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| **Assurance of Student Learning Report****2021-2022** |
| Ogden College of Science & Engineering | School of Engineering and Applied Sciences |
| Master of Science Engineering Management 0447 |
| John Khouryieh |

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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 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.** | **[x]  Met** | **[ ]  Not Met** |
| **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** |
| **Student Learning Outcome 3:**  Graduates will demonstrate an ability to communicate effectively in pertinent areas, both written and oral |
| **Instrument 1** | Thesis abstract scores |
| **Instrument 2** | Thesis oral presentation scores  |
| **Instrument 3** |  |
| **Based on your results, check whether the program met the goal Student Learning Outcome 3.** | **[x]  Met** | **[ ]  Not Met** |
| **Program Summary (Briefly summarize the action and follow up items from your detailed responses on subsequent pages.)**  |
| In 2021-2022, four MSEM graduate students took the ATMAE exam *(N=4)*. The program outcomes were met, and our students have performed very well in all categories, except the Quality category. Starting summer 2022, the MFGE271-Industrial Statistics course policy will be enforced to all students to improve our students performance in the Quality category. Students who are accepted into the MSEM program should have taken a statistic or quality control class during their undergraduate studies. Students who have not taken a statistics or quality control class during their undergraduate studies will be given conditional admissions and are required to take our MFGE271-Industrial Statistics course.We will continue evaluating the program course contents to ensure that graduates are achieving competences consistently.  |

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| **Student Learning Outcome 1** |
| **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 their first semester of Thesis (EGMT 599) were 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 our 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 released by the ATMAE association. In 2021-2022, four *(N=4)* MSEM graduate students took the exam. 100% (4 of 4) of students achieved 60% or more in the Leadership and Self-management categories.  |
| **Measurement Instrument 2** | DIRECT MEASURE: Certified Technology Manager exam questions in “People”Graduate students enrolled in their first semester of Thesis (EGMT 599) 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 our 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 released by the ATMAE website. In 2021-2021, four (N=4) graduate students took the exam. 100% (4 of 4) of students achieved 60% or more in the category of People. |
| **Measurement Instrument 3** | DIRECT MEASURE: Certified Technology Manager exam questions in “Quality” and “Risk”Graduate students enrolled in their first semester of Thesis (EGMT 599) 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 19 questions. |
| **Criteria for Student Success** | The goal for our 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** | 62.5% |
| **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 released by the ATMAE website. In 2021-2022, four (N=4) graduate students took the exam. 100% (4 of 4) of students achieved 60% or more in the Risk category. For the Quality category, four (N=4) graduate students took the exam. 25% (1 of 4) of students achieved 60% or more in the Quality category. So, when combining both categories, 62.5% of students achieved 60% or more in both categories.  |
| **Based on your results, highlight whether the program met the goal Student Learning Outcome 1.** | **[x]  Met** | **[ ]  Not Met** |
| **Actions** (Describe the decision-making process and actions for program improvement. The actions should include a timeline.) |
| In 2021-2022, four MSEM graduate students took the exam *(N=4)*. Based on the exam category scores, 100% (4 of 4) of students achieved 60% or more in the Leadership and Self-management categories and 100% (4 of 4) of students achieved 60% or more in the category of People. While 100% (4 of 4) of students achieved 60% or more in the Risk category, only 25% (1 of 4) of students achieved 60% or more in the Quality category. So, when combining both Quality and Risk categories, 62.5% of students achieved 60% or more in both categories. These results indicate that our students have performed well in the Leadership, Self-management, People, and Risk categories, but they did poorly in the Quality category. Currently, students who are accepted into the MSEM program should have taken a statistics or quality control class during their undergraduate studies. Students who have not taken a statistics or quality control class during their undergraduate studies are given a conditional admission and are required to take our MFGE271-Industrial Statistics course. This MFGE271-Industrial Statistics course policy should be enforced on all students to improve our students’ performance in the Quality category. The managerial course contents should be reviewed at the next graduate faculty meetings (May 10, 2022) to ensure that graduates are achieving competences consistently. The core courses were evaluated to address the areas above are EGMT520 Recourse Management, EGMT590 Operations Leadership, EGMT655 Project Management, and EGMT671 Quality Management. Evaluation of the courses’ contents should be further continued and will be reviewed at upcoming graduate faculty meetings. |
| **Follow-Up** (Provide your timeline for follow-up. If follow-up has occurred, describe how the actions above have resulted in program improvement.) |
| Starting summer 2022, the MFGE271-Industrial Statistics course policy will be enforced to all students to improve our students’ performance in the Quality category.  |
| **Next Assessment Cycle Plan**  |
| 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 twice a year: November and April 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 analyze the exam data.  |

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| **Student Learning Outcome 2** |
| **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 their first semester of Thesis (EGMT 599) were 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 our 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 compiled by the ATMAE representative and then given to the program coordinator. In 2021-2022, four (N=4) graduate students took the exam. 100% (4 of 4) 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) were 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** | 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 released by ATMAE website.In 2020-2021, four (N=4) graduate students took the exam. 100% (4 of 4) students achieved 60% or more in Processes category. |
| **Measurement Instrument 3** | DIRECT MEASURE: Certified Technology Manager exam questions in “Operations” and “Projects”Graduate students enrolled in their first semester of Thesis (EGMT 599) were 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** | 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 released by the ATMAE website. In 2020-2021, four (N=4) graduate students took the exam. 100% (4 of 4) of students achieved 60% or more in both the Operation and Project categories. |
| **Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 2.** | **[x]  Met** | **[ ]  Not Met** |
| **Actions**  |
| In 2021-2022, four graduate students took the exam *(N=4)*. 100% (4 of 4) of students achieved 60% or more in the System category, 100% (4 of 4) of students achieved 60% or more in Processes category, and 100% (4 of 4) of students achieved 60% or more in both the Operation and Project categories.The technical courses contents evaluated to ensure that graduates are achieving competences and were reviewed at graduate faculty meetings. The courses were evaluated to address the areas above are EGMT510-Emerging Technologies, EGMT540-Theory of Constraints, EGMT594-Lean Systems, EGMT580-Six Sigma Quality, EGMT-650 Supply Chain Management, and EGMT-671 Quality Management. Evaluation of the courses’ content should be further continued and will be reviewed at upcoming graduate faculty meetings. |
| **Follow-Up** (Provide your timeline for follow-up. If follow-up has occurred, describe how the actions above have resulted in program improvement.) |
| The MSEM program will be amended to include a thesis and non-thesis concentrations, starting fall 2022. The non-thesis students will not submit a thesis, but they will be required to take one additional graduate course. The impact of this additional course will be evaluated in May 2024.  |
| **Next Assessment Cycle Plan**  |
| 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 twice a year: November and April 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 analyze the exam data. |

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| **Student Learning Outcome 3** |
| **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 our graduate students’ average performance in the thesis 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** | 100% |
| **Methods**  | The thesis abstracts are scored by the thesis committees. The thesis 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 2021-2022, two graduate students successfully finished their thesis defense (N=2). 100% (2 of 2) of students achieved “Competent” level in the thesis written abstract grading rubric.  |
| **Measurement Instrument 2** | DIRECT MEASURE: Thesis oral presentation scores |
| **Criteria for Student Success** | The goal is our 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** | 100% |
| **Methods** | The oral presentations are scored by the thesis committees. The thesis 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, two graduate students successfully finished their thesis defense (N=2). 100% (2 of 2) students achieved “Competent” level (4 point on the 5-point scale) in the thesis oral presentation grading rubric |
| **Measurement Instrument 3** |  |
| **Criteria for Student Success** |  |
| **Program Success Target for this Measurement** |  | **Percent of Program Achieving Target** |  |
| **Methods** |  |
| **Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 3.** | **[x]  Met** | **[ ]  Not Met** |
| **Actions** (Describe the decision-making process and actions for program improvement. The actions should include a timeline.) |
| The students in the MSEM program are required to submit a thesis document and give a thesis oral defense at its completion. The thesis abstracts and oral defenses are scored by thesis committee. The goal is for 60% of students to average a score of 4 or better (on a five-point scale) for the oral defense and the thesis abstract. 100% of the students (2 of 2) who were graduated in 2021-2022 received an average score greater than 4.0 on the five-point scale. |
| **Follow-Up** (Provide your timeline for follow-up. If follow-up has occurred, describe how the actions above have resulted in program improvement.) |
| Continue to monitor and data collection for oral presentation and thesis abstract scores for each defending graduate student.  |
| **Next Assessment Cycle Plan** (Please describe your assessment plan timetable for this outcome) |
| Assessment Time: This outcome will be assessed in early April of each year.Courses will be sampled: Thesis oral presentation and Thesis written abstract. Thesis oral presentation and thesis written abstract scores collection time depends on when graduate students defend their theses. 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 graduate student.  |

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| **CURRICULUM MAP** |  |  |  |
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| **Program name:** | Master of Science in Engineering Management  |  |  |
| **Department:** | School of Engineering & Applied Sciences  |  |  |
| **College:** | Ogden College of Science & Engineering  |  |  |
| **Contact person:** |  John Khouryieh |  |  |
| **Email:** |   |  |  |
| **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 | I | R | R |
|   | 530 | Automated Data Collection Systems |   | R |   |
|   | 535 | Workforce Development | R | I |   |
|   | 540 | Theory of Constraints  | R | R | R  |
|   | 571 | Research Methods in Tech |   | R | R |
|   | 580 | Six Sigma Quality  | R | M |   |
|   | 588 | Product Development | I | R | R |
|   | 590 | Operations Leadership | M |   | R |
|   | 594 | Lean Systems | I | R |   |
|   | 630 | Legal & Ethics Issues in Technology | R |   |   |
|   | 650 | Supply Chain Management | R | I |   |
|   | 655 | Project Management | M | R | R |
|   | 671 | Quality Management | I | I | A |