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| **Assurance of Student Learning Report****2021-2022** |
| *Ogden College of Science & Engineering* | *Department of Mathematics* |
| *730 Middle Grades Mathematics* |
| *Patrick Brown* |

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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.** | **[x]  Met** | **[ ]  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.** | **[x]  Met** | **[ ]  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.)**  |
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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 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** | 91.7% |
| **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 9 out of 12 students meet this criteria. |
| **Based on your results, check 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.) |
| While we achieved Goal 1 during this cycle, we continuously monitor the program looking for ways to make improvements based on a variety formative and summative feedback. |
| **Follow-Up** (Provide your timeline for follow-up. If follow-up has occurred, describe how the actions above have resulted in program improvement.) |
| We recently implemented some changes to our program curriculum in the 300 – and 400 – level courses are presently waiting to see how those changes manifest themselves in the capstone course during the upcoming year. |
| **Next Assessment Cycle Plan** (Please describe your assessment plan timetable for this outcome) |
| In the fall of 2022, we plan to look critically at our program goals and assessment measures to make sure we are appropriately assessing what we believe to be the critical outcomes of the program. We will be working with our Department Chair and Associate Dean during this process. |

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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 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** | 83.3% |
| **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 6 out of 12 students meet this criteria.  |
| **Based on your results, check whether the program met the goal Student Learning Outcome 2.** | **[x]  Met** | **[ ]  Not Met** |
| **Actions** (Describe the decision-making process and actions planned for program improvement. The actions should include a timeline.) |
| While we achieved Goal 2 during this cycle, we continuously monitor the program looking for ways to make improvements based on a variety formative and summative feedback. |
| **Follow-Up** (Provide your timeline for follow-up. If follow-up has occurred, describe how the actions above have resulted in program improvement.) |
| We recently implemented some changes to our program curriculum in the 300 – and 400 – level courses are presently waiting to see how those changes manifest themselves in the capstone course during the upcoming year. |
| **Next Assessment Cycle Plan** (Please describe your assessment plan timetable for this outcome) |
| In the fall of 2022, we plan to look critically at our program goals and assessment measures to make sure we are appropriately assessing what we believe to be the critical outcomes of the program. We will be working with our Department Chair and Associate Dean during this process. |

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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 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** | 75% |
| **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 8 out of 12 students meet this criteria. |
| **Based on your results, check 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.) |
| We did not meet Goal 3 during this assessmenrt cycle. Over the past 2 academic years, we have been implementing changes in our MATH 302, 304, 403, 411, and 413 courses that we believe will lead to an improvement in the metric for this goal. These changes include increased focus on critical reasoning, interpreting and communiting mathematics, and using mathematics as a tool for making decisions. Due to the nature of the program, the students for whom these changes were implemented are still in the program and will not reach the capstone course until this coming year or after. |
| **Follow-Up** (Provide your timeline for follow-up. If follow-up has occurred, describe how the actions above have resulted in program improvement.) |
| We recently implemented some changes to our program curriculum in the 300 – and 400 – level courses are presently waiting to see how those changes manifest themselves in the capstone course during the upcoming year. |
| **Next Assessment Cycle Plan** (Please describe your assessment plan timetable for this outcome) |
| In the fall of 2022, we plan to look critically at our program goals and assessment measures to make sure we are appropriately assessing what we believe to be the critical outcomes of the program. We will be working with our Department Chair and Associate Dean during this process. |

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| **Program name:** | Middle Grades Mathematics |  |  |
| **Department:** | Mathematics |  |  |
| **College:** | Science & Engineering |  |  |
| **Contact person:** | Patrick Brown |  |  |
| **Email:** | patrick.brown@wku.edu |  |  |
| **KEY:** |  |  |  |  |
| **I = Introduced** |  |  |  |  |
| **R = Reinforced/Developed** |  |  |  |  |
| **M = Mastered** |  |  |  |  |
| **A = Assessed** |  |  |  |  |
|  |  |  | **Learning Outcomes** |
|  |  |  | **LO1:**  | **LO2:** | **LO3:** |
| **Course Subject** | **Number** | **Course Title** | Effectively communicate mathematical ideas in verbal and written forms. | Successfully solve a variety of problems using appropriate mathematical tools. | Propose and rigorously prove mathematical conjectures. |
| MATH | 136 | Calculus I |   | I |   |
| MATH | 183 | Introductory Statistics | I | I |   |
| MATH | 205 | Number Systems and Number Theory for Teachers | R | R |   |
| MATH | 206 | Fundamentals of Geometry for Teachers | R | R |   |
| MATH | 308 | Rational Numbers and Data Analysis for Teachers | R | R |   |
| MATH | 302 | Introduction to Advanced Mathematics for Middle Grades Teachers | R | R | I |
| MATH | 304 | Functions, Applications and Explorations | R | R | R |
| MATH | 403 | Geometry for Elementary and Middle School Teachers | M | M | M / A |
| MATH | 411 | Problem Solving for Elementary and Middle School Teachers | M | M / A | M |
| MATH | 413 | Algebra and Technology for Middle Grades Teachers | M | M | M |
| MATH | 490 | Seminar in Middle Grades Mathematics | M / A | M | M |