Assurance of Student Learning 2018-2019	
Ogden College of Science and Engineering	Geography and Geology
Undergraduate Certificate in Geographic Information Systems (#174)	

Use this page to list learning outcomes, measurements, and summarize results for your program. Detailed information must be completed in the subsequent pages.			
Student Learning Outcome 1: Collecting primary data and gathering reliable secondary data for GIS use.			
Instrument 1	Direct: Analysis of Capstone Project.		
Instrument 2	Direct: Certified GIS Professional		
Instrument 3	Indirect: Employer Survey		
Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 1.		**Met**	**Not Met**
Student Learning Outcome 2: Analyze and manipulate data for the appropriate spatial unit of analysis.			
Instrument 1	Direct: Analysis of Capstone Project		
Instrument 2	Direct: Certified GIS Professional		
Instrument 3	Indirect: Employer Survey		
Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 2.		**Met**	**Not Met**
Student Learning Outcome 3: Support and communicate a rationale and argument through the effective use of geographic information and knowledge.			
Instrument 1	Direct: Analysis of Capstone Project		
Instrument 2	Direct: Certified GIS Professional		
Instrument 3	Indirect: Employer Survey		
Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 3.		**Met**	**Not Met**

Program Summary (Briefly summarize the action and follow up items from your detailed responses on subsequent pages.)

GIS stands for Geographic Information Systems, which is a computerized information system for (1) collecting and editing geospatial data, (2) storing, retrieving, and managing geospatial data, (3) manipulating and analyzing geospatial data, (4) and displaying geospatial data in the form of maps, graphs, charts, and reports. Geospatial data are data tied to geographic locations. Geographic Information Science (GIScience) is the scientific discipline studying the theory, concepts, and effective use of GIS and geospatial technologies (e.g. maps, GPS, satellite, radar, drone, photogrammetry, surveying). GIScience prepares students to understand geospatial data structures and methods for capturing, modeling, processing, analyzing, and displaying geographic information and spatial patterns. The undergraduate GIS Certificate at WKU consists of four courses: Fundamentals of GIS (GISC 316), GIS (GISC 317), GIS Analysis & Modeling (GISC 417), and GIS Programming (GISC 419). Any undergraduate student who has taken the above four courses with grades "C" or above is awarded with the Certificate. The program combines face-to-face and web courses; and will soon offer an On Demand online format, beginning in the summer of 2020. From traditional map makers to current day solution providers, this program is designed to educate and train students with a variety of GIS knowledge and skills, so they can use GIS effectively in their respective fields. This certificate has been earned by students in many disciplines at WKU.

Student Learning Outcome 1			
Student Learning Outcome	Collecting primary data and gathering reliable secondary data for GIS use.		
Measurement Instrument 1	Direct measures of student learning: The students in the capstone course, GISC 417 GIS *Analysis & Modeling* were given a final group project for utilizing skills and knowledge in data collections, editing, and managing from the core courses, GISC 316 and GISC 317, as well as skills and knowledge from GISC 417. All three courses are required courses in the GIS Certificate program.		
Criteria for Student Success	• Students must demonstrate the ability in project design, planning, and implementation. • Students must collect required primary geospatial data using professional GPS devices. • Students must search, identify, and obtain necessary secondary data from reliable data sources. • Students must utilize their skills to compile, merge, edit, and manage both primary data and secondary data. • Students must demonstrate their capability as independent investigator as well as effective team workers in a group.		
Program Success Target for this Measurement	70%	**Percent of Program Achieving Target**	100%
Methods	All students' group papers, project data, and maps from GISC 417 (Fall 2018) were evaluated. There were a total of 14 students and they were divided into four groups. The findings in form of posters were presented by each group in front of the entire class.		
Measurement Instrument 2	Direct measures of student learning: Students must complete all four courses with at least a final grade of 70% ("C") or higher to earn WKU's Undergraduate Certificate in GIS. The Professional Certification in GIS (or GISP) by the GIS Certification Institute (www.gisci.org) requires knowledge in GIS Conceptual Foundations, GIS Data Acquisition, Cartography & Visualization and Geospatial Data Fundamentals. Applicants must earn at least 30 points in the Education component for this certification process. The Education component is split into three categories: EDU-1 (Highest Degree or Certificate earned), EDU-2 (GIS course work), and EDU-3 (GIS Conference attendance). Both GISC 316 *Fundamentals of GIS* and GISC 317 *GIS* are four credit hour courses required for WKU's GIS certificate and covers the content areas in GIS Conceptual Foundations, GIS Data Acquisition, Cartography & Visualization, and Geospatial Data Fundamentals. These two courses contribute to a total of nine (9) points toward EDU-2. An applicant who has earned no formal degree, but who has earned a GIS Certificate, may claim 5 additional points in EDU-1. If holding a degree, credential points may be claimed for the degree in EDU-1 (Bachelor's degree is worth 20 points) while course work in the certificate may only be used for course points in EDU-2.		
Criteria for Student Success	Students completing GISC 316 and GISC 317 with a final grade of "C" (70% or higher).		
Program Success Target for this Measurement	70%	**Percent of Program Achieving Target**	82.6% (N = 121)
Methods	Completion and evaluation of course's projects, assignments, and exams in GISC 316 and 317.		
Measurement Instrument 3	Indirect measures of student learning: Employers have expressed being impressed and satisfied with students graduating from WKU's GIS Certificate program. Thanks to their hard work and preparedness, many of our graduates moved up their ranks quickly and some are holding manager-level positions within a few years of employment. This is a big advantage and employers often actively seek our students as they know our students are well-prepared and they put a high regard on our GIS education. Employers in the Commonwealth and the region including Tennessee often refer to WKU as the flagship for GIScience education Many WKU students reported that their GIS certificates and classes have made the critical difference in securing their first jobs. In many cases, employers seek students currently in our GIS		

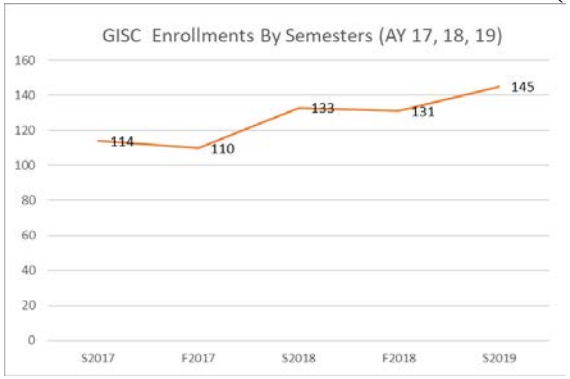
	Certificate program for internships. In addition, the GIS Certificate program is not limited to the majors in the Department of Geography and Geology. As a result, students from other major programs can be challenging to track and we don't have complete data about their employment status.			
Criteria for Student Success	NA			
Program Success Target for this Measurement	NA	**Percent of Program Achieving Target**	NA	
Methods	NA			
Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 1.			**Met**	**Not Met**

Actions (Describe the decision-making process and actions planned for program improvement. The actions should include a timeline.)

- We advised less-prepared students take GISC 216 – Geospatial Technologies in Global Communities before taking 316. GISC 216 was updated and the 2nd edition of the required textbook is required now. The course has been a successful platform to recruit students and preparing them with basic skills and knowledge of geospatial information processing.
- We are changing our main GIS teaching software from ArcGIS Desktop to ArcGIS Pro in GISC 316 and 317 to meet the shift of main GIS software in the industry. Content in both courses have been updated accordingly and the required textbooks were upgraded to the latest edition.
- Decision was made to apply to the same software change to GISC 417 and 419 for Academic Year 2020-2021.
- Prerequisites of GISC 316 were removed so WKU students can take it as early as possible.
- We added four computers to one of the GIS teaching labs and now EST 422 can accommodate the increased student enrollments in all GIS courses.

Follow-Up (Provide your timeline for follow-up. If follow-up has occurred, describe how the actions above have resulted in program improvement.)

- Less-prepared students were able to take GISC 216 first and became more prepared for GISC 316.
- We see increased total student enrollments in GISC courses (see below graph).



- More students enrolled in the GIS Certificate program as shown in the table below.

Enrolled by August 15th	**AY19**	**AY18**	**AY17**
GIS Certificate enrolled	24	16	12

- In both GISC 417 and 419, we were able to maintain 100% of program achieving target even with slightly more enrollments.

Student Learning Outcome 2				
Student Learning Outcome	Analyze and manipulate data for the appropriate spatial unit of analysis.			
Measurement Instrument 1	Direct measures of student learning: The students in the capstone course, GISC 417 GIS *Analysis & Modeling*, were given a final group project for utilizing skills and knowledge in data manipulation and analysis from the core courses, GISC 316 and GISC 317, as well as skills and knowledge from GISC 417. All three courses are required courses in the GIS Certificate program.			
Criteria for Student Success	• Students must utilize their skills to process, manipulate, and analyze both primary data and secondary data in order to generate useful information for project use. • Students must demonstrate their capability as independent investigator as well as effective team workers in a group.			
Program Success Target for this Measurement	70%	**Percent of Program Achieving Target**	100%	
Methods	All students' group papers, project data, and maps from GISC 417 (Fall 2018) were evaluated. There were a total of 14 students and they were divided into four groups. The findings in form of posters were presented by each group in front of the entire class.			
Measurement Instrument 2	Direct measures of student learning: Students must complete all four GIS courses with at least a final grade of 70% ("C") or higher to earn WKU's Undergraduate Certificate in GIS. The Professional Certification in GIS (or GISP) by the GIS Certification Institute (www.gisci.org) requires knowledge in GIS Data Manipulation, GIS Data Acquisition, GIS Analytical Methods, GIS Database Design & Management, and Professional Practice. Applicants must earn at least 30 points in the Education component for this certification process. The Education component is split into three categories: EDU-1 (Highest Degree or Certificate earned), EDU-2 (GIS course work), and EDU-3 (GIS Conference attendance). Both GISC 417 *GIS Analysis and Modeling* and GISC 419 *GIS Programming* are required three credit hour courses for WKU's GIS certificate covering the content in GIS Data Manipulation, GIS Data Acquisition, GIS Analytical Methods, GIS Database Design & Management, and Professional Practice. Both courses together contribute to a total of 6.76 points toward EDU-2. An applicant who has earned no formal degree, but who has earned a GIS Certificate, may claim 10 additional points in EDU-1. If holding a degree, credential points may be claimed for the degree in EDU-1 (Bachelor's degree is worth 20 points) while course work in the certificate may only be used for course points in EDU-2.			
Criteria for Student Success	Students completing the GISC 417 and GISC 419 with a final grade of "C" (70% or higher).			
Program Success Target for this Measurement	70%	**Percent of Program Achieving Target**	100% (N = 36)	
Methods	Completion and evaluation of projects, assignments, and exams in both GISC 417 and GIS 419. Number of students enrolled in GISC 417 for the fall 2018 was 14 and while that in GISC 419 was 22.			
Measurement Instrument 3	Indirect measures of student learning: Employers have expressed being impressed and satisfied with students graduating from WKU's GIS Certificate program. Thanks to their hard work and preparedness, many of our graduates moved up their ranks quickly and some are holding manager-level positions within a few years of employment. This is a big advantage and employers often actively seek our students as they know our students are well-prepared and they put a high regard on our GIS education. Employers in the Commonwealth and the region including Tennessee often refer to WKU as the flagship for GIScience education. Many WKU students reported that their GIS certificates and classes have made the critical difference in securing their first jobs. In many cases, employers seek students currently in our GIS Certificate program for internships. In addition, the GIS Certificate program is not limited to the majors in the Department of Geography and Geology. As a result, students from other major programs can be challenging to track and we don't have complete data about their employment status.			
Criteria for Student Success	NA			

Program Success Target for this Measurement	NA	**Percent of Program Achieving Target**	NA
Methods	NA		
Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 2.		**Met**	**Not Met**

Actions (Describe the decision-making process and actions planned for program improvement. The actions should include a timeline.)

- Decision was made to apply to the same changes to GISC 417 and 419 for Academic Year 2020-2021.
- We added four computers to one GIS teaching lab and now EST 422 can accommodate the increased student enrollments in all GIS courses.

Follow-Up (Provide your timeline for follow-up. If follow-up has occurred, describe how the actions above have resulted in program improvement.)

- We see increased student enrollments in all GIS courses.
- More students enrolled in the GIS Certificate program.
- In both GISC 417 and 419, we were able to maintain 100% of program achieving target with more enrollments.

Student Learning Outcome 3				
Student Learning Outcome	Support and communicate a rationale and argument through the effective use of geographic information and knowledge.			
Measurement Instrument 1	Direct measures of student learning: The students in the capstone course, GISC 417 GIS *Analysis & Modeling*, were given a final group project for utilizing skills and knowledge in data visualization and map making from the core courses, GISC 316 and GISC 317, as well as skills and knowledge from GISC 417. All three courses are required courses in the GIS Certificate program. In addition, students presented their project findings orally.			
Criteria for Student Success	• Students must utilize their skills to visualizing project data (e.g. maps, graphs, other visualization forms) in order to identify patterns, trends, relationships in the data. • Students must demonstrate their capability to effectively communicate their findings in both written and oral forms.			
Program Success Target for this Measurement	70%	**Percent of Program Achieving Target**	100%	
Methods	All students' group papers, project data, and maps from GISC 417 (Fall 2018) were evaluated. There were a total of 14 students and they were divided into four groups. The findings in form of posters were presented by each group in front of the entire class.			
Measurement Instrument 2	Direct measures of student learning: Students must complete all four GIS courses with at least a final grade of 70% ("C") or higher to earn WKU's Undergraduate Certificate in GIS. The two GIS courses (GISC 316 and 317) mentioned in Learning Outcome 1 and GISC 417 mentioned in Student Learning Outcome 2 both measure this outcome. Additionally, the Professional Certification in GIS (or GISP) by the GIS Certification Institute (www.gisci.org) requires knowledge in GIS Database Design & Management, GIS Application Development, and Systems Design & Management. Applicants must earn at least 30 points in the Education component for this certification process. The Education component is split into three categories: EDU-1 (Highest Degree or Certificate earned), EDU-2 (GIS course work), and EDU-3 (GIS Conference attendance). GISC 419 *GIS Programming* is a required three credit hour course for WKU's GIS certificate focusing on the content in GIS Database Design & Management, GIS Application Development, and Systems Design & Management, in addition to GIS Analytical Methods. This course contributes to a total of 3.38 points toward EDU-2. An applicant who has earned no formal degree, but who has earned a GIS Certificate, may claim 5 additional points in EDU-1. If holding a degree, credential points may be claimed for the degree in EDU-1 (Bachelor's degree is worth 20 points) while course work in the certificate may only be used for course points in EDU-2.			
Criteria for Student Success	Students completing the GISC 417 and GISC 419 with a final grade of "C" (70% or higher).			
Program Success Target for this Measurement	70%	**Percent of Program Achieving Target**	100% (N=36)	
Methods	Completion and evaluation of projects, assignments, and exams in both GISC 417 and GIS 419. Number of students enrolled in GISC 417 for the fall 2018 was 14 and while that in GISC 419 was 22.			
Measurement Instrument 3	Indirect measures of student learning: Employers have expressed being impressed and satisfied with students graduating from WKU's GIS Certificate program. Thanks to their hard work and preparedness, many of our graduates moved up their ranks quickly and some are holding manager-level positions within a few years of employment. This is a big advantage and employers often actively seek our students as they know our students are well-prepared and they put a high regard on our GIS education. Employers in the Commonwealth and the region including Tennessee often refer to WKU as the flagship for GIScience education. Many WKU students reported that their GIS certificates and classes have made the critical difference in securing their first jobs. In many cases, employers seek students currently in our GIS Certificate program for internships. In addition, the GIS Certificate program is not limited to the majors in the Department of Geography and Geology. As a result, students from other major programs can be challenging to track and we don't have complete data about their employment status.			
Criteria for Student Success	NA			

Program Success Target for this Measurement	NA	**Percent of Program Achieving Target**	NA
Methods	NA		
Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 3.		**Met**	**Not Met**

Actions (Describe the decision-making process and actions planned for program improvement. The actions should include a timeline.)

- Decision was made to apply to the same changes to GISC 417 and 419 for Academic Year 2020-2021.
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