification remains important for preserving the safety of commercial aviation operations.

Methodology

Commented [TK37]: Popular media does not make or good reference material in the research papers

Commented [TK38]: you established this previously

Commented [TK39]: 1500 hours is not the absolute minimum

Commented [TK40]: just repeating what article say it's not research

Commented [TK41]: formatting, not APA compliant

The research paper portion of our project began with us sitting down as a team and dividing the portions of the research paper into parts. The bulk of our research came from several online sources ranging from scholarly journals written by subject matter experts to products released by the FAA pertaining to regulations involving ATP minimums. Our first step of the research process was to scour articles and regulations looking for information on the current ATP minimums. We found several pieces of writing that laid out the foundation of our research. We then looked for references that pertained to special instances where it would be made possible to obtain an ATP with less than the prescribed amount of flight time. We found that there are a few cases where a pilot could have the number of required flight hours reduced from the initial 1500. We felt that it was extremely important to ensure that all our research came from qualified sources, meaning that any information used in our paper and presentation came from either a qualified subject matter expert or the FAA itself. We felt that this was a to gather information and confirm that the sources we used were credible. Once we compiled several sources two of our group members began sifting through them in order to pull valuable information from them. Not all of the initial sources we found were used in our research but it was still important for us to look over them to ensure they did not contain any information that would be beneficial to our work. After this was completed we were able to divide our references into primary and secondary sources. This allowed us to keep track of the key sources that would be used to describe data and separate them from sources that proved the input of our subject matter experts and the opinions and commentary of other researchers.

Commented [TK42]: What does "scour articles and regulations" mean?

Commented [TK43]: what is a "qualified source"

Commented [TK44]: too casual

Commented [TK45]: too casual

Commented [TK46]: after what was completed?

Results

The findings present data based on three sections of the research questionnaire. The first section of the research questionnaire consisted of collecting data in effect before and after the passage of Pthat can be used in assessing the possibility if the airlines were to succeed and the FAA were to lower the hiring requirements back to 250. In this section, we analyze the number of air carrier accidents that happen pre and post-PL 111-216 and compare the minimum hiring requirement for Air Transport Pilot prior to and post-PL 111-216. The second part of the research questionnaire consisted of whether or not there would still be enough CFIs left to teach the number of students who want to flight train; even under today's circumstances, there still seems to be a shortage of people who can instruct. We examined the data from a couple of journals of pilot sources studies 2010-1018. We collected data regarding the flight programs and the different percentages of CFI and the students. And we also analyzed data on instructors' perspectives on the market that would be impacted and found out what they would do if there were different hour requirements and whether it would cause a pilot shortage in the opposite direction that it's currently going. We compiled the data in an analysis report. The last section of the questionnaire consisted of data analysis on whether the feasibility of lowering the hiring minimum is possible by comparing the hiring minimum of ATP in the U.S., Saudi Arabia, and Indonesia.

Analysis of the number of air carrier accidents that happen pre and post-PL 111-216.

In answering question 1 from the research questionnaire, we analyzed the data from Airlines for America that was depicted by the National Transportation Safety Board (NTSB)'s safety record of the U.S. Air Carriers on the number of air carrier accidents that happened pre and post-PL 111-216. Table 1, the number of accidents that occurred before

Commented [TK47]: you didn't mention any research questionnaire in your methodology section above

Commented [TK48]: You should remind the reader of what the law states

Commented [TK49]: You must spell out acronyms in their first use

Commented [TK50]: be explicit on the number of journals

Commented [TK51]: I don't understand what this section means

Commented [TK52]: what data, the explicit

Commented [TK53]: I don't recall seeing an "analysis report mentioned in the methodology. Where is this analysis report?

Commented [TK54]: Where is the research questionnaire?

and after the implementation of Public Law 111-216, indicates that in the safety record of the year 2000-2021, the total number of accidents prior to 2010 was 357, with 17 fatal accidents that took the total of 777 fatalities. On the other hand, the total number of accidents after 2010 was 277, with two fatal accidents totaling two fatalities. The accident data shows that the number of accidents decreased after the passage of Public Law 11-216, and the safety of air carrier operations increased as it met the purposes of the Airline Safety and Federal Aviation Administration Act of 2010. This result means that raising the minimum hiring requirement, such as having the minimum required number of flight hours to be an air transport pilot, helps to increase the proficiency of pilots, which creates a safe and efficient flight operation that leads to a decrease in the number of accidents.

Commented [TK55]: How did you define the term "accident?"

Commented [TK56]: poor sentence structure

Commented [TK57]: is the decrease statistically significant?

Commented [TK58]: Are you suggesting these results are absolute?

Commented [TK59]: You don't write on how you arrive at this observation.

Table 1

Safety Record of U.S. Carriers (Part 121 Scheduled Service): 2000 to Present

Year	**Total accidents**	**Fatal Accidents**	**Fatal accidents per 100,000 Departures**	**Total fatalities**	**Fatalities: Onboard**
2000-2010	357	17	0.122	777	766
2010-2021	277	2	0.021	2	2

Source of data: Data and Statistics of Safety Record of U.S AirCarriers

Commented [TK60]: The number of fatal aircraft accidents is thankfully relatively small (Although even one accident is bad). My point is that how do you know you have enough data to support your conjecture? I'm thinking minimum sample sizes and generalizability of data

According to the air carriers' accident results in Table 1, there were a high number of accidents before the implementation of the minimum requirement for an ATP certificate. The number gradually decreased after the law was passed. Therefore, the passage of PL

111-216 has impacted the U.S. Airline industry to be more effective and aware of the importance of training and improvement of personal skills for flight crews, especially pilots. Even though ATP certification might not be the massive factor discussed in contributing to the airline accident, continuous learning and improvement are essential in maintaining technical and impersonal skills, and knowledge is vital. Similar results were shown in *Pilot Source 2015*, where the authors discussed that the quality of education and flight training has more impact than total flight hours. All three Pilot Source Studies have shown that flight hours are not a reliable predictor of performance by pilots. Thus, instead of focusing on the minimum requirement for an ATP certificate, that will encourage potential pilots to use various ways, including following a malicious path to achieve it. It is crucial to focus on training potential pilots to be more experienced and provide an advanced quality training environment for the pilots to perform well in order to operate complex aircraft safely and minimize the risk of accidents (Smith et al,. 2017).

Commented [TK61]: How do you know the law it's what resulted in these changes? Why couldn't it be some other variable that affects aviation safety? Like technology?

Commented [TK62]: Similar to what?

Commented [TK63]: I'm confused. So are you suggesting total time does or does not influence accident rates?

Commented [TK64]: How do you train someone to be more experienced?

The comparison of the minimum hiring requirement for Air Transport Pilot prior to and post- PL 111-216.

Commented [TK65]: These headings are not APA

The second part of the data analysis to answer question 1 was to look at the historical data on the minimum requirement for Air Transport Pilots before and after PL 111-26. And also evaluate the difference in qualifications, benefits, and limitations in assessing the possibility of if the airlines were to succeed and the FAA were to lower the hiring requirements back to 250.

Commented [TK66]: What date are you talking about?

Table 2

Commercial pilots' qualifications prior and post Public Law 111-216 Section 216

Commented [TK67]: Table 2 has a lot going on. Generally, tables are used to provide condensed information. This table is quite broad

Qualifications	Prior to Public Law 111-216 Section 216	Part 121 commercial pilots could possess a commercial pilot license with multi-engine and questionnaire ratings with significantly fewer flight hours and still be qualified as a first officer for Part 121 air carriers.
		Collegiate flight students could earn as few as 500 total flight hours before gaining employment with a Part 121 air carrier.
		Pilots operating as first officers under Part 121 carriers were not required to have earned an ATP certificate.
	After Public Law 111-216 section 216	ATP certification is the highest level of certification for pilots and is required to operate large commercial aircraft in the U.S. All ATP-certificated pilots must also have received flight training, academic training, or operational experience that will prepare a pilot, at a minimum, to: (1) function effectively in a multi-pilot environment, (2) function effectively in adverse weather conditions, including icing conditions, (3) function effectively during high altitude operations, and (4) function effectively in an air carrier operational environment (111th Congress, 2010 pp. 19-21).

		Section 217, of PL 111-216, states that an ATP certificate requires a minimum of 1,500 hours of total flight time. However, an exception to these 1,500 hours now exists for collegiate flight students. Students can now earn a restricted-ATP (R-ATP) certificate with only 1,000 hours of total flight time. - PL 111-216 still requires the collegiate flight student to accumulate several hundred additional flight hours beyond current academic requirements before he/she can sit in the right seat (first officer) of a U.S. air carrier.
		Overall, the impact of these two sections 216 and 217 of PL 111-216 on collegiate flight programs in the U.S. may include: (1) an increase in student flight costs, (2) a decrease in student enrollment and/or student retention issues in collegiate flight programs, (3) a 7 decrease in post-graduate job placements such as first officers, and (4) the increased risk of financial viability of U.S. collegiate flight programs.
Benefits	After the Public Law 111-216	Research has shown that ATP certification is associated with lower accident rates in commercial aviation.
		ATP certification is a critical component of aviation safety, and the standards for ATP certification have evolved over time in response to changes in the aviation industry, technological advances, and safety concerns.

Challenges/ Limitations		The impact of these changes on CFIs has been significant, as they must adapt their training programs to ensure that they are providing their students with the necessary knowledge and skills to meet the new ATP certification requirements.
		Pilots shortage: high number of pilot demands and lower number of qualified pilots supply in the future.
		All first officers are now required to earn considerably more flight hours. An ATP certificate for employment with a U.S. air carrier.
		These additional flight hours represent a significant financial expense not previously experienced by collegiate flight students.

Source of data: Commercial pilots Requirement Prior to Public Law 111-216 section 216 (Casebolt, 2015).

Table 2 indicated some qualifications, benefits, and limitations to being an ATP certificate holder before and after the passage of Public Law 111-216. The data indicated that before PL 111-216, pilots operating as first officers under Part 121 carriers were not required to have earned an ATP certificate and could be employed with fewer flight hours and as few as 250-500 total flight hours. Thus, there were more pilots compared to job availability which allowed people to lie to be pilots in command, which led to more accidents occurring as the pilots had lower qualification requirements. After the Airline Safety and Federal Aviation Administration Extension Act of 2010 implemented PL 111-

Commented [TK68]: Why do you bother with the table if you're going to state it all in the narrative?

Commented [TK69]: Do you have any data supporting conjecture that pilots lied?

216, the qualifications for ATP increased as all flight crewmembers operating in Part 121 air carriers must hold an FAA-issued ATP certificate. They must also have received flight training, academic training, or operational experience that will prepare a pilot, at a minimum, to function effectively under any circumstances. An ATP certificate requires a minimum of 1,500 hours of total flight time; however, students can now earn a restricted ATP (R-ATP) certificate with only 1,000 hours of total flight time. These high flight hours requirements increase student flight costs, decrease student enrollment in flight schools, and create challenges or limitations. For instance, pilot shortage as the pilot demand increases and the supply decreases, and financial issues due to more training after graduating from flight programs and bachelor's degree. Research has shown that ATP certification is associated with lower accident rates in commercial aviation and is a critical component of aviation safety. In addition, there are some benefits after the PL 111-216; however, the current research results indicate that commercial pilots were more successful in completing training than those holding an ATP certificate. This would indicate that quality of experience, not just the quantity of hours and certification criteria, better predicts pilot performance at the regional carriers. According to the results of both the 2010 Pilot Source Study and the 2012 Pilot Source Study, pilots with more than 1,500 hours were less successful in regional airline training than in some pilot groupings with fewer than 1,500 hours. This indicates that using a quantitative measure of Total Flight Hours as the success predictor is unsuitable for the aviation industry that constantly strives to improve safety and training performance. Rather than relying solely on a quantitative measure of total flight hours, the industry should also consider two qualitative measures: (a) the quality of training a pilot receives and (b) the quality of flight hours a pilot obtains after training is complete (Smith et al., pg:22, 2013).

Commented [TK70]: Some military pilots only need 750 hours

Commented [TK71]: What do you mean by associated? Are you suggesting there's a correlation?

Commented [TK72]: How do the research results express this?

Commented [TK73]: Why?

The comparison of the number CFIs and flight students in flight programs and the effect of ATP on them.

Commented [TK74]: I won't comment any further about the formatting being non compliant with APA

The second section of the research questionnaire compared the number of CFIs and flight students in in-flight programs and the effect of ATP on CFIs and flight students. Flight instructor jobs demographic statistics data indicated that the average number of years that certified flight instructors enjoy staying in their job for 1-2 years for a percentage of 37%, where 53 % prefer to work at private companies over education companies 34%. These results showed that more flight instructors prefer to work in the private sector than education, creating fewer CFIs in-flight programs and adding to the shorter time they work in the education sector (Zippia, 2022). In contrast, the number of student pilot certificates active in the United States in 2020 was over 222,630 students ((Published by Statista Research Department & 3, 2023). These statistics indicated that there still seems to be a shortage of people who can instruct as there is a higher number of students pursuing flight training. The *2010 Pilot Source Study* produced five significant findings; one was that certified flight instructors (CFI) had fewer extra training events and comparatively fewer non-completions than pilots who were not flight instructors. In addition, the research also indicated that flight instructors are at a disadvantage when it comes to gaining the required aeronautical experience required for the FAA ATP certificate; for instance, a full-time flight instructor obtains an average of 446 total flight hours per year, which take the individual approximately 2.8 years to obtain the needed flight hours to meet the FAA ATP requirement of 1,500 hours of total time. Historically, flight instructing has been the bridge between finishing advanced pilot training and being hired as a pilot for an airline. students pursuing a professional pilot degree attend collegiate flight programs with aspirations of

Commented [TK75]: Jobs demographic?

Commented [TK76]: Explicitly, what data are you talking about?

Commented [TK77]: How do you know they enjoy?

Commented [TK78]: It's not clear to me why aren't these percentages are included and how they apply to your study

Commented [TK79]: How does this information contrast what was written in the previous paragraph?

Commented [TK80]: What is a non- completion in this context?

job placement in commercial or corporate aviation. They will build flight hours through flight instruction to meet their ATP minimum. As the number of CFIs achieves their ATPs minimum hours, it will affect the flight training CFIs number, which might lead to a shortage of CFIs needed. Some of the reasons for the anticipated pilot shortages are varied and may result from a combination of things including, but not limited to, the mandatory retirement age for U.S. pilots, increased flight hour requirements for ATP and R-ATP certificates, and the increase in transport demand in the U.S. Therefore, to solve this issue, the ATP minimum requirements can be taken into consideration in making changes for the better future of pilot operations.

Commented [TK81]: Sentence structure

Commented [TK82]: Is this a comprehensive list?

Commented [TK83]: What constitutes a "better future?"

The feasibility of lowering the hiring minimum is possible by comparing the hiring minimum of ATP in the U.S., to Saudi Arabia, and Indonesia.

The last section of the research questionnaire explored and analyzed whether the feasibility of lowering the hiring minimum is possible by comparing the hiring minimum of ATP in the U.S., to Saudi Arabia, and Indonesia.

Table 3

Qualifications for Hiring Minimums of ATP

The United States	The FAA ATP Requirements: ● Be at least 23 years of age ● Must hold either: ○ A commercial pilot certificate with an instrument rating ○ Or, meet the military experience requirements to qualify for a commercial pilot certificate, and an instrument rating,

	○ Or, a foreign airline transport pilot license with instrument privileges ● Medical requirements: ○ Hold a 1st class medical certificate to act as Pilot-In-Command ○ Hold a 2nd class medical certificate to act as Second-In-Command ● **1,500 hours** of Total Flight Time ● **500 hours** of Cross-Country Flight Time ● **250 hours** as Pilot-In-Command (PIC) ● **100 hours** of Night Flight Time ● **75 hours** of Instrument Training ● **50 hours** of In Class of Rating Sought ● Pass an ATP knowledge test ● Complete and pass an ATP-CTP training program
Saudi Arabia	● Requires certificates up to multi-engine ● 270 hours total flying time (25 of which in multi-engine) ● 27 years old or less. ● Has to be a saudi citizen
	FlyNas ● Requires certificates up to multi-engine ● 240 hours total flying time (25 of which in multi-engine) ● Age between 19 and 35 ● Has to be a saudi citizen

Commented [TK84]: this word should be capitalized

Commented [TK85]: This word should be capitalized

Indonesia	Airline Transport Pilot License (ATPL): ● 1000 hours of total flying experience; - 200 command hours flying experience on type; ● Hold minimum 250 hours on aircraft. (simulator time not included) for smaller aircraft. ● Minimum of level 5 ICAO English proficiency test ● ICAO Class 1 flight crew medical certificate (current), no restriction except for corrective glasses. ● At least 18 years old to start your pilot training in Indonesia and at least 23 years old for ATP. ● Flight school graduate ● Free of accident-incident verification report from authority. ● Valid passport minimum 24 months left

Sources of data: FAA ATP Requirements, Saudi Arabia and Indonesia minimum hiring qualifications for airline pilots websites ((Madwire, 2022).

Commented [TK86]: Why are there two parentheticals here?

We researched the data regarding minimum hiring qualifications for ATP certificates in the United States, Saudi Arabia, and Indonesia in order to compare them and see whether there is a possibility of lowering the hiring minimum in the United States. Table 3 shows the minimum flight hours for Saudi Arabia and Indonesia is five times lower than those in the United States; Indonesia is about 250 for smaller aircraft and about 1000 hours for major airlines. Saudi Arabia with 270 hours total flying and certificates up to multi-engine. In the United States, it is required 1,500 hours of Total Flight Time and also to complete and pass an ATP-CTP training program. To determine whether having high total flight hours for ATP impacted high safety in flight operation, we can see from the result of the rank of countries and regions with the highest number of fatal civil airline accidents from 1945 through 2022. The data indicated the United States holds the first place with 864 accidents and Indonesia in seventh place with 106 accidents. At the same time, Saudi Arabia is not included in the lists (Published by Statista Research Department

Commented [TK87]: What is high safety?

& 3, 2023). Given the statistics data, it shows that having high flight time does not have a massive impact on the safe operation of flight because even though the U.S. required higher flight times to get ATP certificate, it has the highest number of accidents which explains the inversely proportional relationship or negative relationship. Despite this result, many different factors contribute to decision-making that requires a minimum of 1.500 flight hours in the U.S. Nevertheless; the U.S might need to see the possibility of lowering the hiring minimum of ATP by analyzing the data on airline safety around the world and some crucial factors that might impact the effectiveness and safety of the aviation industry.

Commented [TK88]: So is the team suggesting that aviation safety in the United states is the worst? Certainly, the wrong number of accidents it's way too high. To better understand the meaning of the data it must be contextualized. In other words, look at 864 accidents and compare that to the number of flight operations. A single data point can be misleading

Commented [TK89]: how does the statistical data say this?

Commented [TK90]: Do you discuss these different factors?

Commented [TK91]: I don't understand this sentence.

Discussion

Based on the research conducted, we have been able to discover a few different things that not only we didn't initially predict, but additionally lead us to some additional discoveries that we did not plan to find. On the topic of safety, we were able to make a couple observations which tie into each other pretty well; the idea that flight hours have made a significant difference in safety, but also that flight hours may not even indicate whether or not someone is a proficient pilot. pilots at all different stages in their training have to take certification tests after they have completed numerous prerequisites such as training objectives, hour requirements, as well as endorsements from their instructors. Ultimately, someone could complete all of these items and they still may not be at a good enough skill level to safely operate a larger aircraft. This is however impossible to measure, and there is not necessarily any sort of test or recruitment moving forward that would prevent these individuals from flying other than seeing how they perform in the workplace. The second part of the observation made was that once the hour requirements were increased, there was a significant reduction of fatal crashes. There were still a good

Commented [TK92]: Sentence structure

Commented [TK93]: How do you know they "tie into each other pretty well?" What constitutes "pretty well"

Commented [TK94]: Or smaller aircraft

Commented [TK95]: is there a surrogate to workplace observations?

amount of crashes, but it could be theorized that with more experience pilots know how to react in different scenarios and can prepare the plane to be in a safer position.

With regards to the research conducted on the actual numbers of flight instructors versus the number of students, we were able to identify information that was more closely related to what we had initially predicted. The number of people who are interested or who are already student pilots is increasing year over year whereas the number of people who are certified to instruct is not rising at the same rate. In addition to the research that was conducted about overseas flight training (and safety) it was a little bit harder to measure the data simply considering the scales of operations. While there are less accidents, there are also significantly less flights that take place on a daily basis. Because of this, the number of student pilots is also scaled down considerably. Due to the lack of flight schools or instructor pilots in these countries, many students choose to relocate to areas where there are dedicated and established flight training programs which will allow them to move through training in a more efficient manner and most likely in better equipment. We were still able to pull some valuable data from overseas sources, and were able to make conclusions similar to what we had theorized.

Conclusion

In conclusion, we have ultimately come to the decision that it would not be feasible or realistic for the FAA to deregulate the hour requirements as they sit. As mentioned previously, flight time as a lone factor has not done a perfect job of predicting pilot safety, but they have so far done a good enough job. The number of fatal accidents hadrastically decreased since the hour hike, and we believe if it went away, we could see an increase in deaths. With regards to flight training, we still do not believe that it would be realistic to drop the ATP hour requirements. The number of CFI's we currently have are not even

Commented [TK96]: do you provide the actual rates earlier in this document?

Commented [TK97]: Too casual

Commented [TK98]: what do you mean by "scales of operations"

Commented [TK99]: you should support these conjectures with the actual data

Commented [TK100]: What decision has been made?

Commented [TK101]: Deregulate the hour requirement or simply reduce the hour requirement?

Commented [TK102]: Interesting, what criteria do you use to say "good enough job"

Commented [TK103]: what does "drastically" mean in this context? Use data

Commented [TK104]: no drop in the hour per requirement whatsoever enough to support the amount of people who want to become pilots. It is a little difficult to see from our current perspective considering Parks college was always well staffed, however non university affiliated programs often find themselves scrambling to find well qualified instructors. Additionally, we were able to identify what happens in other countries when they have a lack of flight instructors; it leads to outsourcing and a drop in the quality of work. Lastly, the number of pilots who could immediately advance from flight instructor to airline pilot, or even commercially rated pilot to airline pilot would overwhelm the airlines as well as overwhelm the flight schools causing a tremendous logistical issue that would force some unusual situations.

Commented [TK105]: Where is the reference supporting this conjecture?

Commented [TK106]: Is this discussed earlier in the work?

At the current rate that pilot jobs are needed, it is possible that the FAA reconsiders their decision to uphold the hour requirement. We feel that it is not advisable to do so, and would strongly recommend not changing the requirements.

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What is the Future for Zero-Carbon Aviation Fuels?

Samuel Byrne, Eric Deles, Joseph Mason, Kyle Kaestner, and Marike Kobepa

Aviation Science

Saint Louis University

ASCI-4350 Team Resource Management

Abstract

This literature review will be a comprehensive dive into the current issues and challenges facing a future with zero aviation emissions. These key aspects are infrastructure, electric technologies, hydrogen technologies, and construction/planning challenges. The aviation industry wants to jump to alternative fuels as fast as it can and the technology is quickly growing, but there is slow progress towards their actual implementation.

In this paper we want to examine; what are the challenges in infrastructure, electric technologies, hydrogen technologies, and construction/planning that are preventing the aviation industry from being zero emission. Current technologies are not yet developed enough for new carbon-free fuel forms to be used functionally on aircraft, ground infrastructure for both electric and hydrogen aircraft has yet to be scaled to an aviation level, and aviation stakeholders are too slow to implement new policies and procedures on new fuels. In this study, all of the data was collected through online research.

There is a plethora of industry stakeholders that are trying to forward zero emissions technologies and have posted their findings, press statements, and opinions. This team gathered those findings to create conclusions about what the future holds for aviation.

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Commented [TK108]: too casual

The results of this study found that progress is lagging in each area we explored because of a few reasons. For infrastructure, the technology already exists. Many mature industries already use electric charging and hydrogen fueling. However, none do these things on the scale that a large international airport would need. Scaling all these existing technologies up requires a lot of planning and money. For electric and hydrogen aircraft the technologies simply do not exist right now. There are no batteries dense enough to have a true electric transport category aircraft. The technology for hydrogen fuel cells that are light enough and safe enough to go into an airplane also do not exist yet. Lastly, the Federal Aviation Administration has little to no existing regulations or guidance on implementing electric or hydrogen aircraft. While they will certify these aircraft on a developmental or experimental basis, there is nothing written into the regulations as to the best practices during ground operation. Our most important finding is that with the current and projected technology, we came to conclusions on which segments of aviation could use which technologies best.

Commented [TK109]: lack of references supporting conjecture

The reason this study is important is there seems to be a lot of excitement surrounding zero emissions but the practicality of them is missed in many publications. Stakeholders in the industry want to build interest in the future so they leave out the negatives or certain challenges that do not have answers. By looking outside the industry and comparing findings to those inside the industry we have been able to paint a complete picture of what we think the future of aviation fuels is going to look like.

Introduction

. This portion will cover the sources used, an interpretation of their content, and how they fit into the greater body of knowledge. Each area where challenges were found will have its literature review. Next, the methodology will be discussed. Here the methods we used to collect the data will be discussed. After the methodology, there will be a review of the results determined in each of the areas. Then a discussion of the findings, where the results will be interpreted and synthesized. Last will be our conclusion where the paper will be wrapped up with the things this group would like the reader to take away.

Literature Review

Infrastructure

In regards to the airport itself in terms of infrastructure, there are a significant number of challenges that must be addressed when considering adding any type of electrical or hydrogen-based systems. A research study was conducted by the National Academies of Sciences, Engineering, and Medicine which was published in 2022 that went into detail on these challenges.

Commented [TK110]: no formal citation

The first obstacle towards an electric and hydrogen-based system is presented in Chapter 16 of the report on page 137, Aircraft Scenario Planning. It explains that the average airport requires “40 to 50 MW” of power during the day, and “35 to 36 MW” at night. When incorporating an electric aircraft-type system, a careful analysis of the “aircraft-specific power supply requirements” has to be made to ensure that the airport’s current infrastructure can support the increased power requirements that come with its addition (NATIONAL ACADEMY, 137).

These power supply requirements are directly tied to the method of electrical or hydrogen system that an aircraft utilizes. Referenced in Chapter 8 of the report on page 85, Airside Requirements, section 8.1 lists the current three options that are being considered for electric-based systems: "Recharge by fixed ground chargers, also known as charging stations", "Recharge by the mobile supercharger on batteries (truck or trailer)", and "Battery swap at the gate (batteries are recharged separately)".

Commented [TK111]: no formal citation

With smaller airports, the requirements for these would be far less difficult to consider given the space that general aviation and regional airports have and these airports would be able to utilize their current facilities through the installation of "aircraft battery charging stations" and "low-clearance pop-up chargers" (NATIONAL ACADEMY, 88). This is because aircraft typically sit for decent durations or even fly sporadically or once a day depending on the airport.

Commercial airports, however, would face greater difficulty, particularly larger airports with high departure rates and international flights. The core issue presented is trying to maintain the current pace of ground operations as any significant increase in the turnaround time will reduce the financial advantage of electric aviation for flight operators and negatively affect gate capacity (NATIONAL ACADEMY, 88).

Commented [TK112]: always include a year and your citation

With fixed or mobile chargers, this issue comes to light with the question typing back to the first obstacle: would the airport's electrical infrastructure or charging system handle a large number of aircraft at once or even be able to charge larger-sized aircraft? According to the report, current charging technology can only produce an output of 600 kW of power, with regional commercial airliners that are being designed with a hybrid system with the lowest end requiring at least 600 kW and larger aircraft in concept requiring up to 7 MW (NATIONAL ACADEMY, 88). Should the airport want to eventually handle six or seven large-body hybrid aircraft, that automatically nearly doubles the average power used from 40 to 50 MW during the day to 82 to 99 MW, requiring a substantial upgrade to the overall power capacity that the airport can handle. Depending on the capacity of an aircraft's battery, this could significantly increase ground time and reduce flight time.

Lastly, utilizing a battery system alleviates some of that so long as "ground handlers and FBOs have an adequate inventory of fully charged batteries" (NATIONAL ACADEMY, 88). There are three requirements to maintain a battery changing system: "Equipment and trained personnel to load and unload batteries from the aircraft", "Inventory of batteries that are compatible with the aviation activity and aircraft fleet", and "an infrastructure to store and charge batteries". These would be more useful for commercial airports and larger aircraft as if they are charged ahead of time it is a matter of swapping it out and letting the plane continue. The issue that comes into play however, is not just having the storage space and charging capacity to handle this, but the report also picks on the potential that this might "have to be performed by licensed mechanics instead of trained ground handlers" (NATIONAL ACADEMY, 88). Depending on the airline's operation, this could result in additional operational difficulties for them.

Shifting to hydrogen-based systems, there are also three proposed methods for this type of charging: "Refuel hydrogen from a hydrant system", "Refuel hydrogen from a tanker (truck)", and "Swap H2 containers" (NATIONAL ACADEMY, 85). When looking at hydrogen, one major advantage that has been found is that it has a high energy density which according to the research report: "the energy found in 1 kg of hydrogen equates to that found in 3kg of jet fuel (kerosene)" (NATIONAL ACADEMY, 89). This means that, essentially, for every part of hydrogen powering an airplane, 3 parts of jet fuel would have been required. So if an aircraft utilizes 30,000 lbs of jet fuel, only 10,000 lbs of hydrogen would have been required instead.

Risks of hydrogen storage, however, can be high, as it is quickly noted that the element itself is not only very flammable but also has a very low viscosity making it susceptible to leaking, is colorless and odorless making detection difficult. These factors combined can easily result in a leak going unnoticed and, along with the pressure requirements that must be maintained due to hydrogen's viscosity level can result in a very risky situation from even a small leak (NATIONAL ACADEMY, 89). According to the report, holding it at high pressure also has its risks, and the gas in the event of impingement can not only damage the aircraft, or cause the fueling pipe to whip around, but the gas pressure can also "cut bare skin" of someone nearby in addition to flying debris should the tank ever rupture (NATIONAL ACADEMY, 89).

Commented [TK113]: only the use of a single citation supporting this

A natural risk that moves towards this fear is that hydrogen can cause both metal and plastic to become brittle and structurally weaken over time, gradually increasing the risk that an impingement could occur and would require more maintenance and observation as the age of the tank(s) becomes more of a factor, so the usage of both a carbon fiber composite casing and a high-density polymer liner for the tank itself address this potential issue and slow the risk, but are much more expensive compared to the regular containers (NATIONAL ACADEMY, 91).

Addressing concerns, it was noted within the report that the Harvard Environment, Health, and Safety Department created a fact sheet regarding safety precautions that should be taken in the event hydrogen containers are used at an airport. These are: "Store the containers with adequate ventilation in the warehouse", "Maintain the temperature of the warehouse that does not exceed 125 degrees Fahrenheit", "Secure hydrogen containers and tanks to prevent falling or being knocked over", "Use flash arrestor on tanks", "Store full and empty cylinders separately", and "Equip building with an automatic sprinkler or deluge system in case of fire" (NATIONAL ACADEMY, 92).

Electric Aircraft

One of the biggest challenges to electrically-propelled aircraft is having batteries with high enough energy density to accommodate an economically useful range (Pascal 21, Ribeiro, et al).

Commented [TK114]: not an APA citation

While the field of electric propulsion is relatively new, electric aircraft manufacturers are taking cues from the consumer electric vehicle market in that they are adopting standardized charging methods. General aviation scale aircraft manufacturers use the same charging ports as commercial electric vehicles, rather than proprietary chargers or connectors (Pipistrel Manual 8).

In the US and EU, the Combined Charging System (CCS) charger is the most prevalent charger form factor. In Japan, CHAdeMO is the leading connector, and GB/T is the connector of choice in China. All of these comply with the same electrical standards, with the incompatibilities only in a handshake and locking mechanism, meaning that it is feasible to convert a given vehicle to any given charger configuration (MUXSAN). Megawatt chargers are also on the horizon to accommodate charging very large batteries in very short times (NREL.gov).

An aircraft need not be grounded for the entirety of its charging time, either. It is feasible to design aircraft batteries such that they can be swapped with a fully charged one relatively quickly, and the discharged battery be recharged while the aircraft conducts another mission. Researchers at Delft University have been exploring scheduling solutions for a fleet of electric aircraft. This, of course, would necessitate the inclusion of easily-accessible battery compartments in the aircraft and the installation of safe charging bays for the batteries on the ground.

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The ALICE commuter aircraft being developed by Eviation, is the current frontrunner for commercial electric aircraft. At the time of writing, the platform is still in active development, and information on its charge time and connectors was not publicly available. However, the stated operating range as of Q1 2023 was given as 250 miles (Eviation), with expected advancements in battery technology it could reach the target range of 900 miles by 2024 (Hamilton 40).

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Unfortunately, even ALICE's range is not yet commercially viable today. The specific energy density vs productivity of current electric motors and storage is simply not yet high enough for commercial flight operations and is not expected to be viable before 2035. The specific energy of batteries would need to be more than 2000 Watt-hours/kg for electric aircraft to be competitive in regional jet operations, and the best batteries available today can only deliver about 265 Watt-hours/kg (Hall et al. 28-29).

Hydrogen Aircraft

A hydrogen-powered aircraft is an airplane that uses hydrogen fuel as a power source, hydrogen can either be burned in a jet engine or another kind of internal combustion engine or can be used to power a fuel cell to generate electricity to power an electric propulsor. According to IATA ''hydrogen is the most abundant element in the universe and its liquid form contains about 2.5 times more energy per kilogram than kerosene. When burning, hydrogen only produces water vapor as a by-product, since the fuel has no carbon content to start with. With regards to local air quality, hydrogen combustion produces up to 90% less nitrogen oxides than kerosene fuel, and it eliminates the formation of particulate matter. From an environmental and energy content perspective, hydrogen has abundant potential. An advantageous criterion for any fuel is high energy density, inexhaustibility, cleanliness, convenience, and independence from foreign control. Liquid hydrogen achieves the criteria, along with the potential to eliminate combustion emissions.

Another useful feature of hydrogen is that it can be used as a replacement for liquid fuel or as a fuel cell for electrical power. Electrical fuel cells could be suitable for short-range aircraft while hydrogen combustion would be suitable for long-range and higher payloads. Hydrogen fuel cells are already common devices found in cars, buses, and aircraft servicing vehicles. Liquid hydrogen fuel has a lower volumetric density than kerosene. It is estimated that to complete a given mission, despite the aircraft requiring a lower mass of fuel, the space that this fuel would occupy would be around 4 times larger than that of kerosene. This presents a challenge for airframe designers and would require a significant redesign of conventional airframes. Water vapor is another greenhouse gas produced by the combustion of fuel, and although the radiative forcing (difference between the energy absorbed through the Earth's atmosphere compared to the energy that is reflected into space) is lower than that of CO2, it still contributes towards global warming. Hydrogen combustion would produce about 2.6 times more water vapor than kerosene fuel. In a study about the climate change effects of hydrogen aircraft, Ponater et al. evaluated the individual and accumulated effects of the emissions of a hydrogen-based flight to a kerosene-based flight. Overall, this literature review provides valuable information about hydrogen liquid fuel's potential benefits and challenges. It also addresses the challenges for hydrogen to be a viable fuel source. Besides outlining the benefits of hydrogen as a fuel source, like its large energy density, low emissions, and versatility in production methods, it also acknowledges the limitations of hydrogen technology, its high production costs, and the need for significant infrastructure investments. This article lacks further research and development in hydrogen fuel cells to improve their efficiency and safety.

Airbus, ZeroAvia, and Hydrogen Aero are three aircraft manufacturers interested in designing aircraft with hydrogen-electric powertrains. Airbus is aiming towards the world's first zero-emissions commercial aircraft with ZEROe concept aircraft by 2035 to power future aviation. All three ZERO concepts are hybrid-hydrogen aircraft; they are powered by hydrogen combustion modified gas turbine engines. All the technologies are complementary, and the benefits are additive. The methodologies being explored to use hydrogen are as detailed below really interesting content, but it must be supported with citations and references..

Hydrogen can be used directly as fuel for combustion with oxygen that can be used in a turbofan or turbojet engines, or it can be used in Hydrogen Fuel Cells to create electrical power that complements the gas turbine, resulting in a highly efficient hybrid-electric propulsion system. Through future ground and flight testing, Airbus expects to achieve a mature technology readiness level for a hydrogen-combustion propulsion system by 2025. Some example Airbus ZEROe concept aircraft incorporate a Blended-Wing Body, with the exceptionally wide interior opening up multiple options for hydrogen storage and distribution such as underneath the large wings. Two hybrid-hydrogen engines provide thrust on this concept aircraft (Airbus).

Moreover, Airbus is collaborating to utilize a Hydrogen Hib in New Zealand starting with Christchurch International Airport, ‘’Ultimately, the partners will evaluate the means of deploying hydrogen hubs at airports, starting with the case study at Christchurch. If successful, commercial hydrogen-powered aviation could be extended to cover the entirety of New Zealand's domestic network. The additional participants in the consortium include Christchurch International Airport, Fortescue Future Industries (FFI), Hiringa, and Fabrum. New Zealand, with its large share of renewable energy sources in its energy mix, is a model for a proactive, forward-looking ecosystem with a huge potential for low-carbon hydrogen production'' (Airbus).

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ZeroAvia is a British/American hydrogen-electric aircraft developer, aiming to satisfy missions from 20-seat regional trips to over 100-seat long-distance flights, ZeroAvia enables scalable, sustainable aviation by replacing conventional engines with hydrogen-electric powertrains. According to ZeroAvia "hydrogen-electric powertrains offer a long-range, lower fuel and maintenance costs, and zero emissions. Non-toxic hydrogen and compressed gas storage are more reliable with less severe consequences in the event of failure. Compressed hydrogen tank integrity is superior to conventional liquid fuel tanks. Also, hydrogen has a lower radiant heat than conventional gasoline." ZeroAvia had completed a short test flight in the mid of January from Cotswold Airport, "the startup ZeroAvia said it successfully flew its 19-seat prototype plane during a 10-minute flight test… marking an early but important step toward hydrogen-fueled flying. The twin-engine aircraft was retrofitted to include fuel cells — which convert hydrogen into electricity — and batteries on one side, with the other side using an oil-burning jet engine" (Gallucci, 2023). This is a great starting point for hydrogen-fueled aircraft to be more robust in seeking to curb emissions by designing more fuel-efficient engines and combustion jet engines burning liquid H2. “ZeroAvia said it expects to deliver a 2- to 5-megawatt hydrogen-electric propulsion system that’s certified to fly in 2023, with plans to launch nine- to nineteen-seater commercial aircraft with a 300-mile range by 2025” (Gallucci, 2023).

Universal Hydrogen is a Los Angeles-based company also focused on the decarbonization of aviation by making hydrogen a viable long-term fuel source. Hydrogen Aero is also aiming to create a better and greener environment through hydrogen zero-carbon fuel. A hydrogen regional airliner operated by Universal Hydrogen completed its first flight early in March from Washington state, setting a new record. “Successfully flew a 40-passenger aircraft using primarily hydrogen during part of the 15-minute flight. The Los Angeles–based startup replaced one of the plane’s two turbine engines with a fuel-cell electric powertrain. The flight came just weeks after another hydrogen aviation startup, ZeroAvia, flight-tested its prototype plane over the English countryside. The 19-seater flew for 10 minutes, making it the largest aircraft powered partly by hydrogen to take flight. That mantle now apparently belongs to Universal Hydrogen’’ (Gallucci, 2023).

Hydrogen power has become available to the aviation industry but is difficult to utilize in its natural form as it is extremely buoyant and light in weight, therefore the main challenge in hydrogen-powered aircraft is hydrogen storage. In nature, hydrogen is an extremely light atom that can either be bonded to oxygen (in water) or carbon (in gas), resulting in a low volumetric density. ‘’Powered by hydrogen, the aircraft would require four to five times the volume of conventional fuel to carry the same onboard energy. Providing hydrogen in gas form also requires a lot of storage volume. The compression required by the storage volume can then increase costs and energy needs. As a result, storage can get heavy. At the same time, the mass of liquid hydrogen tanks must decrease by 50%. Because of this, hydrogen storage appears to be a materials science challenge in trying to identify lightweight materials that will not react with hydrogen. Therefore, a better understanding of its interactions with other elements (such as metals or composites) is crucial'' (SolidSolutions, 2022). Thus, aircraft manufacturers must have a platform or third party to minimize risk and observe and test aircraft designs under different operating conditions.

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Liquid hydrogen tanks can benefit from unique platforms or third-party solutions that enable designers and engineers to evaluate pressure stratification and temperature stratification at the design stage. Therefore, an efficient storage tank system is needed to achieve hydrogen sustainability in aviation with specific specifications such as ''the storage tanks must be manufactured with specialized materials to withstand extreme temperatures. Moreover, the tanks must have thick walls and provide sufficient isolation between stacks to minimize the heat influx through the tank walls. The leaking heat can cause the LH2 to boil and absorb the surrounding heat necessary to keep the LH2 at deep freeze temperatures. Cryogenic tank manufacturers aim to keep the boil-off condition below 1% per day. The shape of the tanks must be as close to a sphere as possible to minimize design losses. A sphere exposes the least surface per held mass of LH2. To maintain the center of gravity, equal-sized LH2 tanks must be placed such that they do not affect the pitching or tipping moment of the aircraft. Stacks of spherical tanks can be placed in the aircraft's front section (just behind the cockpit on the lower deck) and the rear section (just forward of the tailplane). A vacuum flask technique with additional insulation on top will ensure the LH2 boil-off condition is minimized. If the tank loses the vacuum, insulation layers contain the heat influx within the system.'' (Memon, 2023).

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Construction/Planning

When it comes to the legal aspect of planning charging infrastructure there are lots of hoops to get through. For this specific section of our research, we reviewed press releases and articles published by construction and consulting companies. These articles outlined the beginning processes to get airports and the surrounding areas to support new carbon-free energy methods.

To construct a charging site you have to plan the location, size, chargers, and the associated electric support infrastructure. Like any airport, this charging location would have to be large enough to support multiple different-sized aircraft. "Some electric aircraft have wingspans of 50 feet or more. Setbacks and object-free areas will need to be checked, and aircraft will need room to park when they are done charging" (MeadHunt, 2022). Utilities would also have to be analyzed to be sure that the electricity being supplied to the charging location could support the load. "Widespread implementation of electric aircraft in the small and medium-aircraft markets may increase daily airport electricity demand by as much as 30 megawatts (MW), significantly more than what all but the largest airports use" (Weaton and Williams, 2022). To provide enough power, coordination will need to take place with providers to increase the power supply and possibly upgrade the grid or existing infrastructure. Additionally, airport stakeholders such as FBOs may want to install chargers at their ramp to increase revenue and traffic. This would require planning on the operator's end to ensure they have the necessary facilities to handle the increase in traffic.

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With any airport project, there has to be an environmental review for the impact of the project. "The Federal Aviation Administration (FAA) will determine its level of environmental oversight through the Section 163 process as described in the FAA Reauthorization Act of 2018" (MeadHunt, 2022). The chargers are pretty environmentally friendly and would not have much of an impact on the site's location. Larger impacts could

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be the running of utilities either underground or above ground. This could result in the clearing of areas that are wooded or possibly wetlands, etc. “Some large hub airports currently contract with local utility providers to host solar arrays onsite” (Weaton and Williams, 2022). If large-scale solar arrays are installed this creates additional clearing, construction, and possibly environmental concerns. Once constructed, though, solar arrays would be environmentally friendly. For a hydrogen tank swap, the challenge is storage facilities that can safely house the hydrogen and be accessible for aircraft. If the ramp for the charging site is near noise-sensitive areas this could also be a consideration. Electric infrastructure can sometimes generate noise besides the obvious noise created by a busy apron of coming and going aircraft.

Every airport maintains an airport master layout plan. This plan contains a full survey of the airport property with future layouts and plans. When there is a project being proposed, this master plan is required to be updated to reflect the project. This is part of the planning process with the environmental impact. These plans are very detailed and would contain utility, elevation, drainage, and other relevant information. For any charging site on a ramp, a new airport master plan would be required to be drafted, reviewed, and approved for the project to go forward. If utilities are to be moved or created for this charging site this could also impact the airport and require more construction. This would also need to be included in the master plan.

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The final step for construction would be the FAA Form 7460 which is a notice of construction for the FAA. “FAA Form 7460-1 needs to be submitted for airspace review, a construction safety and phasing plan is needed, and notice should go out to any tenants and users that may be affected by construction activities” (MeadHunt, 2022). The form must be submitted 45 days before the date of proposed construction. Additionally, the airport would

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Methodology

For this paper, the group decided to gather data through research in the aviation industry and academia. The group members focused mainly on those sources that had either done extensive technical research or were in the process of developing zero-emissions technologies. Opinions or guesstimations were not needed for the study conducted in this paper. Instead, hard evidence on where technologies are in development and when they could be implemented was sought out. Publications from companies such as Airbus, ZeroAvia, and Pipistrel were relied on heavily. This is because these companies either have produced hydrogen or electric aircraft or have a timeline for developing them.

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Results

Through the research stated earlier the group has drawn results for each area. For infrastructure, there is a significant amount of analysis and research that still yet needs to be accomplished by individual airports in determining if and how they can support either electric, hydrogen, or both. Analysis and research around real estate capacity to see if there is sufficient space to adequately provide hydrogen storage, battery storage, or charging system installations. Individual airports would also need to assess what the increases in demand on the power grid would be, and determine if transmission lines to the airport can accommodate the increased loads. Around the costs of purchasing and installing the equipment, if the appropriate budget is available to do so and allow. As a whole, the framework to accomplish this has been completed and at this point, it is now dependent on the infrastructure and technological capabilities of those that wish to utilize it. Similar results were drawn from the research into electric aircraft. With the existing technologies, charging the aircraft is the biggest challenge.

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Ground charging infrastructure for aircraft is comparable to that of commercial EV chargers. The challenges of installing fast chargers for an electric aircraft are comparable to that of installing an EV charger, primarily access to a high-voltage power supply. As fleet sizes at airports increase, charging in parallel can lead to challenges in having sufficient power available, which can be offset by charging aircraft or swappable aircraft batteries at off-peak times. Unlike electric aircraft, the results from the research into hydrogen aircraft are less focused on the new technologies and more focused on aircraft design. The technology to store and use hydrogen exists but implementing it into an aircraft has been the main challenge.

Hydrogen could provide one solution for fully decarbonizing long-range flights. The hydrogen sector offers both opportunities and limitations. An opportunity would be that burning hydrogen in a jet engine would result in only water vapor emissions. Using this fuel would virtually eliminate carbon-related emissions, such as carbon emissions. However, incorporating a hydrogen fuel tank would require a considerable change to aircraft architecture. Various aircraft designs would be required and some designs utilize blended wing and body aircraft. While this may produce some aerodynamic advantages, a possible downside could be the time involved in the certification of radical modifications to aircraft.

In addition, substantial costs are involved in designing and certifying upgraded aircraft and operational infrastructure. The potential for a new aircraft or engine design is approaching its limit in terms of fuel efficiency, and as other sectors turn to renewable energy, aviation will need to consider all options for reducing its emissions to remain in line with the industry target of halving net CO2 emissions by 2050. To implement all of these new technologies, construction on airports needs to happen soon. The results from this area were few which the group determined was a very important result in itself. The FAA and other organizations have yet to catch up to the advancing technologies so the requirements to plan and build zero-emissions airports still need to be created.

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Due to the large number of processes that take place when constructing new sites at airports, there is a lot of coordination that takes place. Approval from many different agencies is needed and planning must start early. From our research, we've gathered that the process to fully electrify an airport, meaning to support electric aircraft charging and/or hydrogen, would be a multi-year project. This includes updating and managing the living document of airport master plans. This is essential for all major airport projects. Environmental reviews are also required for airports that receive federal funding. Depending on the airport and situation we can conclude that this could have a large-scale impact. Many airports are not already equipped to provide the means necessary to support the new technology. Bringing in the required utilities or in some other cases constructing solar arrays could require additional property and could impact sensitive environmental areas. Airports use lots of energy for powering lighting systems, terminals, hangars, and other businesses nearby. Adding new fuel sources would dramatically increase the energy requirement creating additional problems for the energy industry.

From our review of multiple sources, there has been little legal or regulatory guidance for this new emerging technology. The legal perspective is lagging behind the technology. Other than the general FARs concerning aircraft certification and airport construction processes, there have not been any specific alternative fuel flight rules created. Because alternative fuel aircraft are still a very new and developing technology we expect the research and development to help spark further guidance and regulation.

Discussion of Findings

There are already millions of tonnes of carbon dioxide and gas emissions generated by aviation each year, which has a significant impact on the environment, according to Aviation Benefits Beyond Border "Air transport generated 895 million tonnes of carbon dioxide (CO2) in 2018" this may sound a lot but aviation only producing 2% of CO2 generated by all human activities every year; such as electricity, road transport, buildings, heat & electricity, shipping, cement, Iron & steel, and other industrial. "As aviation grows to meet increasing demand - particularly in fast-growing emerging markets - and as other sectors of the economy reduce emissions, aviation's share of overall emissions is likely to increase" (Aviation Benefits Beyond Border).

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As the demand for air traffic will grow in commercial aviation as the demand increases for passengers, "20 years ago, there were 2 billion passengers on planes, today there are 4 billion. If we continue at the same pace, 16 billion people will fly by 2050, according to the forecasts of the International Civil Aviation Organization (ICAO). However, even if the energy performance of engines improves, even if certain engines are electric, and even if the share of biofuels has increased, this will lead in the best case to a doubling of greenhouse gas production (David, 2022).” Due to the record increase in traffic, and the significant increase in the number of passengers, and trade volume, aviation, and international shipping are the fastest-growing sources of emissions. As for shipping alone, according to Energy Industry Review ‘’emissions from international aviation and shipping have increased by almost 130% and 32% respectively over the past 20 years. This is the fastest growth in the entire transport sector, the only one in which emissions have increased since 1990.’’ By 2050, despite improvement in fuel consumption, it is expected that aircraft emissions will be 7-10 times higher than the 1990 levels.

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Alternative fuels are needed by the aviation industry now. As the industry grows, the carbon footprint of the industry will also continue to grow. The longer it takes to rid aviation of biofuels the more damage is done to the environment. This study is important because aviation stakeholders must first understand the issues it faces before they can tackle them. In this study, those issues were laid out and now a plan of action is needed to go in the right direction.

Through the research done in this study, the group has determined that some challenges faced by a zero emissions future can be helped and some cannot. Right now the aviation industry is limited by the development of more dense and efficient batteries. What the aviation industry can do to move forward with electric and hydrogen technologies is to plan. As discussed these new aircraft are going to have new needs and new requirements. Stakeholders can start planning now how they are going to meet these new needs. Airports can start looking at where they can store hydrogen and how charging stations can be built and set up. Manufacturers can start planning the infrastructure requirements their new-age aircraft are going to need so that the industry can be prepared for them. Lastly, the Federal

Aviation Administration needs to get ahead of the curve and start regulating now, or risk increasing the time before the aviation industry can properly adopt zero-carbon fuels.

Conclusion

Almost everyone in the United States is affected by aviation in some way. Whether that is being a passenger, getting goods shipped, or being in the industry. The world is relying on aviation more and more every year. This means a bigger and bigger carbon footprint. Every person that uses aviation is responsible for this carbon footprint. As humans, we are responsible for being good stewards of this planet. Alternative fuels such as electricity and hydrogen are the answer to this problem of environmental impact. The faster these technologies are in the industry the greater the impact can be reduced. As the group stated, some things cannot be helped, such as battery technology. But nothing is stopping the industry from planning. While the average person may not see their role in this. Anyone can be a part of the solution. Anyone who is an aviation stakeholder has a responsibility to begin planning for this future. Every consumer of aviation is a stakeholder which means that someone who just flies everyone once in a while is still part of the problem and still has a responsibility. Something as little as voting in favor of making changes at your local airport will make a difference. A future without AVGAS and Jet-A is coming and the aviation industry needs to be ready.

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ASCI 4350 - Homework Assignment 1 - Name Redacted
This assignment should be uploaded to Canvas no later than Wednesday, February 8th by the end of the
day. Please respond to the following four questions. (SLO 4)
1. Describe the importance of a positive attitude toward lifelong learning when working in a high-consequence field. (300 word minimum)
A positive attitude towards lifelong learning is critical for those working in high-consequence fields, such as aviation. In this field, it is crucial to stay current with the latest technology, best practices, and regulations, as even small mistakes can have severe consequences. Therefore, continuous education and professional development are essential to ensure that individuals remain at the top of their game and can make informed decisions in high-pressure situations. Learning is a lifelong journey and it's especially important in fields where even small mistakes can have big consequences, like aviation. To be the best in this field, we need to keep up with the latest technology, best practices, and regulations. That's why continuous education and professional development are a must. Having a positive attitude towards learning allows us to take charge of our own growth and seek out new opportunities to improve. This helps us stay ahead of the curve and maintain the highest levels of safety for passengers and crew. It also helps us adapt to new challenges and have a growth mindset, which is key in this fast-paced industry. Not only does a love for learning benefit our work, but it also has a positive impact on our personal and professional growth. It keeps us engaged and motivated and helps us take pride in what we do. In conclusion, a positive attitude towards lifelong learning is crucial for success in high-consequence fields like aviation. By staying current and continuously learning, we can ensure the safety and security of passengers and crew and make informed decisions even under pressure.
2. Describe the importance of personal integrity when working in a high-consequence field. (300 word minimum)
Personal integrity is a cornerstone of success in high-consequence fields like aviation, where the stakes are high and even small mistakes can have severe consequences. Personal integrity refers to a set of moral and ethical principles that guide an individual's behavior, both in their personal and professional lives. In a high-stakes industry like aviation, it's critical to maintain these principles and consistently apply them, in order to make ethical and responsible decisions, even in challenging or stressful situations. Having strong personal integrity means that individuals are more likely to act in the best interests of their team and the organization, and to uphold their commitments and responsibilities. This can build trust and credibility among colleagues and stakeholders, fostering a positive working environment and promoting collaboration and teamwork. When everyone on the team is committed to acting with integrity, it leads to better outcomes for passengers, crew, and all personnel involved. But personal integrity isn't just about the impact it has on others, it also enhances an individual's own personal and professional growth. By consistently upholding their principles, individuals take pride in their work and develop a strong sense of self-esteem and confidence. They know that they are doing the right thing and acting in line with their values, which is incredibly empowering. In conclusion, personal integrity is a critical aspect of success in high-consequence fields like aviation. It promotes ethical and responsible decision-making, builds trust and credibility, and enhances personal and professional growth. By consistently applying our moral and ethical principles, we help ensure the safety and security of all passengers, crew, and equipment, and contribute to the success of our team and the aviation industry. In a field where even small mistakes can have serious consequences, personal integrity is essential for maintaining the highest standards of professionalism and excellence.

3. Describe the importance of embracing diversity when serving on a high-consequence team. (300 word minimum)
Embracing diversity is crucial when serving on a high-consequence team in aviation, as it helps to promote a culture of inclusiveness and respect, while also enhancing the team's overall

performance and effectiveness. In aviation, it is essential that individuals from diverse backgrounds, perspectives, and experiences are able to work together effectively to achieve a common goal. By embracing diversity, individuals are able to leverage the unique strengths, perspectives, and skills that each team member brings to the table, which can help to promote innovation, improve problem-solving, and increase creativity. Furthermore, an inclusive and respectful team environment can also help to foster better communication and collaboration, leading to improved decision-making, and ultimately better outcomes for passengers, crew, and other personnel. Embracing diversity also helps to promote a culture of safety and security in aviation. By fostering an inclusive environment, individuals are more likely to understand, respect, and appreciate differences, which can help to reduce misunderstandings and tensions, and to ensure that all team members feel valued and supported. This, in turn, can help to improve the overall safety culture within the team and to ensure that all individuals are working together effectively to mitigate potential risks and hazards. Moreover, embracing diversity can also help to attract and retain a highly skilled and diverse workforce, which is essential in high-consequence fields like aviation. When individuals feel valued and respected, they are more likely to be engaged and motivated in their work, which can lead to improved job satisfaction and increased retention rates. In conclusion, embracing diversity is critical for ensuring that individuals serving on a high-consequence team in aviation are able to work together effectively and efficiently to achieve their common goals. By promoting inclusiveness and respect, individuals can help to foster a culture of safety, security, and collaboration

ASCI 4350 - Homework Assignment 1 – Name: Redacted
This assignment should be uploaded to Canvas no later than Wednesday, February 8th by the end of the day. Please respond to the following four questions. (SLO 4)

1. Describe the importance of a positive attitude toward lifelong learning when working in a high-consequence field. (300 word minimum)
The phrase that a pilot never stops learning is very true. I feel that in any profession that is in a high consequence field, you always need to be retraining, learning, and better yourself through various qualifications. In the same way why nurses have go through yearly tests to keep their credentials valid, why military members go through requalification training for their specific job, and the same way that police officers have to be physically fit and requalify for firearms training yearly. All these professions including being a pilot are all high consequence fields and a level of proficiency and professionalism is required. You want to come in with the attitude that you do not know everything because we simply cannot know everything about airplanes. There also requires a certain level of humility. In the same attitude that the United Airlines Captain Al Haynes studied asymmetric thrust and how it affects aircraft performance could have been the very reason an un-survivable crash became survivable. Since Al Haynes was a lifelong learner, he read on the affects that asymmetric thrust and losing an engine could affect an aircraft. Had he not been a lifelong learner, I fear the crash outcome would have been much worse. But he survived to tell the story! You should want to become a lifelong learner because when the learning stops you can become complacent and that is not good in a high consequence environment. It is important to come at the attitude with a genuine care for your profession and curiosity to do better. Likewise, I try to come at aviation with the same attitude. The moment you stop learning or wanting to learn is when you can get yourself in trouble. In times distress and emergency situations, your ability to react and make a good decision depends on your training. But also, your curiosity to learn which supports those decisions and actions in stressful situations.

2. Describe the importance of personal integrity when working in a high-consequence field. (300 word minimum)
Personal integrity is very important in a high consequence environment. Integrity is the ability to have amoral compass or code that allows you to make logical decisions. The hope is that when working in a high consequence environment like a cockpit, that both individuals working together

has a high level of integrity. You both want to be able to make sound decisions and follow standard operating procedures to the letter. You both have a high code of principles or standards (integrity) to follow those procedures and make safe sound decisions. You essentially hold up your end of the deal while your partner does as well. You do not want to have someone who does not have a high level of integrity, confidence, or mental sanity. My first thought that comes to mind is the Germanwings crash back in the mid 2000s. That is an example in my mind of a pilot that did not have a high level of integrity, care, or concern for others. He needed mental health treatment for depression and chose to be selfish instead of seeking the proper support and take a break from flying. A person with a high level of integrity would have been reexamined medically and made the safe and sound choice to take time away from flying. I am not being harsh of that first officer; I understand people in those mental situations sometimes cannot help themselves, but I wished someone had recognized it prior to the accident. Procedures and rules are in place for a reason, for the safety and for the care and concern of others. Having a high level of integrity means following them and doing the right thing. During normal and abnormal operations, it is important to work well in the team environment to complete the mission at hand. Completing the mission successfully is having a good level integrity as part of your toolbelt.

3. Describe the importance of embracing diversity when serving on a high-consequence team. (300 word minimum)
I believe that diversity in experience, upbringing, knowledge, and background are all important. I believe embracing diversity of experience and knowledge are paramount in a high consequence environment. Similar to the situation with Captain Al Haynes, he had some knowledge on using differential thrust to fly the aircraft and keep it straight and level from his own knowledge. The check/simulator instructor Captain who was a passenger assisted the crew since he has a more overall picture of how the aircraft operated and its systems. He probably had a more in-depth knowledge on information since he was a simulator instructor. Putting together the experience of the Sim Captain, Captain Al Haynes, and the First Officer, the vast diversity of knowledge is most likely what saved more lives. By cooperating and accepting the diversity, the crew of the United flight was able to operate very well in the high consequence scenario given the odds were stacked against them. While knowledge and experience are important, diversity in how and where you grew up can play a big factor in how you work in a crew environment. Using the example of the flight deck, having a pilot with experience landing in all weather conditions at short runways in Alaska and another pilot who may have had inter-island flying the Caribbean are two vastly different experiences. But it should be seen that the diversity of where they built the majority of their flight experience and how that environment shaped them into the pilot that they are today. Not only does this offer plenty of experience but it can allow for an exchange of diverse ideas that people can learn from. Afterall, life-long learning is key in a high consequence environment, so the diversity aspect only makes the individual stronger but also the crew stronger.

4. Describe the importance of embracing diversity when leading a high-consequence team. (300 word minimum)
When leading a team in a high consequence environment, diversity is key to that team’s success. A bad leader is one who believes they are the ultimate authority and cannot be wrong. A good leader is one who can use all the people on their team and diversity to accomplish the mission. Listen to the people below you. My father was an officer in the U.S. Air Force, he was an engineer. He worked in a joint civilian and military unit. When leading his unit, he would accept the diversity of people’s experiences. In his mind, as a new officer and college graduate, how could he lead people who may have more experience in the field than him even if they were enlisted. His goal would be to talk to the enlisted, see what they had to offer to the conversation and use their specific jobs and specialties to complete the mission together. He would also ask questions and learn from the people below him. Oftentimes the best leader is

one who can understand all the various roles of the people they are leading. By doing this, he also took the time to get to know his men and understand them on a personal level. This was a way to build comradery while also gaining the respect of his men. He told me that many new officers and college graduates would bark orders and tell the enlisted personnel to do their jobs without getting to know them or their jobs. They figured since they had rank and a college degree that they were “better” than the enlisted. This couldn’t be further from the truth, if anything they lost the chance to gain the diversity in experience and knowledge from their men while also losing the respect of their men. These officers did not last long is what I am told. The military just like the cockpit is a high consequence environment and accepting the diversity, strengths, and weakness of your subordinates and equals is paramount to the success of the organization

Performance Indicator Rubric

Course: ASCI 4450 Aviation Law | Course Instructor: Hoover

Semester Taught: Fall 2022 | Number of Students in Course: 46

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner. Submit one assigned administrative law case brief. Quiz 5; Question 4 Quiz 6; Question 11 Quiz 7; Question 7 MidTerm; Question 7	Case Brief: 100%. Student scores on the case briefs ranged from 98% to 100%. Quiz 5 Q 4: 50% Quiz 6 Q 11: 54% Quiz 7 Q 7: 87% Midterm Q 7: 39%	Case Brief: Yes. All students scored well above a minimum of 70%. Quiz 5 Q 4: No Quiz 6 Q 11: No Quiz 7 Q 7: Yes Midterm Q 7: No

ASSESSMENT TECHNIQUES/ACTIVITES USED:

<u>Case Briefs / Administrative Law</u>

This class used real cases to illustrate important concepts needed for understanding law in the field of aviation. These were real life disputes and the students learned about the law by picking up various pieces of it from what the cases told them. Most cases in this course took place in National Transportation Safety Board (NTSB) Administrative Law Judges' (ALJ) hearings, federal and state appeals courts, and the U.S. Supreme Court. There will be an examination of civil and criminal cases. Each of the 46 students was assigned an administrative law case involving the FAA, NTSB or DOT.

Why did the students examine these cases? The U.S. has inherited from England a legal system that is largely judge-focused. The judges have made the law what it is through their written opinions. To understand that law, the class studied the actual decisions that the judges have written. An objective was to look at the law the way that judges do and study actual cases and controversies, just like the judges. For example, a pilot has a beef with the Federal Aviation Administration's (FAA) action to suspend her pilot's certificate for several months and wishes to contest this with a lawyer in front of an NTSB administrative law judge in a formal court hearing. In another example, the DOT assesses a civil penalty in the thousands of dollars against a regional air carrier for violating a denied boarding regulation. These real cases and disputes historically have been the primary source of law. Common law generally means law that has developed from adjudicated cases. It is sometimes referred to as case law.

A second reason the class studied these selected cases is that it can be hard for an aviation student to understand a particular Federal Aviation Regulation (FAR) or legal rule, and the merits as a matter of policy, without applying the rule in the real world. Some rules are a bit ambiguous, others are quite specific and easy to understand the spirit and intent behind them. There is the need to understand real-life applications of a rule before a student can understand what the rule really means. These rules have both strengths and weaknesses. By studying cases, a student can learn *to conduct aviation operations in a professional, safe, and efficient manner*. It helps the student to think of specific factual situations that reveal the strengths and weaknesses of a particular aviation-related rule. Hopefully, as future leaders in this industry, they can take that skill to help develop better rules as participants in aviation operations.

At the end of each case brief, the student was required to reflect on the court's opinion and the *application of the case* to the individual student writing the brief and on members of the aviation class which was composed of aviation management majors and professional pilot majors. What are the implications to aviation professionals? How does this case impact activities in aviation? How may we apply this case to our activities in aviation?

Eight quizzes were administered in the course. With 46 students enrolled--and at least 12 of the students being international--a different approach was taken to the assessment process. The quiz questions were issued on paper and each student answered the questions privately and individually. Then all students were permitted to work within groups to negotiate what that group believed to be the correct answer. The group responses were recorded on a separate answer sheet and five points was awarded to the group if they got the correct response on the first try. Any subsequent attempts for the correct response was awarded three points, one point or zero points. This process was to encourage students to collaborate, debate, find evidence, and negotiate for what they believed to be the correct responses. It helped the international students and all students enjoyed the process through reduction of testing stressors. However, the downside results in grade inflation.

EVIDENCE:

<u>Example Quiz Questions Relevant to Learning Outcome (SLO 1)</u>

Conduct aviation operations in a professional, safe, and efficient manner.

Quiz 5; Question 4
Of the following, which ***one*** best represents a potential legal enforcement action that may be taken by the FAA.

a. A flight school is discovered to have a flaw in its operations manual which may lead to unsafe aircraft operations in the training environment.
b. A student pilot made a mistake in the traffic pattern, during touch-and-gos, which was inadvertent on her part.
c. A piloted aircraft was observed by an Illinois State Highway Patrol officer making passes over a rural corn field in a sparsely populated area.
d. Matters involving competence of holders of certificates may require retraining.
e. During a ramp inspection, an FAA Safety Inspector saw a pilot make a mistake during his preflight and did an on-the-spot counseling correction.

Quiz 5; Question 4: With "C" being the correct response, one half of the class responded with "A" or "D"

Quiz 6; Question 11
Some of you in this class will become pilots for a large, major air carrier. Others may work in the customer service unit of the airline. Consider the following statements and identify those that are true and accurate by circling the letter or letters.

a. As the *Al-Watan* case discusses, there are safety-related circumstances in which discrimination is lawful and this not infrequently presents uncomfortable issues of racial, ethnic, and gender-based profiling.
b. The pilot in command of the aircraft is the final authority as to the operation of that aircraft (14 CFR 91.3), including any decision to refuse to transport a passenger provided that pilot follows the airline's required security protocol.
c. COVID-19 is a respiratory illness. Airlines may refuse transportation because of a communicable disease if the passenger's condition poses a direct threat to the health or safety of others. (ACAA in 14 CFR Part 382)
d. The Department of Transportation has set the minimum limit of air carrier liability for provable direct or consequential damages resulting from the disappearance of, damage to, or delay in delivery of a passenger's baggage to an amount less than $2,500 per passenger.
e. Air carriers owe a common law duty of care to their passengers, who, as customers, are business invitees.
f. The Captain holds the ultimate decision-making authority on a passenger's removal from a flight.
g. 49 U.S.C. Section 44902 of the Federal Aviation Act, provides that an air carrier "may refuse to transport a passenger or property the carrier decides is, or might be, inimical to safety."

Quiz 6; Question 11: 23 of 46 students were able to identify the six correct responses (A-B-C-E-F-G) to this question

Quiz 7; Question 7

Scenario. You failed to perform an adequate preflight inspection, attempted to take off on almost empty fuel tanks, and fuel starvation caused the engine to quit on takeoff. But when it did, you were able to abort the takeoff without damaging the aircraft or harming its occupants or anyone else.

a. You could be successfully sued for negligence in that you failed to use care.
b. You could not successfully be sued for negligence. (there was no injury) However, the FAA may suspend or revoke you pilot certificate for careless operation under 14 CFR §91.13, inadequate preflight action under 14 CFR §91.103, or your lack of the care,judgment, and responsibility required of the holder of a pilot certificate.
c. Neither the FAA nor a plaintiff's lawyer will take any civil action against you. You have done no wrong and cannot be held liable for this incident.
d. This is a clear-cut case of intentional tort committed by you, the pilot. You could be successfully sued.

Quiz 7; Question 7: 87 percent of the 46 students responded with the correct letter "B"

Midterm Exam; Question 7

As a result of reviewing several cases in both administrative and criminal law (FAA and DOT/OIG), you have noticed a trend in sanctions and penalties. Which of the choices best reflect this trend?

a. Very few FAA enforcement cases are settled. Most all end up in court; that is, at hearing before the NTSB or on appeal.
b. A study of FAA sanctions would seem to indicate that falsification of documents, records and applications leads to letters of warning to most offenders.
c. There appears to be a great deal of focus on prosecuting those certificated airmen who err in the completion of the application for renewal of the airman medical certificate.

Midterm Exam; Question 7: Only 39 percent of the 46 class members correctly responded with answer "C." The majority of students responded to "B" and a minority of eight students responded to "A."

Case Brief Rubric

The students were assessed using a Case Brief rubric. Students followed the format presented in the rubric. Points earned were up to 84 as a perfect score.

Example Case Briefs from NTSB ALJ and DOT Consent Orders databases

Many administrative law cases assigned to students who are certificate holders involved appeal hearings before the NTSB administrative law judges or full Board. Here is a student example brief that involves a mechanic's falsification of an aircraft record.

Aviation Management majors in the course were assigned Consent Orders issued by the Department of Transportation. Here is a student example of an alleged discrimination case against a Delta pilot in command with a subsequent $50,000 civil penalty against the air carrier.

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

RECOMMENDATIONS (based on the results):

Pending review by the department faculty

**Attach description of assignment used for assessment and samples of student work.*

Performance Indicator Rubric

Course: FSCI 1150 Flight 1

Course Instructor: Ryan Boyer

Semester Taught: Spring 2023

Number of Students in Course: 21

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Percentage of student written exams and stage checks passed on first attempt)	Benchmark achieved? (Benchmark: 70% of student written exams and stage checks passed on first attempt)
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	Written Exam Pass Rate: 96% Stage Check Pass Rate: 78%	Yes
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	Written Exam Pass Rate: 96% Stage Check Pass Rate: 78%	Yes

Description of Assessment: The student assessment consists of multiple-choice module written exams as well as stage check practical exams. Written exams require a minimum score of 70% to pass. Each stage check consists of an oral portion and a flight portion, and satisfactory or unsatisfactory performance is determined in accordance with the Module Completion Standards and/or the appropriate Airmen Certification Standards (ACS)/Practical Test Standards (PTS). Attached are samples of the module completion standards included in the approved Training Course Outline. This document describes the expectations and assessment standards for stage check oral and flight checks. Also attached is a sample of a student's completed module written exam.

Recommendations: Continue to identify and discuss student stage check deficiencies with the instructional staff each semester. Revisions to course content and/or module completion standards will be made as needed to ensure adequate student preparation.

Module 1

Basic Flight Training

Prerequisites: Prior to beginning this module the student must be enrolled in the Private Pilot Course and must possess a First or Second Class Medical Certificate issued within the previous 12 calendar months.

Objective: To provide students with the fundamental knowledge and skill necessary to conduct ground operations, takeoffs, and flight maneuvers with minimal instructor assistance.

Completion Standards:

- The student must meet the following minimum training time requirements during this module:

DUAL	OTHER		
Local	ATD	Pre/ Post	Ground
13.3	3.7	5.6	21.0

- Prior to completion of the module, students must pass a written exam and stage check to evaluate their understanding of:
  1) Airworthiness, including certificate and document locations and expiration, required inspections, equipment requirements, and flight with inoperative equipment.
  2) Weather information, including acceptable sources of weather data and weather products such as METARs, TAFs, PIREPs, AIRMETs, SIGMETs, winds aloft forecasts, and area forecasts.
  3) Aerodynamics associated with maneuvering flight, slow flight, stalls, and steep turns, including a description of angle of attack, load factor, maneuvering speed, stall speeds, turning tendencies, and overbanking tendency.
  4) Major aircraft components and systems by describing normal and abnormal operation of systems such as primary and secondary flight controls and trim,

powerplant and propeller, landing gear, fuel, oil, hydraulic, electrical, flight instruments, and environmental systems.

5) Airport considerations such as signs, markings, and lighting, collision avoidance, runway incursion avoidance, wake turbulence avoidance, wind shear avoidance, and NOTAMs and TFRs.

- Prior to completion of the module, students must pass a stage check to evaluate their ability to:
  1) Inspect the airplane with reference to an appropriate checklist and explain which items must be inspected and how to detect possible defects. Verify the airplane is airworthy and in condition for safe flight.
  2) Start the engine under various atmospheric conditions and complete the appropriate checklist.
  3) Brief occupants on the use of safety belts, doors, and sterile cockpit procedures and execute positive exchange of flight controls.
  4) Taxi the airplane, position the flight controls properly for the existing wind conditions, and control direction and speed without excessive use of brakes while maintaining taxiway/runway alignment.
  5) Maintain situational awareness while on the ground, use an airport diagram during taxi, and ensure taxi clearances/instructions are received, recorded, and read back correctly. Comply with airport signs, markings, lighting, and ATC clearances.
  6) Accomplish the before takeoff checklist, ensure the airplane is in a safe operating condition as recommended by the manufacturer, and provide a departure briefing.
  7) Select appropriate radio frequencies for communication with ATC, transmit using phraseology and procedures as specified in the AIM, acknowledge radio communications, and comply with instructions.
  8) Perform a takeoff without assistance, lift off and climb at the recommended airspeed +/- 15 knots, and maintain directional control and proper wind correction throughout takeoff and climb while completing appropriate checklists.

9) Perform straight and level flight, turns, climbs, descents, steep turns, slow flight, stalls, and ground reference maneuvers with minimal assistance and in accordance with published procedures, while maintaining altitude +/- 250 feet, airspeed +/- 25 knots, and heading +/- 25 degrees.
10) Perform a simulated emergency approach and landing with minimal assistance and in accordance with published procedures, maintain the best glide airspeed +/- 20 knots, select a suitable landing area, and complete the appropriate checklist.
11) Complete the before landing checklist, identify airport runways, and comply with proper traffic pattern entry procedures with minimal assistance, as directed by ATC.
12) Conduct flight in the traffic pattern, approach, and landing with instructor assistance.
13) Complete the after landing and engine shutdown checklists, conduct an appropriate post flight inspection, and secure the aircraft.

Notes:

- Lessons may be completed out of sequence as necessary to meet academic goals set by the instructor.
- Multiple instructional periods may be required to meet lesson requirements.

Module 2

Solo Flight Operations

Prerequisites: Prior to beginning this module the student must possess a valid Student Pilot Certificate.

Objective: To prepare students for safe solo flight operations in the local practice area.

Completion Standards:

- The student must meet the following minimum training time requirements during this module:

DUAL		SOLO	OTHER		
Local	Inst. Ref.	Local	ATD	Pre/ Post	Ground
15.3	1.5	0.4	1.3	4.4	11.0

- Prior to completion of the module, students must pass a pre-solo written exam and stage check to evaluate their understanding of:
  1) All knowledge areas included in Module 1.
  2) Basic flight instrument function, operation, limitations, and potential errors.
  3) Factors affecting performance of the aircraft, including aircraft loading, atmospheric conditions, and density altitude.
  4) Use of all performance charts, tables, and data to determine takeoff and landing, climb, and cruise performance.
  5) Computing weight and balance for a given scenario and the effects of exceeding weight and balance limits.
  6) Airspace rules and procedures, including types of airspace, VFR weather minimums, chart symbology, operating rules, pilot certification requirements, and airplane equipment requirements.
  7) Applicable sections of parts 61 and 91 of this chapter, including student pilot privileges and limitations, airmen document requirements, medical certificate class and duration, and applicable general operating rules.
- Prior to completion of the module, students must pass a stage check to evaluate their ability to:

1) Perform all tasks included in Module 1.
2) Liftoff at the recommended airspeed -0/+10 knots, climb at the recommended airspeed +/- 10 knots, and maintain directional control and proper wind correction throughout takeoff and climb while completing appropriate checklists.
3) Perform straight and level flight, turns, climbs, descents, steep turns, slow flight, stalls, and ground reference maneuvers in accordance with published procedures while maintaining altitude +/- 200 feet, airspeed +/- 20 knots, and heading +/- 20 degrees.
4) Navigate by reference to landmarks to any point within the practice area using aeronautical charts.
5) Communicate with other traffic in the practice area, make appropriate position reports, and ensure proper aircraft separation is maintained.
6) Control the aircraft solely by reference to instruments in straight and level flight, constant airspeed climbs and descents, and turns to headings while maintaining altitude +/- 250 feet, heading +/-25 degrees, and airspeed +/- 15 knots. Recognize unusual attitudes solely by reference to instruments and perform the correct flight control application to resolve unusual pitch and bank attitudes.
7) Analyze and take appropriate action during simulated equipment malfunctions and emergencies by completing the appropriate checklist or procedure. Perform a simulated emergency approach and landing, maintain the best glide airspeed +/- 15 knots, select a suitable landing area, plan a flight pattern to the landing area that would allow for a safe landing, and complete the appropriate checklist.
8) Comply with proper traffic pattern procedures, maintain proper spacing from other aircraft, correct for wind drift, and maintain orientation with the runway while maintaining traffic pattern altitude +/- 150 feet and appropriate airspeed +/- 15 knots.
9) Perform normal and crosswind landings and forward slips to a landing without assistance. Establish the recommended approach and landing configuration

while maintaining airspeed +/-10 knots, maintain a stabilized approach, touchdown smoothly at a speed that provides little or no aerodynamic lift, and maintain crosswind correction and directional control throughout the approach and landing.

10) Perform short and soft field takeoffs and landings with instructor assistance.

11) Conduct a go-around as necessary. Make a timely decision to discontinue the approach to landing, retract the flaps, and transition to climb pitch attitude for the appropriate airspeed +/- 10 knots.

Notes:

- Lessons may be completed out of sequence as necessary to meet academic goals set by the instructor.
- Multiple instructional periods may be required to meet lesson requirements.

Private Pilot, Quiz Module 1 Exam (AQ)

Started: May 02, 2023 02:32 PM

Stopped: May 02, 2023 02:55 PM

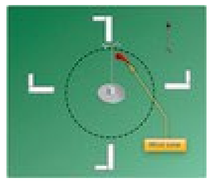
Grade: 90.00

□ Quiz Deadline: Dec 31, 2023 01:13 PM

Question	Answer

Question What is the valid period for the TAF for KMEM? (/gradebookutility/question.php?queID=47926) (/gradebookutility/question.php?queID=47926)  Figure 15.□ (/pled/assessment/main.php? page=imageviewer&origin=gb&imgKey=15&tabs=15&asIds[]=123379)	**Correct** Chosen: c

Question	Answer
Question **En route weather advisories should be obtained from an FSS on** (/gradebookutility/question.php?queID=47934)	**Correct** Chosen: a
Question **To get a complete weather briefing for the planned flight, the pilot should request** (/gradebookutility/question.php?queID=47899)	**Correct** Chosen: c
Question **An airplane said to be inherently stable will** (/gradebookutility/question.php?queID=50141)	**Correct** Chosen: b
Question **On aircraft equipped with fuel pumps, when is the auxiliary electric driven pump used?** (/gradebookutility/question.php?queID=47369)	**Correct** Chosen: b
Question **What is ground effect?** (/gradebookutility/question.php?queID=50134)	**Correct** Chosen: a
Question **You plan to phone a weather briefing facility for preflight weather information. You should** (/gradebookutility/question.php?queID=47904)	**Correct** Chosen: b
Question **When the term "light and variable" is used in reference to a Winds Aloft Forecast, the coded group and windspeed is** (/gradebookutility/question.php?queID=47941)	**Correct** Chosen: b
Question **What is an advantage of a constant-speed propeller?** (/gradebookutility/question.php?queID=47343)	**Incorrect (b)** Chosen: c
Question **The uncontrolled firing of the fuel/air charge in advance of normal spark ignition is known as** (/gradebookutility/question.php?queID=47365)	**Correct** Chosen: b
Question **What is the maximum structural cruising speed?** (/gradebookutility/question.php?queID=47302) (/gradebookutility/question.php?queID=47302)  Figure 4. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=4&tabs=4&asIds[]=123379)	**Correct** Chosen: b

Question	Answer
Question **Which instrument(s) will become inoperative if the static vents become clogged?** (/gradebookutility/question.php?queID=47291)	**Correct** Chosen: c
Question **The trafic patterns indicated in the segmented circle have been arranged to avoid flights over an area to the** (/gradebookutility/question.php?queID=50192) (/gradebookutility/question.php?queID=50192)  Figure 50. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=50&tabs=50&asIds[]=123379)	**Correct** Chosen: c
Question **Most midair collision accidents occur during** (/gradebookutility/question.php?queID=50227)	**Correct** Chosen: b
Question **In the Northern Hemisphere, a magnetic compass will normally indicate a turn toward the north if** (/gradebookutility/question.php?queID=47279)	**Correct** Chosen: c
Question **Wingtip vortices created by large aircraft tend to** (/gradebookutility/question.php?queID=50211)	**Correct** Chosen: a
Question **What steps must be taken when flying with glass cockpits to ensure safe flight?** (/gradebookutility/question.php?queID=47331)	**Correct** Chosen: c
Question **What is the purpose of the runway/runway hold position sign?** (/gradebookutility/question.php?queID=50175)	**Incorrect (c)** Chosen: b
Question **In what flight condition must an aircraft be placed in order to spin?** (/gradebookutility/question.php?queID=50129)	**Correct** Chosen: c
Question **If the engine oil temperature and cylinder head temperature gauges have exceeded their normal operating range, the pilot may have been operating with** (/gradebookutility/question.php?queID=47338)	**Correct** Chosen: c

Question	Answer
Question **A turn coordinator provides an indication of the** (/gradebookutility/question.php?queID=47326) (/gradebookutility/question.php?queID=47326)  Figure 5. (/pled/assessment/main.php? page=imageviewer&origin=gb&imgKey=5&tabs=5&asIds[]=123379)	**Correct** Chosen: a
Question **In the TAF from KOKC, the clear sky becomes** (/gradebookutility/question.php?queID=47924) (/gradebookutility/question.php?queID=47924)  Figure 15. (/pled/assessment/main.php? page=imageviewer&origin=gb&imgKey=15&tabs=15&asIds[]=123379)	**Incorrect (a)** Chosen: b
Question **AIRMETs are advisories of significant weather phenomena but of lower intensities than SIGMETs and are intended for dissemination to** (/gradebookutility/question.php?queID=47947)	**Correct** Chosen: b
Question **If the pitot tube and outside static vents become clogged, which instruments would be affected?** (/gradebookutility/question.php?queID=47290)	**Correct** Chosen: b
Question **If an aircraft is equipped with a fixed-pitch propeller and a float-type carburetor, the first indication of carburetor ice would most likely be** (/gradebookutility/question.php?queID=47350)	**Correct** Chosen: c
Question **One purpose of the dual ignition system on an aircraft engine is to provide for** (/gradebookutility/question.php?queID=47344)	**Correct** Chosen: a
Question **What is absolute altitude?** (/gradebookutility/question.php?queID=47311)	**Correct** Chosen: b
Question **Under which condition will pressure altitude be equal to true altitude?** (/gradebookutility/question.php?queID=47318)	**Correct** Chosen: b

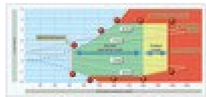
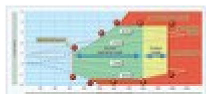
Question **What is a benefit of flying with a glass cockpit?** (/gradebookutility/question.php?queID=47330)	**Correct** Chosen: b

Question	Answer
Question **When departing behind a heavy aircraft, the pilot should avoid wake turbulence by maneuvering the aircraft** (/gradebookutility/question.php?queID=50215)	**Correct** Chosen: b
Question **Deviation in a magnetic compass is caused by the** (/gradebookutility/question.php?queID=47280)	**Correct** Chosen: c
Question **What values are used for Winds Aloft Forecasts?** (/gradebookutility/question.php?queID=47940)	**Correct** Chosen: c
Question **The reason a 4-cylinder reciprocating engine continues to run after the ignition switch is positioned to OFF may be a** (/gradebookutility/question.php?queID=47346)	**Correct** Chosen: c
Question **What wind is forecast for STL at 12,000 feet?** (/gradebookutility/question.php?queID=47935) (/gradebookutility/question.php?queID=47935)  Figure 17. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=17&tabs=17&asIds[]=123379)	**Correct** Chosen: b
Question **What is the maximum flaps-extended speed?** (/gradebookutility/question.php?queID=47297) (/gradebookutility/question.php?queID=47297)  Figure 4. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=4&tabs=4&asIds[]=123379)	**Incorrect (b)** Chosen: c
Question **Wingtip vortices are created only when an aircraft is** (/gradebookutility/question.php?queID=50207)	**Correct** Chosen: c
Question **Why is frost considered hazardous to flight?** (/gradebookutility/question.php?queID=50132)	**Correct** Chosen: c

Question **The pitot system provides impact pressure for which instrument?** (/gradebookutility/question.php?queID=47288)	**Correct** Chosen: c

Question	Answer
Question **To properly purge water from the fuel system of an aircraft equipped with fuel tank sumps and a fuel strainer quick drain, it is necessary to drain fuel from the** (/gradebookutility/question.php?queID=47368)	**Correct** Chosen: c
Question **A positive indication on an ammeter** (/gradebookutility/question.php?queID=47375)	**Correct** Chosen: b
Question **When are the four forces that act on an airplane in equilibrium?** (/gradebookutility/question.php?queID=50121)	**Correct** Chosen: a
Question **(Refer to E.) This sign is a visual clue that** (/gradebookutility/question.php?queID=50170) (/gradebookutility/question.php?queID=50170)  Figure 65.□ (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=65&tabs=65&asIds[]=123379)	**Correct** Chosen: a
Question **Select the proper trafic pattern and runway for landing.** (/gradebookutility/question.php?queID=50189) (/gradebookutility/question.php?queID=50189)  Figure 49.□ (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=49&tabs=49&asIds[]=123379)	**Incorrect (b)** Chosen: c
Question **A lighted heliport may be identified by a** (/gradebookutility/question.php?queID=50181)	**Correct** Chosen: a

Question **The possibility of carburetor icing exists even when the ambient air temperature is as** (/gradebookutility/question.php?queID=47349)	**Correct** Chosen: a

Question	Answer
Question **What load factor would be created if positive 15 feet per second gusts were encountered at 120 mph?** (/gradebookutility/question.php?queID=50159) (/gradebookutility/question.php?queID=50159)  Figure 72. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=72&tabs=72&asIds[]=123379)	**Correct** Chosen: c
Question **A positive load factor of 2 at 80 mph would cause the airplane to** (/gradebookutility/question.php?queID=50158) (/gradebookutility/question.php?queID=50158)  Figure 72. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=72&tabs=72&asIds[]=123379)	**Correct** Chosen: a
Question **You are preparing for a flight with a planned arrival in southern Georgia at 0600Z. What conditions should you expect when landing?** (/gradebookutility/question.php?queID=47945) (/gradebookutility/question.php?queID=47945)  Figure 19. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=19&tabs=19&asIds[]=123379)	**Correct** Chosen: c
Question **Structural damage or failure is more likely to occur in smooth air at speeds above** (/gradebookutility/question.php?queID=50157)	**Correct** Chosen: c
Question **Under what condition is indicated altitude the same as true altitude?** (/gradebookutility/question.php?queID=47316)	**Correct** Chosen: b

Performance Indicator Rubric

Course: FSCI 1250 Basic Flight Foundations

Course Instructor: Ryan Boyer

Semester Taught: Fall 2022

Number of Students in Course: 49

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	Midterm Exam Average: 89% % of Class Achieving 70% or Better on Midterm Exam: 94% Final Exam Average: 88% % of Class Achieving 70% or Better on Final Exam: 92%	Yes
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	Midterm Exam Average: 89% % of Class Achieving 70% or Better on Midterm Exam: 94% Final Exam Average: 88% % of Class Achieving 70% or Better on Final Exam: 92%	Yes

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

Continue to analyze Student Pilot and Private Pilot stage check and checkride deficiencies in Flight 1 and Flight 2 courses. Include greater emphasis on flight course weak areas in Basic Flight Foundations lectures. Consider administering more frequent in-class quizzes to ensure reading assignments are being completed. Consider expanding lecture topics to include basic principles of cross-country flight planning.

Results

87.18%
Score

68
Out of 78 points

01:12:29
Time for this attempt

0 / 1 point

Refer to the chart excerpt below. Which of the following best describes the airspace above TAZ airport?

Class G at the surface extending up to 700 AGL

Class G at the surface extending up to 1,200 AGL

Class E at the surface extending up to 700 AGL

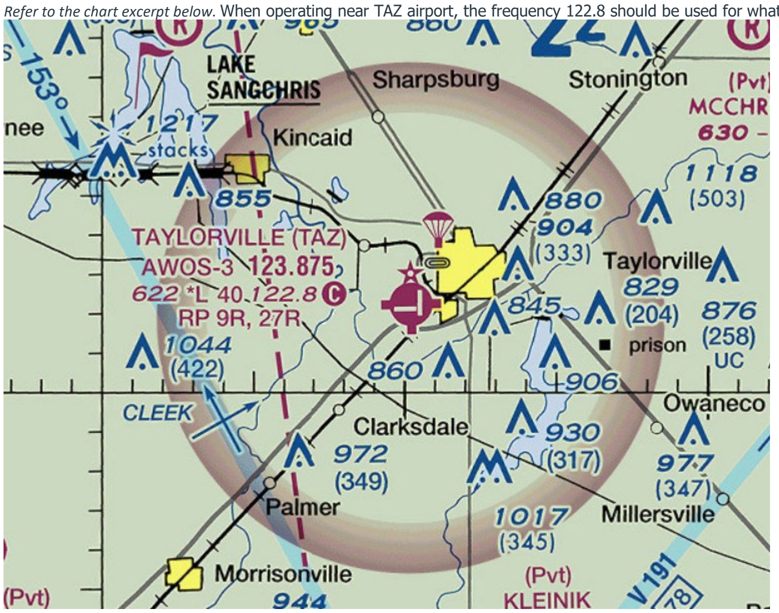
Correct Answer: **Class G at the surface extending up to 700 AGL**

Class E at the surface extending up to 18,000 MSL

0 / 1 point

2 1 / 1 point

Refer to the chart excerpt below. When operating near TAZ airport, the frequency 122.8 should be used for what purpose?

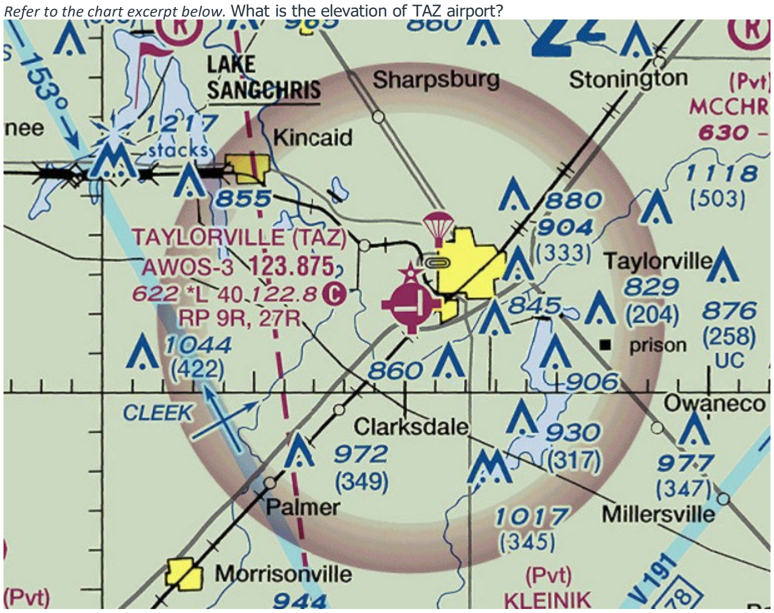


- [x] Communicating your intentions to other aircraft in the area
- [ ] Communicating with the control tower
- [ ] Listening to the automated weather
- [ ] Reporting your position to approach control

1 / 1 point

3 1 / 1 point

Refer to the chart excerpt below. What is the elevation of TAZ airport?

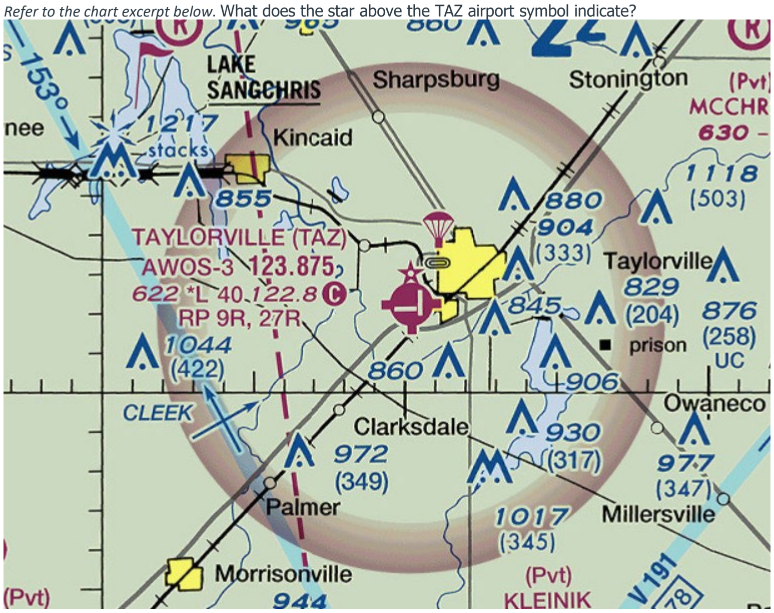


- [ ] 400 feet
- [x] 622 feet
- [ ] 860 feet
- [ ] 4000 feet

1 / 1 point

4 1 / 1 point

Refer to the chart excerpt below. What does the star above the TAZ airport symbol indicate?

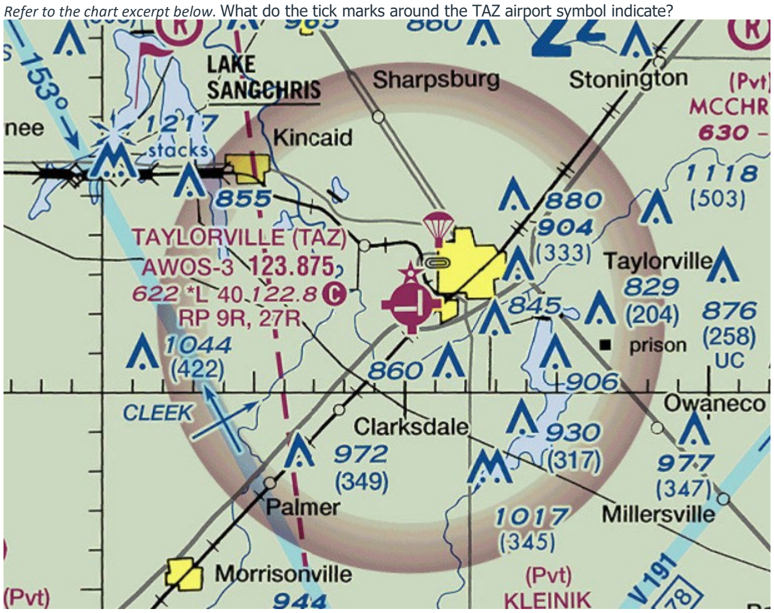


- Lighting limitation exist
- Part time operation of the control tower
- Services are available at the airport
- ✓ A rotating beacon is in operation from sunset to sunrise

1 / 1 point

5 1 / 1 point

Refer to the chart excerpt below. What do the tick marks around the TAZ airport symbol indicate?

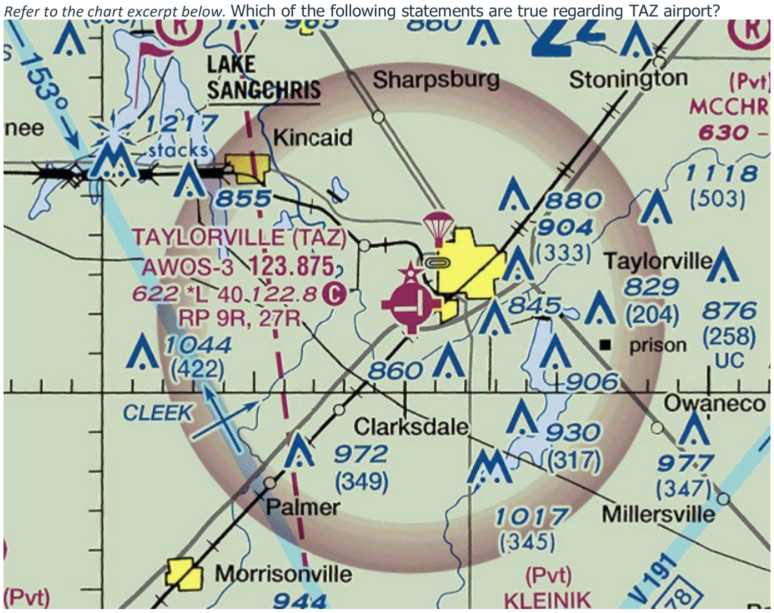


- A rotating beacon is in operation from sunset to sunrise
- Part time operation of the control tower
- The runways are hard surface
- ✓ Services are available at the airport

1 / 1 point

6 1 / 1 point

Refer to the chart excerpt below. Which of the following statements are true regarding TAZ airport?

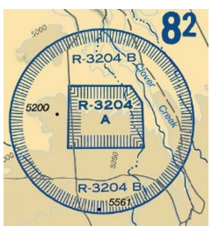


- Right-hand traffic patterns should be flown on certain runways.
- Airport lighting is available, but limitations exist.
- The length of the longest runway is approximately 4000 feet.
- ✓ All of the above statements are true.

1 / 1 point

7 1 / 1 point

Refer to the chart excerpt below. Which statement is true regarding flight in the special use airspace areas depicted?

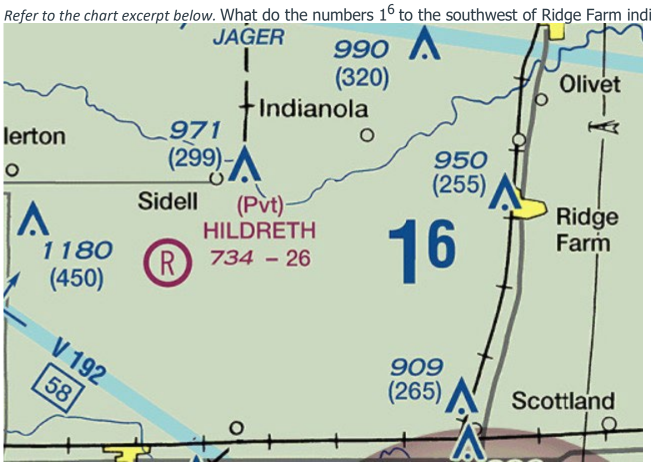


- ✓ Permission is required from the controlling agency prior to entering.
- Flight within is not allowed under any circumstances.
- No authorization is required, but pilots should be extra cautious

1 / 1 point

8 1 / 1 point

Refer to the chart excerpt below. What do the numbers 1^6 to the southwest of Ridge Farm indicate?

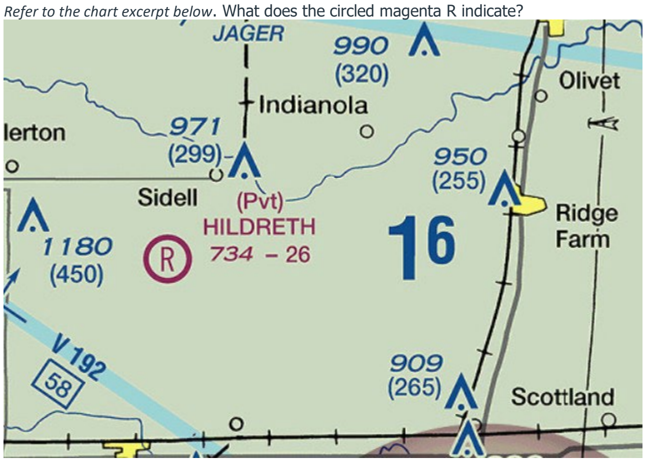


- Length in hundreds of feet of the longest runway in that sector
- Average elevation of the airports in the area
- Required visibility in miles for operating in that quadrant
- ✓ The highest elevation in hundreds of feet of terrain or obstacles in that quadrant

1 / 1 point

9 1 / 1 point

Refer to the chart excerpt below. What does the circled magenta R indicate?

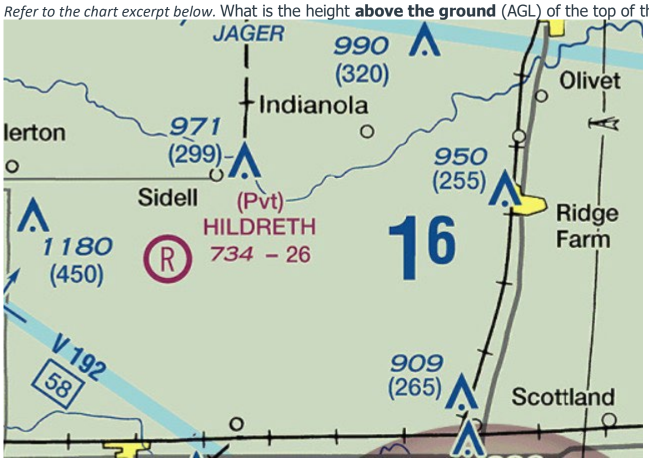


- A restricted area requiring ATC permission to enter
- ✓ A private airport requiring the owner's permission to land
- A public-use airport with an unpaved runway

1 / 1 point

10 1 / 1 point

Refer to the chart excerpt below. What is the height **above the ground** (AGL) of the top of the obstacle located in the town of Ridge Farm?



950 feet

✓ 255 feet

695 feet

1 / 1 point

11 1 / 1 point

Which statement is true regarding right of way rules?

When two airplanes are converging, but not head-on, the faster airplane always has the right of way.

When overtaking another aircraft traveling in the same direction, you must pass well clear on the left side of the other aircraft.

✓ When two airplanes are approaching head-on, you and the pilot of the other aircraft must alter course to the right.

1 / 1 point

12 1 / 1 point

Except when necessary for takeoff or landing, when operating over open water or sparsely populated areas, an aircraft may not be operated closer than________from any person, vessel, vehicle, or structure?

✓ 500 feet

1,000 feet

2,000 feet

½ NM

1 / 1 point

13 1 / 1 point

Except when necessary for takeoff or landing, when operating over any congested area of a city, town, or settlement, or over any open-air assembly of persons, no person may operate an aircraft below:

500 feet above the surface

500 feet above any obstacle within 2000 feet of the aircraft

1000 feet above the surface

✓ 1000 feet above the highest obstacle within 2000 feet of the aircraft

1 / 1 point

14 1 / 1 point

You have just started the airplane's engine and are preparing to taxi to the runway for departure. You must contact ground control and receive instructions prior to:

- Leaving the parking spot
- ✓ Entering the airport movement area
- Taxiing onto the active runway for departure
- Entering the airport ramp area

1 / 1 point

15 1 / 1 point

Runway Aiming Point markings are located how far from the threshold?

- 100 feet
- 500 feet
- ✓ 1000 feet
- 2000 feet

1 / 1 point

16 1 / 1 point

Runway Touchdown Zone markings are separated by how many feet?

- 100 feet
- ✓ 500 feet
- 1000 feet
- 2000 feet

1 / 1 point

17 1 / 1 point

Taxiway markings are white, while runway markings are yellow.

- True
- ✓ False

1 / 1 point

18 1 / 1 point

Runway holding position markings consist of two solid yellow lines and two dashed yellow lines. A pilot needs a clearance prior to crossing when approaching from the side of the solid lines.

- ✓ True
- False

1 / 1 point

19 1 / 1 point

What color are taxiway edge lights?

- Green
- ✓ Blue
- White
- Yellow

1 / 1 point

20 1 / 1 point

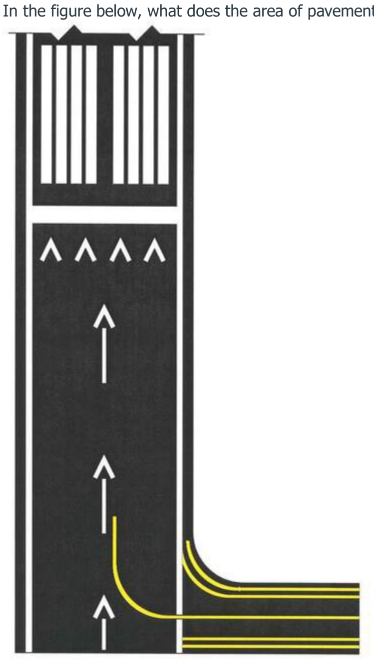
How is a lighted land airport identified at night?

- ✓ White and green flashing beacon
- Yellow and white flashing beacon
- Yellow, white, and green flashing beacon

1 / 1 point

21 1 / 1 point

In the figure below, what does the area of pavement marked by white arrows represent?

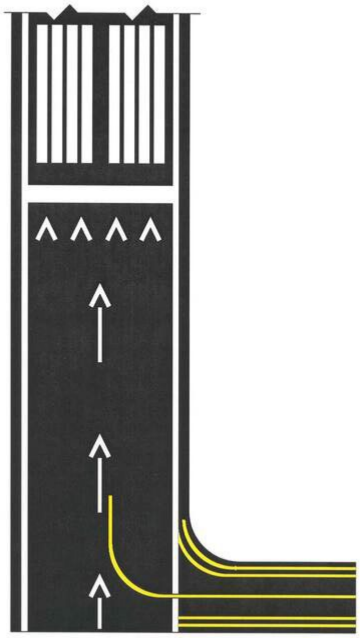


- ✓ A displaced threshold
- A blastpad/stopway
- A runway under construction
- The runway touchdown zone

1 / 1 point

22 1 / 1 point

In the figure below, what may the area marked by white arrows be used for?

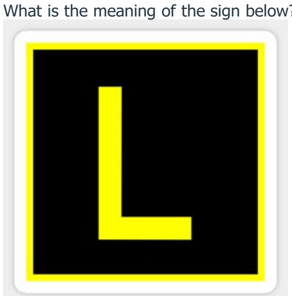


- Taxi only
- ✓ Takeoff in the direction of the arrows
- Landing in the direction of the arrows

1 / 1 point

23 1 / 1 point

What is the meaning of the sign below?



- ✓ The aircraft is currently located on taxiway Lima
- The aircraft is approaching the intersection of taxiway Lima
- The aircraft is approaching the left of two parallel runways

1 / 1 point

24 1 / 1 point

What is an on-glideslope indication from a VASI?

- A red light over a red light
- ✓ A red light over a white light
- A white light over a white light
- A single horizontal line of lights made up of two red lights and two white lights

1 / 1 point

25 1 / 1 point

You receive the following taxi instructions from Ground Control: "Billiken 20, taxi to runway 12R via A and B1." This taxi route takes you across runway 5/23. You may legally taxi:

- All the way to runway 12R, but must hold short of runway 12R.
- ✓ To the intersection of runway 5/23, where a further clearance must be received in order to cross.
- Onto runway 12R, but may not takeoff until a takeoff clearance is received from the control tower.

1 / 1 point

26 1 / 1 point

If ATC instructs you to "Ident," what do they want you to do?

- ✓ Press the "Ident" button on the transponder
- Reply with your aircraft callsign
- Confirm your location and altitude
- Set your transponder code to 1200

1 / 1 point

27 1 / 1 point

A transponder code of 7700 should be used in what situation?

- ✓ Emergency
- Hijacking
- Loss of communications
- VFR operations

1 / 1 point

28 0 / 1 point

Using a network of ground stations and specialized aircraft equipment, this system provides ATC highly accurate position and speed information for all aircraft, and it provides pilots real-time traffic position data and weather information.

- VOR
- × WAAS

Correct Answer: **ADS-B**

- RAIM
- ADS-B

0 / 1 point

29 0 / 1 point

Assume the current time is 2:00 PM (Central Daylight Time). What is the current Zulu time?

- 7:00
- × 8:00

Correct Answer: **19:00**

- 14:00
- 19:00

0 / 1 point

30 1 / 1 point

What is the meaning of the word "Standby" when used over the radio?

- [x] Wait and I will call you
- [ ] Unable to comply with your request
- [ ] Proceed with your message
- [ ] Hold your present position

1 / 1 point

31 1 / 1 point

Which of the following is an appropriate response when asked a yes/no question by ATC over the radio?

- [ ] Yes
- [ ] Roger
- [x] Affirmative
- [ ] Wilco

1 / 1 point

32 1 / 1 point

In the event of suspected communications failure during a VFR training flight when returning to a Class D airport, what is the best course of action?

- [ ] Squawk 7700, enter the airspace, and land immediately on the first available runway
- [x] Observe the flow of traffic, enter the airspace, and wait for light gun signals
- [ ] Choose a different airport; you may not enter the Class D airspace

1 / 1 point

33 1 / 1 point

In the event of radio communication failure, the control tower can provide instructions using a light gun. If while taxiing you saw a flashing red light coming from the tower, what is the appropriate action?

- [ ] Stop immediately
- [ ] Takeoff immediately
- [ ] Return to your starting point on the airport
- [x] Taxi clear of the runway

1 / 1 point

34 1 / 1 point

Additional airport data, such as runway information, fuel availability, hours of operation, and lighting availability, can be found in what publication?

- [x] Chart Supplement
- [ ] Federal Aviation Regulations
- [ ] Notices to Airmen Publication
- [ ] Aeronautical Information Manual

1 / 1 point

35 1 / 1 point

FAR Part 61 deals with which of the following subjects?

- ✓ Certification of Pilots
- Pilot Schools
- Maintenance
- General Operating Rules

1 / 1 point

36 1 / 1 point

FAR Part 91 deals with which of the following subjects?

- Certification of Pilots
- Pilot Schools
- Maintenance
- ✓ General Operating Rules

1 / 1 point

37 1 / 1 point

On Sectional and Terminal Area Charts, towered airports are shown in what color?

- ✓ Blue
- Black
- Magenta
- Grey

1 / 1 point

38 0 / 1 point

Where is Class E airspace most commonly located?

- Surrounding the busiest airports in the nation
- ✗ From the surface to either 700 or 1200 AGL

Correct Answer: **From 700 or 1200 AGL up to the bottom of the overlying airspace**

- From 700 or 1200 AGL up to the bottom of the overlying airspace
- At and above FL180 (18,000 MSL)

0 / 1 point

39 1 / 1 point

What is magnetic variation?

- The change in heading required to compensate for the effects of wind
- ✓ The angular difference between true and magnetic north
- The compass error caused by interference from electrical equipment in the aircraft
- The slow drifting of the heading indicator requiring it to be periodically set to match the compass

1 / 1 point

40 1 / 1 point

Which statement is true regarding operations in Class C airspace?

- A specific clearance must be received prior to entry
- ✓ A pilot may enter as soon as two way radio communications have been established
- No specific communication requirements must be met prior to entry

1 / 1 point

41 1 / 1 point

What are the basic VFR weather minimums when operating an aircraft in Class B airspace?

- 1 mile visibility and clear of clouds
- ✓ 3 miles visibility and clear of clouds
- 3 miles visibility and 500 feet below, 1000 feet above, 2000 feet horizontally from clouds
- 5 miles visibility and 1000 feet below, 1000 feet above, 1 SM horizontally from clouds

1 / 1 point

42 1 / 1 point

How is Class A airspace identified on a Sectional or Terminal Area Chart?

- A dashed blue line
- A shaded blue line
- A dashed magenta line
- ✓ Not depicted

1 / 1 point

43 1 / 1 point

When approaching a Class D airport for landing, you contact the tower and they respond with, "Aircraft calling tower, say again." This is considered to be establishing two-way communication, and the Class D airspace may be entered.

- True
- ✓ False

1 / 1 point

44 1 / 1 point

During operations in Class G airspace below 1,200 AGL during the day, what is the required visibility?

- ✓ 1 SM
- 2 SM
- 3 SM
- 5 SM

1 / 1 point

45 0 / 1 point

When operating below 10,000 MSL in Class E airspace, what are the basic VFR weather minimums?

- 1 mile visibility and clear of clouds
- 1 mile visibility and 500 feet below, 1000 feet above, 2000 feet horizontally from clouds
- 3 miles visibility and 500 feet below, 1000 feet above, 2000 feet horizontally from clouds
- × 5 miles visibility and 1000 feet below, 1000 feet above, 1 SM horizontally from clouds

Correct Answer: **3 miles visibility and 500 feet below, 1000 feet above, 2000 feet horizontally from clouds**

0 / 1 point

46 1 / 1 point

In which of the following areas is a transponder required?

- Above 10,000 feet, excluding that airspace at and below 2,500 AGL
- In Class C and Class B airspace and within 30 NM of the Class B primary airport
- Above Class C airspace
- ✓ All of the above

1 / 1 point

47 1 / 1 point

Which statement is true regarding operating under a special VFR clearance during the day?

- The pilot must be instrument rated in an aircraft equipped for instrument flight
- ✓ One mile flight visibility is required and the flight must be operated clear of clouds
- Air traffic control will automatically issue a special VFR clearance if conditions warrant

1 / 1 point

48 0 / 1 point

What is the maximum airspeed allowed by regulations when operating below 2,500 AGL within 4 NM of a Class C or Class D airport?

- 150 knots
- 200 knots
- × 250 knots

Correct Answer: **200 knots**

- Mach 1.0

0 / 1 point

49 1 / 1 point

Which statement is true regarding flight in an alert area?

- Permission is required from the controlling agency prior to entering
- Flight within is not allowed under any circumstances
- ✓ No authorization is required, but pilots should be extra cautious
- These areas are not charted, and therefore no specific requirements apply

1 / 1 point

50 1 / 1 point

Where would a warning area typically be located?

- Around military bases to warn pilots of potentially hazardous military activity
- Above specific locations in Washington D.C.
- Above ground facilities that require increased security
- ✓ Extending from 3 miles outward along the coast

1 / 1 point

51 1 / 1 point

Generally, pilots are able to operate VFR in airspace affected by a Temporary Flight Restriction without any specific clearance or communication requirements. However, extra vigilance isrecommended.

- True
- ✓ False

1 / 1 point

52 0 / 1 point

Which statement is true regarding flight in the vicinity of stadiums with more than 30,000 seats during major league sporting events?

- ✗ Depending on the event, flight restrictions may or may not be in place; check the FAA website

Correct Answer: **Flights are automatically restricted within a 3-mile radius below 3,000 AGL**

- Flights are automatically restricted within a 3-mile radius below 3,000 AGL
- No flight restrictions exist, but pilots should be extra vigilant

0 / 1 point

53 1 / 1 point

According to Federal Aviation Regulations, who is responsible for ensuring the aircraft is in a condition for safe flight?

- The mechanics
- The flight school
- ✓ The pilot
- The dispatch department

1 / 1 point

54 1 / 1 point

Which aircraft document is required to be visible to passengers or crew?

- ✓ Airworthiness Certificate
- Registration Certificate
- Operation Limitations
- Weight and Balance Data

1 / 1 point

55 1 / 1 point

An airworthiness certificate never expires so long as the aircraft is maintained in accordance with the applicable regulations.

- ✓ True
- False

56 1 / 1 point

The operating limitations found in Section 2 of the AFM function as recommendations from the aircraft manufacturer. Pilots may exceed a limitation if they determine it will be in the interest of operational efficiency.

- True
- ✓ False

1 / 1 point

57 1 / 1 point

For which operation is an annual inspection required?

- ✓ Any operation
- Only operations involving flying for hire
- Only when providing flight instruction
- Only when carrying passengers

1 / 1 point

58 1 / 1 point

An annual inspection was conducted on January 3 of this year. When will the next annual inspection be due?

- December 31 of this year
- January 3 of next year
- ✓ January 31 of next year

1 / 1 point

59 1 / 1 point

Which of the following operations would require a 100-hour inspection to be conducted on the aircraft?

- ✓ Flights carrying passengers for hire
- Flights carrying cargo for hire
- Flights conducted in class B airspace
- All of the above

1 / 1 point

60 1 / 1 point

The annual inspection will satisfy the 100-hour inspection requirement if the annual was conducted within the previous 100 hours of time in service.

- ✓ True
- False

1 / 1 point

61 1 / 1 point

How often must the batteries in an ELT be replaced?

- Every 12 calendar months
- Every 24 calendar months
- ✓ After half of their useful life or one hour of cumulative use

1 / 1 point

62 1 / 1 point

How often must an ELT inspection be performed?

- Every 100 hours of time in service
- Every 30 days
- ✓ Every 12 calendar months
- Every 24 calendar months

1 / 1 point

63 1 / 1 point

How often must a transponder inspection be performed?

- Every 100 hours of time in service
- Every 30 days
- Every 12 calendar months
- ✓ Every 24 calendar months

1 / 1 point

64 1 / 1 point

After determining that an inoperative component is not required, which of the following actions must legally be completed prior to flight?

- Placard the instrument or equipment "INOPERATIVE"
- Deactivate or remove the component
- Determine whether the inoperative equipment will create a safety hazard
- ✓ All of the above

1 / 1 point

65 1 / 1 point

A list of instruments and equipment required to be operational for flight can be found in which of the following sources?

- ✓ FAR 91.205
- Chart Supplements
- Notices to Airmen
- Chapter 5 of the Aircraft Flight Manual

1 / 1 point

66 1 / 1 point

An aircraft that does not currently meet applicable airworthiness requirements, but is capable of safe flight, may be flown to a point where repairs can be made by obtaining a ________.

- Operating Certificate
- Revised Registration Certificate
- Special VFR Clearance
- ✓ Special Flight Permit

1 / 1 point

67 0 / 1 point

The alternate air control provides a secondary source of air for what purpose?

- Power for the gyroscopes
- Engine cooling
- ✕ Carburetor intake

Correct Answer: **Engine combustion**

- Engine combustion

0 / 1 point

68 1 / 1 point

Electrical power for starting the engine is provided by the aircraft battery.

- ✓ True
- False

1 / 1 point

69 1 / 1 point

During cruise flight, you notice that the oil pressure appears to be decreasing, and the oil temperature is gradually increasing. What is the best course of action?

- No need for concern as long as engine is running smoothly; continue the flight
- Suspect a gauge malfunction, monitor the engine gauges, and return to the airport
- ✓ Serious engine problems may be present; reduce throttle to minimum required RPM and prepare for potential off-airport landing
- Immediately shut down the engine and land in any field within gliding distance

1 / 1 point

70 1 / 1 point

What is a function of the anti-servo tab?

- To act as a trim tab for the ailerons
- ✓ To reduce the tendency to overcontrol the airplane’s pitch
- To increase lift without increasing parasite drag
- To compensate for changes in altitude on the elevator

1 / 1 point

71 1 / 1 point

V_Y is the best________of climb speed. This airspeed will produce the greatest altitude gain in a given________.

- ✓ rate, time
- angle, time
- rate, horizontal distance
- angle, horizontal distance

1 / 1 point

72 1 / 1 point

The left turning tendency of an airplane known as torque is caused by what?

- ✓ (selected) The clockwise rotation of the engine and the propeller turning the airplane counterclockwise
- The propeller blade descending on the right, producing more thrust than the ascending blade on the left
- The gyroscopic forces applied to the rotating propeller blades acting 90 degrees after the point the forces were applied
- The spiraling airflow from the propeller striking the vertical stabilizer and rudder

1 / 1 point

73 0 / 1 point

Assuming a constant altitude is maintained, how does lift in slow flight compare to lift at cruise speeds?

- Lift in slow flight is greater than lift during cruise flight due to the higher angle of attack
- ✗ (selected) Lift during cruise flight is greater than lift during slow flight due to the higher airspeed

Correct Answer: **Lift is approximately the same in slow flight as it is during flight at cruise airspeeds**

- Lift is approximately the same in slow flight as it is during flight at cruise airspeeds

0 / 1 point

74 1 / 1 point

What type of drag would be created at the intersection of the wing and the fuselage due to mixing of airflow?

- Form
- Skin Friction
- ✓ (selected) Interference
- Induced

1 / 1 point

75 0 / 1 point

Why is adverse yaw created during a turn?

- The ailerons are deflected during turn entry, resulting in more lift and more induced drag on one wing
- The rudder is deflected creating more drag on one side of the airplane
- Lift is redirected during a bank, resulting in induced drag acting on one wing more than the other
- ✗ (selected) One wing is moving faster than the other in the turn, creating more lift and more induced drag

Correct Answer: **The ailerons are deflected during turn entry, resulting in more lift and more induced drag on one wing**

0 / 1 point

76 1 / 1 point

What is the primary cause of overbanking tendency in steep turns?

- The ailerons are deflected during the turn resulting in more lift on one wing
- The rudder is deflected during turns creating an additional force that increases bank angle
- ✓ (selected) One wing is moving faster than the other, creating more lift than the other wing
- The horizontal component of lift acts on the airplane to increase bank angle

1 / 1 point

77 1 / 1 point

Load factor is defined as the ratio of the total load the airplane is supporting to the________.

- stall speed in the landing configuration
- maximum G's the structure can withstand
- maneuvering speed of the airplane
- ✓ weight of the airplane

1 / 1 point

78 1 / 1 point

Load factor and stall speed will always increase in a coordinated, constant-altitude turn.

- ✓ True
- False

1 / 1 point

Fudge Points
Manually adjust the score by adding positive or negative points to this box

0

Final Score **68 / 78**

Results

91.25%	73	01:33:24
Score	Out of 80 points	Time for this attempt

1 / 1 point

Which of the following instrument indications would you expect if the static port became blocked?

- Only the airspeed indicator would read incorrectly
- The heading indicator, attitude indicator, and turn coordinator would read incorrectly
- The altimeter and VSI would read incorrectly
- The altimeter, VSI, and airspeed indicator would read incorrectly

1 / 1 point

1 / 1 point

In an aircraft equipped with a vacuum system, if the suction/vacuum gauge is indicating below the green arc during the engine run-up, what system or equipment will be affected?

- The fuel system
- The oil system
- The gyroscopic flight instruments
- The environmental system

1 / 1 point

1 / 1 point

When flying into an area of lower atmospheric pressure, without changing the altimeter setting, the altimeter will inaccurately indicate an altitude higher than the aircraft is actually flying.

- True
- False

1 / 1 point

1 / 1 point

In a fuel injected airplane, when would the alternate air need to be opened?

- When the primary engine air intake becomes blocked
- When the pitot or static lines become blocked
- When the engine is operating at higher than normal temperatures due to restricted cooling airflow
- When carburetor ice is suspected

1 / 1 point

1 / 1 point

In the event of a failure of the aircraft's alternator/generator, which of the following indications would you expect to see on the electrical gauges?

- An increase in voltage and a positive indication on the ammeter
- A decrease in voltage and a positive indication on the ammeter
- An increase in voltage and a negative indication on the ammeter
- A decrease in voltage and a negative indication on the ammeter

1 / 1 point

6 1 / 1 point

Induced drag increases as the_____increases.

- Airplane's airspeed
- ✓ Angle of attack of the wing
- Total parasite drag

1 / 1 point

7 1 / 1 point

As the weight of an airplane increases, the speed at which it will stall:

- ✓ Increases
- Decreases
- Remains the same

1 / 1 point

8 1 / 1 point

If an airplane is maintaining altitude during a turn at 30 degrees of bank, the airplane will stall at_____airspeed than during straight and level flight.

- ✓ a higher
- a lower
- the same

1 / 1 point

9 1 / 1 point

Which of the following flight maneuvers would increase the load factor on an airplane compared to unaccelerated, straight and-level flight at cruise speed?

- Approach for landing
- ✓ Steep turns
- Slow flight
- All of the above

1 / 1 point

10 1 / 1 point

Vy is the best_____of climb speed. This airspeed will produce the greatest altitude gain in a given_____.

- ✓ rate; time
- rate; horizontal distance
- angle; time
- angle; horizontal distance

1 / 1 point

11 1 / 1 point

The airspeed above which full or abrupt control inputs should never be made is known as what?

- Stall speed
- ✓ Maneuvering speed
- Maximum structural cruising speed

Never exceed speed

1 / 1 point

12 1 / 1 point

The turning tendency of an airplane known as precession is caused by what?

- The clockwise rotation of the engine and the propeller turning the airplane counterclockwise
- The propeller blade descending on the right, producing more thrust than the ascending blade on the left
- ✓ The gyroscopic forces applied to the rotating propeller blades acting 90 degrees after the point the forces were applied
- The airflow from the propeller striking the vertical stabilizer and rudder

1 / 1 point

13 1 / 1 point

How is adverse yaw created during a turn?

- The inside wing is creating more induced drag because it is moving slower
- The rudder is deflected creating more drag on one side of the airplane
- ✓ The ailerons are deflected during turn entry, resulting in more induced drag on one wing

1 / 1 point

14 0 / 1 point

When operating an airplane in slow flight, lift must be greater than weight in order to compensate for the reduced airflow over the wings at the slower airspeed.

- ✗ True

Correct Answer: **False**

- False

0 / 1 point

15 1 / 1 point

Which of the following best describes ground effect?

- A sudden reduction in performance when within one wingspan of the ground
- A tendency of the airplane to settle to the surface earlier than desired
- ✓ An increase in lift and a decrease in induced drag when within one wingspan of the ground

1 / 1 point

16 0 / 1 point

Runway Touchdown Zone markings are separated by how many feet?

- 100 feet
- 500 feet
- ✗ 1000 feet

Correct Answer: **500 feet**

- 2000 feet

0 / 1 point

17 1 / 1 point

The portion of a runway designated as a displaced threshold may be used for which of the following operations?

- Taxi only
- Landing in the direction of the arrows
- ✓ Taxi and takeoff in the direction of the arrows

18 1 / 1 point

Except when necessary for takeoff or landing, when operating over any congested area of a city, town, or settlement, or over an open-air assembly of persons, no person may operate an aircraft below:

- 500 feet above the surface
- 500 feet above any obstacle within 2000 feet of the aircraft
- 1000 feet above the surface
- ✓ 1000 feet above the highest obstacle within 2000 feet of the aircraft

1 / 1 point

19 1 / 1 point

In the event of radio communication failure, the control tower can provide instructions using a light gun. If, while approaching the airport, you saw an alternating green and red light coming from the tower, what is the appropriate action?

- ✓ Exercise extreme caution
- Land immediately
- Continue circling and await further instructions
- Give way to other aircraft in the traffic pattern

1 / 1 point

20 1 / 1 point

The angular difference between true and magnetic north is known as what?

- ✓ Magnetic variation
- Compass interference
- Compass deviation
- Magnetic divergence

1 / 1 point

21 1 / 1 point

What are the basic VFR weather minimums when operating an aircraft in Class B airspace?

- 1 mile visibility and clear of clouds
- ✓ 3 miles visibility and clear of clouds
- 3 miles visibility and 500 feet below, 1000 feet above, 2000 feet horizontally from clouds
- 5 miles visibility and 1000 feet below, 1000 feet above, 1 SM horizontally from clouds

1 / 1 point

22 1 / 1 point

Which statement is true regarding operations in Class C airspace?

- A specific clearance must be received prior to entry
- ✓ A pilot may enter as soon as two way radio communications have been established
- A private pilot certificate is required to enter; student pilot operations are not authorized

1 / 1 point

23 1 / 1 point

When operating below 10,000 MSL in Class E airspace, what are the basic VFR weather minimums?

- 1 mile visibility and clear of clouds
- 1 mile visibility and 500 feet below, 1000 feet above, 2000 feet horizontally from clouds
- ✓ 3 miles visibility and 500 feet below, 1000 feet above, 2000 feet horizontally from clouds
- 5 miles visibility and 1000 feet below, 1000 feet above, 1 SM horizontally from clouds

1 / 1 point

24 1 / 1 point

Where is Class G airspace typically located in our area?

- ✓ From the surface to either 700 or 1200 AGL
- From 700 or 1200 AGL to the bottom of the overlying airspace
- Surrounding the busiest airports in the nation
- At and above FL180 (18,000 MSL)

1 / 1 point

25 1 / 1 point

Where would a warning area typically be located?

- Around military bases to warn pilots of potentially hazardous military activity
- Above specific locations in Washington D.C.
- Above ground facilities that require increased security
- ✓ Extending from 3 miles outward along the coast

1 / 1 point

26 1 / 1 point

Which statement is true regarding flight in a restricted area?

- These areas are not charted, and therefore no specific requirements apply
- No authorization is required, but pilots should be extra cautious
- ✓ Permission is required from the controlling agency prior to entry
- Flight within is not allowed under any circumstances

1 / 1 point

27 1 / 1 point

In which of the following areas is a transponder required?

- ✓ In and above Class C airspace
- Airspace within 30 NM of a Class C primary airport
- In Class D airspace
- All of the above

1 / 1 point

28 1 / 1 point

What is the maximum airspeed allowed by regulations when operating in airspace underneath Class B airspace?

- 200 knots ✓
- 250 knots
- 300 knots
- Mach 1

1 / 1 point

29 1 / 1 point

Unless pilots maintain contact with Air Traffic Control, when flying in the vicinity of stadiums with more than 30,000 seats during major league sporting events, pilots should maintain a minimum of what altitude and distance away from the stadium?

- 1 mile radius and 1,000 feet AGL
- 3 mile radius and 1,000 feet AGL
- 3 mile radius and 3,000 feet AGL ✓
- 5 mile radius and 3,000 feet AGL

1 / 1 point

30 1 / 1 point

For which operation is an annual inspection required?

- Any operation ✓
- Any operation for hire
- Only operations carrying persons for hire
- Only operations carrying cargo for hire

1 / 1 point

31 1 / 1 point

For which operation is a 100-hour inspection required?

- Any operation
- Any operation for hire
- Only operations carrying persons for hire ✓
- Only operations carrying cargo for hire

1 / 1 point

32 1 / 1 point

The 100-hour inspection can take the place of the annual inspection if the 100-hour inspection was conducted within the previous 12 calendar months.

- True
- False ✓

1 / 1 point

33 1 / 1 point

How often does an aircraft Airworthiness Certificate expire?

- Every 12 calendar months
- Every 24 calendar months
- Every 3 years
- ✓ It does not expire assuming the aircraft is maintained in accordance with the applicable FAR's

1 / 1 point

34 1 / 1 point

How often must an ELT inspection be performed?

- Every 30 days
- Every 100 hours of time in service
- ✓ Every 12 calendar months
- Every 24 calendar months

1 / 1 point

35 1 / 1 point

How often must the batteries in an ELT be replaced?

- Every 12 calendar months
- Every 24 calendar months
- ✓ After half of their useful life or one hour of cumulative use

1 / 1 point

36 1 / 1 point

How often must a transponder inspection be performed?

- Every 30 days
- Every 100 hours of time in service
- Every 12 calendar months
- ✓ Every 24 calendar months

1 / 1 point

37 1 / 1 point

Which transponder code should be used in the event of a loss of communication?

- 1200
- 7500
- ✓ 7600
- 7700

1 / 1 point

38 1 / 1 point

The current altimeter setting is 29.85 at an airport with an elevation of 450 MSL. The current pressure altitude at the surface of the airport is______feet.

- ✓ 520

39 0 / 1 point

If the outside air temperature at the airport is colder than standard, the density altitude will be:

- Equal to pressure altitude
- ✕ Higher than pressure altitude

Correct Answer: **Lower than pressure altitude**

- Lower than pressure altitude

0 / 1 point

40 1 / 1 point

Winds are reported to be from 330° at 20 knots. You plan on departing from runway 30R. Which of the following would be the most reasonable estimation of headwind and crosswind components?

- Headwind: 15 knots, Crosswind: 15 knots
- Headwind: 10 knots, Crosswind: 17 knots
- ✓ Headwind: 17 knots, Crosswind: 10 knots

1 / 1 point

41 1 / 1 point

You plan to depart from an airport with a field elevation 1,300 MSL and climb to a cruise altitude of 8,500 MSL. Based on the climb performance chart, you expect a rate of climb of 1,400 feet per minute (fpm) at the departure airport and 1,000 fpm at cruise altitude. How many minutes would you expect the climb to take? Hint: Ensure you are taking into account the difference in climb rates between takeoff and cruise altitudes.

✓ 6

1 / 1 point

42 1 / 1 point

Which of the following conditions will result in improved cruise performance?

- High pressure
- Light airplane
- Cold temperature
- ✓ All of the above

1 / 1 point

43 0 / 1 point

At 3,000 feet, the outside air temperature is 9°C. How does this compare to the standard temperature at this altitude?

- Equal to standard
- ✕ Above standard

Correct Answer: **Equal to standard**

- Below standard

0 / 1 point

44 1 / 1 point

Assuming the CG is within the allowable limits, what effect would an aft CG have on the airplane?

- Increase in stability compared to an airplane with a forward CG
- ✓ Increase in performance compared to an airplane with a forward CG
- Difficulty flaring for landing

45 1 / 1 point

In the northern hemisphere, Coriolis Force causes objects to be deflected to the_____.

- [x] Right
- Left
- East
- West

1 / 1 point

46 1 / 1 point

Airflow around a low pressure system is_____and_____.

- Upward and clockwise
- Downward and clockwise
- [x] Upward and counterclockwise
- Downward and counterclockwise

1 / 1 point

47 1 / 1 point

A front is best defined as:

- [x] A boundary between two airmasses with different temperatures
- A large area of relatively uniform humidity
- An extended area of high pressure

1 / 1 point

48 1 / 1 point

During the passage of a cold front, which of the following weather conditions would be most likely?

- [x] Cumulous clouds, rain showers, and possible thunderstorms
- Stratus clouds and widespread light precipitation
- Cirrus clouds and possible structural icing

1 / 1 point

49 1 / 1 point

Prior to the passage of a warm front, which of the following weather conditions would be most likely?

- Cumulous clouds and possible thunderstorms
- [x] Poor visibility and light-to-moderate precipitation
- Good visibility and unstable air

1 / 1 point

50 1 / 1 point

Describe the weather conditions most commonly associated with a temperature inversion.

- Stable air and good visibility
- [x] Stable air and restricted visibility
- Unstable air and good visibility
- Unstable air and restricted visibility

51 1 / 1 point

What type of fog forms due to surface cooling and is common on clear, calm nights?

- Advection
- ✓ Radiation
- Upslope
- Steam

1 / 1 point

52 1 / 1 point

Which of the following conditions must be in place for the aircraft to accumulate ice on its exterior surfaces?

- Frozen precipitation, such as snow or ice pellets
- Temperatures below 70 degrees Fahrenheit and high relative humidity
- ✓ Visible moisture and an aircraft surface temperature at or below freezing

1 / 1 point

53 1 / 1 point

Hazards associated with structural icing include which of the following?

- Decrease in lift
- Increase in drag
- Increase in weight
- ✓ All of the above

1 / 1 point

54 1 / 1 point

Which of the following wind shear conditions would likely be most hazardous to an aircraft during takeoff or landing?

- A crosswind abruptly shifting to a headwind
- ✓ A headwind abruptly shifting to a tailwind
- A tailwind abruptly shifting to a headwind

1 / 1 point

55 1 / 1 point

It is typically recommended to remain at least how many miles away from a thunderstorm?

- 5 miles
- 10 miles
- 15 miles
- ✓ 20 miles

1 / 1 point

56 1 / 1 point

Which of the following best describes a PIREP?

- A forecast of hazardous conditions, such as wind shear or icing
- ✓ An in-flight report on current weather conditions made by a pilot
- A forecast of visibility and cloud heights across a large region making up several states
- A report of the current frontal activity and pressure systems

1 / 1 point

57 1 / 1 point

An AIRMET will be issued for which of the following conditions?

- Moderate icing
- Moderate turbulence
- IFR conditions
- ✓ All of the above

1 / 1 point

58 1 / 1 point

A SIGMET would be issued for which of the following conditions?

- Light icing
- ✓ Extreme turbulence
- Marginal VFR conditions

1 / 1 point

59 0 / 1 point

Refer to the weather products below. What local (central standard) time was the KCPS METAR issued?

```
KCPS 061553Z 21003KT 10SM BKN055 03/M03 A3027 RMK AO2 SLP253 T00331033

BLV UA /OV TOY180030/TM 1613/FL150/TP MD80/TA M11/IC MOD CLR 080/RM ZKC FDC

KCPS 061140Z 0612/0712 23007KT 5SM SN OVC030
  FM061700 29008KT 2SM SN OVC020
  FM062000 33008KT 6SM OVC028
  FM070000 35007KT P6SM BKN035
  FM070200 35006KT P6SM SKC

FT  3000    6000    9000    12000   18000   24000  30000  34000  39000
COU 3513 3218-06 2641-06 2747-11 2773-22 2896-32 781047 770955 782357
SGF 3210 3019-03 2537-04 2836-07 2773-19 2889-30 289746 770054 772958
STL 3115 2917-06 2640-08 2755-12 2777-23 7801-32 781747 771655 782357
DIK      2915-14 2822-13 2929-20 3234-28 3043-39 305851 296757 296158
GFK 3015 3119-16 3027-18 3036-24 3249-33 3254-41 315953 306456 306456
```

- 6:15
- 9:53
- 11:40
- ✗ 15:53

Correct Answer: **9:53**

0 / 1 point

60 1 / 1 point

Refer to the weather products below. What surface temperature was observed at KCPS?

```
KCPS 061553Z 21003KT 10SM BKN055 03/M03 A3027 RMK AO2 SLP253 T00331033

BLV UA /OV TOY180030/TM 1613/FL150/TP MD80/TA M11/IC MOD CLR 080/RM ZKC FDC

KCPS 061140Z 0612/0712 23007KT 5SM SN OVC030
  FM061700 29008KT 2SM SN OVC020
  FM062000 33008KT 6SM OVC028
  FM070000 35007KT P6SM BKN035
  FM070200 35006KT P6SM SKC

FT  3000    6000    9000    12000   18000   24000   30000  34000  39000
COU 3513 3218-06 2641-06 2747-11 2773-22 2896-32 781047 770955 782357
SGF 3210 3019-03 2537-04 2836-07 2773-19 2889-30 289746 770054 772958
STL 3115 2917-06 2640-08 2755-12 2777-23 7801-32 781747 771655 782357
DIK      2915-14 2822-13 2929-20 3234-28 3043-39 305851 296757 296158
GFK 3015 3119-16 3027-18 3036-24 3249-33 3254-41 315953 306456 306456
```

- -3 degrees C
- 2 degrees C
- ✓ 3 degrees C
- 10 degrees C

1 / 1 point

61 1 / 1 point

Refer to the weather products below. Which of the following is forecast at KCPS for the morning of the 6th?

```
KCPS 061553Z 21003KT 10SM BKN055 03/M03 A3027 RMK AO2 SLP253 T00331033

BLV UA /OV TOY180030/TM 1613/FL150/TP MD80/TA M11/IC MOD CLR 080/RM ZKC FDC

KCPS 061140Z 0612/0712 23007KT 5SM SN OVC030
  FM061700 29008KT 2SM SN OVC020
  FM062000 33008KT 6SM OVC028
  FM070000 35007KT P6SM BKN035
  FM070200 35006KT P6SM SKC

FT  3000    6000    9000    12000   18000   24000   30000  34000  39000
COU 3513 3218-06 2641-06 2747-11 2773-22 2896-32 781047 770955 782357
SGF 3210 3019-03 2537-04 2836-07 2773-19 2889-30 289746 770054 772958
STL 3115 2917-06 2640-08 2755-12 2777-23 7801-32 781747 771655 782357
DIK      2915-14 2822-13 2929-20 3234-28 3043-39 305851 296757 296158
GFK 3015 3119-16 3027-18 3036-24 3249-33 3254-41 315953 306456 306456
```

- Rain
- ✓ Moderate snow
- Gusty winds
- Broken cloud coverage

1 / 1 point

62 1 / 1 point

Refer to the weather products below. A pilot in the vicinity of KBLV is reporting what type of flight hazard?

```
KCPS 061553Z 21003KT 10SM BKN055 03/M03 A3027 RMK AO2 SLP253 T00331033

BLV UA /OV TOY180030/TM 1613/FL150/TP MD80/TA M11/IC MOD CLR 080/RM ZKC FDC

KCPS 061140Z 0612/0712 23007KT 5SM SN OVC030
  FM061700 29008KT 2SM SN OVC020
  FM062000 33008KT 6SM OVC028
  FM070000 35007KT P6SM BKN035
  FM070200 35006KT P6SM SKC

FT  3000    6000    9000    12000   18000   24000  30000  34000  39000
COU 3513 3218-06 2641-06 2747-11 2773-22 2896-32 781047 770955 782357
SGF 3210 3019-03 2537-04 2836-07 2773-19 2889-30 289746 770054 772958
STL 3115 2917-06 2640-08 2755-12 2777-23 7801-32 781747 771655 782357
DIK      2915-14 2822-13 2929-20 3234-28 3043-39 305851 296757 296158
GFK 3015 3119-16 3027-18 3036-24 3249-33 3254-41 315953 306456 306456
```

- ✓ Moderate icing
- Moderate turbulence
- Thunderstorms in the vicinity
- Wind shear

1 / 1 point

63 1 / 1 point

Refer to the weather products below. You have a flight planned for the 6th departing from KCPS at approximately noon local (central standard) time. According to the TAF, what cloud coverage and cloud height should be expected for the time of your departure?


```
KCPS 061553Z 21003KT 10SM BKN055 03/M03 A3027 RMK AO2 SLP253 T00331033

BLV UA /OV TOY180030/TM 1613/FL150/TP MD80/TA M11/IC MOD CLR 080/RM ZKC FDC

KCPS 061140Z 0612/0712 23007KT 5SM SN OVC030
  FM061700 29008KT 2SM SN OVC020
  FM062000 33008KT 6SM OVC028
  FM070000 35007KT P6SM BKN035
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FT  3000    6000    9000    12000   18000   24000  30000  34000  39000
COU 3513 3218-06 2641-06 2747-11 2773-22 2896-32 781047 770955 782357
SGF 3210 3019-03 2537-04 2836-07 2773-19 2889-30 289746 770054 772958
STL 3115 2917-06 2640-08 2755-12 2777-23 7801-32 781747 771655 782357
DIK      2915-14 2822-13 2929-20 3234-28 3043-39 305851 296757 296158
GFK 3015 3119-16 3027-18 3036-24 3249-33 3254-41 315953 306456 306456
```


- Overcast 300
- ✓ Overcast 2000
- Overcast 2800
- Overcast 3000

1 / 1 point

64 1 / 1 point

Refer to the weather products below. What wind speed and direction would be expected for a flight in the vicinity of STL at 6,000 feet?

```
KCPS 061553Z 21003KT 10SM BKN055 03/M03 A3027 RMK AO2 SLP253 T00331033

BLV UA /OV TOY180030/TM 1613/FL150/TP MD80/TA M11/IC MOD CLR 080/RM ZKC FDC

KCPS 061140Z 0612/0712 23007KT 5SM SN OVC030
  FM061700 29008KT 2SM SN OVC020
  FM062000 33008KT 6SM OVC028
  FM070000 35007KT P6SM BKN035
  FM070200 35006KT P6SM SKC

FT  3000    6000    9000    12000    18000    24000   30000   34000   39000
COU 3513 3218-06 2641-06 2747-11 2773-22 2896-32 781047 770955 782357
SGF 3210 3019-03 2537-04 2836-07 2773-19 2889-30 289746 770054 772958
STL 3115 2917-06 2640-08 2755-12 2777-23 7801-32 781747 771655 782357
DIK      2915-14 2822-13 2929-20 3234-28 3043-39 305851 296757 296158
GFK 3015 3119-16 3027-18 3036-24 3249-33 3254-41 315953 306456 306456
```

- ✓ 290 degrees at 17 knots
- 170 degrees at 29 knots
- 170 degrees at 6 knots
- 320 degrees at 18 knots

1 / 1 point

65 1 / 1 point

According to Part 1 of the Federal Aviation Regulations, "night" begins at what time?

- Sunset
- ✓ The end of evening civil twilight
- 45 minutes after sunset

1 / 1 point

66 1 / 1 point

As a private pilot, you may perform certain maintenance activities on an aircraft you own or operate. What is this known as?

- Minor maintenance
- Minor alteration
- ✓ Preventive maintenance
- Preventive alteration

1 / 1 point

67 1 / 1 point

Private pilots are required to have which of the following documents available in the aircraft when acting as Pilot in Command?

- Medical Certificate
- Pilot Certificate
- Photo Identification
- ✓ All of the above

1 / 1 point

68 1 / 1 point

A pilot conducting operations requiring a private pilot certificate must hold at least what class of medical certificate?

- First Class
- Second Class
- ✓ Third Class

1 / 1 point

69 1 / 1 point

A 19-year old private pilot is issued a second class medical certificate. For operations requiring a private pilot certificate, how long will this medical certificate remain valid?

- 6 calendar months
- 12 calendar months
- 24 calendar months
- ✓ 60 calendar months

1 / 1 point

70 1 / 1 point

Assume a pilot conducted training and completed a Private Pilot checkride in a Diamond DA20. That pilot will be restricted to flying only Diamond DA20 aircraft until passing a type rating in a different make/model.

- True
- ✓ False

1 / 1 point

71 1 / 1 point

A complex airplane is an airplane with flaps, retractable landing gear, and:

- ✓ An adjustable pitch propeller
- A fuel injection system
- An engine with more than 200 horsepower
- A maximum operating altitude above 25,000 feet

1 / 1 point

72 1 / 1 point

Private pilots may log time as "Pilot In Command" whenever they are the sole manipulator of the controls of an aircraft for which they are rated, even if there is another more experienced pilot in the cockpit.

- ✓ True
- False

1 / 1 point

73 1 / 1 point

A private pilot received a flight review on May 10 of this year. When is the next flight review required?

- May 10, next year
- May 31, next year
- ✓ May 31, year after next

1 / 1 point

74 1 / 1 point

To act as pilot in command of an aircraft carrying passengers, the pilot must have made at least three takeoffs and three landings in an aircraft of the same category and class within thepreceding:

- 30 days
- ✓ 90 days
- 12 calendar months
- 24 calendar months

75 0 / 1 point

Which of the following limitations apply to student pilots with a current solo endorsement

- [x] Minimum visibility during the day is always limited to 3 SM

Correct Answer: **All of the above**

- The student pilot may not land at any other airport without an additional logbook endorsement
- The pilot may not operate more 25 NM from the departure airport without an additional logbook endorsement
- All of the above

0 / 1 point

76 1 / 1 point

Private pilots may be compensated for any flight they conduct as long as that flight does not carry passengers.

- True
- [x] False

1 / 1 point

77 0 / 1 point

A private pilot conducts a flight carrying three additional passengers. The operating expenses for the flight total $400.00, and the pilot wishes to share these expenses with the passengers as much as possible. At a minimum, how much is the pilot required to contribute?

- No contribution from the pilot is necessary
- $100.00
- [x] $200.00

Correct Answer: **$100.00**

- $400.00

0 / 1 point

78 1 / 1 point

During cruise flight, passengers may remove their safety belt as long as it is refastened prior to landing.

- [x] True
- False

1 / 1 point

79 1 / 1 point

No person may attempt to act as a crewmember of an aircraft within____after consuming any alcoholic beverage or with a blood alcohol content of____or greater.

- [x] 8 hours; 0.04
- 8 hours; 0.08
- 12 hours; 0.04
- 12 hours; 0.08

1 / 1 point

80 1 / 1 point

According to regulations, what is the fuel requirement for VFR flight during the day in an airplane?

- Enough to complete the flight to the planned destination at normal cruising speed
- ✓ Enough to fly to the first point of intended landing and to fly after that for 30 minutes at normal cruising speed
- Enough to fly to the first point of intended landing and to fly after that for 45 minutes at normal cruising speed
- Enough to fly to the first point of intended landing and to fly after that for 60 minutes at normal cruising speed

1 / 1 point

Fudge Points
Manually adjust the score by adding positive or negative points to this box

0

Final Score **73 / 80**

Performance Indicator Rubric

Course: FSCI 1550 Flight 2

Course Instructor: Ryan Boyer

Semester Taught: Spring 2023

Number of Students in Course: 28

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Percentage of student written exams and stage checks passed on first attempt)	Benchmark achieved? (Benchmark: 70% of student written exams and stage checks passed on first attempt)
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	Written Exam Pass Rate: 94% Stage Check Pass Rate: 75%	Yes
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	Written Exam Pass Rate: 94% Stage Check Pass Rate: 75%	Yes

Description of Assessment: The student assessment consists of multiple-choice module written exams as well as stage check practical exams. Written exams require a minimum score of 70% to pass. Each stage check consists of an oral portion and a flight portion, and satisfactory or unsatisfactory performance is determined in accordance with the Module Completion Standards and/or the appropriate Airmen Certification Standards (ACS)/Practical Test Standards (PTS). Attached are samples of the module completion standards included in the approved Training Course Outline. This document describes the expectations and assessment standards for stage check oral and flight checks. Also attached is a sample of a student's completed module written exam.

Recommendations: Continue to identify and discuss student stage check deficiencies with the instructional staff each semester. Revisions to course content and/or module completion standards will be made as needed to ensure adequate student preparation.

Module 3

Cross-Country Operations

Prerequisites: Prior to beginning this module the student must have successfully completed a solo flight.

Objective: To introduce cross-country operations and to complete the aeronautical knowledge and flight training required to prepare students to pass the Private Pilot Knowledge and Practical Exams.

Completion Standards:

- The student must meet the following minimum training time requirements during this module:

DUAL					SOLO		TOTAL	OTHER		
Local Total	Local Night	XC Total	XC Night	Inst. Ref.	Local	XC	Airplane	ATD	Pre/ Post	Ground
7.2	1.2	7.5	1.8	1.5	2.5	3.8	21.0	1.5	5.6	20.0

- Prior to completion of the module, students must pass the FAA Private Pilot Knowledge Exam.
- Prior to completion of the module, students must pass a stage check to evaluate their ability to:
  1) Demonstrate all applicable Tasks as specified in the Private Pilot Airplane Airmen Certification Standards within the established standards.
  2) Demonstrate mastery of the aircraft by performing each Task successfully.
  3) Demonstrate proficiency and competency in accordance with the standards.
  4) Demonstrate sound judgment and exercise aeronautical decision making and risk management.

Notes:

- Lessons may be completed out of sequence as necessary to meet academic goals set by the instructor.
- Multiple instructional periods may be required to meet lesson requirements.

Module 4

Post Private Pilot Operations

Prerequisites: Prior to beginning this module the student must possess a Private Pilot Certificate with an Airplane Single-Engine Land rating, a First or Second Class Medical Certificate issued within the previous 12 calendar months and must either already hold an Instrument Airplane rating, *or* they must be concurrently enrolled in the Instrument Rating Course and the Commercial Pilot Course.

Objective: To introduce the student to the Commercial Pilot maneuvers and to gain proficiency in VFR cross-country flying, night operations, and takeoffs and landings.

Completion Standards:

- The student must meet the following minimum training time requirements during this module:

DUAL			SOLO			TOTAL	OTHER		
Local	XC Total	XC Night	Local Total	Local Night	XC	Airplane	ATD	Pre/ Post	Ground
9.0 – 12.9	4.0 – 8.6	2.0	2.5 – 6.4	2.5	0 - 4.6	24.0	4.5	6.4	11.0

- Prior to completion of the module, students must pass a written exam and stage check to evaluate their understanding of:
  1) All knowledge areas included in Modules 1 – 3.
  2) Weather products required for preflight planning, current and forecast weather for departure, enroute, and arrival phases of flight.
  3) Meteorology applicable for flights conducted in Visual Meteorological Conditions to include atmospheric composition and stability, wind, temperature, moisture, precipitation, weather system formation, air masses, fronts, clouds, turbulence, thunderstorms, microbursts, icing, and fog.
  4) GPS navigation, including equipment, regulations, authorized use of databases, and receiver autonomous integrity monitoring.

5) Aerodynamics associated with flight maneuvers, including maneuvering speed and impact of weight changes, overbanking tendencies, factors effecting stall speed, and accelerated stalls. Objectives, procedures, and standards of all commercial flight maneuvers, including lazy eights, chandelles, steep spirals, and eights on pylons.

- Prior to completion of the module, students must pass a stage check to evaluate their ability to:
  1) Demonstrate any selected tasks included in the Private Pilot Airplane Airmen Certification Standards within the established standards.
  2) Perform steep turns in accordance with the Commercial Pilot testing standards.
  3) Demonstrate a basic understanding of chandelles by performing the maneuver in accordance with published procedures, complete the rollout at the 180° point +/- 20 degrees, no more than 10 knots above stall speed.
  4) Demonstrate a basic understanding of lazy eights by performing the maneuver in accordance with published procedures, arrive at each 180° point +/- 20 degrees, at an altitude +/- 200 feet from entry altitude, at an airspeed +/- 20 knots from entry airspeed.
  5) Demonstrate a basic understanding of steep spirals by performing the maneuver in accordance with published procedures, maintain a constant radius with only minor deviations while maintaining specified airspeed +/- 20 knots, and roll out toward specified heading +/- 20 degrees.
  6) Demonstrate a basic understanding of eights on pylons by performing the maneuver in accordance with published procedures, select suitable pylons, determine the approximate pivotal altitude, enter the maneuver at the appropriate altitude and airspeed, and maintain the reference line on each pylon with only minor deviations.

7) Perform an accelerated stall in accordance with published procedures, acknowledge the cues and recover promptly at the first indication of an impending stall.
8) Perform a power-off 180° accuracy approach and touch down -200/+400 feet from the specified touchdown point.

Notes:

- Lessons may be completed out of sequence as necessary to meet academic goals set by the instructor.
- Multiple instructional periods may be required to meet lesson requirements.

Commercial Pilot, Quiz Module 4 Exam (AQ)

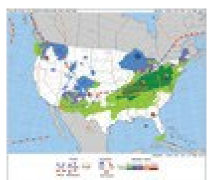
Started: Jan 20, 2023 12:27 PM

Stopped: Jan 20, 2023 12:47 PM

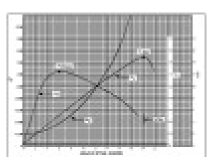
Grade: 96.00

Quiz Deadline: Dec 31, 2023 01:14 PM

Question	Answer
Question **To maintain altitude during a turn, the angle of attack must be increased to compensate for the decrease in the** (/gradebookutility/question.php?queID=52021)	**Correct** Chosen: b
Question **Load factor is the lift generated by the wings of an aircraft at any given time,** (/gradebookutility/question.php?queID=52025)	**Correct** Chosen: a

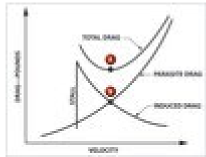
Question	Answer
Question **The stability of an air mass can usually be determined by** (/gradebookutility/question.php?queID=52086)	**Correct** Chosen: c
Question **Limit load factor is the ratio of** (/gradebookutility/question.php?queID=52041)	**Correct** Chosen: c
Question **Clouds with extensive vertical development over mountainous terrain are a sign of** (/gradebookutility/question.php?queID=52085)	**Correct** Chosen: c
Question **What weather phenomenon is implied within an area enclosed by small scalloped lines on a U.S. High-Level Significant Weather Prognostic Chart?** (/gradebookutility/question.php?queID=52189)	**Correct** Chosen: b
Question **At what time will the forecast conditions occur?** (/gradebookutility/question.php?queID=52199) (/gradebookutility/question.php?queID=52199)  Figure 70. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=70&tabs=70&asIds[]=123649)	**Correct** Chosen: a
Question **Which statement is true regarding the opposing forces acting on an airplane in steady-state level flight?** (/gradebookutility/question.php?queID=52001)	**Correct** Chosen: a
Question **If clouds form as a result of very stable, moist air being forced to ascend a mountain slope, the clouds will be** (/gradebookutility/question.php?queID=52105)	**Incorrect (c)** Chosen: b
Question **In-Flight Aviation Weather Advisories include what type of information?** (/gradebookutility/question.php?queID=52183)	**Correct** Chosen: a
Question **While executing a 60° level turn, your aircraft is at a load factor of 2.0. What does this mean?** (/gradebookutility/question.php?queID=52040)	**Correct** Chosen: a

Question For IFR operations off established airways, ROUTE OF FLIGHT portion of an IFR flight plan should list VOR navigational aids which are no more than (/gradebookutility/question.php?queID=46235)	**Correct** Chosen: a

Question	Answer
Question The most current en route and destination weather information for an instrument flight should be obtained from the (/gradebookutility/question.php?queID=52157)	**Correct** Chosen: a
Question Why does the wind have a tendency to flow parallel to the isobars above the friction level? (/gradebookutility/question.php?queID=52050)	**Correct** Chosen: a
Question The difference found by subtracting the temperature of a parcel of air theoretically lifted from the surface to 500 millibars and the existing temperature at 500 millibars is called the (/gradebookutility/question.php?queID=52111)	**Correct** Chosen: a
Question Which is true regarding actual air temperature and dew point temperature spread? The temperature spread (/gradebookutility/question.php?queID=52072)	**Correct** Chosen: b
Question Which weather phenomenon signals the beginning of the mature stage of a thunderstorm? (/gradebookutility/question.php?queID=52123)	**Correct** Chosen: a
Question Recovery from a stall in any airplane becomes more dificult when its (/gradebookutility/question.php?queID=51975)	**Correct** Chosen: a
Question How much altitude will this airplane lose in 3 statute miles of gliding at an angle of attack of 8°? (/gradebookutility/question.php?queID=51997) (/gradebookutility/question.php?queID=51997)  Figure 3. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=3&tabs=3&asIds[]=123649)	**Incorrect (c)** Chosen: b
Question Which is a characteristic typical of a stable air mass? (/gradebookutility/question.php?queID=52102)	**Correct** Chosen: c

Question **What is meant by the Special METAR weather observation for KBOI?** **SPECI KBOI 091854Z 32005KT 1 1/2SM RA BR OVC007 17/16 A2990 RMK RAB12** (/gradebookutility/question.php?queID=52164)	**Correct** Chosen: b

Question	Answer
Question **What does the contraction VRB in the Terminal Aerodrome Forecast (TAF) mean?** (/gradebookutility/question.php?queID=52176)	**Correct** Chosen: c
Question **The most severe weather conditions, such as destructive winds, heavy hail, and tornadoes, are generally associated with** (/gradebookutility/question.php?queID=52117)	**Correct** Chosen: b
Question **What is the approximate base of the cumulus clouds if the temperature at 2,000 feet MSL is 10°C and the dew point is 1°C?** (/gradebookutility/question.php?queID=52077)	**Correct** Chosen: c
Question **For a given angle of bank, in any airplane, the load factor imposed in a coordinated constant-altitude turn** (/gradebookutility/question.php?queID=52026)	**Correct** Chosen: a
Question **When an air mass is stable, which of these conditions is most likely to exist?** (/gradebookutility/question.php?queID=52107)	**Correct** Chosen: c
Question **What values are used for Winds Aloft Forecasts?** (/gradebookutility/question.php?queID=52201)	**Correct** Chosen: b
Question **Which correctly describes the purpose of convective SIGMETs (WST)?** (/gradebookutility/question.php?queID=52186)	**Correct** Chosen: c
Question **When using VOT to make a VOR receiver check, the CDI should be centered and the OBS should indicate that the aircraft is on the** (/gradebookutility/question.php?queID=46228)	**Correct** Chosen: c
Question **Hazardous wind shear is commonly encountered** (/gradebookutility/question.php?queID=52152)	**Correct** Chosen: c
Question **Dashed lines on a Surface Analysis Chart, if depicted, indicate that the pressure gradient is** (/gradebookutility/question.php?queID=52173)	**Correct** Chosen: a
Question **What is the standard temperature at 6,500 feet?** (/gradebookutility/question.php?queID=52074)	**Correct** Chosen: b

Question	Answer
Question **At an airspeed represented by point B, in steady flight, the pilot can expect to obtain the airplane's maximum** (/gradebookutility/question.php?queID=51992) (/gradebookutility/question.php?queID=51992)  Figure 1. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=1&tabs=1&asIds[]=123649)	**Correct** Chosen: b
Question **How are significant weather prognostic charts best used by a pilot?** (/gradebookutility/question.php?queID=52195) (/gradebookutility/question.php?queID=52195)  Figure 71. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=71&tabs=71&asIds[]=123649)	**Correct** Chosen: a
Question **What significant cloud coverage is reported by this pilot report?** **KMOB** **UA/OV 15NW MOB 1340Z/SK OVC025-TOP045/OVC075-TOP080/OVC090** (/gradebookutility/question.php?queID=52168)	**Correct** Chosen: a
Question **Which statement is true concerning the hazards of hail?** (/gradebookutility/question.php?queID=52132)	**Correct** Chosen: c
Question **When navigating using only VOR/DME based RNAV, selection of a VOR NAVAID that does not have DME service will** (/gradebookutility/question.php?queID=46236)	**Correct** Chosen: a
Question **If airspeed remains constant, but the air density increases, what will be the effect on both lift and drag?** (/gradebookutility/question.php?queID=51988)	**Correct** Chosen: c
Question **When turbulence causes changes in altitude and/or attitude, but aircraft control remains positive, that should be reported as** (/gradebookutility/question.php?queID=52140)	**Correct** Chosen: c

Question	Answer
Question **Which combination of weather-producing variables would likely result in cumuliform-type clouds, good visibility, and showery rain?** (/gradebookutility/question.php?queID=52080)	**Correct** Chosen: b
Question **The station originating the following METAR observation has a field elevation of 5,000 feet MSL. If the sky cover is one continuous layer, what is the thickness of the cloud layer? (Top of overcast reported at 8,000 feet MSL.)** **METAR KHOB 151250Z 17006KT 4SM OVC005 13/11 A2998** (/gradebookutility/question.php?queID=52163)	**Correct** Chosen: a
Question **Which is true regarding the use of airborne weather-avoidance radar for the recognition of certain weather conditions?** (/gradebookutility/question.php?queID=52126)	**Correct** Chosen: a
Question **Which is correct with respect to rate and radius of turn for an airplane flown in a coordinated turn at a constant altitude?** (/gradebookutility/question.php?queID=52017)	**Correct** Chosen: a
Question **While flying cross-country in the Northern Hemisphere, you experience a continuous left crosswind which is associated with a major wind system. This indicates that you** (/gradebookutility/question.php?queID=52055)	**Correct** Chosen: a
Question **In a rapid recovery from a dive, the effects of load factor would cause the stall speed to** (/gradebookutility/question.php?queID=51972)	**Correct** Chosen: a
Question **The formation of either predominantly stratiform or predominantly cumuliform clouds is dependent upon the** (/gradebookutility/question.php?queID=52106)	**Correct** Chosen: b
Question **Which statement pertaining to the following Terminal Aerodrome Forecast (TAF) is true?** **TAF** **KMEM 091135Z 0915 15005KT 5SM HZ BKN060 FM1600 VRB04KT P6SM SKC** (/gradebookutility/question.php?queID=52178)	**Correct** Chosen: c
Question **Ice pellets encountered during flight are normally evidence that** (/gradebookutility/question.php?queID=52133)	**Correct** Chosen: c

Question **When transitioning from straight-and-level flight to a constant airspeed climb, the angle of attack and lift** (/gradebookutility/question.php?queID=52003)	**Correct** Chosen: c

Question	Answer
Question **If the airspeed is decreased from 98 knots to 85 knots during a coordinated level 45° banked turn, the load factor will** (/gradebookutility/question.php?queID=52036)	**Correct** Chosen: a

Performance Indicator Rubric

Course: FSCI 1560 Flight 2 Transition

Course Instructor: Ryan Boyer

Semester Taught: Spring 2023

Number of Students in Course: 1

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Percentage of student written exams and stage checks passed on first attempt)	Benchmark achieved? (Benchmark: 70% of student written exams and stage checks passed on first attempt)
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	Written Exam Pass Rate: 100% Stage Check Pass Rate: 100%	
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	Written Exam Pass Rate: 100% Stage Check Pass Rate: 100%	

Description of Assessment: The student assessment consists of multiple-choice module written exams as well as stage check practical exams. Written exams require a minimum score of 70% to pass. Each stage check consists of an oral portion and a flight portion, and satisfactory or unsatisfactory performance is determined in accordance with the Module Completion Standards and/or the appropriate Airmen Certification Standards (ACS)/Practical Test Standards (PTS). Attached are samples of the module completion standards included in the approved Training Course Outline. This document describes the expectations and assessment standards for stage check oral and flight checks. Also attached is a sample of a student's completed module written exam.

Recommendations: Continue to identify and discuss student stage check deficiencies with the instructional staff each semester. Revisions to course content and/or module completion standards will be made as needed to ensure adequate student preparation.

Module 4

Post Private Pilot Operations

Prerequisites: Prior to beginning this module the student must possess a Private Pilot Certificate with an Airplane Single-Engine Land rating, a First or Second Class Medical Certificate issued within the previous 12 calendar months and must either already hold an Instrument Airplane rating, *or* they must be concurrently enrolled in the Instrument Rating Course and the Commercial Pilot Course.

Objective: To introduce the student to the Commercial Pilot maneuvers and to gain proficiency in VFR cross-country flying, night operations, and takeoffs and landings.

Completion Standards:

- The student must meet the following minimum training time requirements during this module:

DUAL			SOLO			TOTAL	OTHER		
Local	XC Total	XC Night	Local Total	Local Night	XC	Airplane	ATD	Pre/ Post	Ground
9.0 – 12.9	4.0 – 8.6	2.0	2.5 – 6.4	2.5	0 - 4.6	24.0	4.5	6.4	11.0

- Prior to completion of the module, students must pass a written exam and stage check to evaluate their understanding of:
  1) All knowledge areas included in Modules 1 – 3.
  2) Weather products required for preflight planning, current and forecast weather for departure, enroute, and arrival phases of flight.
  3) Meteorology applicable for flights conducted in Visual Meteorological Conditions to include atmospheric composition and stability, wind, temperature, moisture, precipitation, weather system formation, air masses, fronts, clouds, turbulence, thunderstorms, microbursts, icing, and fog.
  4) GPS navigation, including equipment, regulations, authorized use of databases, and receiver autonomous integrity monitoring.

5) Aerodynamics associated with flight maneuvers, including maneuvering speed and impact of weight changes, overbanking tendencies, factors effecting stall speed, and accelerated stalls. Objectives, procedures, and standards of all commercial flight maneuvers, including lazy eights, chandelles, steep spirals, and eights on pylons.

- Prior to completion of the module, students must pass a stage check to evaluate their ability to:
  1) Demonstrate any selected tasks included in the Private Pilot Airplane Airmen Certification Standards within the established standards.
  2) Perform steep turns in accordance with the Commercial Pilot testing standards.
  3) Demonstrate a basic understanding of chandelles by performing the maneuver in accordance with published procedures, complete the rollout at the 180° point +/- 20 degrees, no more than 10 knots above stall speed.
  4) Demonstrate a basic understanding of lazy eights by performing the maneuver in accordance with published procedures, arrive at each 180° point +/- 20 degrees, at an altitude +/- 200 feet from entry altitude, at an airspeed +/- 20 knots from entry airspeed.
  5) Demonstrate a basic understanding of steep spirals by performing the maneuver in accordance with published procedures, maintain a constant radius with only minor deviations while maintaining specified airspeed +/- 20 knots, and roll out toward specified heading +/- 20 degrees.
  6) Demonstrate a basic understanding of eights on pylons by performing the maneuver in accordance with published procedures, select suitable pylons, determine the approximate pivotal altitude, enter the maneuver at the appropriate altitude and airspeed, and maintain the reference line on each pylon with only minor deviations.

7) Perform an accelerated stall in accordance with published procedures, acknowledge the cues and recover promptly at the first indication of an impending stall.
8) Perform a power-off 180° accuracy approach and touch down -200/+400 feet from the specified touchdown point.

Notes:

- Lessons may be completed out of sequence as necessary to meet academic goals set by the instructor.
- Multiple instructional periods may be required to meet lesson requirements.

Commercial Pilot, Quiz Module 4 Exam (AQ)

Started: Jan 18, 2023 12:57 PM

Stopped: Jan 18, 2023 01:15 PM

Grade: 98.00

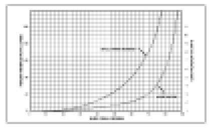
 Quiz Deadline: Dec 31, 2023 01:14 PM

Question	Answer
Question **What does the contraction VRB in the Terminal Aerodrome Forecast (TAF) mean?** (/gradebookutility/question.php?queID=52176)	**Correct** Chosen: c

Question **The difference found by subtracting the temperature of a parcel of air theoretically lifted from the surface to 500 millibars and the existing temperature at 500 millibars is called the** (/gradebookutility/question.php?queID=52111)	**Correct** Chosen: a

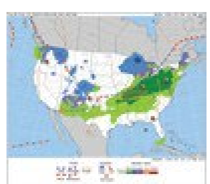
Question	Answer
Question What is meant by the Special METAR weather observation for KBOI? **SPECI KBOI 091854Z 32005KT 1 1/2SM RA BR OVC007 17/16 A2990 RMK RAB12** (/gradebookutility/question.php?queID=52164)	**Correct** Chosen: b
Question **The most severe weather conditions, such as destructive winds, heavy hail, and tornadoes, are generally associated with** (/gradebookutility/question.php?queID=52117)	**Correct** Chosen: b
Question **The stalling speed of an airplane is most affected by** (/gradebookutility/question.php?queID=51974)	**Correct** Chosen: c
Question **What single reference contains information regarding a volcanic eruption, that is occurring or expected to occur?** (/gradebookutility/question.php?queID=52182)	**Correct** Chosen: a
Question **An increase in temperature with an altitude increase** (/gradebookutility/question.php?queID=52075)	**Correct** Chosen: a
Question **Which statement is true regarding the opposing forces acting on an airplane in steady-state level flight?** (/gradebookutility/question.php?queID=52001)	**Correct** Chosen: a
Question **How are significant weather prognostic charts best used by a pilot?** (/gradebookutility/question.php?queID=52195) (/gradebookutility/question.php?queID=52195)  Figure 71. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=71&tabs=71&asIds[]=123649)	**Correct** Chosen: a
Question **Some aircraft are fitted with wing spoilers to decrease** (/gradebookutility/question.php?queID=51956)	**Correct** Chosen: c
Question **During departure, under conditions of suspected low-level wind shear, a sudden decrease in headwind will cause** (/gradebookutility/question.php?queID=52147)	**Correct** Chosen: a
Question **The angle of attack at which a wing stalls remains constant regardless of** (/gradebookutility/question.php?queID=51964)	**Correct** Chosen: a

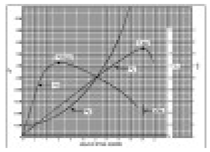
Question	Answer
Question **Reliance on GPS units** (/gradebookutility/question.php?queID=46249)	**Correct** Chosen: a
Question **What type of In-Flight Weather Advisories provides an en route pilot with information regarding the possibility of moderate icing, moderate turbulence, winds of 30 knots or more at the surface and extensive mountain obscurement?** (/gradebookutility/question.php?queID=52184)	**Correct** Chosen: c
Question **What values are used for Winds Aloft Forecasts?** (/gradebookutility/question.php?queID=52201)	**Correct** Chosen: b
Question **At what altitude is the freezing level over area 5 on the 12-hr. significant weather prognostic chart?** (/gradebookutility/question.php?queID=52194) (/gradebookutility/question.php?queID=52194)  Figure 71. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=71&tabs=71&asIds[]=123649)	**Correct** Chosen: c
Question **Longitudinal stability involves the motion of the airplane controlled by its** (/gradebookutility/question.php?queID=52009)	**Correct** Chosen: b
Question **If the airplane attitude remains in a new position after the elevator control is pressed forward and released, the airplane displays** (/gradebookutility/question.php?queID=52011)	**Correct** Chosen: a
Question **When conditionally unstable air with high-moisture content and very warm surface temperature is forecast, one can expect what type of weather?** (/gradebookutility/question.php?queID=52109)	**Correct** Chosen: c

Question **What increase in load factor would take place if the angle of bank were increased from 60° to 80°?** (/gradebookutility/question.php?queID=52032) (/gradebookutility/question.php?queID=52032)  Figure 4. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=4&tabs=4&asIds[]=123649)	**Correct** Chosen: c

Question	Answer
Question **To best determine observed weather conditions between weather reporting stations, the pilot should refer to** (/gradebookutility/question.php?queID=52169)	**Correct** Chosen: a
Question **If the airspeed is increased from 90 knots to 135 knots during a level 60° banked turn, the load factor will** (/gradebookutility/question.php?queID=52031)	**Correct** Chosen: c
Question **The presence of standing lenticular altocumulus clouds is a good indication of** (/gradebookutility/question.php?queID=52082)	**Correct** Chosen: b
Question **What is the meaning of the terms PROB40 2102 +TSRA as used in a Terminal Aerodrome Forecast (TAF)?** (/gradebookutility/question.php?queID=52177)	**Correct** Chosen: b
Question **If the airspeed is increased from 89 knots to 98 knots during a coordinated level 45° banked turn, the load factor will** (/gradebookutility/question.php?queID=52037)	**Correct** Chosen: a
Question **The need to slow an aircraft below V_A is brought about by the following weather phenomenon:** (/gradebookutility/question.php?queID=51966)	**Correct** Chosen: b
Question **The jet stream and associated clear air turbulence can sometimes be visually identified in flight by** (/gradebookutility/question.php?queID=52067)	**Correct** Chosen: b
Question **Penetrating fog while flying an approach at night, you might experience the illusion of** (/gradebookutility/question.php?queID=52096)	**Correct** Chosen: a
Question **The strength and location of the jet stream is normally** (/gradebookutility/question.php?queID=52064)	**Correct** Chosen: a
Question **Which is true regarding the forces acting on an aircraft in a steady-state descent? The sum of all** (/gradebookutility/question.php?queID=51982)	**Correct** Chosen: c
Question **With respect to advection fog, which statement is true?** (/gradebookutility/question.php?queID=52094)	**Correct** Chosen: c

Question **Which weather phenomenon signals the beginning of the mature stage of a thunderstorm?** (/gradebookutility/question.php?queID=52123)	**Correct** Chosen: a

Question	Answer
Question **What is a characteristic of stable air?** (/gradebookutility/question.php?queID=52099)	**Correct** Chosen: a
Question **Which statement is true relative to changing angle of attack?** (/gradebookutility/question.php?queID=51978)	**Correct** Chosen: b
Question **Load factor is the lift generated by the wings of an aircraft at any given time,** (/gradebookutility/question.php?queID=52025)	**Correct** Chosen: a
Question **A pilot reporting turbulence that momentarily causes slight, erratic changes in altitude and/or attitude should report it as** (/gradebookutility/question.php?queID=52139)	**Correct** Chosen: b
Question **Temperature and radiation variations over land with a clear sky typically lead to** (/gradebookutility/question.php?queID=52095)	**Correct** Chosen: a
Question **To generate the same amount of lift as altitude is increased, an airplane must be flown at** (/gradebookutility/question.php?queID=51979)	**Correct** Chosen: c
Question **What minimum distance should exist between intense radar echoes before any attempt is made to fly between these thunderstorms?** (/gradebookutility/question.php?queID=52125)	**Correct** Chosen: c
Question **What type of front is passing through area 1?** (/gradebookutility/question.php?queID=52200) (/gradebookutility/question.php?queID=52200)  Figure 70. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=70&tabs=70&asIds[]=123649)	**Correct** Chosen: c

Question	Answer
Question **If an airplane glides at an angle of attack of 10°, how much altitude will it lose in 1 mile?** (/gradebookutility/question.php?queID=51995) (/gradebookutility/question.php?queID=51995)  Figure 3. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=3&tabs=3&asIds[]=123649)	**Correct** Chosen: b
Question **A load factor of 1.2 means the total load on an aircraft's structure is 1.2 times its** (/gradebookutility/question.php?queID=52029)	**Correct** Chosen: a
Question **On Surface Analysis Charts, widely spaced isobars indicate a** (/gradebookutility/question.php?queID=52054)	**Correct** Chosen: a
Question **Hatching on a Constant Pressure Analysis Chart indicates** (/gradebookutility/question.php?queID=52202)	**Correct** Chosen: b
Question **From which of the following can the observed temperature, wind, and temperature/dewpoint spread be determined at a specified altitude?** (/gradebookutility/question.php?queID=52204)	**Correct** Chosen: c
Question **Convective circulation patterns associated with sea breezes are caused by** (/gradebookutility/question.php?queID=52110)	**Correct** Chosen: b
Question **To maintain a standard rate turn as the airspeed decreases, the bank angle of the airplane will need to** (/gradebookutility/question.php?queID=52023)	**Incorrect (a)** Chosen: b
Question **Which chart provides a ready means of locating observed frontal positions and pressure centers?** (/gradebookutility/question.php?queID=52174)	**Correct** Chosen: a
Question **Turbulence that is encountered above 15,000 feet AGL not associated with cumuliform cloudiness, including thunderstorms, should be reported as** (/gradebookutility/question.php?queID=52141)	**Correct** Chosen: b

Question	Answer
Question **Select the correct statement regarding stall speeds.** (/gradebookutility/question.php?queID=51970) (/gradebookutility/question.php?queID=51970)  Figure 2. (/pled/assessment/main.php? page=imageviewer&origin=gb&imgKey=2&tabs=2&asIds[]=123649)	**Correct** Chosen: c

Performance Indicator Rubric

Course: FSCI 2150 Flight 3 Course Instructor: ___________________________________

Semester Taught:____________________________ Number of Students in Course: ________

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.		
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.		

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

**Attach description of assignment used for assessment and samples of student work.*

Performance Indicator Rubric

Course: FSCI 2250 Instrument Flight Foundations

Course Instructor: Stephen Belt

Semester Taught: Fall 2022

Number of Students in Course: 39

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	76.03% within this category	Yes
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	74.66% within this category	Yes

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

Quarter Exam Level Assessment attached

FAA Written Exam: 79% pass rate (30/38)

Additional FAA-style quizzes and study sessions during course.

**Attach description of assignment used for assessment and samples of student work.*

FSCI 2250 SLO 1 and 5 Fall 2022

Category Performance Report

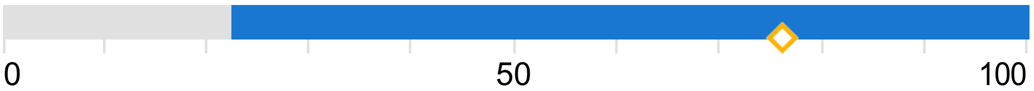
At-Risk Categories: 0 | **Total Courses**: 1

Date Range: **8/1/22 - 12/31/22** | Category At-Risk Threshold: **70%** | Needs Review Threshold: **70%**

Flight Science Student Learning Outcomes

At-Risk Categories: 0 | Total Categories: 2

Average | Score Range | At-Risk | Needs Review | Doing Well

CATEGORY NAME	AVERAGE	ASSESSMENTS	STATUS
SLO 1: Conduct aviation operations in a professional, safe, and efficien ... 	76.03%	3	

ASSESSMENT NAME	AVERAGE SCORE WITH THIS CATEGORY	QUESTION / CRITERIA WITH THIS CATEGORY
Exam 1	67%	3 questions
FSCI 2250 Exam 2	78%	3 questions
Exam 3	84%	3 questions

SLO 5: An ability to apply the techniques, skills, and modern aviation t ...

0 50 100

74.66% 3

ASSESSMENT NAME	AVERAGESCORE WITH THIS CATEGORY	QUESTION / CRITERIA WITH THIS CATEGORY
Exam 1	76%	4 questions
FSCI 2250 Exam 2	66%	2 questions
Exam 3	79%	3 questions

FSCI 2250 Fall 2022 Exam 1

Assessment Performance

AVERAGE SCORE

71%

(71.3/100)

LOW SCORE

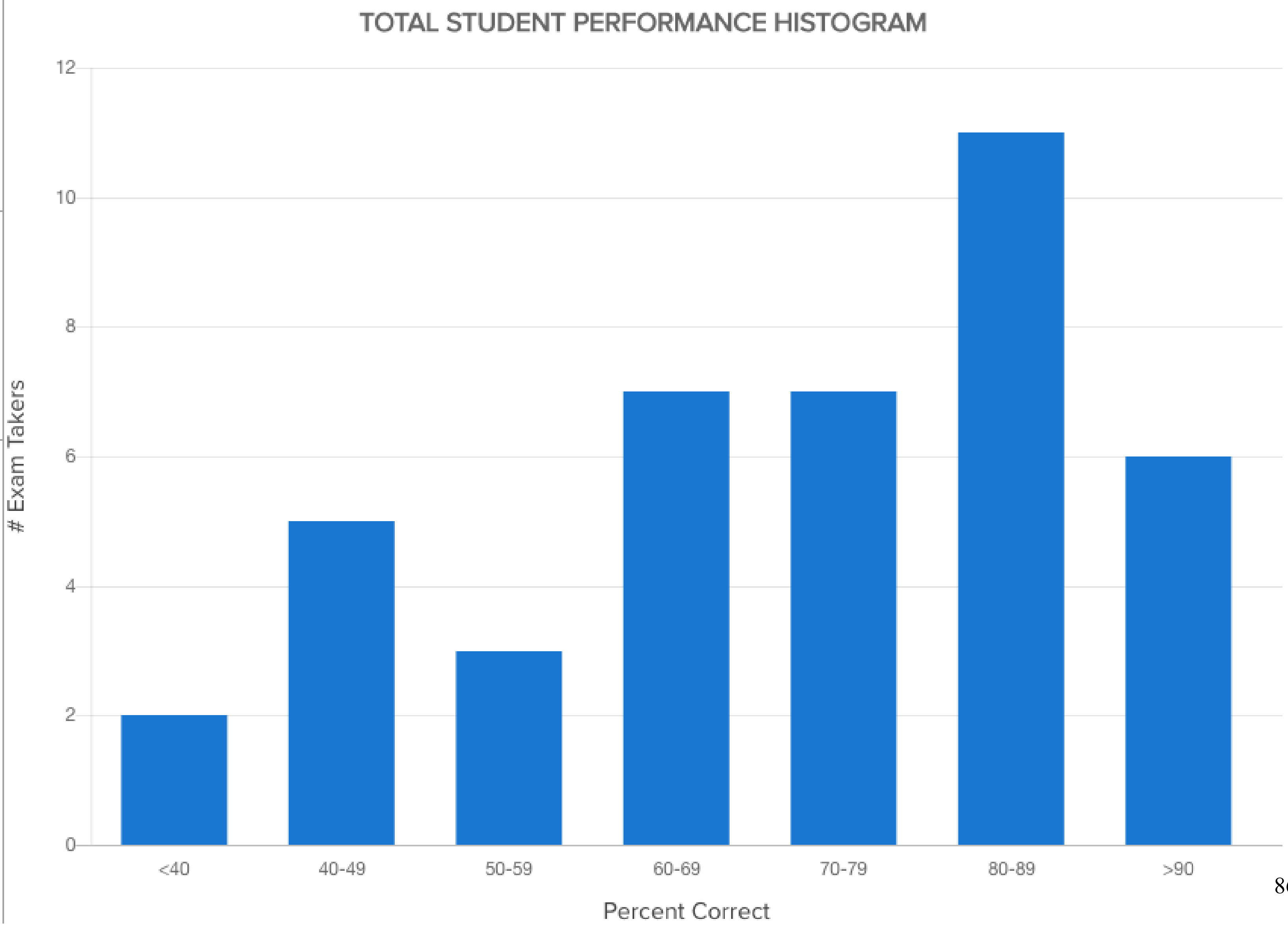
31%

(31.0/100)

HIGH SCORE

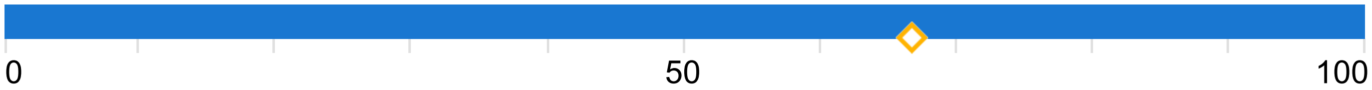
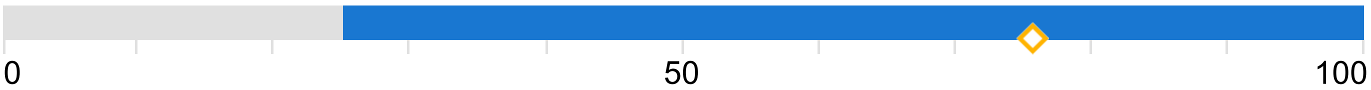
98%

(98.0/100)



Category Performance

Average   Score Range

CATEGORY NAME	AVERAGE SCORE	QUESTIONS
In Flight Science Student Learning Outcomes SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.  	66.67%	3
In Flight Science Student Learning Outcomes SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation r  	75.61%	4

Assessment Performance

AVERAGE SCORE

88%

(88.5/100)

LOW SCORE

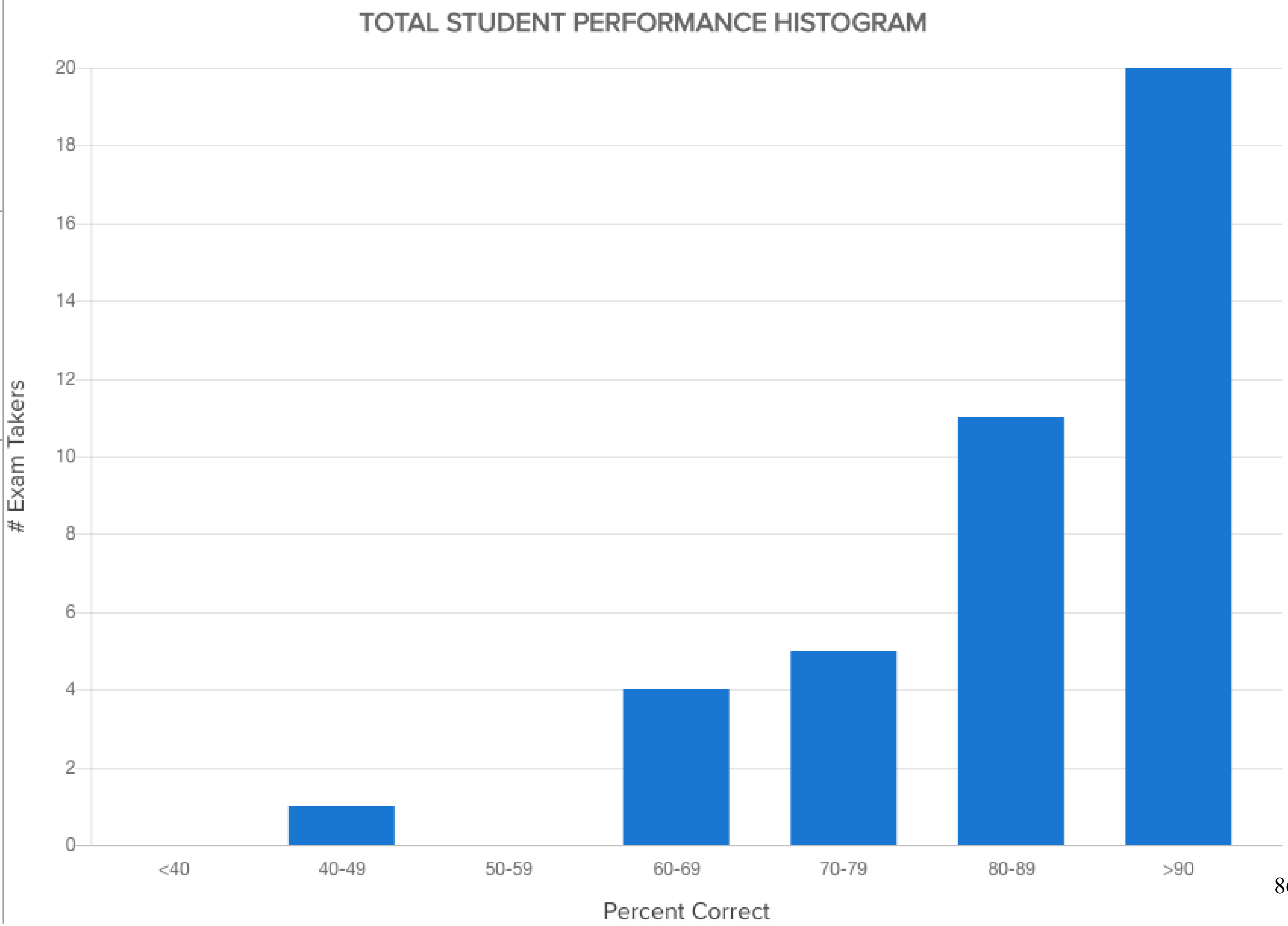
47%

(46.9/100)

HIGH SCORE

110%

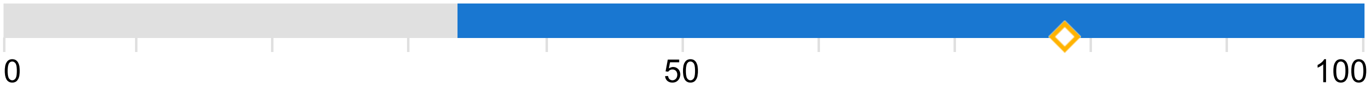
(110.4/100)

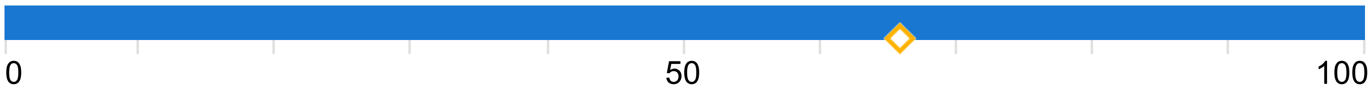


Category Performance

Average Score Range

CATEGORY NAME	AVERAGE SCORE	QUESTIONS
In Flight Science Student Learning Outcomes SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	78.05%	3
In Flight Science Student Learning Outcomes SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation r	65.85%	2





Assessment Performance

AVERAGE SCORE

86%

(85.5/100)

LOW SCORE

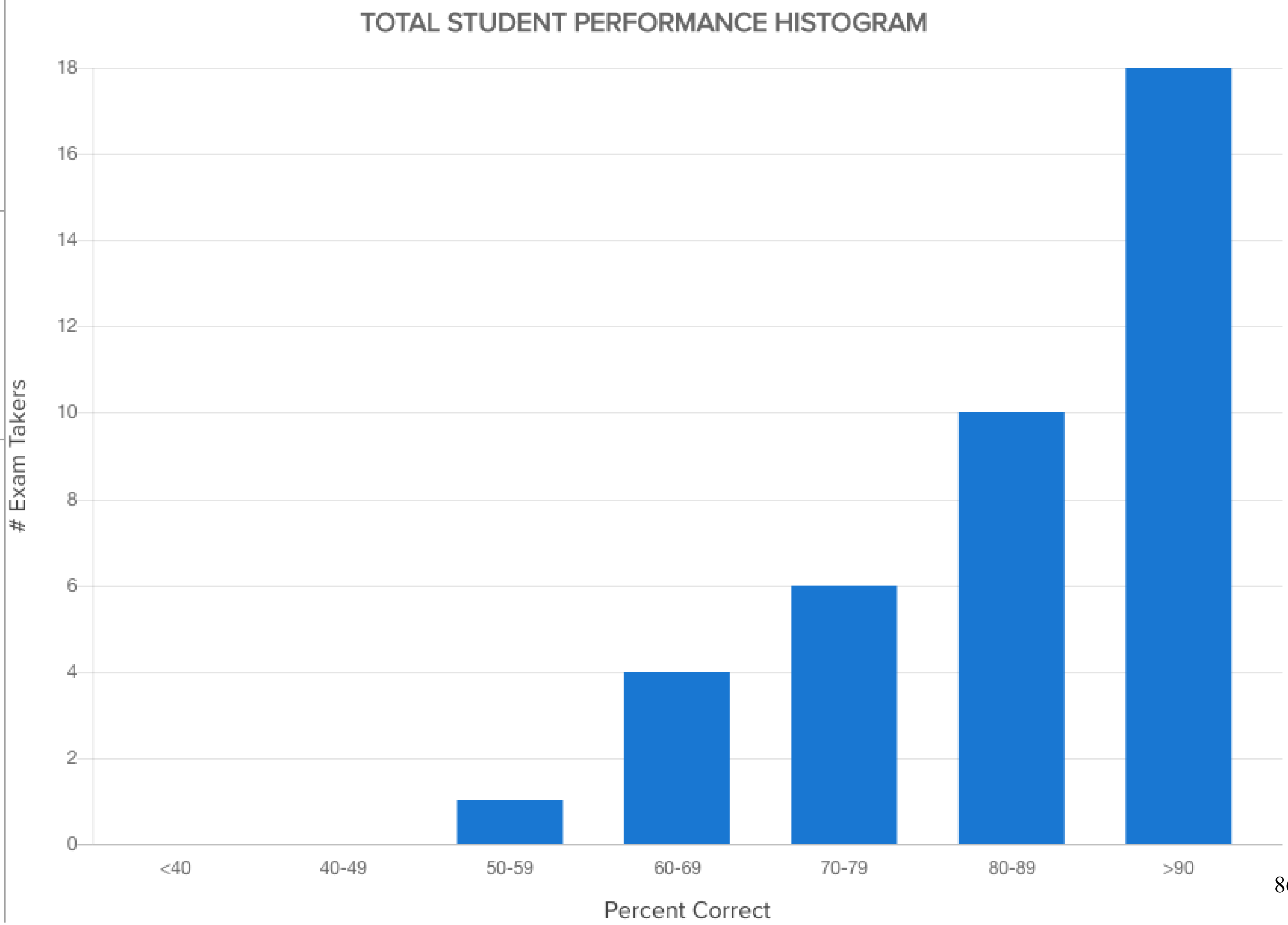
57%

(57.0/100)

HIGH SCORE

104%

(104.0/100)



Category Performance

Would you like to select the categories for this report use the top 25 categories used on this assessment?

SELECT CATEGORIES

USE TOP 25

FSCI 2250 Assessment Report Fall 2022

Date and Time of Exam Creation: 01/11/2022 6:10 PM CST | Total Exam Points: 18 | Est. Completion Time: 15 mins Avg. Point Biserial: 0.35 | Upper 27%: 0.88 | Lower 27%: 0.53 | Disc. Index: **0.35** | Difficulty: **0.75** | Total Questions: 18 | Multiple Choice: 16 | Fill in the Blank: 1 | Essay: 1

---

1. Prior to using GPS for IFR operations, what actions must you take?

A. For WAAS-certified GPS equipment, you must verify that RAIM will be available for the intended route and duration of the flight and ensure that your GPS navigational database is current.

✓ **B. For non-WAAS GPS equipment, you must verify that RAIM will be available for the intended route and duration of the flight and ensure that your GPS database is current**

C. For all GPS equipment, you must verify that WAAS will be available for the intended route and duration fo the flight and ensure that your GPS navigational database is current.

D. You do not have to do anything. The system does it for you.

Question ID: 9520 | Point Value: 1 | Categories: AABI Student Learning Outcomes, H. Use the techniques, skills, and modern technology necessary for professional practice, Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.

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2. Preflight tolerance of the Altimeter is +/- ft. When the current local altimeter setting is properly set.

A. 50

B. 100

✓ **C. 75**

D. 25

Question ID: 9388 | Point Value: 1 | Point Biserial: .6 | Difficulty: 0.59 | Categories: AABI Student Learning Outcomes, A. Apply mathematics, science, and applied sciences to aviation related disciplines, AABI A-1, Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.

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3. When performing a VOR operational check who must document the it? What is required to be documented?

A. The pilot-in-command must enter date, place, bearing error in the aircraft log or other record.

B. The pilot-in-command must enter the date, place, bearing error, and sign the aircraft log book

C. The person conducting the check must enter date, place, and bearing error in the aircraft log books.

✓ **D. The person conducting the check must enter the date, place, and bearing error and sign the aircraft log or other record.**

Question ID: 9374 | Point Value: 1 | Point Biserial: .29 | Difficulty: 0.81 | Categories: Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner., FSCI 2250 Course Level Objectives, 6. Recognize applicable federal aviation regulations, and discuss basic applications of these regulations.

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t2lchart.png

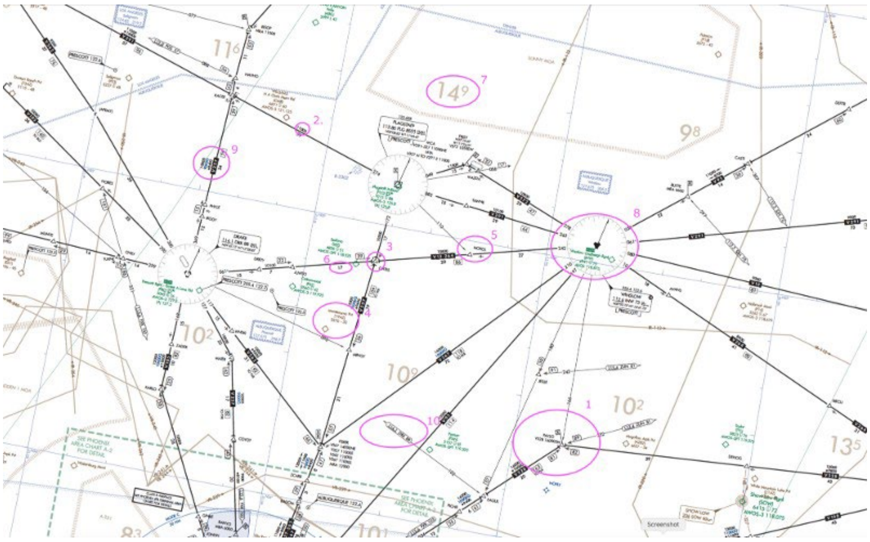
4. (Please use the L-chart excerpt provided to answer this question) What is the significance of the color of Item 4?

A. Non-towered airport

✓ **B. No published IAP**

C. No Voice

D. No good



Question ID: 17094 | Point Value: 1 | Point Biserial: .11 | Difficulty: 0.99 | Categories: Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.

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5. DEPARTURE

You are preparing to depart Santa Fe Municipal SAF on an IFR cross country to Denver. You receive the following clearance: "cleared to Denver International Airport via the Poake Two Departue, Taos transition, then as filed." Once you copy and read back the clearance, you request taxi clearance are cleared to taxi to runway 20. Prior to departure, you review the SID. At what point does the DEPARTURE segment end and the TRANSITION segment begin?

A. CFFDN

B. SAF

✓ **C. POAKE**

D. TAS

Question ID: 10156 I Point Value: 1 I Point Biserial: .21 I Difficulty: 0.79 I Categories: Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner., FSCI 2250 Course Level Objectives, 3. Identify, explain and apply the important elements of instrument departure, enroute and approach procedures.

6. When Cindy receives her IFR clearance to Chicago she hears the phrase "cleared as filed." What does that specific phrase tell her? (Cleared as filed includes _)

A. She may fly the flight plan she has filed, including the altitudes and departure procedures.

B. She may fly the route she has filed, and is automatically cleared to her destination.

C. She may fly the entire flight plan she has filed, and is automatically cleared to her destination.

✓ **D. She may fly the route she has filed, but she will still receive a clearance limit, altitudes, and departure procedures.**

Question ID: 10149 I Point Value: 1 I Point Biserial: .37 I Difficulty: 0.61 I Categories: Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner., FSCI 2250 Course Level Objectives, 3. Identify, explain and apply the important elements of instrument departure, enroute and approach procedures.

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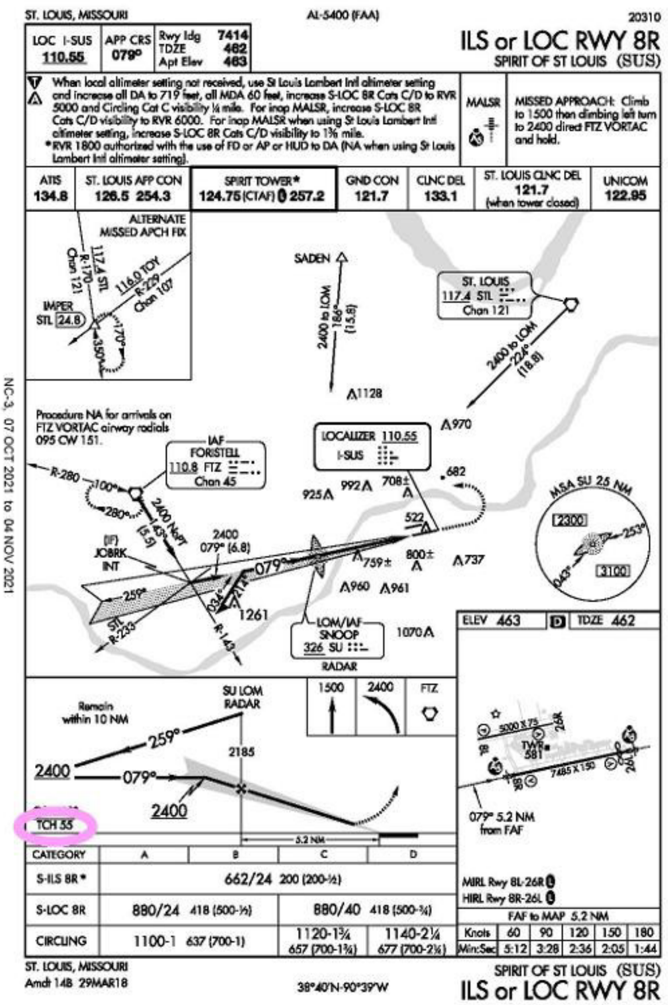
7. Explain item 3. (TCH 55)



✓ **A. IF you are on glide slope, you will cross the runway threshold at 55' AGL**

B. IF you are on glide slope, you will touch down 55' past the threshold

C. The Tower Clearance Height is 55'

D. The Tower Enroute Clearance is on page 55

Question ID: 10624 I Point Value: 1 I Point Biserial: .51 I Difficulty: 0.88 I Categories: Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.

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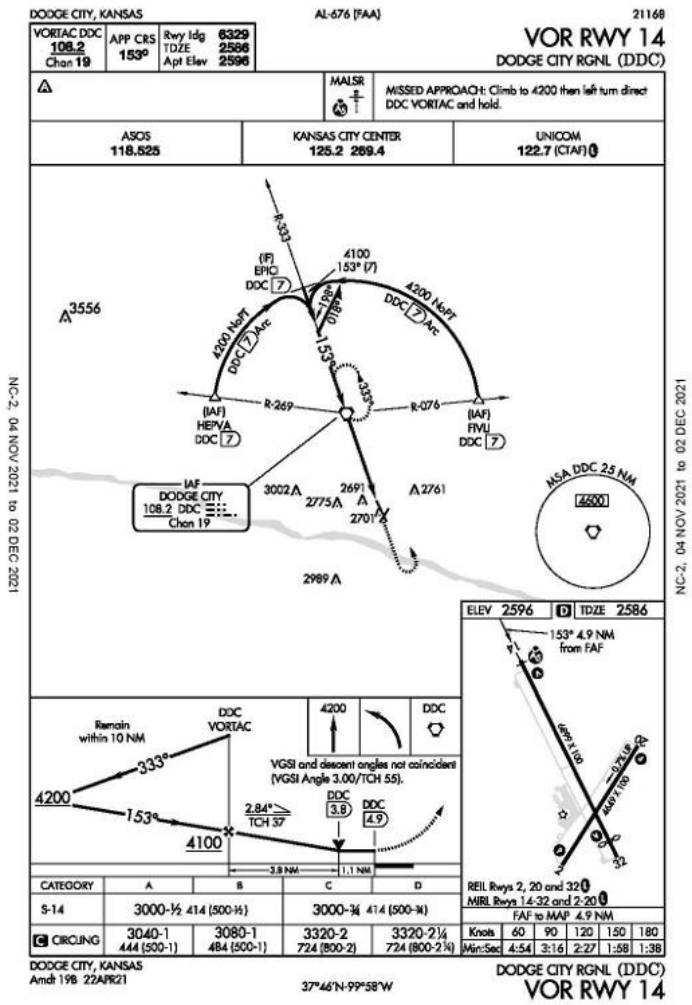
8. What is the Missed Approach Point for this approach?



A. 4 minutes 54 seconds at 60 KIAS

B. **4.9 DME from the Dodge City VORTAC**

C. 1.1 NM

D. DDC 3.8

Question ID: 10621 I Point Value: 1 I Point Biserial: .32 I Difficulty: 0.74 I Categories: AABI Student Learning Outcomes, AABI H-1, Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.

9. How do you determine you are on the intermediate segment if there is no intermediate fix?

A. When you cross the "IAF" outbound toward the procedure turn

B. When you are headed to the airport

C. With a Maltese Cross

D. It is when you are established on the published route and proceeding inbound to the final approach fix, are properly aligned with the final approach course, and are located within the prescribed distance from the FAF.

D. It is when you are established on the published route and proceeding inbound to the final approach fix, are properly aligned with the final approach course, and are located within the prescribed distance from the FAF.

Question ID: 10610 I Point Value: 1 I Point Biserial: .14 I Difficulty: 0.87 I Categories: Flight Science Student Learning Outcomes, SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.

10. Only the attitude indicator provides information of pitch and bank.

A. **Direct and immediate**

B. Indirect

C. Derived and interpolated

D. Any

Question ID: 9376 I Point Value: 1 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot., FSCI 2250 Course Level Objectives, 1. Explain the requirements of ICAO/FAA for instrument flight, 5. Recognize and evaluate various conditions effecting the safety of flight, aeronautical decision-making, airmanship, and physiological readiness of instrument flight.

11. How does the blockage of the static port affect each of the pitot-static instruments during a descent from the altitude where the blockage occurred?

A. The airspeed indicator will show lower than actual airspeed, the VSI will read zero, and the altimeter will be frozen at the altitude the blockage occurred.
B. The airspeed indicator will give incorrect readings, the VSI will read zero, and the altimeter will be frozen at the altitude the blockage occurred.
✓ **C. The airspeed indicator will show faster than actual airspeed, the VSI will read zero, and the altimeter will be frozen at the altitude the blockage occurred.**
D. The airspeed indicator will give incorrect readings, the VSI freeze at the rate of descent it indicated when the blockage occurred, and the altimeter will be frozen at the altitude the blockage occurred.

Question ID: 9391 I Point Value: 1 I Point Biserial: .34 I Difficulty: 0.54 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot., FSCI 2250 Course Level Objectives, 5. Recognize and evaluate various conditions effecting the safety of flight, aeronautical decision-making, airmanship, and physiological readiness of instrument flight.

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12. Describe the proper sequence to recover from a nose-low unusual attitude:

1 ______
2 ______
3 ______

✓ **1. Power to Idle, Pull the power, Reduce Power**
✓ **2. Level the Wings, Wings level**
✓ **3. Pitch to the horizon, Pitch up, Raise the Nose**

Question ID: 9518 I Point Value: 1 I Point Biserial: .28 I Difficulty: 0.71 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot., FSCI 2250 Course Level Objectives, 5. Recognize and evaluate various conditions effecting the safety of flight, aeronautical decision-making, airmanship, and physiological readiness of instrument flight., 7. Assess best practice as it relates to instrument flight.

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13. What does staying on the VASI glide path assure on final approach?

✓ **A. Obstruction clearance within 10° the extended runway centerline and out to 4 nautical miles from the threshold**
B. That you will land on the runway
C. That you will have enough runway for your rollout
D. Obstruction clearance within 30° of the extended runway centerline and out 1 nautical mile from the threshold

Question ID: 10146 I Point Value: 1 I Point Biserial: .43 I Difficulty: 0.66 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot., FSCI 2250 Course Level Objectives, 3. Identify, explain and apply the important elements of instrument departure, enroute and approach procedures.

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14. In order, what are the 5 T's?

(Please write your essay response on a separate piece of paper)

Question ID: 10184 I Point Value: 1 I Point Biserial: .53 I Difficulty: 0.64 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot., FSCI 2250 Course Level Objectives, 7. Assess best practice as it relates to instrument flight.

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15. What is the standard climb gradient for departure obstacle clearance

✓ **A. 200 feet per nautical mile**
B. 200 feet per minute
C. 300 feet below traffic pattern altitude
D. 152 feet per minute

Question ID: 10152 I Point Value: 1 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot., FSCI 2250 Course Level Objectives, 3. Identify, explain and apply the important elements of instrument departure, enroute and approach procedures.

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16. Immediately after passing the final approach fix in bound during an ILS approach in IFR conditions, the glide slope warning flag appears. The pilot is

A. permitted to continue the approach and descend to the DH.
B. required to immediately begin the prescribed missed approach procedure.
✓ **C. permitted to continue the approach and descend to the localizer MDA.**

Question ID: 14829 I Point Value: 1 I Point Biserial: .47 I Difficulty: 0.68 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.

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17. Ryan is flying a sidestep maneuver. At what point may he begin the maneuver?

A. When he is cleared for the approach
B. When he reaches the MDA
✓ **C. When he has the runway that he is sidestepping to in sight**
D. Only after reaching the DA

Question ID: 10628 I Point Value: 1 I Point Biserial: .46 I Difficulty: 0.95 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.

00632il1.pdf (https://phx004-public-prod-bucket.s3-us-west-2.amazonaws.com/attachments/9/e/9e38e64a-29d8-440f-857a-3099a9be2128.pdf?X-Amz-Security-Token=IQoJb3JpZ2luX2VjEGwaCXVzLXdlc3QtMiJHMEUCIGj%2FyPhgfGGt6RNb8XoHwuUT%2BMXvg0DPGsdtcaip8LfNAiEAwpEtdltXEMqOul6CdOROUlY80Z37a5gDWps3HRSfDd8q1QQIxf%2F%2F%2F%2F%2F Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Date=20230112T212633Z&X-Amz-SignedHeaders=host&X-Amz-Expires=3600&X-Amz-Credential=ASIA4TBQZ2TGNVVCK6H5%2F20230112%2Fus-west-2%2Fs3%2Faws4_request&X-Amz-Signature=6b904b4763c0d985c0173dd471d9211280e82342cde441d55f1d98d3ff9c7049)

18. Austin is flying the ILS RWY 1 approach to WYS. His airplane is equipped with dual Avidyne IFD 440 receivers. ATIS is reporting 1200 overcast with 3/4 mile visibility and calm winds. He turns inbound from the procedure turn, intercepts the final approach course and descends to 9600 msl. He intercepts the glide slope and begins his descent at 90kias. At TARGY, he starts his timer. Shortly after that, he notices that his glide slope receiver has failed. What should he do? Could he continue the approach? How?

A. He should continue the approach to the DA6849
B. He should descend no lower than 7449 and proceed for 4:36 to the MAP
✓ **C. He should descend no lower than 7780 and proceed for 4:36 to the MAP**
D. He should immediately turn left to enter the hold at TARGY and query the controller

Question ID: 10632 I Point Value: 1 I Point Biserial: .25 I Difficulty: 0.75 I Categories: Flight Science Student Learning Outcomes, SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.

Performance Indicator Rubric

Course: FSCI 2550 Flight 4 | Course Instructor: Ryan Boyer

Semester Taught: Spring 2023 | Number of Students in Course: 19

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Percentage of student written exams and stage checks passed on first attempt)	Benchmark achieved? (Benchmark: 70% of student written exams and stage checks passed on first attempt)
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	Written Exam Pass Rate: 100% Stage Check Pass Rate: 87%	Yes
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	Written Exam Pass Rate: 100% Stage Check Pass Rate: 87%	Yes

Description of Assessment: The student assessment consists of multiple-choice module written exams as well as stage check practical exams. Written exams require a minimum score of 70% to pass. Each stage check consists of an oral portion and a flight portion, and satisfactory or unsatisfactory performance is determined in accordance with the Module Completion Standards and/or the appropriate Airmen Certification Standards (ACS)/Practical Test Standards (PTS). Attached are samples of the module completion standards included in the approved Training Course Outline. This document describes the expectations and assessment standards for stage check oral and flight checks. Also attached is a sample of a student's completed module written exam.

Recommendations: Continue to identify and discuss student stage check deficiencies with the instructional staff each semester. Revisions to course content and/or module completion standards will be made as needed to ensure adequate student preparation.

Module 7

Instrument Cross-Country and Partial Panel Operations

Prerequisites: Prior to beginning this module the student must have successfully completed Module 6.

Objective: To introduce IFR cross-country and partial panel operations and to complete the aeronautical knowledge and flight training required to prepare students to pass the Instrument Rating Airplane Knowledge and Practical Exams.

Completion Standards:

- The student must meet the following minimum training time requirements during this module:

DUAL			OTHER		
Local	XC	Inst. Ref.	ATD	Pre/ Post	Ground
11.5	6.0	13.0	5.5	5.6	18.0

- Prior to completion of the module, students must pass the FAA Instrument Rating Knowledge Exam.
- Prior to completion of the module, students must pass a stage check to evaluate their ability to:
  1) Demonstrate all applicable Tasks as specified in the Instrument Rating Airplane Airmen Certification Standards within the established standards.
  2) Demonstrate mastery of the aircraft by performing each Task successfully.
  3) Demonstrate proficiency and competency in accordance with the standards.
  4) Demonstrate sound judgment and exercise aeronautical decision making and risk management.

Notes:

- Lessons may be completed out of sequence as necessary to meet academic goals set by the instructor.
- Multiple instructional periods may be required to meet lesson requirements.

Module 8

Technically Advanced Airplane Operations

Prerequisites: Prior to beginning this module the student must possess a Private Pilot Airplane Single-engine Land certificate and an Instrument Airplane Rating.

Objective: To introduce the student to Technologically Advanced Airplane (TAA) operations and to gain proficiency in cross-country operations, commercial pilot maneuvers, and commercial aeronautical knowledge.

Completion Standards:

- The student must meet the following minimum training time requirements during this module:

TOTAL				OTHER		
Local	XC	TAA	Airplane	ATD	Pre/ Post	Ground
15.0	8.5	10.0	23.5	4.5	5.6	13.5

- Prior to completion of the module, students must pass a written exam to evaluate their understanding of:
  1) Major aircraft components and systems by describing normal operation of systems such as primary and secondary flight controls and trim, powerplant and propeller, landing gear, fuel, oil, hydraulic, electrical, flight instruments, avionics, and environmental systems.
  2) Use of all performance charts, tables, and data to determine takeoff and landing, climb, and cruise performance.
  3) Weather products required for preflight planning, current and forecast weather for departure, enroute, and arrival phases of flight.
  4) Meteorology applicable for flights conducted in both instrument and Visual Meteorological Conditions to include atmospheric composition and stability, wind, temperature, moisture, precipitation, weather system formation, airmasses, fronts, clouds, turbulence, thunderstorms, microbursts, icing, and fog.

5) Airworthiness, including certificate and document locations and expiration, required inspections, airworthiness directives, equipment requirements, and flight with inoperative equipment.
6) Currency requirements, privileges, limitations, medical certification, and documents related to commercial pilot operations.

- Prior to completion of the module, students must pass a stage check to evaluate their ability to:
  1) Perform steep turns and slow flight in accordance with published procedures while maintaining altitude +/- 100 feet, airspeed +/- 10 knots, and heading +/- 10 degrees.
  2) Perform power-on, power-off, and accelerated stalls in accordance with the Commercial Pilot testing standards.
  3) Perform chandelles in accordance with published procedures, complete the rollout at the 180° point +/- 15 degrees, no more than 10 knots above stall speed.
  4) Perform lazy eights in accordance with published procedures, arrive at each 180° point +/- 15 degrees, at an altitude +/- 150 feet from entry altitude, at an airspeed +/- 15 knots from entry airspeed.
  5) Perform steep spirals in accordance with published procedures, maintain a constant radius with only minor deviations while maintaining specified airspeed +/- 15 knots, and roll out toward specified heading +/- 15 degrees.
  6) Perform eights on pylons in accordance with published procedures, select suitable pylons, determine the approximate pivotal altitude, enter the maneuver at the appropriate altitude and airspeed, and maintain the reference line on each pylon with only minor deviations.
  7) Perform a power-off 180° accuracy approach and touch down -200/+400 feet from the specified touchdown point.
  8) Perform normal takeoffs and landings, short-field takeoffs, soft-field takeoffs, and soft-field landings in accordance with the Commercial Pilot testing standards.

9) Perform short-field landings, establish the recommended approach and landing configuration while maintaining airspeed +/- 5 knots, touchdown within 400 feet beyond a specified point with no side drift and minimum float.

Notes:

- Lessons may be completed out of sequence as necessary to meet academic goals set by the instructor.
- Multiple instructional periods may be required to meet lesson requirements.

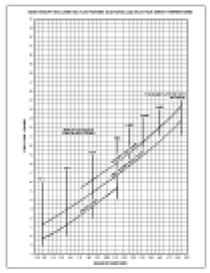
Commercial Pilot, Quiz Module 8 Exam (AQ)

Started: Mar 09, 2023 03:09 PM

Stopped: Mar 09, 2023 03:39 PM

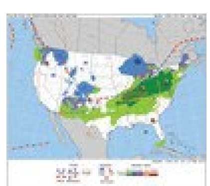
Grade: 98.00

 Quiz Deadline: Dec 31, 2023 01:15 PM

Question	Answer
Question **GIVEN:** **Approximately how much flight time would be available with a day VFR fuel reserve remaining?** (/gradebookutility/question.php?queID=45913) (/gradebookutility/question.php?queID=45913)  Figure 8. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=8&tabs=8&asIds[]=123657)	**Correct** Chosen: b
Question **Which chart provides a ready means of locating observed frontal positions and pressure centers?** (/gradebookutility/question.php?queID=52174)	**Correct** Chosen: a
Question **From which measurement of the atmosphere can stability be determined?** (/gradebookutility/question.php?queID=52112)	**Correct** Chosen: b
Question **Unless adjusted, the fuel/air mixture becomes richer with an increase in altitude because the amount of fuel** (/gradebookutility/question.php?queID=52305)	**Correct** Chosen: c
Question **When is preflight action required, relative to alternatives available, if the planned flight cannot be completed?** (/gradebookutility/question.php?queID=45766)	**Correct** Chosen: b
Question **If you are operating under BasicMed, what is the maximum speed at which you may fly?** (/gradebookutility/question.php?queID=45751)	**Correct** Chosen: a
Question **The angle of attack of a cruise propeller is** (/gradebookutility/question.php?queID=52342)	**Correct** Chosen: b

Question **The uncontrolled firing of the fuel/air charge in advance of normal spark ignition is known as** (/gradebookutility/question.php?queID=52319)	**Correct** Chosen: c

Fuel quantity	**65 gal**
Best power (level flight)	**55 percent**

Question	Answer
Question **While in flight a helicopter and an airplane are converging at a 90° angle, and the helicopter is located to the right of the airplane. Which aircraft has the right-of-way, and why?** (/gradebookutility/question.php?queID=45787)	**Correct** Chosen: a
Question **What is the standard temperature at 10,000 feet?** (/gradebookutility/question.php?queID=52070)	**Correct** Chosen: a
Question **Hazardous wind shear is commonly encountered** (/gradebookutility/question.php?queID=52152)	**Correct** Chosen: c
Question **The best power mixture is that fuel/air ratio at which** (/gradebookutility/question.php?queID=52310)	**Correct** Chosen: b
Question **Unless otherwise authorized or required by air trafic control, what is the maximum indicated airspeed at which a person may operate an aircraft below 10,000 feet MSL?** (/gradebookutility/question.php?queID=45788)	**Correct** Chosen: c
Question **An airplane is converging with a helicopter. Which aircraft has the right-of-way?** (/gradebookutility/question.php?queID=45786)	**Correct** Chosen: b
Question **If all index units are positive when computing weight and balance, the location of the datum would be at the** (/gradebookutility/question.php?queID=45928)	**Correct** Chosen: b
Question **14 CFR Part 1 defines V_Y as** (/gradebookutility/question.php?queID=45711)	**Correct** Chosen: c
Question **What type of front is passing through area 1?** (/gradebookutility/question.php?queID=52200) (/gradebookutility/question.php?queID=52200)  Figure 70. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=70&tabs=70&asIds[]=123657)	**Correct** Chosen: c

Question **On an instrument approach where a DH or MDA is applicable, the pilot may not operate below, or continue the approach unless the** (/gradebookutility/question.php?queID=45808)	**Correct** Chosen: a

Question	Answer
Question **When turbulence causes changes in altitude and/or attitude, but aircraft control remains positive, that should be reported as** (/gradebookutility/question.php?queID=52140)	**Correct** Chosen: c
Question **What steps must be taken when flying with glass cockpits to ensure safe flight?** (/gradebookutility/question.php?queID=52301)	**Correct** Chosen: c
Question **According to 14 CFR Part 91, at what minimum altitude may an airplane be operated unless necessary for takeoff and landing?** (/gradebookutility/question.php?queID=45794)	**Correct** Chosen: c
Question **While executing a 60° level turn, your aircraft is at a load factor of 2.0. What does this mean?** (/gradebookutility/question.php?queID=52040)	**Correct** Chosen: a
Question **As air temperature increases, density altitude will** (/gradebookutility/question.php?queID=45877)	**Correct** Chosen: b
Question **To act as pilot in command of an airplane towing a glider, a pilot must have accomplished, within the preceding 24 months, at least** (/gradebookutility/question.php?queID=45747)	**Correct** Chosen: b
Question **Before shutdown, while at idle, the ignition key is momentarily turned OFF. The engine continues to run with no interruption; this** (/gradebookutility/question.php?queID=52321)	**Correct** Chosen: b
Question **Who is responsible for filing a Near Midair Collision (NMAC) Report?** (/gradebookutility/question.php?queID=45871)	**Correct** Chosen: c
Question **If the airplane attitude initially tends to return to its original position after the elevator control is pressed forward and released, the airplane displays** (/gradebookutility/question.php?queID=52012)	**Correct** Chosen: b
Question **The ratio of an airplane's true airspeed to the speed of sound in the same atmospheric conditions is** (/gradebookutility/question.php?queID=52043)	**Correct** Chosen: c
Question **Which is required equipment for powered aircraft during VFR night flights?** (/gradebookutility/question.php?queID=45821)	**Correct** Chosen: b
Question **Advection fog has drifted over a coastal airport during the day. What may tend to dissipate or lift this fog into low stratus clouds?** (/gradebookutility/question.php?queID=52091)	**Correct** Chosen: c

<table>
<tr><th>Question</th><th>Answer</th></tr>
<tr><td>Question The pilot in command of an aircraft operated under IFR, in controlled airspace, shall report as soon as practical to ATC when (/gradebookutility/question.php?queID=45813)</td><td>Correct
Chosen: b</td></tr>
<tr><td>Question
GIVEN:
<table>
<tr><td>Temperature</td><td>70°F</td></tr>
<tr><td>Pressure altitude</td><td>Sea level</td></tr>
<tr><td>Weight</td><td>3,400 lb</td></tr>
<tr><td>Headwind</td><td>16 kts</td></tr>
</table>
Determine the approximate ground roll.
(/gradebookutility/question.php?queID=45923)
(/gradebookutility/question.php?queID=45923)

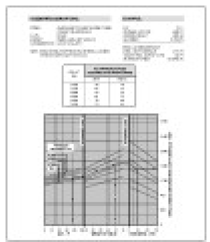
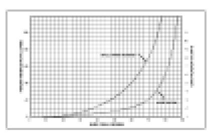
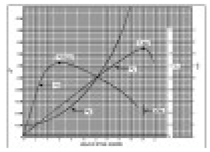



Figure 35.
(/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=35&tabs=35&asIds[]=123657)</td><td>Incorrect (a)
Chosen: b</td></tr>
<tr><td>Question Authority for approval of a minimum equipment list (MEL) must be obtained from the (/gradebookutility/question.php?queID=45830)</td><td>Correct
Chosen: b</td></tr>
<tr><td>Question In theory, if the airspeed of an airplane is doubled while in level flight, parasite drag will become (/gradebookutility/question.php?queID=51985)</td><td>Correct
Chosen: c</td></tr>
<tr><td>Question A person with a Commercial Pilot certificate may act as pilot in command of an aircraft for compensation or hire, if that person (/gradebookutility/question.php?queID=45754)</td><td>Correct
Chosen: a</td></tr>
<tr><td>Question Unless otherwise authorized, what is the maximum indicated airspeed at which an aircraft may be flown in a satellite airport trafic pattern located within Class B airspace? (/gradebookutility/question.php?queID=45789)</td><td>Correct
Chosen: c</td></tr>
<tr><td>Question As the angle of bank is increased, the vertical component of lift (/gradebookutility/question.php?queID=51981)</td><td>Correct
Chosen: a</td></tr>
</table>

Question	Answer
Question **A pilot reporting turbulence that momentarily causes slight, erratic changes in altitude and/or attitude should report it as** (/gradebookutility/question.php?queID=52139)	**Correct** Chosen: b
Question **Commercial pilots are required to have a valid and appropriate pilot certificate in their physical possession or readily accessible in the aircraft when** (/gradebookutility/question.php?queID=45717)	**Correct** Chosen: b
Question **Which would increase the stability of an air mass?** (/gradebookutility/question.php?queID=52100)	**Correct** Chosen: b
Question **You are flying an aircraft equipped with an electronic flight display and the air data computer fails. What instrument is affected?** (/gradebookutility/question.php?queID=52300)	**Correct** Chosen: b
Question **In order to qualify for BasicMed, you must have received a comprehensive examination from:** (/gradebookutility/question.php?queID=45729)	**Correct** Chosen: c
Question **What is the stall speed of an airplane under a load factor of 2.5 Gs if the unaccelerated stall speed is 60 knots?** (/gradebookutility/question.php?queID=52033) (/gradebookutility/question.php?queID=52033)  Figure 4. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=4&tabs=4&asIds[]=123657)	**Correct** Chosen: c
Question **What flight time may a pilot log as second in command?** (/gradebookutility/question.php?queID=45737)	**Correct** Chosen: c
Question **Which is true with respect to formation flights? Formation flights are** (/gradebookutility/question.php?queID=45780)	**Correct** Chosen: c

Question	Answer
Question **How much altitude will this airplane lose in 3 statute miles of gliding at an angle of attack of 8°?** (/gradebookutility/question.php?queID=51997) (/gradebookutility/question.php?queID=51997)  Figure 3. (/pled/assessment/main.php?page=imageviewer&origin=gb&imgKey=3&tabs=3&asIds[]=123657)	**Correct** Chosen: c
Question **If not equipped with required position lights, an aircraft must terminate flight** (/gradebookutility/question.php?queID=45825)	**Correct** Chosen: a
Question **You are conducting your preflight of an aircraft and notice that the last inspection of the emergency locator transmitter was 11 calendar months ago. You may** (/gradebookutility/question.php?queID=45824)	**Correct** Chosen: b
Question **Which list accurately reflects some of the documents required to be current and carried in a U.S. registered civil airplane flying in the United States under day Visual Flight Rules (VFR)?** (/gradebookutility/question.php?queID=45814)	**Correct** Chosen: c
Question **What is the base of the ceiling in the following pilot report?** **KMOB UA /OV APE230010/TM 1515/FL085/TP BE20/SK BKN065/WX FV03SM HZ FU/TA 20/TB LGT** (/gradebookutility/question.php?queID=52166)	**Correct** Chosen: c

Performance Indicator Rubric

Course: FSCI 2650 Navigation Foundations   Course Instructor: Jack Schwarz

Semester Taught: Spring 2023   Number of Students in Course: 35

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Indicate what % of class achieved a minimum 70%)	Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	Final Exam - #4: 88.57%	Yes.
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	Final Exam - #5: 85.71%	Yes.

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

Recommendation is to continue the current methods of presenting the course materials to the class.

**Attach description of assignment used for assessment and samples of student work.*

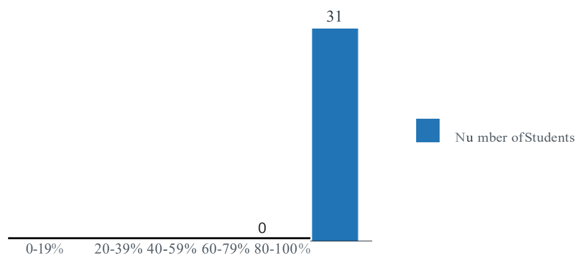
Es.s:.1Y 11 p::>ints pos:s ib le

G

An air craft is flying TAS 260 lds a nd tracking 085"T.The *WN* is 045/50. How f.lr can the air cra ft fl y out from its b.lse .lnd re tu rn w it hin 1 hour ?

0.89	0.05	1.00	0.8 9tt pts
Difficulty Index	Discr iminat ion Inde x	RPB	Mea n Ea rn ed Score

Perf ormance by Quintile



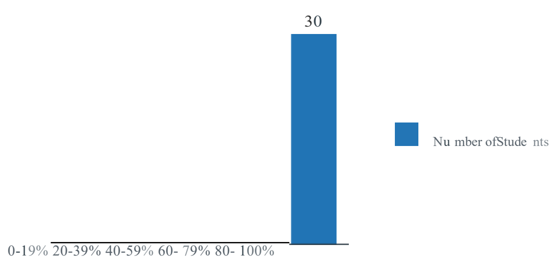
Es.say 12 p::>ints poss ib le

W

An aircraft is at FL340 with 280 KCAS and a true -18°C OAT. The wind component is a tailwind of 35 kts. When the aircraft is at 120 nm from• reporting point.ATC reques ts the crew to arrive 2 minutes later than plan t he re port ing po i nt How much do they need to reduce KCAS?

0.86	0.25	1.00	1.7112pts
Difficulty Inde x	Disc rim in .1t ion Index	RPB	Mea n Ea rned Score

Performance by Quintile



Performance Indicator Rubric

Course: FSCI 3700 Principles of Flight Instruction   Course Instructor: ________________________________

Semester Taught:___________________________   Number of Students in Course: ________

Student Learning Outcome Assessed	**Assessment Results: (Indicate what % of class achieved a minimum 70%)**	**Benchmark achieved? (Benchmark: 80% of students will score a minimum of 70% = "C")**
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.		
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.		

Course Assessment (Intended Use of Results)
The following will be used for recommendations to improve the quality of course delivery based on assessment results. These recommendations may include prerequisite change; changing course outline and adding more topics; adding a third assessment; changing the course sequence, etc.

**Attach description of assignment used for assessment and samples of student work.*

Performance Indicator Rubric

Course: FSCI 3750 Flight 6

Course Instructor: Ryan Boyer

Semester Taught: Spring 2023

Number of Students in Course: 6

FLIGHT SCIENCE CONCENTRATION

Student Learning Outcome Assessed	Assessment Results: (Percentage of student written exams and stage checks passed on first attempt)	Benchmark achieved? (Benchmark: 70% of student written exams and stage checks passed on first attempt)
SLO 1: Conduct aviation operations in a professional, safe, and efficient manner.	Written Exam Pass Rate: 100% Stage Check Pass Rate: 90%	Yes
SLO 5: An ability to apply the techniques, skills, and modern aviation tools to perform aviation related tasks of a professional pilot.	Written Exam Pass Rate: 100% Stage Check Pass Rate: 90%	Yes

Description of Assessment: The student assessment consists of multiple-choice module written exams as well as stage check practical exams. Written exams require a minimum score of 70% to pass. Each stage check consists of an oral portion and a flight portion, and satisfactory or unsatisfactory performance is determined in accordance with the Module Completion Standards and/or the appropriate Airmen Certification Standards (ACS)/Practical Test Standards (PTS). Attached are samples of the module completion standards included in the approved Training Course Outline. This document describes the expectations and assessment standards for stage check oral and flight checks. Also attached is a sample of a student's completed module written exam.

Recommendations: Continue to identify and discuss student stage check deficiencies with the instructional staff each semester. Revisions to course content and/or module completion standards will be made as needed to ensure adequate student preparation.

Module 11

Fundamentals of Instruction

Prerequisites: Prior to beginning this module the student must possess an ATP Certificate with an Airplane Single-Engine Land Rating or Commercial Pilot Certificate with Airplane Single-Engine Land and Instrument Ratings and must possess either a valid FAA medical certificate or meet the Alternative Pilot Physical Examination and Education Requirements under FAR 68 (BasicMed).

Objective: To introduce the student to the Fundamentals of Instruction, to gain proficiency in teaching technical subject areas, and to increase competence in demonstrating and describing Private Pilot procedures and maneuvers.

Completion Standards:

- The student must meet the following minimum training time requirements during this module:

DUAL		OTHER
Airplane	Pre/ Post	Ground
12.7	3.6	21.0

- Prior to completion of the module, students must pass the FAA Fundamentals of Instruction Knowledge Exam and a stage check to evaluate their instructional knowledge of:
    1) The fundamentals of instructing, including human behavior, effective communication, the teaching process, the learning process, assessment and critique, instructor responsibilities and professionalism, techniques of flight instruction, and risk management, as described in the Flight Instructor Practical Test Standards or Airmen Certification Standards.
    2) Technical subject areas, including principles of flight, flight controls, aircraft systems, performance, and weight and balance, as described in the Flight Instructor Practical Test Standards or Airmen Certification Standards.

- Prior to completion of the module, students must pass a stage check to evaluate their ability to:
  1) Demonstrate all procedures and maneuvers in this module from the right seat to the Private Pilot skill level.
  2) Demonstrate a preflight inspection while describing reasons for the inspection, items to check, and recognition of defects.
  3) Demonstrate and simultaneously explain all ground operations, including engine starting procedures, cockpit management, taxiing, airport signs and markings, ATC communication procedures, and before takeoff checks.
  4) Demonstrate and simultaneously explain fundamentals of flight and basic instrument maneuvers.
  5) Demonstrate and simultaneously explain traffic pattern procedures, including normal/crosswind takeoff and landing, short-field takeoff and landing, soft-field takeoff and landing, slip to a landing, and go-arounds.
  6) Demonstrate and simultaneously explain steep turns, slow flight, and stalls.
  7) Demonstrate and simultaneously explain Private Pilot ground reference maneuvers, including turns around a point, s-turns, and rectangular course.
  8) Demonstrate and simultaneously explain emergency operations, including a simulated emergency approach and landing.

Notes:

- Lessons may be completed out of sequence as necessary to meet academic goals set by the instructor.
- Multiple instructional periods may be required to meet lesson requirements.

Module 12

Flight Instructor Practical Test Preparation

Prerequisites: Prior to beginning this module the student must possess an ATP Certificate with an Airplane Single-Engine Land Rating or Commercial Pilot Certificate with Airplane Single-Engine Land and Instrument Ratings.

Objective: To gain proficiency in teaching technical subject areas and demonstrating and describing all required procedures and maneuvers. To complete the aeronautical knowledge and flight training required for the Certified Flight Instructor Practical Exam.

Completion Standards:

- The student must meet the following minimum training time requirements during this module:

DUAL	OTHER	
Airplane	Pre/ Post	Ground
12.3	4.2	20.0

- Prior to completion of the module, students must pass the FAA Flight Instructor Airplane and Advanced Ground Instructor Knowledge Exams.
- Prior to completion of the module, students must pass a stage check to evaluate their:
  1) Ability to demonstrate all applicable tasks as specified in the Flight Instructor Practical Test Standards or Airmen Certification Standards within the established standards.
  2) Knowledge of the fundamentals of instruction, technical subject areas, and instructor responsibilities.
  3) Ability to demonstrate the procedures and maneuvers to at least the Commercial Pilot skill level while giving effective instruction.
  4) Competence in teaching the selected procedures and maneuvers.
  5) Competence in describing, recognizing, analyzing, and correcting common errors.

6) Knowledge of the development and effective use of a course of training, syllabus, and lesson plan.

Notes:

- Lessons may be completed out of sequence as necessary to meet academic goals set by the instructor.
- Multiple instructional periods may be required to meet lesson requirements.

U.S. DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration
Airman Knowledge Test Report

NAME:

FAA TRACKING NUMBER (FTN): A5469453 EXAM ID: 90030320230335228

EXAM: Fundamentals of Instructing (FOI)

EXAM DATE: 03/03/2023 EXAM SITE: ABS63102

SCORE: 88% GRADE: Pass TAKE: 1

Learning statement codes listed below represent incorrectly answered questions. Learning statement codes and their associated statements can be found at https://www.faa.gov/training testing/testing/media/LearningStatementReferenceGuide.pdf.

Reference material associated with the learning statement codes can be found in the appropriate knowledge test guide at https://www.faa.gov/training_testing/testing/.

A single code may represent more than one incorrect response.

PLT204 PLT227 PLT230 PLT306 PLT504

EXPIRATION DATE: 03/31/2025

DO NOT LOSE THIS REPORT

AUTHORIZED INSTRUCTOR'S STATEMENT: (if applicable)
On ________ (date) I gave the above named applicant _____ hours of additional instruction, covering each subject area shown to be deficient, ~~and consider the applicant competent to pass the knowledge test.~~

Name____

Cert. No.____ (print clearly)

Type of instructor certificate ________________________________

Signature ____

FRAUDULENT ALTERATION OF THIS FORM BY ANY PERSON IS A BASIS FOR SUSPENSION OR REVOCATION OF ANY CERTIFICATES OR RATINGS HELD BY THAT PERSON.
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FEDERAL AVIATION ADMINISTRATION

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Flight Science – Data Collected in Support of Faculty and Staff Goals and SLO 2

PARKS COLLEGE FACULTY T/TT ANNUAL EVALUATION SUMMARY 2023 (for calendar year 2022)				
[redacted]		Annual Evalulation Score		[redacted]
	Total Workload Assignment for 2021	**24**	**Proportion**	**Area Score (1-4)**
	Research & Grants and Contracts Assignment	9	0.375	[redacted]
	Teaching Assignment	12	0.500	[redacted]
	Service and Professional Development Assignment	3	0.125	[redacted]
	Administrative Assignment		0.000	

All input data expressed in workload units

Enter data into light gray squares.

Department Chair's Assessment: Evaluate the faculty member's performance in accordance with the mission of the department, college, and univers[redacted]sider performance norms for the rank and seniority of this faculty member, overall workload, and the fac[redacted]ber's overall engagement in the college. List key strengths and weaknesses and suggest strategies for improvement. Comment on any weaknesses or concerns noted in previous evaluations.

[redacted] role in the department is that of a tenured, associate professor. As such, he has successfully fulfilled the duties of his appointment. His performance in teaching was outstanding. He successfully taught the courses assigned to him and he continued to work to imrove his teachi[redacted]ds. Students recognized hs teaching efforts. He mentored both undergradute and graduate students and served on the graduate committees of our graduate students. exceeded expectations in conducting research, collaborating within the department as well as inter-departmentally within the college. He made presentations as PI and with student collabora[redacted]mitted a paper for publication and actively submitted grant proposals, some of which if awarded, would bode well for the department and its research goals. performance in the area of service was outstanding, both internally at SLU and within the community. He served on committees at various levels at SLU and served the college as its Chief Diversity Officer. is active in service to the Ville area of the St. Louis community. I highly commend his service to the Revitalization 2000 initiative, including his work at the Claver House and the Hickey Elemenltary School. His use of his students in a service learning opportunity was well received by his students and those in the Ville. I recommend that in his role as Chief Diversity Officer, has exceeded the expectations of the position, as he worked to establish the position and diverity within the college. There are no weaknesses or concerns that carry over from previous evaluations. I ask that [redacted] continue the efforts given to date and I thank him for those efforts.

Faculty Member's Response: Please provide your response to the overall assessment. At the minimum, you are expected to sign the document to acknowledge the receipt of this review.

I acknowledge receipt of the annual evaluation as presented in this document.

Signed:

Faculty Member	Date
Department Chair	Date

PARKS COLLEGE FACULTY T/TT ANNUAL EVALUATION TEMPLATE 2023 (for calendar year 2022)		
	[redacted]	**2022**
Number of Items	*This is imported from Table 3 of "Parks-001 Faculty Workload and Annual Evaluation Policy"*	[redacted]
	Research Activities	**4.5**
	Presentations	
2	Contributed by student in group	0.5
2	Contributed by PI	1
	Invited	0
	Publications and Patents	
1	Papers or patents submitted (provide details for each in FAR)	1
	Papers or patents published (provide year of submission in FAR)	0
	Books	
	When contract obtained	0
	While book is in process	0
	When book is completed	0
	Grants and Contracts	
	Internal proposal funded	0
	External proprosal funded (<$50K)--PI	0
	External proprosal funded (<$50K)--co-PI/co-I	0
	External proposal funded (>$50K)--PI	0
	External proposal funded (>$50K)--co-PI/co-I	0
	External proposal not funded--PI	0
2	External proposal not funded--co-PI/co-I	2
	PI on current externally-supported grant	0
	co-PI or co-I on current externally supported grant	0

PARKS COLLEGE FACULTY T/TT ANNUAL EVALUATION TEMPLATE 2023 (for calendar year 2022)			
[redacted]			**2022**
Number of Items	*This is imported from Table 4 of "Parks-001 Faculty Workload and Annual Evaluation Policy"*		[redacted]
	Service Activities	**Total pts**	**58.25**
	Internal Service		
2	Smaller activity (meeting with prospective students, etc.)	0.1-0.25	0.25
15	Committee member (department, college, or university)	2	30
1	Committee chair (department, college, or university)	5	3
1	Professional development activity (workshop, conference, course)	1-3	3
2	Major activity (significant adminstrative responsibility, major initiative)	6-10	10
	External Service		
	Reviewer for papers, grant proposals	0.5-1	
	Chairing or organizing symposia, sessions at conferences	3	0
1	Leadership role in external/professional service	3	3
	Undergraduate Mentoring		
	0-10 students	3	0
	11-20 students	6	0
1	21+ students	9	9

PARKS COLLEGE FACULTY T/TT ANNUAL EVALUATION TEMPLATE 2023 (for calendar year 2022)			
[redacted]		**2022**	
Number of Items	*This is imported from Table 5 of "Parks-001 Faculty Workload and Annual Evaluation Policy"*	[redacted]	Enter Area Score (1-4)
	Teaching Activities	**Total pts**	**53.5**
	Teaching Productivity & Quality		
	Base teaching productivity	5-7	7
	Student satisfaction/Teaching quality	5-7	6
	New course development	6	0
2	Major course redesign	2-4	4
1	Teaching a large section	3	3
1	Teaching an extra course	4	4
	Pedagogical Activities		
	Attend a teaching-related conference	1-5	
1	Teaching seminar or other teaching professional development	1-5	
	Mentoring and Student Research		
11	Graduate student committee member	0.5	5.5
	Directing undergraduate in research	1	0
12	Directing graduate or postdoctoral student in reasearch	2	24

	Visiting researcher in laboratory	1	0

[redacted]

[redacted]

Coordinator

Manager: Stephen Magoc

Evaluated By: Stephen Magoc

2022 Year End Review

Organization: Aviation Science-General (Stephen Magoc)

Location: Center for Aviation Science

01/01/2022 - 12/31/2022

Overall

Manager Overall Evaluation

Rating: **Exceeds Expectations**

Acknowledgement

Employee

Entered by: [redacted]

Date: **03/14/2023**

Status: **Acknowledge**

Comment: **I appreciate the opportunity to be of service at the CAS. Working with students in the best department at the University is a plus!**

Goals

Goal_1

Participate in and support the CAS efforts in community and industry outreach.

Due Date: **12/31/2021** Status: **Successfully Completed** Completion Date: **12/31/2021**

Supports:

Manager Evaluation

Rating: Exceeds Expectations

Comment: [redacted] **has shown time and again the willingness and ability to be supportive of CAS endeavors to reach out and promote our flight program to the community and industry.**

Employee Evaluation

Rating: Exceeds Expectations

Comment: **Participates in outreach including Women in Aviation, Girls in Aviation Day, high school outreach camps, and organizes Christmas holiday donations for community families.**

Goal_2

Continue to improve your own personal education and skills as an example to the CAS staff. Continue to encourage and enable CAS staff to develop professionally.

Due Date: **12/31/2021** Status: **Successfully Completed** Completion Date: **12/31/2021**

Supports:

Manager Evaluation		Employee Evaluation	
Rating:	Exceeds Expectations	Rating:	Exceeds Expectations
Comment:	[redacted] attends the necessary SLU and CAS required training and certification as the	Comment:	Worked with DPS and SLU to complete required certifications for dispatcher position.

Dispatch Coordinator.	Also completed Certified Peer Support Counseling seminar through the State of Missouri.

Goal_3

Continue to explore and implement efficient operation of the dispatch department. Work with other CAS, AVSC, Parks College and SLU administrators to improve efficiency in operations at the CAS as the department moves towards an "aviation business" model.

Due Date: **12/31/2021** Status: **Successfully Completed** Completion Date: **12/31/2021**

Supports:

Manager Evaluation		Employee Evaluation	
Rating:	Exceeds Expectations	Rating:	Exceeds Expectations
Comment:	[redacted] is often the go-to person at the CAS, working to ensure that the department chair and SLU administration are kept up-to-date on the inner workings of the CAS.	Comment:	Continues to work with both faculty and staff to insure the department is efficient and operational at the airport. Works as a contact between main campus and the airport to insure communications are effectively distributed.

Work with the Department of Aviation Science and dispatch personnel at the CAS to ensure that AABI-required safety management goals are met.

Take an active role in the development and management of the safety goals set out by the department faculty and CAS administrators.

Due Date: **12/31/2022** Status: **Partially Completed** Completion Date:

Supports:

Manager Evaluation		Employee Evaluation	
Rating:	Meets Expectations	Rating:	Exceeds Expectations
Comment:	[redacted] actively works towards maintaining a safe and orderly dispatch department at the CAS, which is critical to the operating efficiency of the CAS.	Comment:	This is an ongoing process and is crucial to the safety of the department.

Values

Acting With Character

Approaches work with a sense of integrity and duty to produce high quality results in the Jesuit tradition, even when it's the harder thing to do.

Examples

- **Uses good listening skills, gets to know others' needs and takes timely action to respond to those needs.**
- **Shows up to work regularly, on time and stays on task during the workday.**
- **Applies knowledge, skills, and mastery of job tasks to achieve results.**
- **Demonstrates strong work ethic and sense of urgency to meet commitments.**

Manager Evaluation

Rating: Exceeds Expectations

Comment: [redacted] often exceeds the work requirements of her dispatch coordinator appointments. She is typically the first person to show up early and/or stay after her normal work hours to accommodate the students, staff, and faculty utilizing the CAS for flight education and training.

Employee Evaluation

Rating: Exceeds Expectations

Comment: I strive to work over and above the necessary requirements, working early or late to accommodate students, flight team, etc. I am efficient with my time, and and respond quickly to any questions or requests.

Strengthening Our Community

Forms inclusive and equitable relationships with others in the workplace.

Examples

- **Treats others with respect, courtesy, honesty, and compassion.**
- **Uses appropriate self-control of emotions and behaviors, even in difficult situations.**
- **Respects, embraces, and celebrates all expressions of identity.**

Manager Evaluation

Rating: Exceeds Expectations

Comment: [redacted] works in a sometimes frenetic environment. In spite of this, she is always extremely courteous to coworkers, students, and prospective students and their families.

Employee Evaluation

Rating: Exceeds Expectations

Comment: Treats others with respect and courtesy, both internally and with students/parents. This is especially true in answering student/parent billing questi

Driving Change & Innovation

Improves work processes with the goal of adding value, increasing quality and efficiency, or stopping unnecessary tasks.

Examples

- **Puts team goals first. Stops tasks that don't help the team achieve its goals.**
- **Looks for ways to improve quality every day.**
- **Finds creative ways to solve problems.**
- **Recommends ways to improve work.**

Manager Evaluation

Rating: Exceeds Expectations

Comment: [redacted] always puts the goals and needs of the CAS first and is more than capable of prioritizing her tasks when found necessary. She is a very capable problem-solver in an environment which can be quite tense when something out of the ordinary occurs.

Employee Evaluation

Rating: Exceeds Expectations

Comment: Continually looks to improve quality and solve problems at the hangar. I am willing and open to work on problem solving or changes to better the activity at CAS

Individual Development Plan

Professional develolpment

Additional Information: [redacted] should take advantage of any SLU-sponsored (or outside sponsorship) that involve pent to assist with her daily duties and/or personal life.

Status: **Successfully Completed**

Start Date: **Jan 1, 2022** Completion Date: **Dec 31, 2022**

Flight Science – Data Collected in Support of
Facilities, Equipment, and Service Goals and SLO 2

SAINT LOUIS UNIVERSITY
OLIVER L. PARKS DEPARTMENT OF AVIATION SCIENCE

School of Science and Engineering
3450 Lindell Blvd.
McDonnell Douglas Hall Room 1017B
St. Louis, MO 63103

P: 314-977-8251

May 31, 2023

Dean Duellman,

Following is a report on the condition of the facilities, equipment, and services utilized by the Department of Aviation Science. This report is required to be sent to you as part of the assessment process used by the department.

The department has the following goals for facilities, equipment, and services.

- The facilities remain adequate for the aviation department's academic and flight training activities.
- Saint Louis University will continue to support the services required by the aviation department.
- Saint Louis University will support the aviation department in its need for aircraft and advanced aircraft training devices (AATDs – flight simulators) to operate the aviation academic and flight training activities.

The following describes the condition of the Facilities, Equipment and Services utilized by the department.

Facilities

- The McDonnell Douglas Hall facility remains adequate for the current level of staff and faculty.
- The Center for Aviation Science facility continues to leak in different areas when it rains and needs continual roof repairs. Please note that the facility phased renovations did not restart in July 2022 as planned. Phase 2 renovations are currently being rebid and scheduled to be started as soon as possible.

Equipment

- Equipment used in McDonnell Douglas Hall is generally in adequate condition except for the CRJ 700 flight simulator used by the department. The CRJ 700 flight simulator is due for replacement during the summer 2023. The replacement unit will be a Boeing 737 MAX AATD manufactured by Flightdeck Solutions (FDS).
- Equipment at the Center for Aviation Science is becoming aged. The aircraft continue to be maintained in an airworthy condition, but it is becoming increasingly expensive to maintain them in such a condition. The Diamond DA20 aircraft were manufactured in 2008 and the

Piper Seminole aircraft were manufactured in 2001 and overdue for replacement, based on the department's seven-year replacement cycle.

- The 2018 aircraft simulators are operating adequately and are within the seven-year replacement cycle.
- The 1996 ground support truck used by the department needs replacement and is becoming increasingly difficult to use in support of snow removal from the hangar ramp areas.
- The forklift vehicle used by the department needs replacement or overhaul.
- The aircraft oil storage shed is in an unusable, unsafe condition and requires replacement.

Services

- The services at McDonnell Douglas Hall are adequate.
- The services at the Center for Aviation Science are barely adequate as the facility continues to deteriorate, the roof leaks, several doors require replacement, the HVAC in the simulator room requires adjusting, there is a lack of SLU branding on the exterior and in the interior of the facility, Site 41 aircraft ramp drainage pipe is clogged and does not sufficiently drain, causing a large, long-standing pool of water on the ramp (large area of ice in the winter), etc.

Changes recommended at the last assessment of the Facilities, Equipment and Services criteria included the replacement of the Diamond DA20 and Piper Seminoles. The Provost declined to consider the recommendations of the department.

At this time, the department recommends replacement/repair of the following items of equipment:

- The nine Diamond DA20 aircraft with 10-12 Piper Pilot 100i aircraft.
- The two Piper Seminoles with two or three new Piper Seminoles.
- The ground support vehicle which is being used by the Center for Aviation Science.
- Replacement/overhaul of the forklift which is being used by the Center for Aviation Science.
- Replacement of the oil storage shed which is being used by the Center for Aviation Science.
- Repairs of the hangar facility.
- Repair the site 41 drainage issue.

Further, the department recommends the hiring of a custodian who can be dedicated to a schedule which allows for daily cleaning/servicing at the Center for Aviation Science.

Further, the department recommends the hiring of a custodian who can be dedicated to a schedule which allows for daily cleaning/servicing at the Center for Aviation Science.

Respectfully,

Stephen G. Magoc

Stephen G. Magoc
Chairperson

Safety Survey AY 2022 -2023

One articulated goal surrounding safety in the Department of Aviation Science is to conduct a survey surrounding safety and safety culture at the Center for Aviation Science (CAS). The current iteration of the survey measures participants attitudes and opinions on topics related to safety using a 5-point Likert scale with the opportunity to provide summary narrative feedback. The safety survey was conducted toward the end of the Spring 2023 semester.

The Safety Survey was modified for the 2022 -2023 academic year in order to collect more actionable information. Four overarching themes are measured in the survey including:

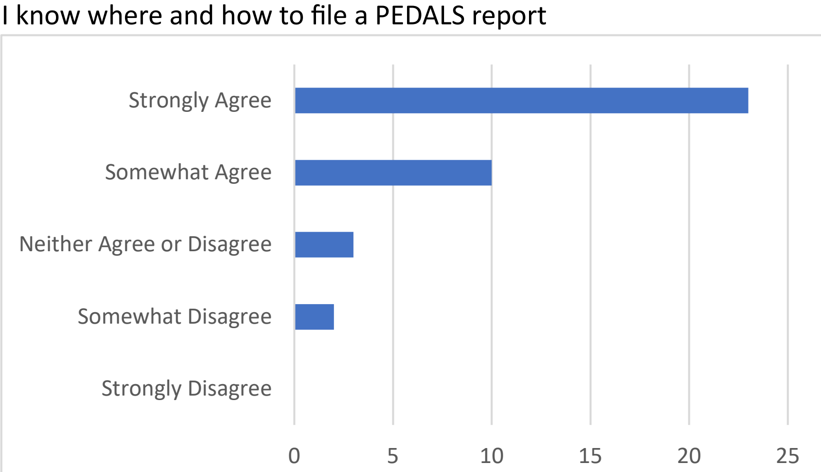
1. Parks Event Debrief and Learning System (PEDALS) Hazard Reporting System
2. Safety Communication (Safety Advisories)
3. Safety Training
4. Safety Culture

The survey was developed by the Assistant Chief Flight Instructor, the Safety Advisor and the Chair of the Safety Committee. The Spring 2023 survey was distributed using Qualtrics, a web-based survey tool. The survey was marketed by in-class announcements and a direct email request from the Department Chair. The survey was administered once at the end of the academic year following recommendations from the Safety Committee to discontinue both a fall and a spring survey. 38 individuals responded to the survey.

PEDALS Survey Questions

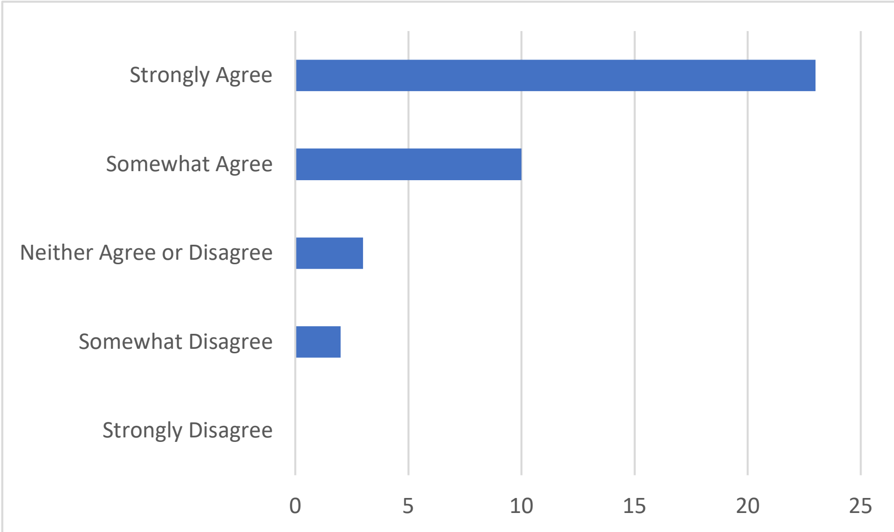
The following questions focused on the Parks Event Debrief and Learning System (PEDALS) Hazard Reporting System. Three questions were asked surrounding PEDALS:

1. I know where and how to file a PEDALS report



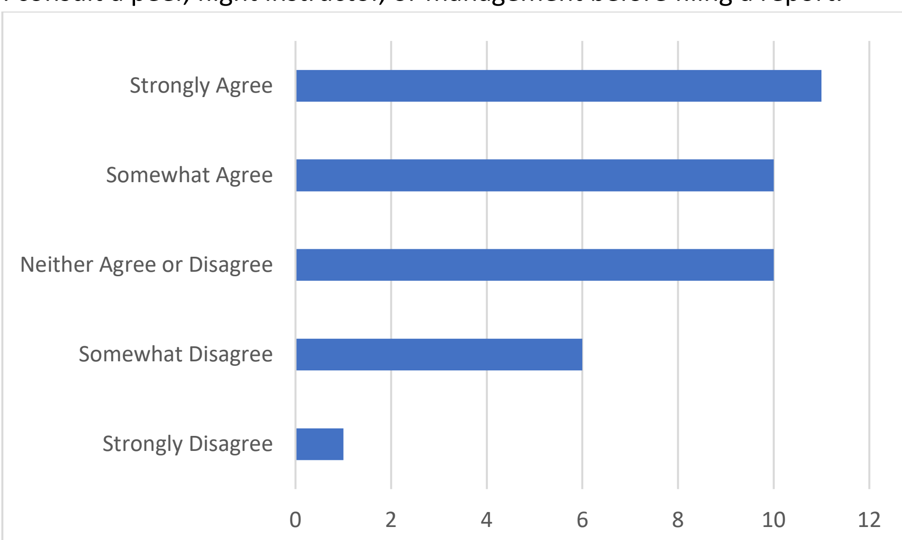
33 of 38 respondents indicated they know how to file a PEDALS report.

2. I feel comfortable reporting hazards within the PEDALS system.



33 of 38 respondents indicate they are comfortable filling PEDALS's reports.

3. I consult a peer, flight instructor, or management before filing a report.

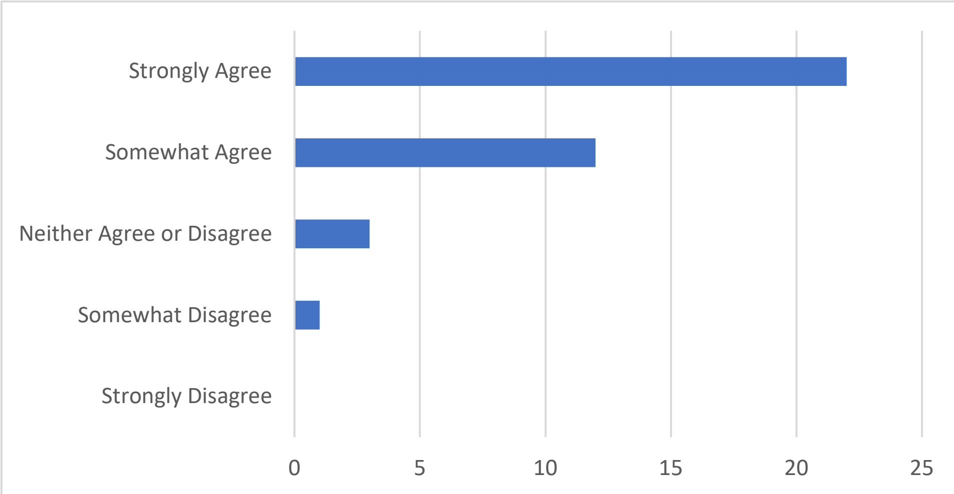


21 of 38 respondents indicate they consult with a peer prior to filing a PEDALS report.

Safety Advisories

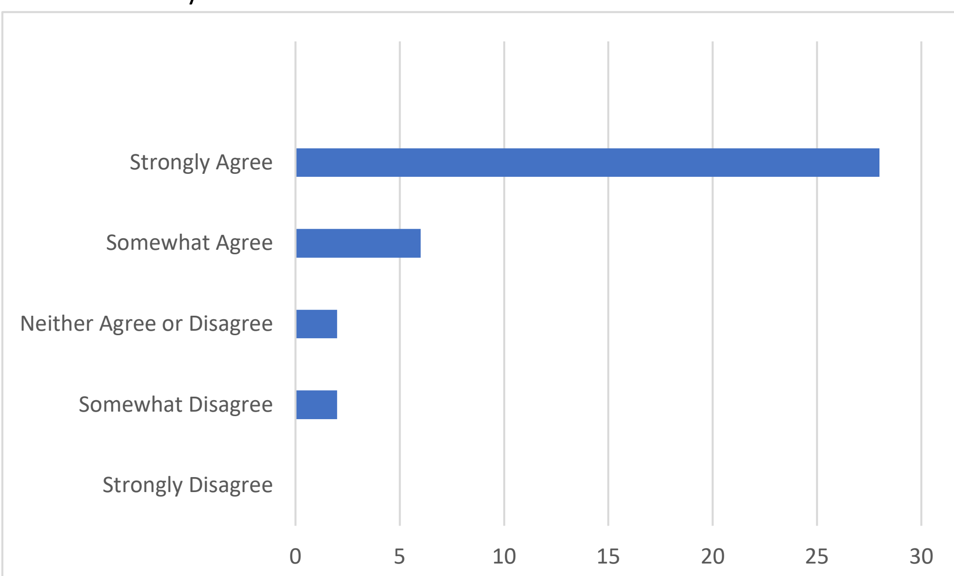
The following questions focused on weekly Safety Advisories.

1. I think that the safety advisory format is easy to read.



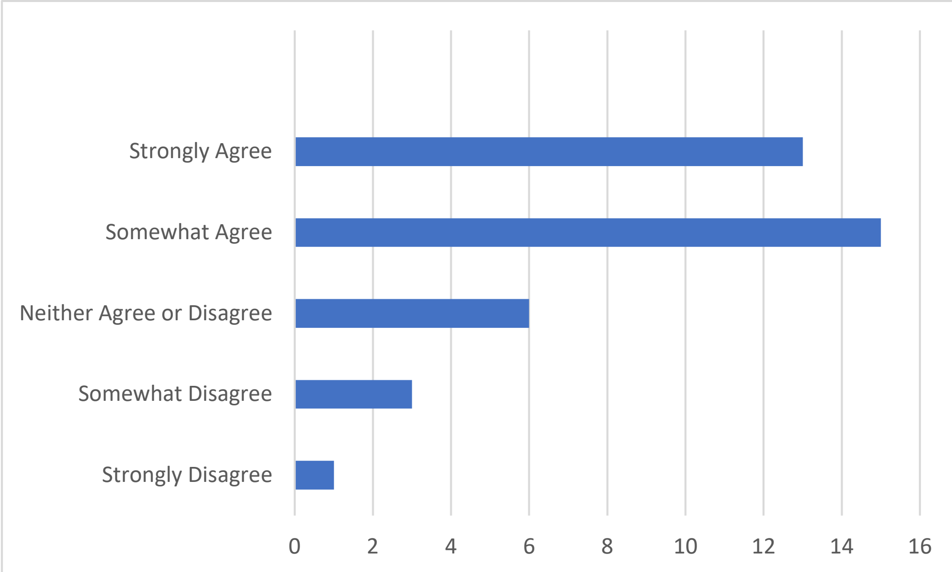
34 of 38 respondents found Safety Advisories easy to read.

2. I read the Safety Advisories.



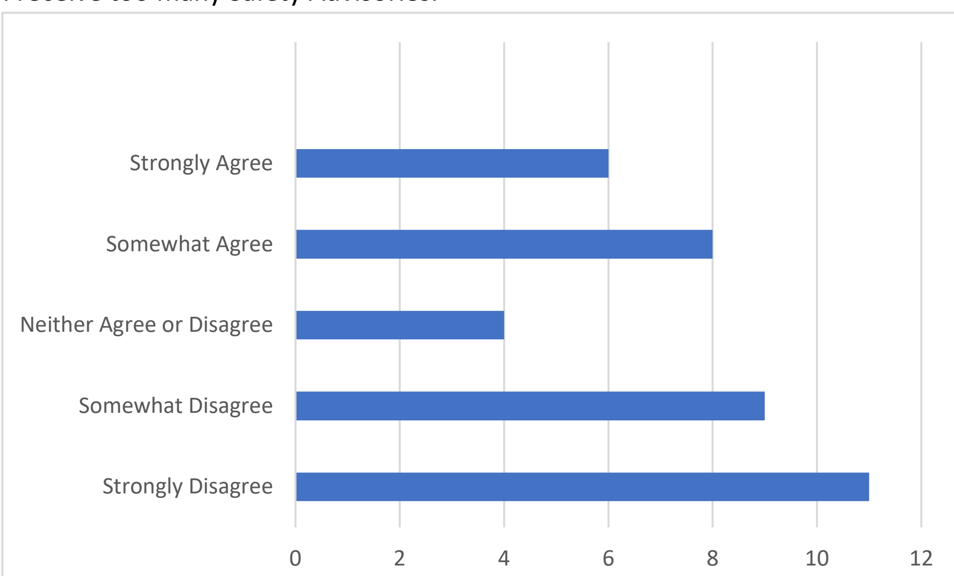
33 of 38 respondents read Safety Advisories

3. I have altered my choices and/or behaviors as a result of a Safety Advisory.



27 of 38 respondents indicate that safety advisories have altered their choices and/or behaviors.

4. I receive too many Safety Advisories.

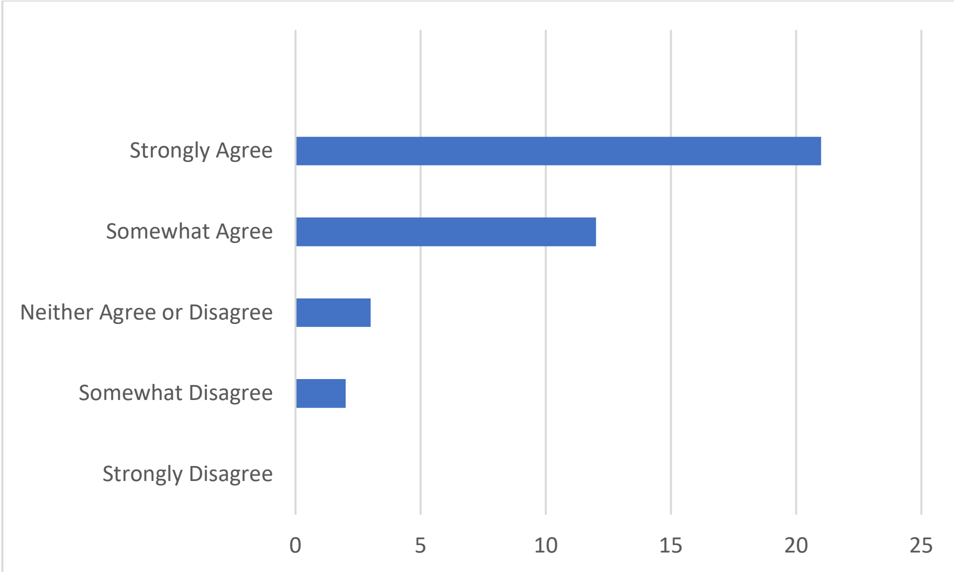


14 of 38 respondents indicate they receive too many Safety Advisories.

Safety Training

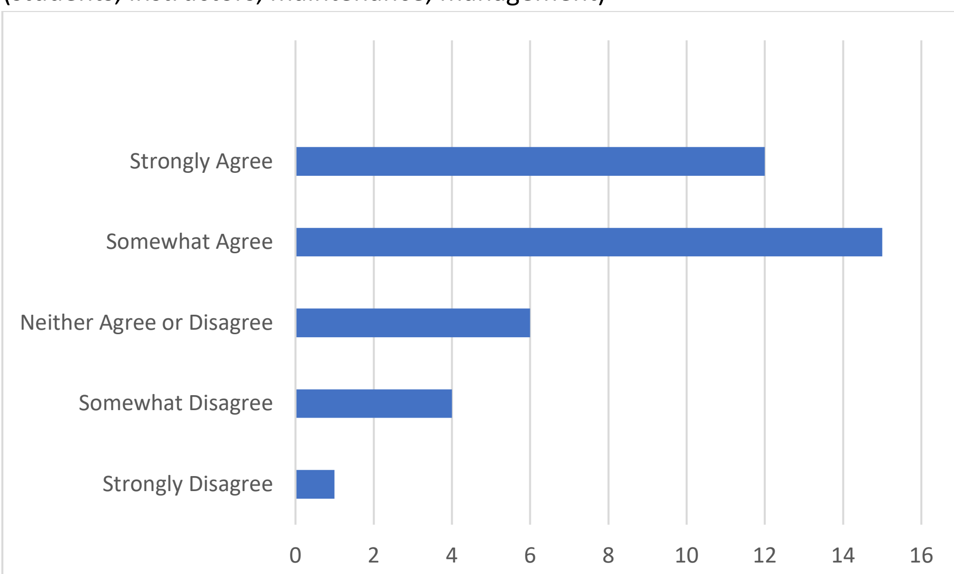
The following questions focused on safety training.

1. I am familiar with the most current version of the Flight Operations Manual



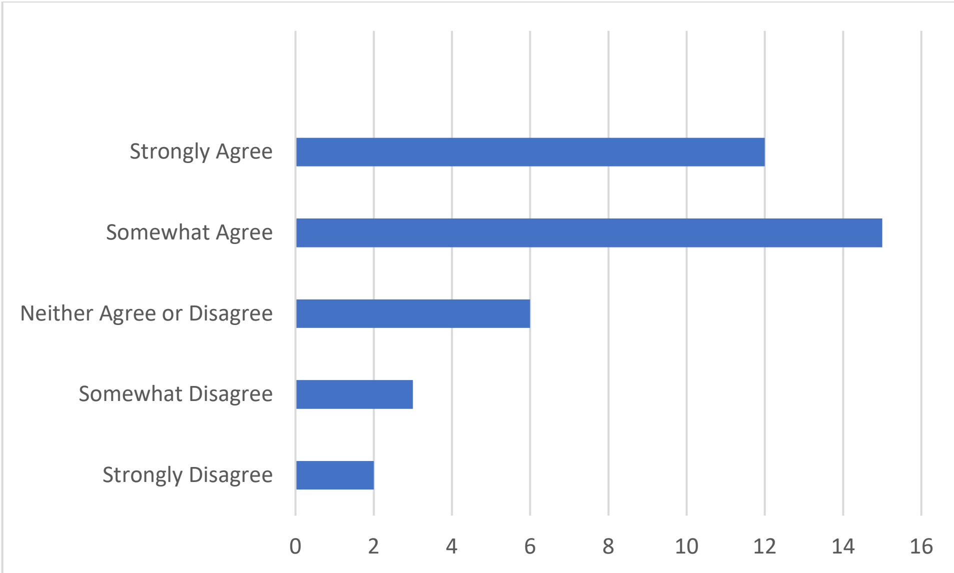
33 of 38 respondents indicated they are familiar with the most current version of the Flight Operations Manual.

2. Changes that might affect safety in our flight operations are adequately communicated to CAS stakeholders (students, instructors, maintenance, management)



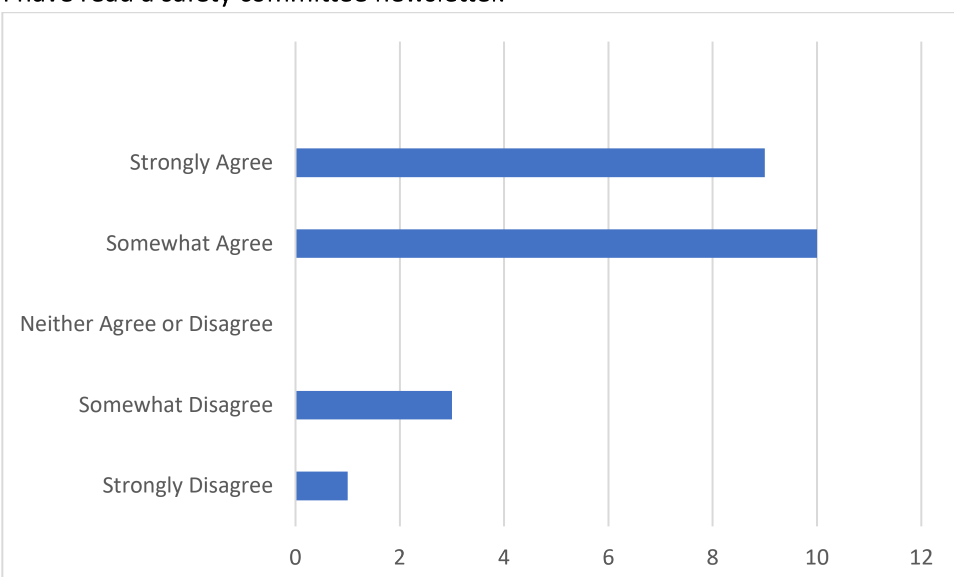
27 of 38 respondents changes that affect safety are adequately communicated to CAS stakeholders.

3. Safety Standdowns are effective in communicating safety information to our community.



27 of 38 respondents indicated Safety Standdowns are effective in communicating safety information to the community.

4. I have read a safety committee newsletter.

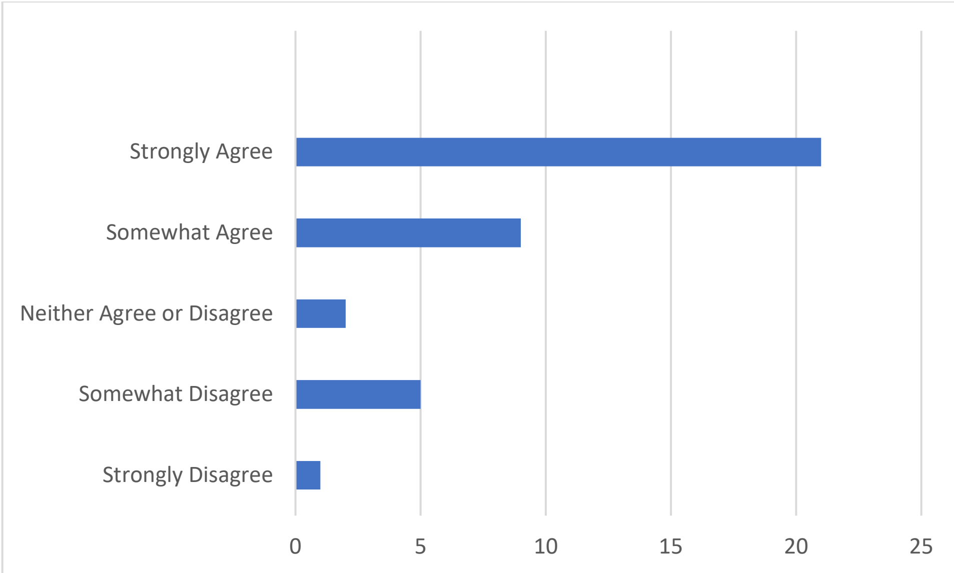


19 of 23 respondents indicated they have read a Safety Committee newsletter.

Safety Culture

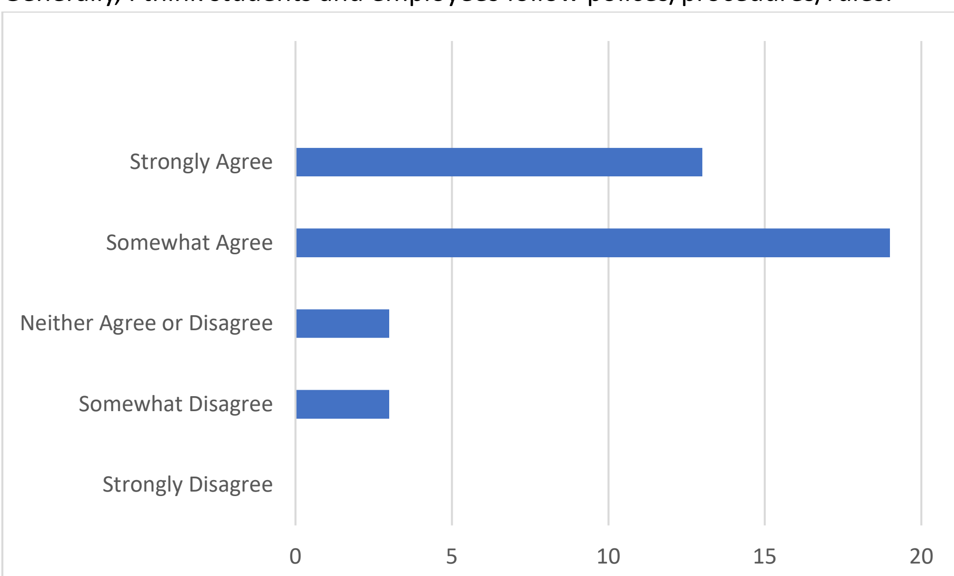
The following questions focused on Safety Culture.

1. I believe the Department of Aviation Science has a non-punitive safety culture.



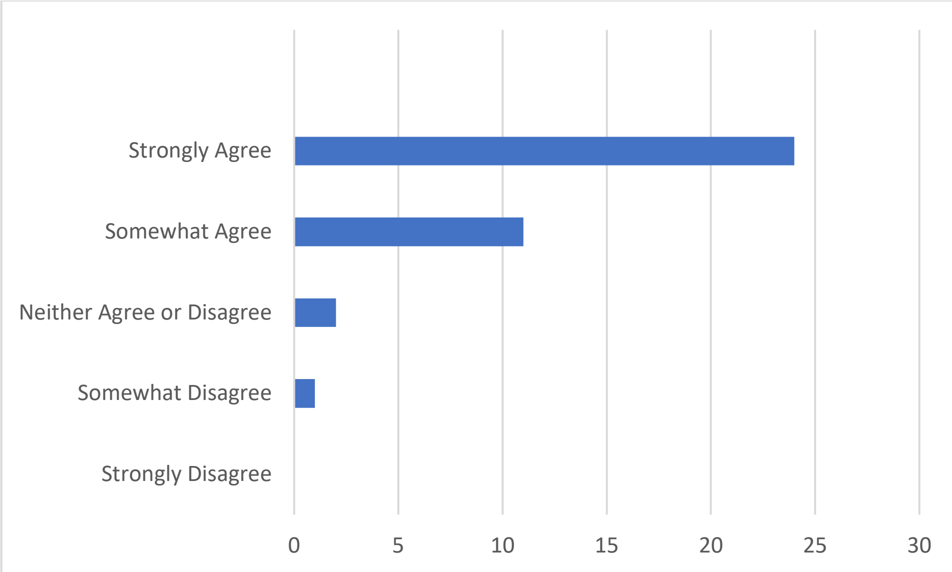
30 of 38 respondents indicate the Department Of Aviation Science has a non- punitive safety culture.

2. Generally, I think students and employees follow polices/procedures/rules.



32 of 38 respondents indicate they believe members of the AVSCI community follow policies, procedures, and rules

3. I believe we have access to the proper resources to be safe in our flight operations.



35 of 38 respondents indicate they have access to the necessary resources to be safe.

Survey Comments

This may sound contradictory to the mission of the Safety Committee, but I would argue that Parks has become "too safe." For example, students have no real experience with soft-field operations due to the ban on these operations. The same could be said with short-fields due to the specific runway requirements listed in the FOM. Similarly, I've noticed that some of my peers are unsure what to do or "afraid" of uncontrolled airports due to lack of ADS-B Out requirements, ATC coverage, and other traffic avoidance measures (besides "see-and-avoid"). As a result, I think it is imperative that Parks not only allows these operations, but encourages them. Safety is always the number one priority, I completely agree. But it is impossible to prepare pilots for real operations when they are constantly being in a safe "bubble" (such as CPS, the south practice area, etc.). Avoiding these situations during training does not create better pilots. Consider videos or a different design layout to readers of the safety newsletter so that it is more visually appealing to your audience. Otherwise, the PEDALS program is very successful in my opinion.

Safety Standdowns are not as effective as they could be because of the lack of a *requirement* to attend them. If we wished to make safety our number one priority, I believe we should make a safety standdown a higher priority than it currently is. Instructors are unfamiliar with several of our FOM policies. Safety (PEDALS) reports are sometimes handled inappropriately. Assumptions are made, rumors spread, and misinformation exists. Members of our community end up being reprimanded (rarely, but not never). It is not perceived to be an *entirely* non-punitive system.

Consider videos or a different design layout to readers of the safety newsletter so that it is more visually appealing to your audience. Otherwise, the PEDALS program is very successful in my opinion.

I feel when a major problem happens like engine problem or something major it feels like we don't hear about to almost a month later, and if you hear something happen like that and try to ask a a (sic) safety committee member they can't talk about it for some reason. When something major happens I feel like we should be know almost right away.

Over my time at SLU I've seen an increase in certain student members of the AvSci community posting photos and videos to their social media accounts while it appears they are operating the aircraft or acting as a crew member. Posting so frequently that I don't say anything to them anymore because I don't believe it will do any good to people in our age group since we are often entranced with our phones. To play devil's advocate, I believe it's okay for us to capture moments in our flight training that we will look back on fondly. The question is whether those photos and videos are being captured during a non-critical phase of flight while the aircraft is under positive control from another crew member (i.e. a Flight Instructor) if they are present. I believe capturing photos and videos while solo in the aircraft distracts us from safety of the flight, to a degree removing us from situational awareness, and preventing the pilot from acting on see and avoid techniques to steer clear of traffic. At United Airlines, the expectation is that once the flight deck door is closed, personal electronic devices are not to be used. If they are used, it is only for business-specific reasons, and the aircraft must remain stationary with the parking brake set to address those reasons. We ought to adhere to the same standards for the sake of our SLU flying community and those sharing the skies and aviation infrastructure surrounding us. Luckily, we already have this outlined in the FOM! If we all acted within the bounds of section 4.3 and specifically 4.3.4, I would have zero feedback for you all this semester. This is not a call to remove iPads/EFBs from our flight decks. I believe ForeFlight and similar flight-specific apps are helpful. My grievance concerns the personal use of electronic devices.

Safety Standdown Report

The Department of Aviation Science created a safety goal of hosting a Safety Standdown each semester; to include at least one external safety expert.

Fall 2022 Safety Standdown

The Fall 2022 Safety Standdown took place on Thursday, September 15th at 5:00 PM in the Carlo Auditorium of Tegeler Hall. Attendance for the event was excellent (140+ attendees) owing to the support of faculty and staff who awarded extra credit (and encouraged attendance). Once again, the Department of Aviation Science and the Safety Committee sponsored the event. Food and drinks were generously provided by GoJet Airlines.

Speakers for the Fall 2022 Safety Standdown included:

Greg Pochapsky (GoJet's Chief Accident Investigator) who discussed how the investigation of aviation accidents has yielded improvements and safety. (External Speaker)

Chris Fuller (CAS Flight Instructor) who discussed how to develop and maintain a safety culture mindset.

The last event for the fall 2022 Safety Standdown was a question-and-answer panel with the CAS management team including:

- Chief Flight Instructor: Bill Baumheuter
- Assist. Chief Flight Instructor: Ryan Boyer
- Director of Maintenance: Eric Heightman
- Dispatch Coordinator: Michelle Scheipeter.

Spring 2023 Safety Standdown

The spring 2023 Safety Standdown took place on Thursday, March 30th at 6:00 PM in the Carlo Auditorium of Tegeler Hall. Like the fall Safety Standdown, attendance was excellent (130+ attendees). The Safety Standdown was sponsored by the Department of Aviation Science and the Safety Committee. Food and drinks were again generously provided by GoJet Airlines.

Speakers for the spring 2023 Safety Standdown included:

Captain James Bono, United Airlines Chief Pilot (Chicago and Cleveland) and Captain Joseph Scaminaci Assistant Chief Pilot (Chicago and Cleveland) discussed the importance of safety culture in commercial aviation operations. (external speakers)

John Teipen (Aviation Professional) who spoke on the E-Z Wings program. (external speaker)

CAS Management Panel who spoke on safety at the Center for Aviation Science - Assistant Chief Flight Instructor Ryan Boyer and Dispatch Coordinator Michelle Scheipeter

SAINT LOUIS UNIVERSITY
EST. 1818

SCHOOL OF SCIENCE AND ENGINEERING

Oliver L. Parks Department of Aviation Science

4300 Vector Dr.
Cahokia, IL 62206

P 314-977-9569

www.slu.edu

William Baumheuter
Chief Instructor

Stephen G. Magoc
Saint Louis University
Department Chair of Aviation Science
McDonnell Douglas Hall
3450 Lindell Blvd.
St. Louis, MO 63103

May 26, 2023

For the period of June 2022 until today, there were no accidents or violations of any Federal Aviation Regulations.
We did experience a few significant operational incidents.

DA20 Stuck Throttle - 2 incidents
N<u>arrative from the first incident</u>
"Our investigation revealed the throttle control arm was slipping on the shaft that opens and closes the butterfly valve. The arm was installed backwards, and this prevented the serrations on the throttle shaft from engaging the serrations on the throttle arm. Thankfully, the throttle butterfly valve remained wide open.

The corrective action was to remove and re-install the same throttle arm, this time in the correct orientation. After reassembly, the throttle function was normal. Immediately, the remaining 8 DA-20 aircraft were inspected to see if the same issue existed. All 8 throttle arms were found to be correctly installed. The maintenance personnel are now fully aware of the correct orientation, and it is unlikely this will happen again."

S<u>econd throttle incident</u>
An instructor and student experienced a non-responsive throttle. The aircraft was at a flight power setting. Thankfully the crew was able to return to CPS and land safely. The investigation revealed the throttle arm serrations were stripped. We determined this to be due to excessive cushion at the wide-open end of the throttle arm travel. The cushion is set during installation of the engine or replacement of the throttle control cable. Although the service manual doesn't specify a maximum limit to the cushion, Maintenance personnel determined this

amount of cushion allows for an undue amount of stress to be placed on the serrated interface with the throttle shaft. After numerous movements to the wide-open position during takeoffs and in-flight maneuvers that require wide open throttle, the repeated stresses made the interface fail.

The corrective action was to immediately inspect the remainder of the DA20 aircraft to ensure the amount of cushion at full throttle was equal to the amount of cushion at idle, this effectively reduced the ability of a pilot to stress the interface at either end of throttle travel.
It is clear this throttle shaft interface design is weak compared to other models of engines. Our maintenance personnel are now fully aware of the weaknesses of the design and will take extra care during installation or maintenance of the throttle control.

September Bird Strike
From the Safety Report: "A DA-20 experienced a bird strike at 5,500 ft MSL while returning to CPS. The strike blew the side window into the baggage compartment. The crew maintained control of the aircraft and returned to CPS without incident and determined that the situation did not warrant an emergency declaration. A bird strike report was filed with the FAA."

Seminole oil cooler incident
The left oil cooler on a Piper PA44-180 Seminole cracked during a dual training flight on February 24, 2023. This crack allowed a significant quantity of oil to leak overboard. The crew was able to perform a safe landing after an inflight shutdown of the engine and feathering of the propeller.
An investigation revealed the cooler was relatively new and had developed a crack due to poor manufacture. It was replaced with another new cooler and a report was made to the FAA.

Completion of SLU fleet ADSB-IN upgrades
During the Christmas 2022 break, we were able to complete the installation of new transponders in the DA20 aircraft. This upgrade allows for display of traffic and weather data on the IFD440 electronic moving map in these aircraft, along with reliable wireless connectivity to Electronic Flight Bag (EFB) devices used by students and instructors. All SLU training aircraft now have these capabilities. Situational awareness for personnel operating our aircraft, especially in the busy south practice area airspace, has increased. During the transponder upgrade we were also able to make optional upgrades to the audio systems in the DA20's that allow for aural terrain warnings and various altitude callouts from the IFD440's to be heard by the pilots. Safety at SLU has taken a big step forward.

Replacement of iPads (EFB's) issued to staff instructors

The iPad Mini's we issue to our staff instructors are primarily used as EFB's for use with our ADSB-IN equipped fleet. The older units are slower than these newer models and as the manufacturer issues operating system upgrades and the EFB application keeps getting enhanced, the result is a device that runs slowly. Additionally, the battery life degrades with use. The cost for replacement of the older model iPad Mini's has been determined to be ~$18,045 and we are waiting on funding to complete the purchase of these 22 new units.

Digitally signed by William Baumheuter Date: 2023.05.30 15:43:53 -05'00' during the routine FAA Surveillance of the Certified repair Station during this time frame.

FAA surveillance dates.

09/14/22

The following are the incidents that have occurred that required FAA investigation.

N325PC Throttle unresponsive. 09/12/22 Throttle arm backwards

N621PC bird strike 09/21/22

N621PC Throttle unresponsive. 01/25/23 throttle arm lousy design.

N552PC Cracked oil cooler. 03/22/23 Oil Cooler with less than 100hr time in service cracked.

Items of concern

1/3 of our fleet has or had a cracked canopy causing extended downtime.

Other FAA related activities.

8/22 we were able to get Field Approval from the FAA to install challenger oil filters if needed due to supply chain issues.

Flight line Maintenance Safety Seminars

As much as we would like to have after-hours hands-on Safety Seminars at the airport for students, the logistics of getting students to the airport have been problematic.

We will continue to pursue this in hopes a solution can be found.

Eric Heightman

Maintenance Manager

CRS NI1R349K

Report date 05/30/23 Report time frame 05/31/22-05/30/23

Avionics servicing, repairs, inspections and upgrades performed at the CRS.

All the DA20-CI Garmin GTX 330ES transponders were replaced with the Garmin GTX345, upgrade was completed in Dec 22.

	91.411, 91413 Due	ELT Batt due
N324PC	12/24	7/25

N325PC 12/24 N327PC 12/24 N329PC 12/24 N423PC 12/24 N426PC 12/24 N620PC 12/24 N621PC 11/24 N628PC 11/24 N475PC 4/25

N476PC 4/25

N477PC 4/25

N478PC 4/25

N552PC 2/25

N553PC 2/25

Heightman

nager

CRS NI1R349K

Dispatch Orientation Sessions

In-service meetings for Back to School were conducted on August 22nd and 23rd at the Center for Aviation Science. During this meeting, dispatch discussed with the instructors the orientation items to review with students during on-boarding for the new semester. At that time, the following items were reviewed:

- Arrival check-in procedures
- Proper completion of dispatch tickets, especially during cross-country maneuvers
- Delayed return procedures
- Ramp safety (including no phones)
- Maintenance issue reporting
- Safety issue reporting
- FIF (Flight Information File) – dissemination of non-critical information thru the Talon system

Safety Stand-Down

Dispatch personnel participated in two (2) safety stand-down meetings with students, held on September 15, 2022, and March 30, 2023. During both meetings, open panel discussions were held regarding the dispatch role as it pertains to safety. An open forum discussion allowed students to ask questions and delve into the behind-the-scenes activities within the dispatch department.

Certifications

Campus Security Authority – course completed January 2023
Ask. Listen. Refer – suicide prevention training program completed November 9, 2022
Mental Health First Aid USA – certification completed November 1, 2021 (3-year certification)
TSA Recurrent Security Awareness Training – completed annually per FAA requirements

Completed by:
Michelle Scheipeter – Dispatch Coordinator
May 30, 2023

Safety Inspection of Center for Aviation Science

Emergency Response Manual

Building Emergency Action Plan (BEAP)

Safety Inspection

A safety inspection of the Center for Aviation Science was conducted by the Saint Louis University Department of Public Safety on July 22, 2022. This included a surprise fire drill to ensure all procedures were followed correctly as outlined in the Emergency Response Manual. No deficiencies were found.

Emergency Response Manual

The Emergency Response Manual was updated and distributed. An updated copy, including the Public Safety Dispatch Reference Guide was forwarded to Michael Parkinson in the Department of Public Safety (DPS) on 9/7/22. This copy remains in the DPS office for reference in case of an incident or accident at the airport or with an off-site aircraft.

Building Emergency Action Plan (BEAP)

The Building Emergency Action Plan is updated annually in cooperation with DPS. Current revisions are in process, and due to Anna Rice, Emergency Preparedness Coordinator, by August 1, 2023.

Completed by:

Michelle Scheipeter – Dispatch Coordinator

May 30, 2023

Flight Science – Data collected in support of Relations with Industry and SLO 2

The following internships were conducted by Aviation Management students during the assessment period.

Name of Company	Academic Term	# of Students
GoJet Airlines	Summer 2022	2
St. Louis Lambert International Airport	Summer 2022	1
Garmin/AeroNavData	Fall 2022	1
St. Louis Lambert International Airport	Summer 2022	1
National Geospatial Intelligence Agency	Summer 2022	1
United Airlines	Summer 2022	1
United States Air Force	Spring 2023	1
Garmin/AeroNavData	Spring 2023	1
GoJet Airlines	Spring 2023	1