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| **Assurance of Student Learning Report****2020-2021** |
| Ogden College of Science and Engineering | Department of Earth Environmental and Atmospheric Sciences |
| Environmental, Sustainability, and Geographic Studies #5009 |
| Dr. Leslie North |

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| ***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**: Students can demonstrate a theoretical and applied understanding of basic environmental concepts, sustainability pillars, and geographical principles and convey an understanding of their value and importance to stakeholders and the public. |
| **Instrument 1** | Direct: Capstone Comprehensive Program Exit Exam.  |
| **Based on your results, check whether the program met the goal Student Learning Outcome 1.** | **[x]  Met** | **[ ]  Not Met** |
| **Student Learning Outcome 2:** Students can demonstrate proficiency in the quantitative and qualitative spatial analysis and critical thinking through written and oral communication. |
| **Instrument 1** | Direct: Analysis of applied spatial data synthesis and analysis projects in GISC 317 |
| **Based on your results, check whether the program met the goal Student Learning Outcome 2.** | **[x]  Met** | **[ ]  Not Met** |
| **Student Learning Outcome 3:** Students can explain the complexities of social, cultural, and environmental diversity, and demonstrate an ability to critically assess contemporary challenges and develop problem-solving skills. |
| **Instrument 1** | Direct: Capstone Research Proposal and Presentation in GEOG 300 |
| **Instrument 2** | Indirect: Student success in professional research conferences, graduate school admissions, and employment. |
| **Based on your results, check whether the program met the goal Student Learning Outcome 3.** | **[x]  Met** | **[ ]  Not Met** |
| **Program Summary (Briefly summarize the action and follow up items from your detailed responses on subsequent pages.)**  |
| The goals of all three student learning outcomes were met in AY21 despite challenges presented by the COVID-19 pandemic. Courses were transitioned seamlessly to online and/or hybrid modality, with no compromise in delivered course materials or student learning. As evidence, the ESGS majors performed at a similar level when compared to past cohorts. Regarding SLO 1, 100% of students were able to achieve the target of passing the capstone comprehensive program exit exam with a score of 80% or higher. The skills necessary to learn to successfully pass the exam are gleaned from courses taken by majors throughout their time in the major and are often honed further by completion of an internship or independent research project in their junior/senior year/summer transition. Regarding SLO 2, 80% of the 257 artifacts evaluated demonstrated student proficiency in quantitative and qualitative spatial analysis through written, oral, and computer-based means. GISC 317 is the final GISC course required for all majors, so examining the artifacts of this course provides the best overall reflection of students’ ability to synthesize and analyze data quantitively and spatially. All data analysis and projects completed in the course are from real-world environmental, sustainability, and geographic data sets. GISC 317 is the final GISC course for our majors, so examining the artifacts of this course provides a better overall reflection of students’ ability to synthesize and analyze data quantitively and spatially. Regarding SLO 3, In a research proposal, students must demonstrate the ability to successfully develop and design an original research project. Student work must also incorporate spatial data analysis and qualitative and quantitative data collection common in the geographic, sustainability, and environmental studies fields. Since students must place their research within an appropriate methodological and/or technological framework and provide evidence to support their arguments through a complete and comprehensive literature review their proposed research is a holistic reflection of content and skills learned throughout a student’s time in the program. Students must also prepare and present their proposed work to their peers and a selection of department faculty, including the course instructor. 85% of the 34 evaluated artifacts surpassed the measurement target.The success of our students can be observed by their professional development, participation in professional research conferences that reflect their personal career objectives, success in the job market, and admission and graduation from leading graduate programs. In AY 20, despite the COVID-19 pandemic, we have received zero feedback from recent graduates who unable to meet their career/graduate school objectives. This demonstrates that our graduates are particularly well-suited for careers that involve the many human and environmental challenges precipitated by climate and environment change and sustainability. Their ability to gain admission to leading graduate programs and publishing research articles in peer-reviewed journals also provides evidence of their written and oral communication skills. Many of our graduates have remained in Kentucky and the region and are contributing to their communities both directly and indirectly. Since the goal of all three assessment outcomes were achieved, there is no need for specific follow-up items. Nonetheless, we are constantly improving and updating our curriculum, equipment, lab and field research methods and tools, to meet our students’ needs. If deficiencies in any area arise, we are nimble and effective in our responses to our programmatic needs. Annually, we update all modules in our GISC courses to incorporate any added capabilities of the latest geoscience spatial analysis software and adapt to any changes in the operalization of common GISC technologies and software. Project, assignment, and exam data utilized in our GISC courses are updated to reflect the latest challenges and opportunities present in the geosciences. All measurements will be reevaluated in A22.  |

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| **Student Learning Outcome 1** |
| **Student Learning Outcome**  | Students can demonstrate a theoretical and applied understanding of basic environmental concepts, sustainability pillars, and geographical principles and convey an understanding of their value and importance to stakeholders and the public. |
| **Measurement Instrument 1**  | Direct: All majors must successfully pass the capstone professional course (GEOG 499) and pass the program exit exam administered in the course. The exam consists of multiple choice, fill in the blank, and short- and long-essay questions, with questions designed to assesses student understanding and application of theoretical and foundational concepts and methodologies in the discipline. The exam also included a selection of real-world applied questions designed to evaluate students’ ability to think critically and address comprehensive challenges faced by global and regional populations.  |
| **Criteria for Student Success** | Students must complete GEOG 499 with an 80% or higher on their comprehensive program exit exam. |
| **Program Success Target for this Measurement** | 70% or higher | **Percent of Program Achieving Target** | 100% |
| **Methods** | All student exit exams administered in AY 21 were evaluated. All exams are graded by the course instructor, with a selection also independently reviewed by program faculty.  |
| **Based on your results, highlight whether the program met the goal Student Learning Outcome 1.** | **[x]  Met** | **[ ]  Not Met** |
| **Actions**  |
| No consistently deficient areas were identified on the exit exam results of GEOG 499. All students were able to demonstrate their ability to complete a capstone exam and course. The exam is changed annually to incorporate regularly evolving conditions in the environment and geoscience discipline. Successfully passing the exam reflects directly on the variety of coursework students develop while completing the program.  |
| **Follow-Up**  |
| As this outcome was achieved with great success, we have no intended changes to our program to meet this outcome at this time. We are constantly improving and updating our curriculum, equipment, lab and field research methods and tools, to meet our students’ needs. If deficiencies in any area arise, we are nimble and effective in our responses to our programmatic needs. |
| **Next Assessment Cycle Plan**  |
| GEOG 499 is taught every fall term. As such, we will assess this outcome again in Fall 2021. |

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| **Student Learning Outcome 2** |
| **Student Learning Outcome**  | Students can demonstrate proficiency in the quantitative and qualitative spatial analysis and critical thinking through written and oral communication. |
| **Measurement Instrument 1** | Direct: Applied spatial data synthesis and analysis projects (both written and oral) administered in required GISC 317 course. A series of five applied projects is completed in the course. All data analysis and projects completed in the course are from real-world environmental, sustainability, and geographic data sets. GISC 317 is the final GISC course for our majors, so examining the artifacts of this course provides the best overall reflection of students’ ability to synthesize and analyze data quantitively and spatially. |
| **Criteria for Student Success** | Students will have earned a grade of 80% or higher on a series of five applied projects to demonstrate proficiency in quantitative and spatial data analysis, critical thinking, and written communication. (see grading criteria at end of document) |
| **Program Success Target for this Measurement** | 75% or higher (n=257) | **Percent of Program Achieving Target** | 80% |
| **Methods**  | 100% of projects completed in GISC 317 during AY21 were included in the data set.  |
| **Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 2.** | **[x]  Met** | **[ ]  Not Met** |
| **Actions** |
| As the success target for this measurement was met, not follow-up actions are required. Annually, we update all modules in our GISC courses to incorporate any added capabilities of the latest geoscience spatial analysis software and adapt to any changes in the operalization of common GISC technologies and software. Project, assignment, and exam data utilized in our GISC courses are updated regularly to reflect the latest challenges and opportunities present in the geosciences. |
| **Follow-Up** |
| As this outcome was achieved, we have no intended changes to our program to meet this outcome at this time. We are constantly improving and updating our curriculum, equipment, lab and field research methods and tools, to meet our students’ needs. If deficiencies in any area arise, we are nimble and effective in our responses to our programmatic needs. |
| **Next Assessment Cycle Plan** |
| GISC 317 is taught every fall and spring. As such, we will assess this outcome again at the conclusion of AY22. |

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| **Student Learning Outcome 3** |
| **Student Learning Outcome**  | Students can explain the complexities of social, cultural, and environmental diversity, and demonstrate an ability to critically assess contemporary challenges and develop problem-solving skills. |
| **Measurement Instrument 1** | Direct: Capstone Research Proposal and Presentation in GEOG 300 (Research and Writing in the Discipline) In a research proposal, students must demonstrate the ability to successfully develop and design an original research project. Their proposed research design must incorporate spatial data analysis and qualitative and quantitative data collection common in the geographic, sustainability, and environmental studies fields. Students must place their research within an appropriate methodological and/or technological framework and provide evidence to support their arguments through a complete and comprehensive literature review. Students must also prepare and present their proposed work to their peers and a selection of department faculty, including the course instructor. |
| **Criteria for Student Success** | Students must have earned an 80% or higher on the final research proposal and presentation to demonstrate proficiency. |
| **Program Success Target for this Measurement** | 75% or higher (n=34) | **Percent of Program Achieving Target** | 85% |
| **Methods**  | 100% of research proposals and presentations completed in the GEOG 300 course during AY21 were examined. Research proposals and presentations are graded by the course instructor, with presentation feedback also provided by selected program faculty.  |
| **Measurement Instrument 2** | Indirect: Student success in professional research conferences, graduate school admissions, and employment. |
| **Criteria for Student Success** | The success of our students can be observed by their professional development, participation in professional research conferences that reflect their personal career objectives, success in the job market, and admission and graduation from leading graduate programs. In AY 20, despite the COVID-19 pandemic, we have received zero feedback from recent graduates who unable to meet their career/graduate school objectives. This demonstrates that our graduates are particularly well-suited for careers that involve the many human and environmental challenges precipitated by climate and environment change and sustainability. Their ability to gain admission to leading graduate programs and publishing research articles in peer-reviewed journals also provides evidence of their written and oral communication skills. Many of our graduates have remained in Kentucky and the region and are contributing to their communities both directly and indirectly.  |
| **Program Success Target for this Measurement** | N/A | **Program Success Target for this Measurement** | N/A |
| **Methods** | N/A |
| **Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 3.** | **[x]  Met** | **[ ]  Not Met** |
| **Actions** |
| As the target for students successfully passing GEOG 300 was achieved, no significant changes are anticipated to this course or the program to achieve this outcome. Several 300 and 400 level elective courses in the program have incorporated applied service-learning projects to continually expose students to the disciplines’ quantitative methods, qualitative analysis, spatial analysis, critical thinking, and written and oral communication skills. |
| **Follow-Up** |
| As this outcome was achieved, we have no intended changes to our program to meet this outcome at this time. We are constantly improving and updating our curriculum, equipment, lab and field research methods and tools, to meet our students’ needs. If deficiencies in any area arise, we are nimble and effective in our responses to our programmatic needs. |
| **Next Assessment Cycle Plan** |
| GEOG 300 is taught every semester, and GEOG 499 is taught every Fall term. As such, we will assess this outcome again at the conclusion of AY22. |

GISC 317 Assessment Rubric

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| Georeferencing – Criteria:* The image is accurately georeferenced to the orthophotos
* The images were given correct spatial metadata
* Include RMS score or table image in write-up
 |  /10pts  |
| Feature accuracy - Attribute accuracy – Criteria: * A polygon feature class was created to hold the polygons multiple were created instead of just one as indicated in the directions.
* All data sets reside in the geodatabase
* the feature class’s spatial reference was correctly defined
* all polygons are present
* no extra polygons, gaps, slivers of open areas
* Domain Created. Students should follow the same set up as learned in the digitizing practice assignment. A suitable attribute domain for soil type was created in the geodatabase. The geodatabase and subsidiary structures have been set up correctly with a domain
* Attribute were created and it reference the attribute domain
* All polygons have been given a cotrect attribute value
 |  /30pts  |
| Digitizing quality – Criteria:* lines are smooth
* lines accurately placed relative to areas on photo at edges
* adjacent polygons form a smooth boundary
 |  /20pts  |
| Symbology – Criteria:* Each lot type has been given a different color and an appropriate color scheme was selected
* Labels do not overlap polygon lines and are well place
 |  /20pts  |
| Metadata – Criteria:* Created the required metadata for the polygon feature class
* The metadata contains good and reasonable information
 |  /10pts  |
| Project management – Other Criteria: * all files are present
* no broken links in the map project
* all names are well chosen and descriptive
* All extraneous files (other than the geodatabase & .mxd) have been removed
* Named layers in the Table of contents (instead of a legend)
* Completion is of professional quality.
 |  /10pts  |
| Total: |  /100pts  |