Program-Level Assessment Plan

Program: MS in GIScience	Degree Level (e.g., UG or GR certificate, UG major, master's program, doctoral program): Master's
Department: EAS	College/School: Arts and Sciences
Date (Month/Year): 08/2021	Primary Assessment Contact: Dr. Zachary Phillips

Note: Each cell in the table below will expand as needed to accommodate your responses.

#	Student Learning Outcomes What do the program faculty expect all students to know or be able to do as a result of completing this program? Note: These should be measurable and manageable in number (typically 4-6 are sufficient).	Curriculum Mapping In which courses will faculty intentionally work to foster some level of student development toward achievement of the outcome? Please clarify the level at which student development is expected in each course (e.g., introduced, developed, reinforced, achieved, etc.).	Assessment Methods	
			Artifacts of Student Learning (What) 1. What artifacts of student learning will be used to determine if students have achieved this outcome? 2. In which courses will these artifacts be collected?	Evaluation Process (How) 1. What process will be used to evaluate the artifacts, and by whom? 2. What tools(s) (e.g., a rubric) will be used in the process? Note: Please include any rubrics as part of the submitted plan documents.
1	Graduates will be able to discuss how GIS and remote sensing is used to investigate problems related to sustainability and environmental science.	GIS 5010 – Introduction to GIS (Introduced) GIS 5040 – Introduction to Remote Sensing (introduced) GIS 5050 – Digital Image Processing (Developed) GIS 5090 – Intro to Programming for GIS and Remote Sensing (Developed) BIOL 5190 – Geographic Information Systems in Biology (Developed) GIS 5091 – Advanced Programming for GIS and Remote Sensing (Reinforced) GIS 5092 - Machine Learning for GIS and Remote Sensing (Achieved)	The artifacts used to assess learning outcomes are written and presentation portions of final projects in GIS 5010, GIS 5040, GIS 5050, and GIS 5092. If written sections of student projects are of passing quality, the student shows adequate learning progress in the Student Learning Outcome listed.	Student learning is evaluated by collecting percent of failing grades for final projects. Evaluations are conducted by Drs. Vasit Sagan and Zach Phillips. Students pass the assessment if they pass their final project. Students are further evaluated for their discussion skills using written/presentation portions of the final projects if their overall final project score is failing. If failing grades are over 7% of total, changes to curriculum are made.
2	Graduates will be able to demonstrate the use of relational database	GIS 5010 – Introduction to GIS (Introduced) GIS 5030 – Geospatial Data Management	The artifacts used to assess learning outcomes are the Data Management Lab (Chapter 4) in GIS 5010 and the	Student learning is evaluated by assessing grades for the specified artifacts. If failing grades are over 7%, adjustments to the

	management systems as applied to geospatial data.	(Introduced, Developed)	Relational Database Labs (Labs 5 and 6) in Geospatial Data Management. Successful completion of these labs show adequate development of Relational Database Management Systems skills.	curriculum is made through consultation with local remote sensing professionals. Evaluations are conducted by Drs. Vasit Sagan and Zach Phillips.
3	Graduates will be able to demonstrate effective cartographic/geovisualization skills employing principles of map design and graphic representation techniques.	GIS 5010 – Introduction to GIS (Introduced) GIS 5080 – Digital Cartography and Geovisualization (Developed)	The artifacts used to assess learning outcomes are the Cartography and map-making labs and assignments (Chapter2 and 3) in GIS 5010, and the Final Projects for GIS 5080.	Student learning is evaluated by assessing pass/fail percentages for the specified artifacts in GIS 5010, and the Final Projects for GIS 5080. If failing grades are over 7% of the total, adjustment to the curriculum is made through consultation with local GIS professionals. Evaluations are conducted by Drs. Vasit Sagan and Zach Phillips.
4	Graduates will be able to describe and interpret remote sensing spectra and imagery.	GIS 5040 – Introduction to Remote Sensing (introduced) GIS 5050 – Digital Image Processing (Developed) ECE 5153 – Image Processing (Developed, Reinforced) GIS 5092 - Machine Learning for GIS and Remote Sensing (Achieved)	The artifacts used to assess learning outcomes are Final Projects in GIS 5040, GIS 5050, ECE 5153, and GIS 5092.	Student learning is evaluated by assessing pass/fail percentages for the specified artifacts in GIS 5040, GIS 5050, ECE 5153, and GIS 5092. If failing grades are over 7% of the total, adjustment to the curriculum is made through consultation with local remote sensing professionals. Evaluations are conducted by Drs. Vasit Sagan and Zach Phillips.
5	Graduates will be able to perform supervised, unsupervised and object based classification techniques using remote sensing data.	GIS 5040 – Intro to Remote Sensing (introduced) GIS 5050 – Digital Image Processing (Developed) ECE 5153 – Image Processing (Developed, Reinforced) GIS 5092 - Machine Learning for GIS and Remote Sensing (Achieved)	The artifacts used to assess learning outcomes are Remote Sensing Image Classification Labs in Remote Sensing and Image Processing classes (Lab 10 in GIS 5040, Labs 8 and 9 in GIS 5050)	Student learning is evaluated by assessing pass/fail percentages for the specified artifacts in GIS 5040 and 5050. If failing grades are over 7% of the total, adjustment to the curriculum is made through consultation with local remote sensing professionals. Evaluations are conducted by Drs. Vasit Sagan and Zach Phillips.

Use of Assessment Data

1. How and when will analyzed data be used by program faculty to make changes in pedagogy, curriculum design, and/or assessment practices?
    - Every other academic year, program faculty assess student learning. Courses that need curriculum adjustments are noted by assessments. For those

classes needing adjustment, regional experts in GIS and Remote Sensing are consulted as to what curriculum aspects can be improved upon, what other learning resources may be helpful, or what classes need rethought.

2. How and when will the program faculty evaluate the impact of assessment-informed changes made in previous years?
    - Assessments are performed every other year by monitoring the total percent of failing grades as noted in the Evaluation Process section above. Comparison across years points to progress (decrease in % failing) or decline (increase in % failing).

Additional Questions

1. On what schedule/cycle will program faculty assess each of the program's student learning outcomes? (Please note: It is not recommended to try to assess every outcome every year.)
    - Assessments are conducted every other academic year, during the summer break.

2. Describe how, and the extent to which, program faculty contributed to the development of this plan.

    - This assessment plan was developed by Vasit Sagan and documented for this report by Zachary Phillips

IMPORTANT: Please remember to submit any rubrics or other assessment tools along with this plan.