GAAC Degree Program Proposal

Requesting College(s)/School(s)/Center(s): CAS

Requesting Department(s): EAS

Academic Level:	☐☒Post-Baccalaureate (includes all graduate and professional programs)
Associated Degree:	☐☐Master of Arts (M.A.) ☐ ☐Master of Science (M.S.) ☐☒Doctor of Philosophy (Ph.D.) ☐☐Other – *please specify*: Click or tap here to enter text.
Program Title/Area of Study:	***Examples:*** *English, Biology, Public Health* Geoinformatics and Geospatial Analytics
Program Start Term	☐☒Fall 2022 ☐☐Spring Click or tap here to enter year. ☐☐Summer Click or tap here to enter year. ☐☐Other Click or tap here to enter term.

SLU Approval Authority	Signature	Date
Department Chair	Charles E Graves	9/11/2021
College/School/Center Curriculum Committee Chair		
College/School/Center Dean		
Chair, GAAC		
Council of Academic Deans and Directors		
Provost		
Chair, Academic Affairs Committee of the University Board of Trustees		
Chair, University Board of Trustees		

☐ HLC Approval Date *(if applicable)* Click or tap to enter a date.

4.0 STUDENT LEARNING OUTCOMES AND ASSESSMENT PLAN

Note: You are strongly encouraged to work with the University Assessment Coordinator as you develop this portion of the proposal. The University Assessment Coordinator can help you establish appropriate student learning outcomes, methods for measuring student progress and using the data to inform program improvement, and assist with all facets of academic assessment.

4.1 Student Learning Outcomes Assessment Plan

Complete the table below to provide an overview of your plan to assess student progress toward achievement of desired program-level learning outcomes. Note that results of evaluations of student performance against each learning outcome identified below will be reviewed as part of all college/school/center-level and University-level program reviews.

Program-Level Student Learning Outcomes *What are the most important (no more than five) specific learning outcomes you intend for all program completers to be able to achieve and demonstrate upon completion of the program?*	**Evaluation Method** *How will students document/demonstrate their performance toward achievement of the learning outcomes? How will you measure student performance toward achievement of the learning outcomes?* *Describe any use of direct measures: capstone experiences/courses, standardized exams, comprehensive exams, dissertations, licensure exams, locally developed exams, portfolio reviews, course-embedded assessments, etc.* *Describe any use of indirect measures: student, alumni or employer surveys (including satisfaction surveys); exit interviews/focus groups with grads; retention/transfer studies; graduation rates; job placement/grad school admission rates; etc.*	**Use of Assessment Data** *How and when will student performance data be analyzed and then used to "close the assessment loop" and inform **program improvement**? How will you document that?*
EXAMPLE: *1. Demonstrate a thorough understanding of ethical problems being addressed in an individual case or class of cases.*	***EXAMPLE:*** ***Direct Measures:*** *1. The following courses in the program specifically require formal case analyses designed to elicit direct evidence of student development toward this outcome: BUS 500, BUS 522, BUS 600* *2. Embedded in the mid-term and final exams in certain required courses (BUS 550, MGMT 503, BUS 650) will be questions designed specifically to provide data enabling faculty and program administrators to evaluate student progress toward this outcome.* ***Indirect Measures*** *1. End-of-course student surveys will solicit self-evaluations of their development in the context of this outcome.* *2. Alumni surveys (administered one and five post-graduation) will solicit from graduates self-evaluations of their continued*	***EXAMPLE:*** *Assessment results will be analyzed annually against a standard rubric by the program director and a small team of faculty; recommendations for curriculum, pedagogy and/or assessment revisions will be made to the department faculty on an annual cycle that allows for appropriate implementation.* *Reviews of the impact of any such program changes will also be conducted annually, and the records of those reviews will be maintained by our department assessment coordinator.*

	development in the context of this outcome, and will particularly focus on how the program has impacted professional competency.	
1. Students would be able to analyze complex datasets, apply spatial statistics and concepts to big data, and visualize and describe patterns.	**Direct Measures:** **1.** Introductory GIS, programming and remote sensing classes (GIS 5010, 5030, GIS 5040, GIS 5090) will require students accomplish case studies, projects, and spatial analysis that elicit direct evidence of student development toward this outcome. Artifacts from these classes will be collected to assess this outcome. **2. Indirect Measures:** Exist surveys and student self-assessments collected through annual evaluation in year 1 and year 3 will provide indirect measure of this outcome	Assessments of curriculum and student performance will occur annually by instructors. Assessments will focus on student development and rely on capstone projects, assignments, and group projects to measure student performance as spatial thinkers, analysts, and cartographers. Program level assessment will be conducted in a 3-year cycle under supervision of the Assessment Committee. Any recommendations for curriculum changes will be made to the faculty annually and revisions are documented and maintained by the program coordinator.
2. Utilize state-of-the-art techniques (imaging, AI/ML, photogrammetry, and geomatics) in their domain research to solve cutting-edge research questions.	**Direct Measures:** 1. The following courses in remote sensing, photogrammetry, digital image processing, and satellite geodesy will require students to complete class projects and case studies that are used to assess student's progress toward this outcome. GIS 5050, GIS 5061, GIS 5091, GIS 5092, GIS 5120, GIS 5130, GIS 5140 **2.** Comprehensive and oral qualifying exams will be used to assess students' mastery of this outcome. Assessment of the outcome will be conducted by using rubric developed by the program assessment committee. **3.** Peer-reviewed journal publications and conference presentations will be used as direct measures of this outcome. **Indirect Measures:**	Assessments of curriculum and student performance will occur annually by instructors. Assessments will focus on student development and rely on capstone projects, assignments, and group projects to measure student performance as spatial thinkers, analysts, and cartographers. Program level assessment will be conducted in a 3-year cycle under supervision of the Assessment Committee. Any recommendations for curriculum changes will be made to the faculty annually and revisions are documented and maintained by the program coordinator. Review of program change impacts will also be conducted every 5 years, pre-/post-change metrics will be compared, and new changes may be implemented during review.

	1. Exist surveys and student self-assessments collected through annual evaluation in year 1 and year 3 will provide indirect measure of this outcome. 2. We will also use participation in Ideathon/ Mapathon events as an indirect measurement of this outcome.	
3. Conduct independent, high-quality research in geoinformatics and geospatial analytics	**Direct Measures:** *1.* A survey of students' dissertation defense committee will be used to evaluate this outcome. *2.* Conference presentations and peer-reviewed journal papers will be reviewed to assess student's progress toward this outcome. **Indirect Measures:** 3. Exist surveys and student self-assessments collected through annual evaluation in year 1 and year 3 will provide an indirect measure of this outcome.	Assessments of curriculum and student performance will occur annually by instructors. Assessments will focus on student development and rely on capstone projects, assignments, and group projects to measure student performance as spatial thinkers, analysts, and cartographers. Program-level assessment will be conducted in a 3-year cycle under the supervision of the Assessment Committee. Any recommendations for curriculum changes will be made to the faculty annually and revisions are documented and maintained by the program coordinator. Review of program change impacts will also be conducted every 5 years, pre-/post-change metrics will be compared, and new changes may be implemented during review.
4. Communicate geoinformatics and geospatial science research results effectively	**Direct Measures:** **1.** Peer-reviewed publications will be evaluated based on the journal impact factor, rejection rate. **2.** Conference papers and presentations 3. Students oral presentation skills are similarly evaluated during colloquium presentations and dissertation defense **Indirect Measures:** 1. Exist surveys and student self-assessments collected through annual evaluation in year 1 and year 3 will provide an indirect measure of this outcome.	Assessments of curriculum and student performance will occur annually by instructors. Assessments will focus on student development and rely on capstone projects, assignments, and group projects to measure student performance as spatial thinkers, analysts, and cartographers. Program-level assessment will be conducted in a 3-year cycle under the supervision of the Assessment Committee. Any recommendations for curriculum changes will be made to the faculty annually and revisions are documented and maintained by the program coordinator. Review of program change impacts will also be conducted every 5 years, pre-/post-change metrics will be compared, and new changes may be implemented during the

		review.
5. Demonstrating cross-functional competencies including critical thinking, reporting, synthesis, and collaboration	**Direct Measures:** 1. In GIS 5120 and 5130, final papers will be evaluated using a rubric designed by the program assessment committee. 2. Class projects, presentations, and peer-reviewed publications **Indirect Measures:** 1. Exist surveys and student self-assessments collected through annual evaluation in year 1 and year 3 will provide an indirect measure of this outcome.	Assessments of curriculum and student performance will occur annually by instructors. Assessments will focus on student development and rely on capstone projects, assignments, and group projects to measure student performance as spatial thinkers, analysts, and cartographers. Program-level assessment will be conducted in a 3-year cycle under the supervision of the Assessment Committee. Any recommendations for curriculum changes will be made to the faculty annually and revisions are documented and maintained by the program coordinator. Review of program change impacts will also be conducted every 5 years, pre-/post-change metrics will be compared, and new changes may be implemented during the review.

4.2 Curriculum Mapping

Courses should contribute to student achievement of the program learning outcomes detailed above. Sequencing should be intentional and complementary, allowing for the development of curricular content at multiple levels and the application and demonstration of student understanding and skills at multiple levels. Accordingly, complete the two curriculum maps below, indicating the course(s) in which each learning outcome is intentionally addressed and at particular levels of intellectual complexity and rigor, using the level indicators* provided below. ***Depending on the nature of the proposed program, the levels may seem more or less appropriate. Without veering from the spirit of the exercise, you may adapt the levels as deemed appropriate.***

Level I	Level II	Level III
▪ *Knowledge & Comprehension:* Recall data or information; understand the meaning, translation, interpolations, and interpretation of instructions and problems; state a problem in one's own words.	▪ *Application:* Use a concept in new situations; unprompted use of an abstraction. Application of knowledge in novel situations. ▪ *Analysis:* Separates material or concepts into component parts so organizational structure may be understood. Distinguishes facts from inferences.	▪ *Synthesis:* Builds a structure or pattern from diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning or structure. ▪ *Evaluation:* Make judgments about the value of ideas or materials.

Note: *When you first complete the curriculum maps, you may see that certain outcomes are not addressed in any developmentally-appropriate sequence, or that a particular outcome might not be addressed substantially enough; you might even see that you have included a course(s) in your curriculum that doesn't*

substantially contribute to the development of any *outcome. You should use the map to alter your program design, course syllabi and course sequencing to best facilitate and support student achievement of the outcomes. The result of that exercise should be a final curriculum map presented below when you submit your proposal to UAAC.*

Courses Offered by Home Department of Proposed Major or Minor:

Major or Minor Student Learning Outcomes	GIS 5030	GIS 5040	GIS 5050	GIS 5061	GIS 5080	GIS 5090	GIS 5091	GIS 5092	GIS 5100	GIS 5120	GIS 5130	GIS 5140	GIS 6990
Outcome #1	*1, 2*	*1, 2*	*1, 2*		*1, 2*	*1, 2*	*1, 2*	*1, 2*	*1, 2*		2,3		*3*
Outcome # 2			*1*	*1, 2*			*1*	*2,3*	*2,3*			*2,3*	*2,3*
Outcome #3						*1,2*		*2,3*		*2,3*	*2,3*		*2,3*
Outcome #4							*1, 2*	*1, 2*		*1,2*	*2,3*		*2,3*
Outcome #5			*1,2*		*1*		*1*	*2, 3*	*1, 2*	*2, 3*	*2, 3*		*2, 3*

Program Courses (elective) Offered by Other Departments:

Major or Minor Student Learning Outcomes	CSCI 5750	CSCI 5830	CSCI 5760	SOC 5670	
Example: Outcome #1	***1***		***2, 3***		
Outcome #1				*1,2*	
Outcome #2	*1,2*	*1,2,3*	*2,3*		
Outcome #5				*2,3*	

* Adapted from Bloom's Taxonomy (1965)