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| **Assurance of Student Learning Report****2023-2024** |
| Ogden College of Science and Engineering | Chemistry Department |
| Chemistry MS (059) |
| Lawrence Hill – lawrence.hill@wku.edu |
| ***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! (If they don’t match, explain on this page under **Assessment Cycle)** |

**\*\*\* Please include Curriculum Map as part of this document (at the end), NOT as a separate file.**

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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: Communicate effectively in written form.**  |
| **Instrument 1** | **Rubric analysis of literature reviews written by the students in CHEM 516 (Chemical Literature Review)** |
| **Based on your results, check whether the program met the goal Student Learning Outcome 1.** | **[x]  Met** | **[ ]  Not Met** |
| **Program Student Learning Outcome 2: Communicate effectively in oral form.**  |
| **Instrument 1** | **Rubric analysis of oral presentations in CHEM 598 (Graduate seminar)** |
| **Based on your results, check whether the program met the goal Student Learning Outcome 2.** | **[x]  Met** | **[ ]  Not Met** |
| **Program Student Learning Outcome 3: Design and propose effective experiments.** |
| **Instrument 1** | **Rubric analysis of research proposals in CHEM 588 (Research Proposal)**  |
| **Based on your results, check whether the program met the goal Student Learning Outcome 3.** | **[x]  Met** | **[ ]  Not Met** |
| **Assessment Cycle Plan:**  |
| We plan to continue to assess the above program learning outcomes in the upcoming year. |

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| **Program Student Learning Outcome 1** |
| **Program Student Learning Outcome**  | Communicate effectively in written form. |
| **Measurement Instrument 1**  | **Rubric analysis of literature reviews written by the students in CHEM 516 (Chemical Literature Review)**One draft literature review and one final version of the literature review were submitted by each student. These review papers were based on content related to each student’s research interests.The instrument was assessed in a fashion consistent with the Written Communication VALUE Rubric from AAC&U. Basic parameters for *Context, Content, Conventions, Sources, and Syntax* were rated on the 1 to 4 scale. |
| **Criteria for Student Success** | There should be an increase in rubric scores from the first paper drafts to the final paper. Students should score an average of 2.6 out of 4 on the final report.  |
| **Program Success Target for this Measurement** | At least 75% of the papers will score at least an average of 2.6. | **Percent of Program Achieving Target** | 100% of students met this targetAverage of 2.5 for the first draft.Average of 3.3 for the final version. |
| **Methods**  | The papers were evaluated using the Written Communication VALUE rubric by Dr. Matthew Nee. A score of 1 (benchmark) to 4 (capstone) was assigned for each category and the values were averaged. |
| **Results, Conclusion, and Plans for Next Assessment Cycle (Describe what worked, what didn’t, and plan going forward)** |
| The written assignments were described in the syllabus. After the first draft, the papers were returned to the students and they were given the opportunity to revise the assessments and discuss changes before submitting a final version. The quality of the submissions improved after the first draft, and the target was achieved. We will continue to assess students’ writing quality in the upcoming year. |

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| **Program Student Learning Outcome 2** |
| **Program Student Learning Outcome**  | Communicate effectively in oral form. |
| **Measurement Instrument 1** | **Rubric analysis of oral presentations in CHEM 598 (Graduate seminar)**Students taking CHEM 598 will be scored using an Oral Communication Rubric. The instrument was assessed in a fashion consistent with the Oral Communication VALUE Rubric from AAC&U. Basic parameters for *Organization, Language, Deliverys, Supporting Material, and Central Message* were rated on the 1 to 4 scale.The instructor and audience faculty scored these students. Students deliver two oral presentations as a program requirement. One presentation is on literature, which is usually based on the literature review that students write for CHEM 516 in the previous semester. The second presentation is on their research, which is delivered in a semester after the literature seminar. |
| **Criteria for Student Success** | There should be an increase in rubric scores from the literature review presentation compared to the research presentation. Students should score an average of 2.6 out of 4 on the research presentation. |
| **Program Success Target for this Measurement** | At least 75% of the students will score at least an average of 2.6. | **Percent of Program Achieving Target** | 100% of students met this targetAverage of 2.9 for the literature seminar.Average of 3.4 for the research seminar. |
| **Methods**  | Students presented literature seminars for this course during the 2022-2023 AY and were evaluated by all chemistry department faculty that attended the seminar presentation. Students then watched a recording of themselves presenting and met with the instructor to discuss feedback from the faculty. Literature seminar scores ranged from 2.6 – 3.2. Research seminar scores ranged from 3.1 – 3.7. |
| **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)** |
| The assignments were described in the syllabus. After each presentation, students then watched a recording of themselves presenting and met with the instructor to discuss feedback from the faculty. Overall, the scores showed improvement after the first presentation. The quality of the presentations generally improved, and the target was achieved. We will continue to assess students’ oral presentation quality in the upcoming year. |

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| **Program Student Learning Outcome 3** |
| **Program Student Learning Outcome**  | Design and propose effective experiments. |
| **Measurement Instrument 1** | **Rubric analysis of research proposals in CHEM 588 (Research Proposal)**Each student submitted a research proposal on a topic related to their active research using the guidelines for the WKU Graduate Student Research Grants program. Students were given due dates for each secondary proposal piece (title, SciFinder search, statement of the research problem, plan of procedure, budget and justification) and they received feedback on each of theses submissions before compiling a final proposal for the course. Students will demonstrate though a written report their ability to formulate independent experimental plans based on their thesis topic.These review papers were based on content related to each student’s research interests.The instrument was assessed in a fashion consistent with the Written Communication VALUE Rubric from AAC&U. Basic parameters for *Context, Content, Conventions, Sources, and Syntax* were rated on the 1 to 4 scale. |
| **Criteria for Student Success** | Students should score an average of 3.0 out of 4 on the final proposal. |
| **Program Success Target for this Measurement** | At least 75% of students will score at least an average of 3.0. | **Percent of Program Achieving Target** | 100%Average score was 3.6 |
| **Methods**  | The papers were evaluated using the Written Communication VALUE rubric by Dr. Lawrence Hill. A score of 1 (benchmark) to 4 (capstone) was assigned for each category and the values were averaged. The scores on the proposal ranged from 3.5 to 3.8. |
| **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)** |
| The written assignments were described in the syllabus and students were given feedback after each assignment. In some cases, they were given the opportunity to revise the assessments to receive points back on a portion of the assignments leading up to the final version. Overall, the quality of the submissions improved over time and the target was achieved. We will continue to assess students’ proposal writing in the upcoming year. Students taking CHEM 588 were scored using a rubric which is consistent with the Written Communication VALUE Rubric from AAC&U. Basic parameters for *Context, Content, Conventions, Sources, and Syntax* were rated on the 1 to 4 scale. We will continue to assess students’ research proposal quality in the upcoming year. |

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| **CURRICULUM MAP TEMPLATE** |  |  |  |  |  |
| **Program name:** | M.S. in Chemistry (Ref. 059) |  |  |  |
| **Department:** | Chemistry |  |  |  |
| **College:** | Ogden College of Science and Engineering |  |  |  |
| **Contact person:** | Lawrence Hill |  |  |  |
| **Email:** | lawrence.hill@wku.edu  |  |  |  |
| **KEY:** |  |  |  |  |  |
| **I = Introduced** |  |  |  |  |  |
| **R = Reinforced/Developed** |  |  |  |  |  |
| **M = Mastered** |  |  |  |  |  |
| **A = Assessed** |  |  |  |  |  |
|  |  |  | **Learning Outcomes** |  |  |  |
|  |  |  | **LO1:** | **LO2:** | **LO3:** | **LO4:** |
|   |  |  | Communicate scientific findings orally | Communicate scientific findings in written form | Complete an independent research project | Design and conduct research experiments to test a hypothesis |
| **Course Subject** | **Number** | **Course Title** |   |   |   |   |
| CHEM | 516 | Chemical Literature Review |   | I, A |   |   |
| CHEM  | 588 | Research Proposal |   | R, A | I | I, A |
| CHEM  | 598 | Graduate seminar (taken repeatedly) | I, R, A |   |   |   |
| CHEM | 599 | Thesis research/writing (taken repeatedly) | R | M | I, R, M, A | R, M |