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| **Assurance of Student Learning Report****2020-2021** |
| *Ogden College of Science & Engineering* | *Department of Mathematics* |
| *730 Middle Grades Mathematics* |
| *Natasha Gerstenschlager* |

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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:** Graduates will communicate mathematics effectively in both written and oral forms. |
| **Instrument 1** | Capstone project in MATH 490. |
| **Based on your results, check whether the program met the goal Student Learning Outcome 1.** | **[ ]  Met** | **[x]  Not Met** |
| **Student Learning Outcome 2:** Students will learn application of mathematics in solving real world problems and will demonstrate their capacity to use multiple strategies and appropriate technology to apply mathematics in problem-solving situations. |
| **Instrument 1** | Capstone project in MATH 490. |
| **Based on your results, check whether the program met the goal Student Learning Outcome 2.** | **[ ]  Met** | **[x]  Not Met** |
| **Student Learning Outcome 3:**  Students will be able to use mathematics as a tool for decision making. |
| **Instrument 1** | Capstone project in MATH 490. |
| **Based on your results, check whether the program met the goal Student Learning Outcome 3.** | **[ ]  Met** | **[x]  Not Met** |
| **Program Summary (Briefly summarize the action and follow up items from your detailed responses on subsequent pages.)**  |
| We have implemented specific changes for each student learning outcome, and will continue to monitor progress on students’ success in meeting our criteria on each one. Given that we did not meet any SLO this particular year, we will be discussing at our August committee meeting targeted ways to address these SLOs throughout the program.  |

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| **Student Learning Outcome 1** |
| **Student Learning Outcome**  | Graduates will communicate mathematics effectively in both written and oral forms. |
| **Measurement Instrument 1**  | **Capstone project in MATH 490** (rubric attached at the end of the document) |
| **Criteria for Student Success** | Students will average a 2.5 or better on a 0 to 4 scale on rubric measures of the communication of mathematics in their senior project. |
| **Program Success Target for this Measurement** | 80% | **Percent of Program Achieving Target** | 67% |
| **Methods**  | Students are graded on both a 12- to 20-page paper and a 23- to 27-minute presentation of their senior project. Each project has three faculty graders, including the faculty member who supervised the student’s project research. The categories measuring the communication of mathematics on the paper are* Writing of Paper: Readability, Structure, Formatting, Style, Grammar, Spelling, Citations, References, Writing Conventions, Length, etc., with a 3 denoting “Accomplished” and a 2 denoting “Sufficient”; and
* Delivery of Presentation: Style, Comfort, Audience Engagement, Flexibility, Tone, etc., with a 3 denoting “Accomplished” and a 2 denoting “Sufficient”.

We had 6 out of 9 students meet this criteria. |
| **Based on your results, highlight whether the program met the goal Student Learning Outcome 1.** | **[ ]  Met** | **[x]  Not Met** |
| **Actions** (Describe the decision-making process and actions for program improvement. The actions should include a timeline.) |
| We added more days to the instructional calendar for MATH 490 to address issues with writing and presentation. Addtionally, students have opportunities to write mathematics in MATH 413 (a project) and write proofs in MATH 403. However, the low score on this particular SLO indicates need for serious improvement. (Discussed below.) |
| **Follow-Up** (Provide your timeline for follow-up. If follow-up has occurred, describe how the actions above have resulted in program improvement.) |
| We will continue to monitor students’ success on this learning outcome. We will discuss student’ work in our courses in our committee meetings and continue to develop ways to support them in our classes.  |
| **Next Assessment Cycle Plan** (Please describe your assessment plan timetable for this outcome) |
| 2020-2021 AY, we will brainstorm additional ways to support our students in meeting these objectives at our August committee meeting. From previous conversations, we recognize that more supports need to be in place in earlier mathematics courses to give students many opportunities to work on these skills (particularly MATH 302). Decisions will be implemented in classes fall and spring 2021-2022 academic year. |

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| **Student Learning Outcome 2** |
| **Student Learning Outcome**  | Students will learn application of mathematics in solving real world problems and will demonstrate their capacity to use multiple strategies and appropriate technology to apply mathematics in problem-solving situations. |
| **Measurement Instrument 1** | **Capstone project in MATH 490.**  |
| **Criteria for Student Success** | Students will average a 2.5 or better on a 0 to 4 scale on rubric measures of the application of mathematics in their senior project. |
| **Program Success Target for this Measurement** | 80% | **Percent of Program Achieving Target** | 50% |
| **Methods**  | Students are graded on both a 12- to 20-page paper and a 23- to 27-minute presentation of their senior project. Each project has three faculty graders, including the faculty member who supervised the student’s project research. The categories measuring the communication of mathematics on the paper are* Quality of Mathematics: Appropriateness of Topic/Problem, Level of Difficulty, Originality, with a 3 denoting “Accomplished” and a 2 denoting “Sufficient”; and
* Quantity of Mathematics: Student exhibits a body of his/her own mathematical work appropriate for a 3 credit, 400-level mathematics class, with a 3 denoting “Accomplished” and a 2 denoting “Sufficient”.

We had 5 out of 10 students meet this criteria.  |
| **Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 2.** | **[ ]  Met** | **[x]  Not Met** |
| **Actions** (Describe the decision-making process and actions planned for program improvement. The actions should include a timeline.) |
| Students have been given opportunities to explore rigorous mathematics in their other courses. In MATH 403, students were given opportunities to work on their proof-writing skills. However, the low score on this particular SLO indicates need for serious improvement. (Discussed below.) |
| **Follow-Up** (Provide your timeline for follow-up. If follow-up has occurred, describe how the actions above have resulted in program improvement.) |
| We will continue to monitor students’ success on this learning outcome. |
| **Next Assessment Cycle Plan** (Please describe your assessment plan timetable for this outcome) |
| At our August committee meeting, we will discuss ways to better support our students on these particular standards. From previous conversations, we have recognized that MATH 302 is a great location for us to begin addressing these topics deeply. Decisions will be implemented in classes fall and spring 2021-2022 academic year. |

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| **Student Learning Outcome 3** |
| **Student Learning Outcome**  | Students will be able to use mathematics as a tool for decision making. |
| **Measurement Instrument 1** | Capstone project in MATH 490. |
| **Criteria for Student Success** | Students will average a 2.5 or better on a 0 to 4 scale on rubric measures of the application of mathematics in their senior project. |
| **Program Success Target for this Measurement** | 80% | **Percent of Program Achieving Target** | 50% |
| **Methods**  | Students are graded on both a 12- to 20-page paper and a 23- to 27-minute presentation of their senior project. Each project has three faculty graders, including the faculty member who supervised the student’s project research. The categories measuring the communication of mathematics on the paper are* Mathematical Accuracy: Appropriate use of mathematical tools, lack of errors, etc., with a 3 denoting “Accomplished” and a 2 denoting “Sufficient”; and
* Mathematical Understanding: Evidence that student deeply and thoroughly understands the project, and that the project is student’s own work, with a 3 denoting “Accomplished” and a 2 denoting “Sufficient”

We had 5 out of 10 students meet this criteria. |
| **Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 3.** | **[ ]  Met** | **[x]  Not Met** |
| **Actions** (Describe the decision-making process and actions for program improvement. The actions should include a timeline.) |
| Students have been given opportunities to develop their mathematical accuracy and understanding. Particularly in MATH 413 students were given an opportunity to work on their mathematical accuracy through a project. However the low score on this SLO indicates need for serious improvement. (Discussed below.)  |
| **Follow-Up** (Provide your timeline for follow-up. If follow-up has occurred, describe how the actions above have resulted in program improvement.) |
| We will continue to monitor students’ success on this learning outcome. |
| **Next Assessment Cycle Plan** (Please describe your assessment plan timetable for this outcome) |
| As with the previous two SLOs, these percents indicate room for improvement. We will be discussing ways to improve our students’ experiences throughout our program to better meet these objectives next year. Decisions will be implemented in classes fall and spring 2021-2022 academic year. |

MATH 490 rubric follows.

The student’s final paper and presentation will be evaluated by a committee of mathematics faculty members, including the student’s supervising faculty member. The committee shall use the departmental rubric for grading the final products.

For each category, the student will receive a grade of 0-4 from each committee member.

 **0 – Inadequate 1 – Deficient 2 – Sufficient 3 – Accomplished 4 – Exemplary**

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| Category  | Score |
| **Writing of Paper**Readability, Structure, Formatting, Style, Grammar, Spelling, Citations, References, Writing Conventions, Legth (12-20 pgs.), etc. |  |
| **Delivery of Presentation**Style, Comfort, Audience Engagement, Flexibility, Tone, etc. |  |
| **Quality of Mathematics**Appropriateness of Topic/Problem, Level of Difficulty, Originality |  |
| **Quantity of Mathematics**Student exhibits a body of his/her own mathematical work appropriate for a 3 credit, 400-level mathematics class |  |
| **Mathematical Accuracy**Appropriate use of mathematical tools, Lack of errors, etc. |  |
| **Mathematical Understanding**Evidence that student deeply and thoroughly understands the project, and that the project is student’s own work  |  |

 Comments:

The final grade will be determined by averaging all of the scores from each committee member, less any deductions. Letter grade will be assigned as follows:

 **F – [0, 0.5) D – [0.5, 1.5) C – [1.5, 2.5) B – [2.5, 3.5) A – [3.5, 4.0]**

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| Length of Presentation |
| Start Time | Finish Time |
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The final presentation, without questions, should fall between 23 and 27 minutes in length. A penalty will be assessed on the average score of 0.25 points for every 2 minutes the presentation falls outside of these boundaries (note: there is no penalty for up to 2 minutes in either direction). For example, a presentation of at least 21 minutes but fewer than 23 minutes will not be assessed a penalty, whereas a presentation of at least 19 minutes but no more than 21 minutes will be assessed a 0.25-point penalty.