**M.S. in Geospatial Sciences**

**Annual Program Report Template**

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| **Year:** | Academic Year 2022-2023 |
| **Program:** | Geospatial Sciences |
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**Summary of Continuous Improvement Efforts since Last Report**

*Provide a brief description of how assessment results have been used for program improvement. Point to a specific example of how an assessment provided the program with data it could use for improvement and what that improvement was, if possible, also show evidence of the improvement. You may look at data from the two previous academic years to support this case.*

Respond here: No assessment on this program was done last cycle since the program is too new. However, the two Non-Thesis program majors were assessed this cycle on Outcome-2 and Outcome-3 based on their final reports and oral presentations in the Geospatial Research Project course. Since the program failed to meet the target for Outcome-3 based on one student's poor oral presentation, an action plan was devised to help instruct students on the proper way to create and deliver an oral presentation, and to allow the students to critique each other's presentations in enough time to make changes before the final presentation.

**Program Highlights Since Last Report**

*Identify and briefly discuss any programmatic curriculum changes made since the last report (e.g. new courses, course changes, SLO changes, course deletions).*

Respond here: An action plan for a minor course change in Geospatial Research Methods is planned for the next time the course is taught. The plan is to better prepare students for oral presentations by discussing proper planning procedures and oral presentation skills in class, then to ask the students in the class to give their presentations to each other before the final presentation to aid with critiques for classmates that should improve everyone's presentations.

**Table 1. Assessment Results and Analyses for Current Cycle.**

| STAGE 1: PLAN | | | | STAGE 2: DO | | STAGE 3: STUDY |
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| **Departmental Student Learning Goal** | **Program Student Learning Outcome** | **Assessment** | **Assessment Method/Location** | **Benchmark Expectations** | **Data Results** | **Actions/Goals Based on Data Results*** What do the data tell you? How will you use this data? How were data from the last cycle used to make changes during this cycle, and What were the results of those changes? |
| Describe, distinguish, and apply the fundamental concepts, principles, and tools of GIS to make informed use of existing GIS applications and gain skills needed to construct new applications in the physical, environmental, social and economic realms. | <u>Outcome-1:</u><br><br>Graduate students in the rapidly growing field of Geospatial Sciences will exhibit in-depth mastery of Geospatial Sciences key concepts taught in graduate courses. A crucial skill of a geospatial analyst is the capacity to apply acquired knowledge to new or novel situations. Understanding the basic concepts of Geospatial Sciences will allow our graduates to acquire geospatial intuition, allowing them to use their knowledge and insight to comprehend and solve real-world problems, as well as assist decision making. | Graduate students will take a comprehensive written exam in the graduate level course. The examination question will be written by a committee of two instructors of the graduate courses and the main advisor. A rubric will be used to assess the embedded question. Levels of proficiency: | <u>Rubric:</u><br><br>• Level # 4 - Excellent: Student can write and develop the information in a clear logical fashion. Student answers the question asked and incorporates relevant information. Student integrates all pertinent material from lecture, textbooks, and tutorials, and appropriately applies learned information correctly.<br>• Level # 3 - | The desired level of performance will be a mean of 2.6 and above on a four-point scale. This level of performance was chosen because it represents adequate level of training, based on the rubrics, for a person obtaining a master's degree in science. | The written exam question for Outcome-1 is designed for the student to take in their last semester before graduation. The program's first students started in the Fall of 2021 and are taking an extra long semester to complete their classes or thesis. Therefore there has been no exams given yet since no students qualify to take them. It is expected that several students will be graduating at the end of the Fall semester | No Data. Program too new. |

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| | | | Good: Student can write and develop the information in a clear logical fashion. Student answers question asked. Answer incorporates relevant information; however, one or more pertinent facts/observations/ideas are omitted.<br>• Level # 2 - Marginal: Student does not write in a clear logical form. Ideas are present but not organized into a meaningful development of topic. Facts are incorporated in a disorganized fashion. Information is missing from the<br>• discussion, and irrelevant information is included. Does | | 2023 so there will be data for the next cycle. | |

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| | | | not appear that the student really understands but knows information from lecture and is hoping it is relevant.<br>• Level # 1 - Poor: Illogical assemblage of facts and misinformation. Student does not properly answer the questions and merely offers material that has limited applicability. | | | |
| Describe, distinguish, and apply the fundamental concepts, principles, and tools of GIS to make informed use of existing GIS applications and gain skills needed to construct new applications in the physical, environmental, social and economic realms. | <u>Outcome-2:</u><br><br>Graduate students will show their ability to use the scientific method and scientific reasoning while writing research papers in the capstone Geospatial Research project class and when writing a master's thesis for thesis-based students. In the contemporary world, scientific techniques and scientific reasoning serve as the basis for | Students will write either a scientific research paper or thesis in selected graduate courses. A numeric value (1 to 4) corresponding to the level of performance will be assigned to each question on the scientific research paper and thesis | <u>Rubric:</u><br><br>• Level # 4 - Excellent: Student followed all instructions. Students demonstrate their ability to work independently. Student demonstrated the ability to develop the information in a clear logical | The target level of performance will be 3.0 or above on a four-point scale. This level of performance was selected because it indicates a sufficient level of training for a person pursuing a master's degree in science on the rubrics. | **Target Met!**<br><br>Two students in the Non-Thesis program were evaluated in their Geospatial Project Course using their written final project report. The Mean score was 3.5 and the Standard Deviation was 0.71. | The Non-Thesis students are doing well with their written reports. Next cycle should include the Thesis students and the writing scores for their theses. |

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| | the quest of knowledge. A geospatial analyst must be able to use scientific approaches to address geographical challenges. The study should be presented both in written and spoken form. | rubric. Scientific paper in the Geospatial Research Project course and the master thesis will be used in the assessment. Mean and standard deviations for each rubric metric will be calculated, as will the mean and standard deviation of each section in the research paper/thesis and overall scores. | fashion. Students were able to draw conclusions from the data and tie those conclusions to ideas presented in the literature.<br>• Level # 3 - Good: Student followed most instructions. Student demonstrated and inconsistent ability to develop the information in a clear logical fashion. Student was able to draw conclusions from the data and tie those conclusions to ideas presented in the literature.<br>• Level # 2 - Marginal: Student was inconsistent in their ability to follow instructions. Student | | No students in the Thesis program wrote their thesis yet so were not evaluated. | |

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| | | | demonstrated major deficiencies in their ability to develop the information in a clear logical fashion. Student was unable to draw conclusions from the data and tie those conclusions to ideas presented in the literature. • Level #1 - Poor: Failure to comply with instructions. Student demonstrated an inability to develop the information in a clear logical fashion. Student did not draw conclusions from the data and tie those conclusions to ideas presented in the literature. | | | |
| Describe, distinguish, and apply the | <u>Outcome-3:</u> | The oral presentation skills of | <u>Rubric:</u> | 80% of students will score an average of 3.0 on | **Target <u>Not</u> Met!** | There were no data last cycle so there is nothing to compare to the results in this cycle. |

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| fundamental concepts, principles, and tools of GIS to make informed use of existing GIS applications and gain skills needed to construct new applications in the physical, environmental, social and economic realms. | The oral presentation skills of graduate students will be assessed during a presentation of their research project for non-thesis-based and thesis for thesis-based by external committee of two professors and the main advisor.<br>The assessment rubric includes a numeric value (1 to 4) corresponding to the level of performance on preparedness, comprehension, ability to answer questions, verbal delivery, and quality of the PowerPoint and presented materials. Mean and standard deviations for each rubric metric will be calculated and overall scores. | graduate students will be assessed during a presentation of their research project for non-thesis-based and thesis for thesis-based by external committee of two professors and the main advisor.<br>The assessment rubric includes a numeric value (1 to 4) corresponding to the level of performance on preparedness, comprehension, ability to answer questions, verbal delivery, and quality of the PowerPoint and presented materials. Mean and standard deviations for each rubric metric will be calculated and overall scores. | • Level # 4 – Excellent: Student completely prepared; complete comprehension of the presented materials was shown; mostly uses scientific vocabulary correctly; clearly answer questions; and very good use of graphics made.<br>• Level # 3 – Good: Student mostly prepared; strong comprehension of the presented materials was shown; mostly uses scientific vocabulary correctly; demonstrated ability to answer questions; and very good use of graphics made.<br>• Level # 2 - | the rubric. This level of performance was selected because it indicates a sufficient level of training for a person pursuing a master's degree in science on the rubrics. | Two students in the Non-Thesis program were evaluated in their Geospatial Project Course using the final oral presentations of their projects. One student received a Level 1 score and the other a level 3 score. This meant that only 50% of the students scored at a 3.0 or better which is below the 80% target.<br><br>No students in the Thesis program wrote their thesis yet so were not evaluated. | Since there were no thesis students evaluated this cycle, their oral communication skills could not be assessed. Also, there were only two students assessed so the statistics of the results are not robust. However, with that in mind, one student performed poorly in all aspects of the oral presentation. The question is why?<br><br><u>Outcome-3 Action Plan:</u><br>The student that scored a 1 on their final project oral presentation did not plan the talk well or practice it. The talk was too long and had too much introductory material.<br>To help remedy it, the plan is to not assume students know how to put an oral presentation together, even as masters students. There will be some class instruction on how to deliver a proper scientific oral presentation in the Geospatial Project class prior to the oral presentation. Students will also be asked to critique each other's practice presentation in enough time prior to the final presentation to give each student enough time to improve their presentation as needed. These two changes will be evaluated next cycle to see if there was improvement. |

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| | | | Marginal: Student somewhat prepared; fair comprehension of the presented materials was shown; sometimes uses scientific vocabulary correctly; confused and not clearly answer questions; and marginal use of graphics made.<br>• Level #1 - Poor: Student not prepared; no comprehension of presented materials; inability to clearly answer questions; never uses scientific vocabulary correctly; and use of graphics was inappropriate. | | | |

**Table 2. Continuous Improvement Results Since Last Report**

| **Stage 4: ACT** | | |
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| **Actions/Goals Based on Data Results**<br>**Copy last cycle's actions/goals and report on progress toward continuous improvement on those here.* | **Status**<br>*C=Complete*<br>*P=Progressing*<br>*N=No Action Taken* | **Discussion of Status**<br>*If C, describe efforts that led to accomplishment of actions/goals.*<br>*If P, provide update on progress made toward accomplishing actions/goals and what tasks remain*<br>*If N, discuss why action toward accomplishing actions/goals has been delayed and what work will be initiated toward accomplishment.* |
| No action goals last cycle because no assessment last cycle since program is too new. | | |