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| **Assurance of Student Learning Report****2022-2023** |
| *Ogden College of Science and Engineering* | *School of Engineering and Applied Sciences* |
| *Mastee of Science Engineering Management 0447* |
| *Mark Doggett* |
| ***Is this an online program***? [x]  Yes [ ]  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)** |

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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:**  **Graduates will demonstrate the knowledge and capacity to apply managerial/ leadership principles and practices to appropriate situations.** |
| **Instrument 1** | Certified Technology Manager exam questions in “Leadership” and “Self-Management” |
| **Instrument 2** | Certified Technology Manager exam questions in “People”  |
| **Instrument 3** | Certified Technology Manager exam questions in “Quality” and “Risk” |
| **Based on your results, check whether the program met the goal Student Learning Outcome 1.** | **[ ]  Met** | **[x]  Not Met** |
| **Program Student Learning Outcome 2:**  **Graduates will possess/ demonstrate the ability to identify, formulate, and solve technical problems** |
| **Instrument 1** | Certified Technology Manager exam questions in “Systems” |
| **Instrument 2** | Certified Technology Manager exam questions in “Processes” |
| **Instrument 3** | Certified Technology Manager exam questions in “Operations” and “Projects” |
| **Based on your results, check whether the program met the goal Student Learning Outcome 2.** | **[x]  Met** | **[ ]  Not Met** |
| **Program Student Learning Outcome 3:**  **Graduates will demonstrate an ability to communicate effectively in pertinent areas, both written and oral.** |
| **Instrument 1** | Thesis and project abstract scores |
| **Instrument 2** | Thesis and project oral presentation scores  |
| **Based on your results, check whether the program met the goal Student Learning Outcome 3.** | **[x]  Met** | **[ ]  Not Met** |
| **Assessment Cycle Plan:**  |
| In 2022-2023, MSEM graduate students took the ATMAE exam *(N=7)*. The program outcomes were met, and students performed well in all categories except Learning Outcome 1, Instrument 3, Quality category. In 2022, Students who applied to the MSEM program were asked to provide evidence of sucessful completion in a statistics or quality control course taken during or after their undergraduate studies. Students who had not completed a statistics or quality control course were accepted with conditions and required to take MFGE 271 Industrial Statistics. However, because this policy was new, it was applied inconsistently in 2022-2023. The statistics course policy should be enforced to improve student performance in the Quality category. In addition, the statistics or quality control course should be completed with a passing grade within the last four years. Program faculty may want to strongly consider adding a graduate statistics course as a program requirement. |

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| **Program Student Learning Outcome 1** |
| **Program Student Learning Outcome**  | Graduates will demonstrate the knowledge and capacity to apply managerial/ leadership principles and practices to appropriate situations. |
| **Measurement Instrument 1**  | DIRECT MEASURE: Certified Technology Manager exam questions in “Leadership” and “Self-Management”Graduate students enrolled in Thesis (EGMT 599) or Graduate Project (EGMT 690) are required to take the ATMAE Certified Technology Manager (CTM) exam. Leadership is a process of social influence, which maximizes the efforts of others towards the achievement of goals. The Leadership category includes 10 questions. Self-management is the methods, skills, and strategies by which individuals can effectively direct their own activities toward the achievement of goals and objectives. The Self-Management category includes 18 questions. |
| **Criteria for Student Success** | The goal for graduate students is to have an average performance in each exam category that meets or exceeds the passing threshold (59.38%). The passing threshold represents over 100 accredited programs across the U.S. that use this exam to meet standards for numerous industry professions. |
| **Program Success Target for this Measurement** | 60%  | **Percent of Program Achieving Target** | 100% |
| **Methods**  | Certified Technology Manager (CTM) exam offered by the Association of Technology, Management, and Applied Engineering (ATMAE). The exam is two hours and must be taken in a proctored setting. Scores are tallied and sent to the program by ATMAE. In 2022-2023, *(N=7)* MSEM graduate students took the exam. 86% of students achieved 60% or more in Leadership category. 71% of students achieved 60% or more in the Self-Management category.  |
| **Measurement Instrument 2** | DIRECT MEASURE: Certified Technology Manager exam questions in “People”Graduate students enrolled in Thesis (EGMT 599) or Graduate Project (EGMT 690) were required to take the ATMAE Certified Technology Manager (CTM) exam. Managing people involves the deployment and handling of human resources to work together to accomplish desired goals and objectives using available resources efficiently and effectively. The People category includes 19 questions. |
| **Criteria for Student Success** | The goal for graduate students is to have an average performance in each exam category that meets or exceeds the passing threshold (59.38%). The passing threshold represents over 100 accredited programs across the U.S. that use this exam to meet standards for numerous industry professions. |
| **Program Success Target for this Measurement** | 60% | **Percent of Program Achieving Target** | 100% |
| **Methods** | Certified Technology Manager (CTM) exam offered by the Association of Technology, Management, and Applied Engineering (ATMAE). The exam is two hours and must be taken in a proctored setting. Scores are tallied and sent to the program by ATMAE. In 2022-2023, *(N=7)* MSEM graduate students took the exam. 100% of students achieved 60% or more in the category of People. |

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| **Measurement Instrument 3** | DIRECT MEASURE: Certified Technology Manager exam questions in “Quality” and “Risk”Graduate students enrolled in Thesis (EGMT 599) or Graduate Project (EGMT 690) were required to take the ATMAE Certified Technology Manager (CTM) exam. Risk management is the identification, assessment, and prioritization of risk followed by coordinated and economical application of resources to minimize, monitor, and control their probability and/or impact. The Risk category includes 7 questions. Quality management involves the use of quality assurance and control of processes and products to achieve consistent and predictable quality. The Quality management category includes 19 questions. |
| **Criteria for Student Success** | The goal for graduate students is to have an average performance in each exam category that meets or exceeds the passing threshold (59.38%). The passing threshold represents over 100 accredited programs across the U.S. that use this exam to meet standards for numerous industry professions. |
| **Program Success Target for this Measurement** | 60% | **Percent of Program Achieving Target** | 56% |
| **Methods** | Certified Technology Manager (CTM) exam offered by the Association of Technology, Management, and Applied Engineering (ATMAE). The exam is two hours and must be taken in a proctored setting. Scores are tallied and sent to the program by ATMAE. In 2022-2023, (N=7) graduate students took the exam. 71% of students achieved 60% or more in the Risk category. 0% of students achieved 60% or more in the Quality category. Average score was 50.5%26 Total questions. (71%)(7Q) = 5 + (50.5%)(19Q) = 9.6 = 14.614.6/26 = 56% when combining both categories. |
| **Based on your results, highlight whether the program met the goal Student Learning Outcome 1.** | **[ ]  Met** | **[x]  Not Met** |

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| **Results, Conclusion, and Plans for Next Assessment Cycle (Describe what worked, what didn’t, and plan going forward)** |
| **Results**:For 2022-2023, seven MSEM graduate students took the exam. Based on the exam category scores:86% of students achieved 60% or more in Leadership category. 71% of students achieved 60% or more in the Self-Management category.100% of students achieved 60% or more in the People catagory.71% of students achieved 60% or more in the Risk category. 0% of students achieved 60% or more in the Quality category. Average score was 50.5%**Conclusions**:These results indicate that students performed well in the People category, acceptable in Leadership, Self-management, and Risk categories, but performed poorly in the Quality category. Students must complete a statistics or quality control class during or after their undergraduate studies. Students who have not taken a statistics or quality control class should be conditionally admitted and required to take MFGE 271 Industrial Statistics or an equivalent course. However, because this policy was new, it was applied inconsistently in 2022-2023. **Plans for Next Assessment Cycle:**Assessment Time: This outcome will be assessed in May of each year.Courses will be sampled: Certified Technology Manager (CTM) exam offered by the Association of Technology, Management, and Applied Engineering (ATMAE). The exam will be offered once a year in April for Graduate Project (EGMT 690) students and on-demand for Thesis (EGMT 599) students. Data/artifacts will be collected: Certified Technology Manager exam questions in “Leadership” and “Self-Management”Certified Technology Manager exam questions in “People”Certified Technology Manager exam questions in “Quality” and “Risk”Faculty responsible for collecting and providing data and information:Students on campus will be proctored by Brian Janes for the Certified Technology Manager ATMAE exam, while students who are not on campus will be proctored by approved testing centers. John Khouryieh will provide data for Graduate Project (EGMT 690) students and Mark Doggett will provide data for Thesis (EGMT 599) students and analyze the overall exam data.The statistics course policy should be enforced to improve student performance in the Quality category. In addition, the statistics or quality control course should be completed with a passing grade within the last four years. Program faculty may want to strongly consider adding a graduate statistics course as a program requirement.  |

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| **Program Student Learning Outcome 2** |
| **Program Student Learning Outcome**  | Graduates will possess/ demonstrate the ability to identify, formulate, and solve technical problems. |
| **Measurement Instrument 1** | DIRECT MEASURE: Certified Technology Manager exam questions in “Systems”Graduate students enrolled in Thesis (EGMT 599) or Graduate Project (EGMT 690) are required to take the ATMAE Certified Technology Manager (CTM) exam. Systems consist of the management of technology across disciplines and companies in an integrated fashion for the purpose of business venture and development. The System category includes 18 questions. |
| **Criteria for Student Success** | The goal for graduate students is to have an average performance in each exam category that meets or exceeds the passing threshold (59.38%). The passing threshold represents over 100 accredited programs across the U.S. that use this exam to meet standards for numerous industry professions. |
| **Program Success Target for this Measurement** | 60% | **Percent of Program Achieving Target** | 100% |
| **Methods**  | Certified Technology Manager (CTM) exam offered by the Association of Technology, Management, and Applied Engineering (ATMAE). The exam is two hours and must be taken in a proctored setting. Scores are tallied and sent to the program by ATMAE. In 2022-2023, (N=7) graduate students took the exam. 100% of students achieved 60% or more in the Systems category. |
| **Measurement Instrument 2** | DIRECT MEASURE: Certified Technology Manager exam questions in “Processes”Graduate students enrolled in their first semester of Thesis (EGMT 599) are required to take the ATMAE Certified Technology Manager (CTM) exam. A process is the transformation of input elements into output elements with specific properties, within defined parameters or constraints. The Processes category includes 19 questions. |
| **Criteria for Student Success** | The goal for our graduate students to have an average performance in each exam category that meets or exceeds the passing threshold (59.38%). The passing threshold represents over 100 accredited programs across the U.S. that use this exam to meet standards for numerous industry professions. |
| **Program Success Target for this Measurement** | 60% | **Percent of Program Achieving Target** | 71% |
| **Methods** | Certified Technology Manager (CTM) exam offered by the Association of Technology, Management, and Applied Engineering (ATMAE). The exam is two hours and must be taken in a proctored setting. Scores are tallied and sent to the program by ATMAE. In 2021-2022, (N=7) graduate students took the exam. 71% of students achieved 60% or more in Processes category. |

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| **Measurement Instrument 3** | DIRECT MEASURE: Certified Technology Manager exam questions in “Operations” and “Project”Graduate students enrolled in Thesis (EGMT 599) or Graduate Project (EGMT 690) are required to take the ATMAE Certified Technology Manager (CTM) exam. Operations management is the management of technology within a specific industrial specialty. The Operation category includes 19 questions. Projects are the one-time application of a process to produce a unique product or service. The Project category includes 19 questions. |
| **Criteria for Student Success** | The goal for our graduate students to have an average performance in each exam category that meets or exceeds the passing threshold (59.38%). The passing threshold represents over 100 accredited programs across the U.S. that use this exam to meet standards for numerous industry professions. |
| **Program Success Target for this Measurement** | **60%** | **Percent of Program Achieving Target** | **82.3%** |
| **Methods** | Certified Technology Manager (CTM) exam offered by the Association of Technology, Management, and Applied Engineering (ATMAE). The exam is two hours and must be taken in a proctored setting. Scores are tallied and sent to the program by ATMAE. In 2021-2022, (N=7) graduate students took the exam. 100% of students achieved 60% in the Operations category.57% of students achieved 60% in the Project category. Average score was 65%.38 Total questions. (100%)(19Q) = 19 + (65%)(19Q) = 12.3 = 31.3.31.3/38 = 82.3% when combining both categories. |
| **Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 2.** | **[x]  Met** | **[ ]  Not Met** |

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| **Results, Conclusion, and Plans for Next Assessment Cycle (Describe what worked, what didn’t, and plan going forward)** |
| **Results**:In 2022-2023, seven graduate students took the exam. 100% of students achieved 60% or more in the System category, 71% of students achieved 60% or more in the Processes category.100% of students achieved 60% or more in the Operation category.57% of students acheived 60% or more in the Project category.**Conclusions**:These results indicate that students performed well in the Systems and Operations catagories, acceptable in the Processes category, and slightly less than expected in the Project category. **Plans for Next Assessment Cycle:**Assessment Time: This outcome will be assessed in May of each year.Courses will be sampled: Certified Technology Manager (CTM) exam offered by the Association of Technology, Management, and Applied Engineering (ATMAE). The exam will be offered once a year in April for Graduate Project (EGMT 690) students and on-demand for Thesis (EGMT 599) students. Data/artifacts will be collected: Certified Technology Manager exam questions in “Systems”Certified Technology Manager exam questions in “Processes”Certified Technology Manager exam questions in “Operations” and “Projects”Faculty responsible for collecting and providing data and information:Students on campus will be proctored by Brian Janes for the Certified Technology Manager ATMAE exam, while students who are not on campus will be proctored by approved testing centers. John Khouryieh will provide data for Graduate Project (EGMT 690) students and Mark Doggett will provide data for Thesis (EGMT 599) students and analyze the overall exam data.A technical course content evaluation of EGMT 655 Project Management will be performed to ensure that graduates are achieving the required competences. Evaluation of the other technical course content should be continued and will be reviewed at graduate faculty meetings. |

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| **Program Student Learning Outcome 3** |
| **Program Student Learning Outcome**  | Graduates will demonstrate an ability to communicate effectively in pertinent areas, both written and oral. |
| **Measurement Instrument 1** | DIRECT MEASURE: Thesis abstract scores. |
| **Criteria for Student Success** | The goal is graduate students’ average performance in the Thesis (EGMT 599) or Graduate Project (EGMT 690) abstracts meets or exceeds the “Competent” level in the grading rubric. Grading rubric criteria: Mastery (5 points), Competent (4 points), Marginal (3 points), Deficient (2 points), and Unacceptable (1 point). |
| **Program Success Target for this Measurement** | 60% | **Percent of Program Achieving Target** | 83% |
| **Methods**  | The thesis and graduate projct abstracts are scored by the thesis committees or the instructor of record for the graduate project. The abstracts are evaluated based on five criteria: 1) purpose of writing/audience, 2) content development, 3) control of syntax and mechanics, 4) data interpretation, and 5) sources/evidence. In 2022-2023, (N=6) graduate students completed an abstract. 83% of students achieved a “Competent” level or higher in the written abstract grading rubric.  |
| **Measurement Instrument 2** | DIRECT MEASURE: Thesis or Graduate Project oral presentation scores. |
| **Criteria for Student Success** | The goal is graduate students’ average performance in the thesis oral presentation meets or exceeds the “Competent” level in the grading rubric. The grading rubric criteria: Mastery (5 points), Competent (4 points), Marginal (3 points), Deficient (2 points), and Unacceptable (1 point). |
| **Program Success Target for this Measurement** | 60% | **Percent of Program Achieving Target** | N/A |
| **Methods** | The oral presentations are scored by the thesis committees or the instructor of record for the graduate project. The oral presentations are evaluated based on four criteria: 1) delivery and style, 2) validity and scholarly justification, 3) presentation format/organization, and 4) presentation content. In 2021-2022, no graduate students finished their thesis and a presentation was not required for the graduate project. Thus, the success target for this measurement is not applicable this year.  |
| **Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 3.** | **[x]  Met** | **[ ]  Not Met** |

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| **Results, Conclusion, and Plans for Next Assessment Cycle (Describe what worked, what didn’t, and plan going forward)** |
| **Results**:Thesis students in the MSEM program are required to submit a proposal abstract and give an oral defense at its completion. The thesis abstracts and oral defenses are scored by the thesis committee. Non-Thesis students in the MSEM program are required to submit a project proposal abstract only. The graduate project proposal abstracts are scored by the instructor. **Conclusions**:The target measures indicate graduates are achieving competences at the desired levels.**Plans for Next Assessment Cycle:**Assessment Time: This outcome will be assessed in early April of each year.Courses will be sampled: Thesis oral presentations and Thesis written abstracts for EGMT 599. Thesis oral presentation and thesis written abstract score collection times depend on when graduate students defend their theses. Oral presentations and written abstracts for EGMT 690 Graduate Project. Oral presentations and written abstract score collection times will be every spring semester. Data/artifacts will be collected: Student Written Communication Artifacts: 1) Purpose for Writing/Audience, 2) Content Development, 3) Control of Syntax and Mechanics, 4) Data Interpretation (Quantitative Literacy), and 5) Sources/EvidenceStudent Oral Communication Artifacts: 1) Deliver and Style, 2) Validity and Scholarly Justification, 3) Presentation Format/Organization, and 4) Presentation ContentFaculty responsible for collecting and providing data and information:Thesis chair and committee members are responsible for collecting the thesis written and oral presentation data from each defending student. The assigned instructor of record for EGMT 690 Graduate Project is responsible for collecting the written and oral presentation data from each student.Continue to monitor and collect data for oral presentation and abstract scores for each graduate student. Starting in 2024, students enrolled in the Graduate Project (EGMT 690) will also be required to give an oral presentation of their project. The goal is for 60% of students to achieve a score of 4 or better (on a five-point scale) for both the abstract and oral presentation.The MSEM program was amended in 2022 to include both thesis and non-thesis concentrations. The non-thesis students do not submit a thesis, but are required to take one additional graduate course. The impact of this change will be evaluated in May 2024. |

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| **CURRICULUM MAP** |  |  |  |
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| **Program name:** | Master of Science Engineering Management  |  |  |
| **Department:** | School of Engineering & Applied Sciences  |  |  |
| **College:** | Ogden College of Science & Engineering  |  |  |
| **Contact person:** |  Mark Doggett |  |  |
| **Email:** | mark.doggett@wku.edu |  |  |
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| **KEY:** |  |  |  |  |
| **I = Introduced** |  |  |  |  |
| **R = Reinforced/Developed** |  |  |  |  |
| **M = Mastered** |  |  |  |  |
| **A = Assessed** |  |  |  |  |
|  |  |  | **Learning Outcomes** |  |  |
|  |  |  | **LO1:** | **LO2:** | **LO3:** |
|   |  |  | Graduates will demonstrate the knowledge and capacity to apply managerial/ leadership principles and practices to appropriate situations. | Graduates will possess/ demonstrate the ability to identify, formulate, and solve technical problems. | Graduates will demonstrate an ability to communicate effectively in pertinent areas, both written and oral.  |
| **Course Subject** | **Number** | **Course Title** |   |   |   |
| EGMT | 510 | Emerging Technologies | I | R | R |
|   | 520 | Resource Management | M | R | R |
|   | 530 | Automated Data Collection Systems |   | R |   |
|   | 535 | Workforce Development | R | I |   |
|   | 540 | Theory of Constraints  | R | M | R  |
|   | 571 | Research Methods in Tech |   | R | M |
|   | 580 | Six Sigma Quality  | R | M | R |
|   | 588 | Product Development | I | R | R |
|   | 590 | Operations Leadership | M |   | R |
|   | 594 | Lean Systems | I | M |   |
|   | 630 | Legal & Ethics Issues in Technology | R |   | R  |
|   | 650 | Supply Chain Management | R | I |   |
|   | 655 | Project Management | R | M | R |
|   | 671 | Quality Management | R | M | R |
|  | 599 | Thesis | R | R | A |
|  | 690 | Graduate Project | R | R | A |