

Institutional Effectiveness
2022-2023

Program: Engineering Management MS, Master's of Science in Engineering Management (MSEM)

College and Department: College of Engineering

Contact: John Tester

Mission:

To provide distance learning in the engineering management knowledge area to working technology employees with four-year engineering degrees and equivalent science degrees.

Attach Curriculum Map (Educational Programs Only): *See Appendix 1.

SLO 1: COMMUNICATION

Define Outcome:

Students will demonstrate an ability to communicate graduate-level Engineering Management topics in a professional format.

Assessment Methods:

EMGT 6900 (Final Professional Project class) Professional Project Report. Data contains:

- Student creation of written project report.
- Student oral presentation (online or in person) before instructor and advisory committee members.

Criteria for Success (Thresholds for Assessment Methods):

Metrics for success

- Written Report: Exceeding 75%: Student proportion of above average grading outcomes for written project report
 - Result: 100%. All students exceeded 85/100 score. Detailed outcomes for each student are in attached sheets under "Plan Item Files"
- Written Report: Exceeding 75%: Student proportion of above average grading outcomes for oral presentation report
 - Result: 100%. All students exceeded 85/100 score. Detailed outcomes for each student are in attached sheets under "Plan Item Files"

Results and Analysis:

EMGT 6900 (Final Professional Project class) Professional Project Report. Data contains:

- Student creation of written project report. **Result: 100% (all students achieved metric threshold)**
- Student oral presentation (online or in person) before instructor and advisory committee members. **Result: 100% (all students achieved metric threshold)**

Writing portion:

Background for the Fall 2022 course, developed and taught by Dr. John T. Tester, General & Basic Engineering Associate Professor.

(For Fall 2022 EMGT6900 offering. A Summer 2023 EMGT6900 offering was not finished and graded by due date of the 2023 annual Campus Assessment deadline)

The Project Report (“The Report”) was created from a semester-long project. The project was either

- a student-specific project from their workplace, termed “Industry Project,” or
- a business simulation project that emulated an electronic sensor manufacturing company.
 - This simulation was managed through CapSim, a company that specifically runs such simulations for higher institutions.
 - Students wrote their reports based upon their own individual management decisions for the simulated company. Each student had different outcomes for their company.
 - Emphasis during semester was not how well the student could “Score” in the built-in scoring system, but rather what they learned as part of their decision-making processes.

The instructor structured the course such that there were 3 graded drafts created for the report throughout the semester, and one final version of the report; the final version was the assessment instrument for this LO. This approach enabled early feedback to the students with regards to grammatical defects presented and the structure of organizing their ideas. The result was that the final versions of the reports had very few writing errors. This positive result also may be supported by the fact that all the students were working professionals in their fields.

Metrics for success

- Exceeding 75%: Student proportion of above average grading outcomes.

Results: Average is considered a B (85/100) or better score overall. All students earned above this metric for their final version of the report. The graded reports (student original work, instructor grading comments, and scoring) are included as single file, attached.

Oral Presentation portion:

Background for the Fall 2022 course, developed and taught by Dr. John T. Tester, General & Basic Engineering Associate Professor.

For Fall 2022 EMGT6900 offering. A Summer 2023 EMGT6900 offering was not finished and graded by due date of the 2023 annual Campus Assessment deadline. Though the oral presentation was finished and scored prior to the Campus Assessment deadline, these results are withheld pending the final completion of the Summer 2023 course.

The Oral presentation was based upon the preliminary results of a student's the Project Report, which in turn was based upon a semester-long project. Refer to "Writing Portion" of this SLO for information on the project. The oral presentation had characteristics of...

- Totally online presentation. This requirement was due to the completely online aspect of the MSEM program. However, the presentation was synchronously delivered.
 - This synchronous delivery was one of the very few required for the otherwise asynchronous nature of the MSEM program courses.
- Presentation to be conducted by student for 25 to 45 minutes.
 - Variation due to the differences between types of projects.
- Scoring and assessment scoresheets were completed by evaluators:
 - Instructor (Dr. Tester)
 - Optional: Other faculty observers (graduate committee members)

Metrics for success

- Exceeding 75%: Student proportion of above average grading outcomes.

Results: Average is considered a B (85/100) or better score overall. All students earned above this metric for their final version of the report.

Use of Results to Improve Outcomes:

Part 1: Written

The written communications (report document) assessments were thorough with feedback throughout the semester. The final version (graded with feedback) are attached.

Part 2: Oral presentation

There were two sets of questions on the oral presentation scoresheets, one for grading of the student in broad categories of

- Appropriate presentation of project knowledge and findings
- Correct Format, Grammar and Spelling
- Organization of presentation and displayed preparation

These scoring categories may not align well with “Assessment of communication” for an oral presentation point of view. Thus, the next EMGT6900 offering will include instructor questions beyond simply prescribed grading from the course.

SLO 2: ENGINEERING ANALYSIS AND EVALUATION

Define Outcome:

Students will be able to analyze and evaluate data from multiple sources as part of making informed engineering management decisions.

Assessment Methods:

SLO2 A1: EMGT 6220 Assignment 2 results. Data contains: Student creation and evaluation of Engineering Management proposal.

SLO2 A2: EMGT6900 (Final Professional Project class) Exit Survey. Report contains data:

- Student self-efficacy of engineering management analysis tools learned as part of MSEM educational experience.
- Student self-efficacy of business management tools learned as part of MSEM courses enrolled from the Business College.

SLO2 A3: EMGT 6300 Project assignment. Data contains: Student creation and evaluation of Decision Analysis report, based upon several selected Engineering Management publications.

Criteria for Success (Thresholds for Assessment Methods):

SLO2 A1: Metrics for success

- a. Exceeding 75%: Student proportion of above average grading outcomes.

SLO2 A2: Metrics for success

- a. Greater than 50% of students report good confidence (or higher) in at least 75% of the listed analytical tools.
- b. Greater than 50% of students report good confidence (or higher) in at least 75% of the listed management tools.

SLO2 A3: Metrics for success

- a. Exceeding 75%: Student proportion of above average grading outcomes.

Results and Analysis:

Three instruments used for assessment. 2 show positive completion and one was inconclusive (poor data). See below for details.

EMGT 6220 Assignment 2 results. Data contains:

- Student creation and evaluation of Engineering Management proposal.

Background for Assignment 2

For their proposal document, the students are to identify the tasks, resources, and the resource types (individual, cost, or material). The result for each student is an enterprise charter and an early draft proposal document (it may be one document or two separate ones). Identification of the above items also lead to the development of additional required elements: Advantages, Quality plan, Communication plan, project schedule, deliverables, financial information (cost/price estimations) and other terms or conditions. Writing style is addressed primarily for format.

Metrics for success

- Exceeding 75%: Student proportion of above average grading outcomes.

Results: Average is considered a B (8/10) or better score overall.

5 out of 6 students earned above this metric for their work, or 83%.

Analysis:

The metric was achieved. This result was anticipated, since the work requires noting the details of a developed charter and proposal. The one student who had difficulty may have not understood the assignment as delivered, as he simply did not develop in detail the required elements.

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EMGT6900 (Final Professional Project class) Exit Survey. Report contains data:

- Student self-efficacy of engineering management analysis tools learned as part of MSEM educational experience.

- Student self-efficacy of business management tools learned as part of MSEM courses enrolled from the Business College.

Background for Survey

Fall 2022 was the first semester for the MSEM ‘professional project course,’ EMGT6900. The students were requested to address the MSEM program as part of their EMGT6900 Oral Presentation. Primary information was in students’ presentation slide bullets. Also, notes were taken by the instructor and other faculty attending (optional) with regards to their presentation comments on this topic.

Metrics for success

- Greater than 50% of students report good confidence (or higher) in at least 75% of the listed analytical tools.
- Greater than 50% of students report good confidence (or higher) in at least 75% of the listed management tools.

Results: Inconclusive (no data of value collected).

Analytical tools:

Essentially no student reported on analytical learning levels in their presentation. Some reported value to the following topics in a general manner:

- Decision analysis (3 student)
- Project Management (1 student)
- Forecasting (1 student)

Management tools:

Essentially no student reported on management learning levels in their presentation. Some reported value to the following management-oriented topics in a general manner:

- Organizational Leadership (4 students)

Analysis:

The method used to collect the data—oral presentation slides and manual notes—was too broadly interpreted by the students to be of value in Fall 2023, except for anecdotal information.

The goal of addressing these topics was to ask their experiences in learning from the “Engineering” side (seven courses from the Engineering College) and the “Business” side (four courses from the Business College).

The students reported primarily upon their views of ‘most useful’ or ‘most valuable in the workplace.’ They did not address the more specific topics of “analytical tools” or “management tools” learned and practiced.

It was valuable to learn that the Business College’s Organizational Leadership course (BMGT6200) was so universally well received by all these Engineering students. The MSEM Coordinator is located in the College of Engineering and thus did not have clear feedback on any of the four College of Business’ courses taken by the students, until this assessment was completed.

Assessment Methods

EMGT 6300 Project assignment

Student creation and evaluation of Decision Analysis report, based upon several selected Engineering Management publications.

Background for Project assignment

Students are to investigate methods of decision-making in an Engineering Management environment. They develop their supporting introductions and backgrounds, with a summative conclusion. All their statements must be supported by Engineering Management disseminations. Writing style is addressed, with an emphasis for connecting statements with evidence or deductive reasoning.

Of note: Only 3 students were enrolled for this course in this semester.

Metrics for success

- Exceeding 75%: Student proportion of above average grading outcomes.

Results: Average is considered a B (8/10) or better score overall.

3 out of 3 students earned at or above this metric for their work, or 100%.

Analysis:

The metric was achieved.

Low enrollment was already noted, regardless. In this case, it may have allowed for even a distance course instructor to devote more time per student than may otherwise be possible for future, higher enrollments. Thus, this perfect metric achievement may change in the future.

Also of note: EMGT6300 is offered as the 6th Engineering course in the 5th semester of the MSEM program. Students should be understanding the nature of Engineering Management details at this point in the program.

Use of Results to Improve Outcomes:

Three instruments used for assessment. Improvements planning for each noted in order of Results presentation:

EMGT 6220 Assignment 2 results. Data contains:

- Student creation and evaluation of Engineering Management proposal.

Improvement investigations:

Given the achievement of the metric score, only a continuing review for the Spring 2024 assignment is warranted.

A totally online and asynchronous course may have the immediate observation that students do not always consume the instructions on their own in an in-depth or comprehending manner. Nevertheless, EMGT6220 is slated as taken in the 3rd semester of the MSEM program; it also is envisioned as the 3rd Engineering course taken by the students. Thus, the student should have had previous experience in both online instruction and in the Engineering Management genre.

EMGT6900 (Final Professional Project class) Exit Survey. Report contains data:

- Student self-efficacy of engineering management analysis tools learned as part of MSEM educational experience.
- Student self-efficacy of business management tools learned as part of MSEM courses enrolled from the Business College.

Improvement Investigations:

The assessment method was simply too vague to be of value in this first course offering.

This method was not anonymous, and accomplished while the EMGT6900 grades had yet to be finalized. Thus, students' observations of their learning experience and knowledge may be even less accurate than already observed.

For the next offering (Summer 2023), the MSEM Coordinator will create and make available a survey for the students to submit. The survey results will be anonymously submitted with the Survey quiz tool in iLearn (the Learning Management System). It will enable recorded answers that should produce more targeted information for this LO's assessment approach.

EMGT 6300 Project assignment

- Student creation and evaluation of Decision Analysis report, based upon several selected Engineering Management publications.

Improvement investigations:

Even though the metric was achieved, there were so few students enrolled in the class that this assessment method will be reviewed after more enrollment is secured in the next year.

Summative Evaluation:

SLO1: The communication outcomes (Written and Oral)

These were sufficiently demonstrated in EMGT6900. However, the individual course's scoring categories may not align well with "Assessment of communication" for an oral presentation point of view.

SLO2: Engineering Management Analysis demonstrations:

The engineering management tools knowledge application was well demonstrated in two course results. However, for one course (EMGT6300), there was low enrollment (three students) to prevent any confidence in consistent outcomes. The third assessment approach, using self-reported confidence in the use of engineering management knowledge, was not sufficiently responded to by the graduates.

Program Outcomes were not separately reported in AY2022-2023. However, preliminary summaries are reported in the Summative Evaluation below, and details may be updated upon request.

PO 1: Degree completion.

Six students have been awarded MSEM degrees by end of Spring 2023 (report required data prior to end of Summer 2023 semester). Three students completed (or on track to complete) the program in six semesters, verifying that the published curriculum is achievable by students who choose to follow it. However, the same data shows that students are taking longer than two years to complete, averaging 2.6 semesters for

degrees. This issue is not a concern for totally online programs with fully employed students.

PO 2: Provide an equivalent learning experience to that of on campus

The Degrees Sought data implies the MSEM degree is completed on an average of 2.6 years per student, which may indicate a similar graduation length as that of other on campus engineering degree programs. No on-campus comparative data is available to Coordinator by time of this report.

PO 3: Program Sustainability

Enrollment

Student enrollment is a key component of the program's continued sustainability. The data shows trend data as slightly increasing each academic year: 26 to 39 to 53 by end of 2022-2023 AY. Part of the increases are due to students being retained longer than the planned 2 years of enrollment, as they enroll in courses for less than 2 courses per semester, thus staying in the pipeline.

Support infrastructure

Only two faculty in the MSEM-supporting department are eligible and partially available to teach MSEM Engineering graduate courses.

Assessment Plan Changes:

SLO1: The communication outcomes (Written and Oral)

These were sufficiently demonstrated in EMGT6900. However, the individual course's scoring categories may not align well with "Assessment of communication" for an oral presentation point of view. Thus, the next EMGT6900 offering will include instructor questions (interactive and survey-based) beyond simply prescribed grading from the course.

SLO2: Engineering Management Analysis demonstrations:

The engineering management tools knowledge application was well demonstrated in two course results. However, for one course (EMGT6300), there was low enrollment (three students) to prevent any confidence in consistent outcomes. This assessment will be repeated in the next course offering with more students participating. The third assessment approach, using self-reported confidence in the use of engineering management knowledge, was not sufficiently responded to by the graduates. An

anonymous survey will be integrated into EMGT6900 and required for completion, in order to remedy this issue for the SLO.

Program Outcomes were not separately reported in AY2022-2023. However, preliminary summaries are reported in the Summative Evaluation below, and details may be updated upon request.

PO 1: Degree completion.

No concern in student completion makespan is present, so no changes are planned for this PO1.

PO 2: Provide an equivalent learning experience to that of on campus

The Coordinator will request on-campus graduation data for engineering graduate programs, for comparison

PO 3: Program Sustainability

Enrollment

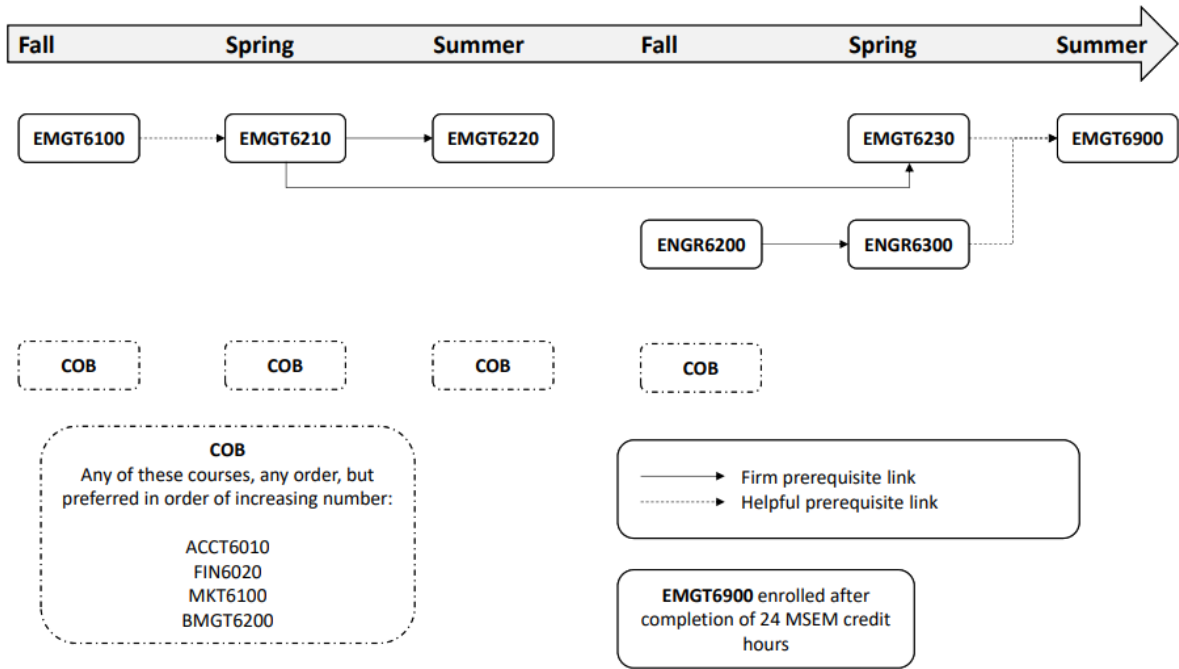
Increasing numbers staying enrolled is not a concern, due to fully employed, career students. No activities to change this trend are planned.

Support infrastructure

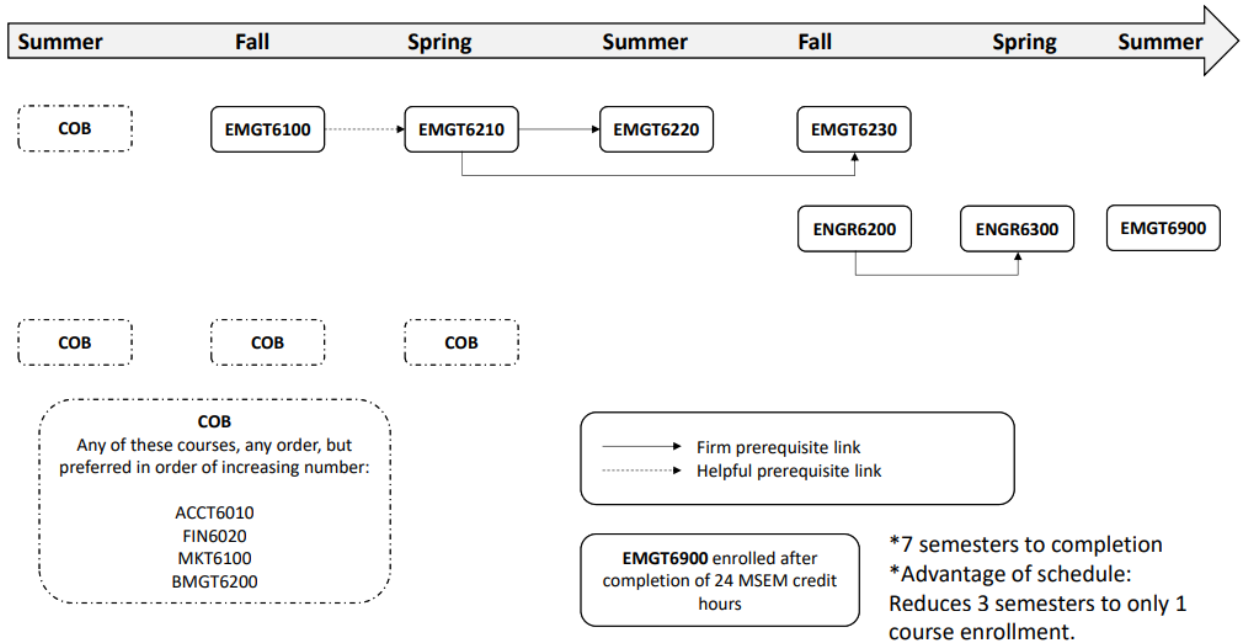
The MSEM Coordinator is seeking alternatives for supporting the teaching obligations. Adjunct employment is one option currently underway. In 2024, a curriculum review will soon be conducted by a committee of MSEM-oriented faculty and external industry advisors to better understand other options for sustainability.

Appendix 1: Curriculum Map, Engineering Management MS

Fall start



*Summer start**



Appendix 1, Curriculum Map, Engineering Management MS, cont.

