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| **Assurance of Student Learning Report**  **2023-2024** | | |
| *Ogden College of Science and Engineering* | | *School of Engineering and Applied Sciences* |
| *Lean Six Sigma Graduate Certificate 0452* | | |
| *Mark Doggett* | | |
| ***Is this an online program***?  Yes  No | Please make sure the Program Learning Outcomes listed match those in CourseLeaf . Indicate verification here  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 advanced knowledge and competency in Lean Six Sigma to be able to identify, formulate, and solve technical problems.** | | | |
| **Instrument 1** | Analysis of final project/research paper in Lean System course | | |
| **Instrument 2** | Analysis of application papers in Six Sigma Quality course | | |
| **Instrument 3** | Analysis of application papers in Theory of Constraints course | | |
| **Based on your results, check whether the program met the goal Student Learning Outcome 1.** | | **Met** | **Not Met** |
| **Assessment Cycle Plan:** | | | |
| The Lean Six Sigma Certificate program outcome was met. **Only students seeking certificate credits were counted. Majors taking the courses as electives were not counted.** The program will continue evaluating course contents to ensure that students are achieving this competency. | | | |

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| **Program Student Learning Outcome 1** | | | | | | |
| **Program Student Learning Outcome** | **Graduates will demonstrate advanced knowledge and competency in Lean Six Sigma to be able to identify, formulate, and solve technical problems.** | | | | | |
| **Measurement Instrument 1** | DIRECT MEASURE: Analysis of final project in Lean System course.  Lean Sigma Certificate Students who were enrolled into the Lean Systems EGMT 594 course were required to submit a final, written paper that required them to synthesize the main concepts covered in the course. Students should analyze their projects and discuss important issues. and provide recommendations. The final reports were evaluated based on plan content, analysis, organization and flow, structure of the report and syntax. Also, students were evaluated on the ability to link theory and concepts to practice. | | | | | |
| **Criteria for Student Success** | Lean Sigma Certificate Students who were enrolled into the EGMT594 Lean Systems course should meet or exceed the “Competency” grade level on scale of 1-4. The rubric has the following grading scale: “Mastery (4),” “Competency (3), “Marginal (2),” “Deficient (1).” | | | | | |
| **Program Success Target for this Measurement** | | | 75% of the students in the certificate will have earned 3 / 4 on the written paper on the rubric | | **Percent of Program Achieving Target** | 87% |
| **Methods** | The EGMT 594 Lean System course was offered on Fall 2023. Final project/ research paper was 20% of course total grade. Scores on the rubric ranged from “Mastery (4),” “Competency (3), “Marginal (2),” and “Deficient (1).”  In fall 2022, *(N=8)* Lean Sigma Certificate students took the course with 87% of students achieving competency or mastery grade level on the written paper. Other students in the course were excluded because they were not admitted into the certificate. | | | | | |
| **Measurement Instrument 2** | DIRECT MEASURE: Analysis of final project in Six Sigma Quality course.  Lean Sigma Certificate Students who were enrolled into the Six Sigma Quality EGMT 580 course were required to two application papers that required them to synthesize the main concepts covered in the course. Students analyzed project data and discussed the principal issues, quality status, and recommendations. The papers were evaluated based on technical content, organization, spelling, grammar, punctuation and accuracy. | | | | | |
| **Criteria for Student Success** | Lean Sigma Certificate Students who were enrolled into the EGMT 580 Six Sigma Quality course should meet or exceed the “Competency” grade level on scale of 1-5. The rubric has the following grading scale: “Excellent (5),” "Good (4)," “Competency (3), “Marginal (2),” “Deficient (1).” | | | | | |
| **Program Success Target for this Measurement** | | 75% of the students in the certificate will have earned 3 / 5 on the application papers rubric | | **Percent of Program Achieving Target** | | 91% |
| **Methods** | The EGMT 580 Six Sigma Quality course was offered on Spring 2023. The application papers were 50% of course total grade. Scores on the rubric ranged from “Excellent (5),” "Good (4)," “Competency (3), “Marginal (2),” “Deficient (1).”  In Spring 2024, *(N=11)* Lean Sigma Certificate students took the course with 91% of students achieving competency or above level on the application papers. Other students in the course were excluded because they were not admitted into the certificate. | | | | | |

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| **Measurement Instrument 3** | DIRECT MEASURE: Analysis of application papers in Theory of Constraints TOC course.  Lean Sigma Certificate Students who were enrolled into the Thoery of Constraints EGMT 540 course were required to submit two application papers that required them to apply the TOC thinking tools to a real process, situation, or problem. Students analyzed their selected applications and discussed the principal issues about its undesirable effects, provide a structured approach for resolutions, and identified root causes. The papers were evaluated based on content, appropriate use of tools, format, organization, completeness, research style, grammar, spelling, and punctuation. | | | | |
| **Criteria for Student Success** | Lean Sigma Certificate Students who were enrolled into the EGMT 540 Theory of Constraints course should meet or exceed the “Competency” grade level on scale of 1-5. The rubric has the following grading scale: “Outstanding (5),” "Commendable (4)," “Competency (3), “Marginal (2),” “Deficient (1).” | | | | |
| **Program Success Target for this Measurement** | | 75% of the students in the certificate will have earned 3 / 5 on the application papers rubric | **Percent of Program Achieving Target** | 75% | |
| **Methods** | The EGMT 540 Theory of Constraints course was offered in Spring 2024. The application papers were 50% of course total grade. Scores on the rubric ranged from “Outstanding (5),” "Commendable (4)," “Competency (3), “Marginal (2),” “Deficient (1).”  In Spring 2024, *(N=12)* Lean Sigma Certificate students took the course with 75% of students achieving competency or above on the application papers. Other students in the course were excluded because they were not admitted into the certificate. | | | | |
| **Based on your results, highlight whether the program met the goal Student Learning Outcome 1.** | | | | **Met** | **Not Met** |
| **Results, Conclusion, and Plans for Next Assessment Cycle (Describe what worked, what didn’t, and plan going forward)** | | | | | |
| **Results**:  For 2023-2024, (N = 8 to 12) graduate LSS students participated in the assessment.  Based on the measurement intruments:  87% of students achieved 75% or more in the Lean Systems final project/research paper.  91% of students achieved 60% or more in the Six Sigma application papers.  75% of students achieved 60% or more in the Theory of Constraints application papers.  This was the first year that measurement instrument 3 was added to the ASL. The results are less are slightly less than the other courses, but still meet the sucess target measurement. Faculty will continue to monitor the instrument to ensure students are meeting expectations.  **Conclusions**:  The core courses content and target measures indicate graduates are achieving competences at the desired levels.  **Plans for Next Assessment Cycle:**  Assessment Time:  Outcomes will be assessed in early May every year.  Courses sampled:  EGMT 594 Lean System course  EGMT 580 Six Sigma Quality course  EGMT 540 Theory of Constraints course  Data/artifacts will be collected:  Research and application papers. Grading rubrics and scores.  Faculty responsible for collecting and providing data and information:  Certificate students enrolled will be assessed by the instructors of record.  No further changes are planned at this time. Evaluation of the contents and measures will be reviewed at regular graduate faculty meetings. | | | | | |

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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:** | Mark Doggett | | |
| **Email:** | [mark.doggett@wku.edu](mailto:mark.doggett@wku.edu) | | |
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| **KEY:** | |  |  |
| **I = Introduced** | |  |  |
| **R = Reinforced/Developed** | |  |  |
| **M = Mastered** | |  |  |
| **A = Assessed** | |  |  |
|  |  |  | **Learning Outcomes** |
|  |  |  | **LO1:** |
|  |  |  | **Graduates will demonstrate advanced knowledge and competency in Lean Six Sigma to be able to identify, formulate, and solve technical problems.** |
| **Course Subject** | **Number** | **Course Title** |  |
|  | 580 | Six Sigma Quality | A |
|  | 594 | Lean Systems | A |
|  | 540 | Theory of Constraints | A |
|  |  | Electives (select 1) |  |
|  | 655 | Project Management | M |
|  | 671 | Quality Management | M |
|  | 520 | Resource Management | R |
|  |  |  |  |
|  | 590 | Operations Leadership | R |