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| **Assurance of Student Learning Report****2022-2023** |
| 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 projects 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 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** |
| **Assessment Cycle Plan:**  |
| The goals of all three student learning outcomes were met in AY22 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, 89.23% 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 but the values are slightly lower than the previous academic year. At present it is not believed to be a significant issue regarding instruction but it is important to mention that the GIS 317 class has been approved for a remodeling of the GIS certificate necessary to be current with the industry. This aspect will be watched very closely in the coming years.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. 82% of the evaluated artifacts surpassed the measurement target. This is lower than last year, but there was also a documented uptick in the number of students who failed the course for non-attendance, so we feel the score is not necessarily reflective of the instruction of the course or our program, but more so a broader issue related to student engagement in courses more broadly. 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. Of the AY23 graduating class (n=18), only four students aren’t already employed in a geoscience field or admitted to graduate programs, also serving as a indicate measure of their preparation.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 AY24.  |

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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=16) |
| **Methods**  | All student exit exams administered in AY 23 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 AY24. |

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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: 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 75% 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 | **Percent of Program Achieving Target** | 89.23% (n=26) |
| **Methods**  | 100% of projects completed in GISC 317 during AY22 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)** |
| 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.The 89.23% program target achieved is much improved from the 80% recorded in AY21 and lower than the 99% in AY22. We attribute the improvement from AY21 to AY22 to changes which were made in delivery in the course content, in that part of the course is held in a lecture setting, while part is transitioned to a computer-based lab classroom for immediately incorporating the lecture material. This is a deviation from the previous teaching methods which allowed students to follow along with the lecture in the computer labs. We believe the focus on lecture without the distractions of following along in the GISC software allows for students to remember more of the basic principles and applicates, thus improving the overall ability to synthesize and analyze data quantitatively and spatially. We still believe this is the best method for delivery. The major has had experienced fast growth within the last two years so the number of students enrolled in GISC is increasing. At this time it is not believed that class size played a role in the dropping of the overall score as most students were very successful in the course, but intead it is believed that covid has played a role in the change. These students mostly completed high school while dealing with covid changes to their class structure. Some students are struggling with assignment instructions particularly multi-step and synthesizing solutions on their own. More attention will be given to this area in AY24.As this outcome was achieved, we have no intended changes to our program to meet this outcome at this time. We will continue to use the altered teaching modality to see if the improved score are maintained. 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.GISC 317curriculum has been reorganized but the assessment will stay the same. GISC 317 is taught every spring, so we will assess this outcome again at the end of AY24. |

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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** | 82% (n=39) |
| **Methods**  | 100% of research proposals and presentations completed in the GEOG 300 course during AY23 were examined. Research proposals and presentations are graded by the course instructor, with presentation feedback also provided by selected program faculty and 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. 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. Of the AY23 graduating class (n=18), only four students aren’t already employed in a geoscience field or admitted to graduate programs, also serving as a indicate measure of their preparation. |
| **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)** |
| 82% 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. 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.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.GEOG 300 is taught every semester, so we will assess this outcome again at the conclusion of AY24. |

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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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| 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  |

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. |