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| **Assurance of Student Learning Report****2023-2024** |
| Ogden College of Science and Engineering | Department of Earth Environmental and Atmospheric Sciences |
| Environmental, Sustainability, and Geographic Studies #5009 |
| Amy Nemon |
| ***Is this an online program***? [ ]  Yes [x]  No | Please make sure the Program Learning Outcomes listed match those in CourseLeaf . Indicate verification here [x]  Yes, they match!  |

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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. Add more Outcomes as needed.*** |
| **Program 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** |
| **Program 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 project in GISC 317 |
| **Based on your results, check whether the program met the goal Student Learning Outcome 2.** | **[x]  Met** | **[ ]  Not Met** |
| **Program 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 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** |
| **Assessment Cycle Plan:**  |
| The goals of all three student learning outcomes were met in AY24 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 70% 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, 95.61% of the 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. The evaluated artifact did meet the target and are higher than the previous academic year. 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 geoscience 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. 76% of the evaluated artifacts surpassed the measurement target. This is lower than last year, but still higher than the target metric, so we feel the score is not necessarily reflective of the instruction of the course or our program. 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. 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. Additional resources are being prepared for distribution in the GEOG 300 course. All measurements will be reevaluated in AY25.  |

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| **Program Student Learning Outcome 1** |
| **Program 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 complete the program exit exam administered in the last semester of the student’s program. The exam consists of four essay questions, with questions designed to assesses student understanding and application of theoretical and foundational concepts and methodologies in the discipline. These questions include 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, with a 70% or higher, their comprehensive program exit exam. |
| **Program Success Target for this Measurement** | 70% or higher | **Percent of Program Achieving Target** | 100% (n=22) |
| **Methods**  | All student exit exams administered in AY 24 were evaluated.  |
| **Based on your results, highlight whether the program met the goal Student Learning Outcome 1.** | **[x]  Met** | **[ ]  Not Met** |
| **Results, Conclusion, and Plans for Next Assessment Cycle (Describe what worked, what didn’t, and plan going forward)** |
| No consistently deficient areas were identified on the exit exam. All students were able to demonstrate their ability to complete a capstone exam. 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. 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.As such, we will assess this outcome again in AY25. |

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| **Program Student Learning Outcome 2** |
| **Program 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: For the capstone project, students must create a customized research project, in their area of interest. Each project requires data collection, manipulation, analysis, interpretation and display through a traditional map that has a projection for their study area, and develop an attractive map layout that effectively communicates their data set’s theme while adhering to accepted principles of cartographic design. In addition students must create an online storymap to further reinforce their process and findings. Each project was then presented to their classmates. A comprehensive rubric is used to evaluate the capstone project. GISC 317 GIS II is the final 300-level GISC course for all certificate students, so examining the artifacts of this course provides the best overall reflection of students’ basic ability to synthesize and analyze data quantitively and spatially.  |
| **Criteria for Student Success** | Students will have earned a grade of 75% or higher on the applied project 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 | **Percent of Program Achieving Target** | 95.61% (n=26) |
| **Methods**  | 100% of projects completed in GISC 317 during AY24 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** |
| **Results, Conclusion, and Plans for Next Assessment Cycle (Describe what worked, what didn’t, and plan going forward)** |
| GISC 317 curriculum was adjusted and this was the first academic year the new format and content was implemented. This was also the first time that a project such as this was implemented in a 300 level GIS course. It is believed that the success rate of an average score of 95.61 occurred as the class spent a number of weeks on the project and students were required to meet and send regular progress reports to the instructor. As the success target for this measurement was met, no 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 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.As the success target for this measurement was met, no 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. |

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| **Program Student Learning Outcome 3** |
| **Program 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 | **Percent of Program Achieving Target** | 76% (n=46) |
| **Methods**  | 100% of research proposals completed in the GEOG 300 course during AY24 were examined. Research proposals are graded by the course instructor, with feedback also provided by peers. |
| **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. Students in the program presented at over 12 different regional and national conferences in AY24. Three students won national scholarships for the research and professional pursuits. All AY24 graduates who applied for graduate schools were admitted with funding. Other students are seeking or have already secured employment. Collectively, these successes demonstrate that our graduates are particularly well-suited for careers that involve the many human and environmental challenges. 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.  |
| **Program Success Target for this Measurement** | N/A | **Percent of Program Achieving Target** | N/A |
| **Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 3.** | **[x]  Met** | **[ ]  Not Met** |
| **Results, Conclusion, and Plans for Next Assessment Cycle (Describe what worked, what didn’t, and plan going forward)** |
| 76% of the evaluated artifacts surpassed the measurement target. As such, since 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. The GEOG 300 cohort in Spring 2024 was a lower performing group of students, but great improvement in their writing and communication ability was documented over the course of the semester. Several 300 and 400 level elective courses in the program continue to incorporate 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. 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. Additional resources, activities, and examples of science writing are being developed for use in AY25.GEOG 300 is taught every semester. As such, we will assess this outcome again at the conclusion of AY25. |

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| **CURRICULUM MAP TEMPLATE** |  |  |  |
| **Program name:** | Environmental, Sustainability, and Geographic Studies |  |  |
| **Department:** | Earth, Environmental, and Atmospheric Sciences |  |  |
| **College:** | Ogden College of Science of Engineering |  |  |
| **Contact person:** | Amy Nemon |  |  |
| **Email:** | amy.nemon@wku.edu |  |  |
| **KEY:** |  |  |  |  |
| **I = Introduced; R = Reinforced/Developed; M = Mastered; A = Assessed** |
|  |  |  | **Learning Outcomes** |  |  |
|  |  |  | **LO1:** | **LO2:** | **LO3:** |
|   |  |  | 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. | Demonstrate proficiency in the quantitative and qualitative spatial analysis and critical thinking through written and oral communication. | Explain the complexities of social, cultural, and environmental diversity, and demonstrate an ability to critically assess contemporary challenges and develop problem-solving skills. |
| **Course Subject** | **Number** | **Course Title** | I | I | I |
| GEOG  | 103 | Our Dynamic Planet | I | I | I |
| GEOG  | 110 | World Regional Geography | I | I | I |
| GEOG  | 280 | Environmental Science & Sustainability | R | R | R |
| GEOG  | 300 | Writing in the Geosciences | R/M | R/M | R/M |
| GEOG  | 380 | Global Sustainability | R/M | R/M | R/M |
| GEOG  | 391 | Geoscience Data Analysis | R/M | R/M | R/M |
| GEOG  | 452 | Applied Geoscience Field Experiences | R/M | R/M | R/M |
| GEOG  | 475 | Selected Topics in Geography | R/M | R/M | R/M |
| GEOG  | 480 | Sustainable Cities | R/M | R/M | R/M |
| GEOG  | 499 | Professional Preparation | A | A/M | A/M |
| GEOL | 111 | The Earth | I | I | I |
| GISC | 316 | Fundamentals of GIS | I | I | I |
| GISC | 317 | Geographic Information Systems | R/M | R/M | R/M |
| METR | 121 | Meteorology | I | I | I |

GISC 317 Assessment Rubric

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| Topic & Presentation Logistics: Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* Topic pproved by professor
* research question is\_\_\_\_\_\_
* Submitted progress report
* Attended meetings with professor
* Present for both days of presentations April 22 & 24
* Presentation submitted on time for presentation date 8am on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Final Project turned in on time. Due\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* All files turned in: map project, pdf of project, story map link, write up
* Other
 |  /10pts |
| Detailed Write up* Word, 12pt font, double spaced or bulleted points.
* Make sure there are headings for each section of the write up
* Describe why you chose this topic
* Include screenshots of your process as you go
* Detailed description of the process to:
* A) Data collection or Creation process that you did to get your specific data into the GIS, (see section below for what to include)
* B) Analysis: Describe the tools and layers used for each step of the analysis. If you using queries then the equation should be in the write up. (see section below for what to include)
* Analysis Interpretation
* Findings/Trends
* Well interpreted
* Other
 |  /10pts |
| Data collection* Process of data collection explained in detail for clear understanding
* Links for any collection should be included in the write up
* Details of any manipulation to the datasets to get them to work in the GIS
* Details any digitizing, domain creation if used
* Created Metadata (see section below)
* All data used and layers created should be in the geodatabase and not deleted
* Metadata was created for any layers manipulated through data collection, data creation or analysis from its original form
* Does the new metadata include your name, data, and all other details of the collection process or analysis that led to the output?
* Other
 |  /20pts |
| Analysis:* Write up clearly explains all tools and layers used for each step of the analysis
* If you using queries then the equation should be in the write up
* Write up should include why this process was chosen specifically for this research question
* Accuracy
* Other
 |  /20pts |
| Create a map layout, in Pro, of your final solution* Do not include any unnecessary details
* Layout, balance
* Use of inset
* Color
* Typography
* Title
* Legend
* Source/name
* Scale
* File management:
* Broken links
* Names
* Data frame names
* Projection
* Submitted all the layers for the project in one geodatabase
* Other:
 |  /20pts |
| Storymap:* Created a story map
* You have much flexibility in your storymap but here are some guidelines I will grade on:
* Published your map into the app from pro
* Using details from your write up; these sections required:
* 1-Abstract/question
* 2-Data collection process
* 3-Analysis used
* 4-Findings and interpretations
* Should have a map or image for each section
* Published correctly
* Other
 |  /20pts |
| Grade:  |  /100  |
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GEOG 300 Assessment Rubric

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| **Students will demonstrate the ability to write clear and effective prose in several forms, using conventions appropriate to audience (including academic audiences), purpose, and genre.** |
|  | **Capstone (4)** | **Milestone (3)** | **Milestone (2)** | **Benchmark (1)** |
| **Context and Purpose for Writing**  | Demonstrates a thorough understanding of context, audience, and purpose that is responsive to the assigned task(s) and focuses on all elements of the work. | Demonstrates adequate consideration of context, audience, and purpose and a clear focus on the assigned task(s) (e.g., task aligns with audience, purpose, and context). | Demonstrates awareness of context, audience, to the assigned task(s) (e.g., begins to show awareness of audience’s perceptions and assumptions). | Demonstrates minimal attention to context, audience, and to the assigned task(s) (e.g., expectation of instructor or self as audience). |
| **Genre and Disciplinary Conventions** | Demonstrates detailed attention to and successful execution of a wide range of conventions particular to a specific discipline and/or writing task(s) including organization, content, presentation, formatting, and stylistic choices. | Demonstrates consistent use of important conventions particular to a specific discipline and/or writing task(s) including organization, content, presentation, formatting, and stylistic choices. | Follows expectations appropriate to a specific discipline and/or writing task(s) for basic organization, content, and presentation. | Attempts to use a consistent system for basic organization and presentation. |
| **Students will demonstrate the ability to find, analyze, and cite pertinent primary and secondary sources, including academic databases, to prepare speeches and written texts.** |
|  | **Capstone (4)** | **Milestone (3)** | **Milestone (2)** | **Benchmark (1)** |
| **Use of Sources** | Demonstrates skillful use of high-quality, credible, relevant sources to develop ideas that are appropriate for the discipline and genre of the writing. | Demonstrates consistent use of high-quality, credible, relevant sources to support ideas that are situated within the discipline and genre of the writing. | Demonstrates an attempt to use credible and/or relevant sources to support ideas that are appropriate for the discipline and genre of the writing. | Demonstrates an attempt to use sources to support ideas in the writing. |
| **Students will demonstrate the ability to identify, analyze, and evaluate statements, assumptions, and conclusions representing diverse points of view; and construct informed, sustained, and ethical arguments in response.** |
|  | **Capstone (4)** | **Milestone (3)** | **Milestone (2)** | **Benchmark (1)** |
| **Evidence** | Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly. | Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning. | Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning. | Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question. |
| **Students will demonstrate the ability to plan, organize, revise, practice, edit, and proofread to improve the development and clarity of ideas.** |
|  | **Capstone (4)** | **Milestone (3)** | **Milestone (2)** | **Benchmark (1)** |
| **Control of Syntax and Mechanics** | Uses graceful language that skillfully communicates meaning to readers with clarity and fluency, and is virtually error-free. | Uses straightforward language that generally conveys meaning to readers. The language in the portfolio has few errors. | Uses language that generally conveys meaning to readers with clarity, although writing may include some errors. | Uses language that sometimes impedes meaning because of errors in usage. |