

711: ENGINEERING MANAGEMENT GRADUATE MAJOR

In Workflow

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8. 14 Day Review (none)
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Approval Path

1. Thu, 19 Jan 2023 23:24:54 GMT
Janice Nave-Abele (Curriculum Management, Curriculum Coordinator) (janice.nave-abele): Rollback to Initiator
2. Wed, 01 Feb 2023 20:18:21 GMT
Janice Nave-Abele (Curriculum Management, Curriculum Coordinator) (janice.nave-abele): Approved for APA Coordinator Programs
3. Thu, 02 Feb 2023 05:20:38 GMT
Belinda Sykes (Office of the Registrar, Catalog & Curriculum Coordinator) (belinda.sykes): Approved for Catalog Coordinator
4. Wed, 01 Mar 2023 07:11:49 GMT
David Blunck (College of Engineering, Associate Dean for Undergraduate Programs) (david.blunck): Approved for 16 Dean Designee
5. Fri, 03 Mar 2023 16:10:23 GMT
Alix Gitelman (Vice Provost for Academic Affairs) (alix.gitelman): Approved for Provost Designee
6. Fri, 03 Mar 2023 16:50:56 GMT
Robert Bertini (School of Civil & Construction Engineering, School Head) (robert.bertini): Approved for CCE Head
7. Fri, 03 Mar 2023 19:41:31 GMT
Kathryn Howard (Ecampus, Program Intake Coordinator) (kathryn.howard): Approved for Ecampus Programs
8. Mon, 06 Mar 2023 20:54:42 GMT
David Jacobs (Capital Planning & Development, Manager - Space Allocation) (david.jacobs): Approved for Space Evaluation
9. Tue, 21 Mar 2023 09:27:47 GMT
0/1 votes cast.
Yes: 0% No: 0%
Approved for 14 Day Review
10. Tue, 21 Mar 2023 14:14:04 GMT
June Worley (School of Mechanical, Industrial & Manufacturing Engineering, Instructor) (worleyj): Approved for worleyj
11. Tue, 21 Mar 2023 16:28:58 GMT
Kristin Nagy Catz (OSU Director of Assessment) (kristin.nagycatz): Approved for Graduate Assessment
12. Mon, 27 Mar 2023 21:52:04 GMT

Brian Bay (School of Mechanical, Industrial & Manufacturing Engineering, Associate Professor) (Brian.Bay): Approved for 16 College Committee Approver

13. Mon, 03 Apr 2023 18:26:21 GMT
Janice Nave-Abele (Curriculum Management, Curriculum Coordinator) (janice.nave-abele): Approved for APA Coordinator Programs
14. Mon, 03 Apr 2023 18:35:00 GMT
June Worley (School of Mechanical, Industrial & Manufacturing Engineering, Instructor) (worleyj): Approved for worleyj
15. Wed, 19 Apr 2023 00:12:03 GMT
Frank Chaplen (Biological & Ecological Engineering, Associate Professor) (frank.chaplen): Rollback to worleyj for Budgets and Fiscal Planning Committee Chair
16. Tue, 09 May 2023 15:24:43 GMT
June Worley (School of Mechanical, Industrial & Manufacturing Engineering, Instructor) (worleyj): Approved for worleyj
17. Mon, 22 May 2023 18:12:56 GMT
Frank Chaplen (Biological & Ecological Engineering, Associate Professor) (frank.chaplen): Approved for Budgets and Fiscal Planning Committee Chair
18. Tue, 30 May 2023 17:38:24 GMT
John Becker-Blease (College of Business, Associate Dean of Graduate Programs, and Graduate Council Chair) (john.becker-blease): Approved for Graduate Council Co-Chairs
19. Wed, 31 May 2023 19:22:34 GMT
Janice Nave-Abele (Curriculum Management, Curriculum Coordinator) (janice.nave-abele): Approved for APA Coordinator Programs
20. Mon, 09 Oct 2023 22:56:03 GMT
Jim Coakley (College of Business, Associate Professor and Curriculum Council Co-Chair) (jim.coakley): Approved for Curriculum Council Co-Chairs

New Program Proposal

Date Submitted: Fri, 20 Jan 2023 00:49:11 GMT

Viewing: : Engineering Management Graduate Major

Last edit: Thu, 02 Feb 2023 05:19:50 GMT

Changes proposed by: worleyj

Proposal

Effective Term

Fall 2023

Justification

The Engineering Management program is currently offered through Ecampus as a "Master of Engineering in Industrial Engineering with Engineering Management Option." This proposal would:

1. Separate the degree from Industrial Engineering to create a stand-alone Engineering Management degree.
2. House the new degree to Civil and Construction Engineering (CCE).

Though Engineering Management does share some curriculum with Industrial Engineering, CCE has a thriving Construction Engineering Management (CEM) undergraduate program. Moving the program to CCE will create a graduate path for the undergraduate program, while still serving engineering students from other disciplines. It is anticipated that future program developments will include the addition of CEM online graduate courses to create a CEM-focused track, as well as additional subject-focused tracks to better meet the needs of our students.

Correct designation of the degree will:

1. Lessen confusion amongst students.
2. Align the degree name with other academic institutions.
3. Allow Ecampus to accurately focus marketing efforts.
4. Allow better tracking for budgetary and administrative purposes.

The Industrial Engineering with an Engineering Management option is well-established at OSU. It has been offered through Ecampus since 2015. The longevity of the program, paired with the nationally recognized quality of Ecampus, will help facilitate growth of the new Engineering Management degree program. With the modality of the program, OSU is uniquely positioned to recruit students regardless of geographic location. The cost of the degree makes it competitive with other academic institutions within the United States.

Primary Originator

Name
June Worley (School of Mechanical, Industrial & Manufacturing Engineering, Instructor)
Carley Ries (College of Engineering, Assistant Dean-Online Learning)
John Becker-Blease (College of Business, Associate Dean of Graduate Programs, and Graduate Council Chair)

Glencora Borradaile (School of Electrical Engineering & Computer Science, Associate Dean of Graduate Programs)

Robert Bertini (School of Civil & Construction Engineering, School Head)

Shane Brown (School of Civil & Construction Engineering, Professor)

Brian Mills (College of Engineering, Assistant Dean Curriculum & Assessment)

Liaisons

Academic Unit

College of Business - Graduate (BA)

School of Civil & Construction Engineering (ARE, CE, CCE, CEM)

School of Mechanical, Industrial & Manufacturing Engineering (AAE, ESC, ESE, HEST, IE, MATS, ME, MFGE, MIME, ROB)

School of Electrical Engineering & Computer Science (CS, ECE, SE)

College of Business - Graduate (BA)

School of Management, Entrepreneurship & Supply Chain (MGMT, SCLM)

School of Marketing, Analytics & Design (BANA, DSGN, MRKT)

College of Forestry

Forest Engineering, Resources & Management (FE, FOR)

Wood Science and Engineering (WSE)

Agricultural Education & General Agriculture (AED, AG, LEAD)

Program Information

Program Level

Graduate

Program Type

Major / Degree

Name

Engineering Management Graduate Major

CIP Code

151501 - Engineering/Industrial Management.

College

Engineering (16)

Academic Unit

School of Civil & Construction Engineering

Is this program jointly administered?

No

Date the Early Alert was submitted for this proposal

July 2020

What degree types are available for this graduate or professional program?

Other

Select other degree type

Master

List other degree type/s

Master of Engineering (MEng)

Campus Locations

Ecampus

Is this program currently or planned to be offered in hybrid format?

No

Will this program lead to professional licensure in any U.S. state or territory?

No

Program Relationships

Are all degree types and options (if applicable) available at all locations?

Yes

Does this program use an alternative admissions process or have grade/GPA standards that are different from the university minimum?

No

Does this major have options?

No

Executive Summary

Executive Summary

The Engineering Management program serves undergraduates from STEM programs who have some work experience and are interested in transitioning to a position in management or leadership. The broad-based curriculum remains technical in nature, with an emphasis on quantitative analysis and critical thinking.

The MEng requires a minimum of 45 credits, a capstone course, and a final oral exam.

Most students work full-time and take one to two classes a term, completing the degree within three years. The degree is entirely online and asynchronous.

HECC - Higher Education Coordinating Commission

Program Description

HECC Description

Graduates from the Engineering Management program complete foundational coursework in project management, basic management, and economic analysis. With electives, students can shape their education to fit their unique needs. Classes are offered four terms a year, providing maximum flexibility for students.

The program is designed to provide both foundational theory and opportunities for application of concepts. Emphasis is on active learning and high levels of interaction including teacher-to-student, student-to-content, and student-to-student.

Brief overview of the proposed program, including its disciplinary foundations and connections; program objectives; programmatic focus; degree, certificate, minor, and concentrations offered

Disciplinary Foundations and Connections:

The Engineering Management program has been structured to align with the eleven subject domains identified as foundational knowledge for an engineering manager by the American Society for Engineering Management (ASEM). ASEM is recognized as one of the first societies to promote the field of engineering management, based on its close association with the first engineering management program at the University of Missouri (now Missouri S&T). The ASEM engineering management body of knowledge (EMBOK) is regularly updated by ASEM scholars.

In addition, the Institute of Industrial and Systems Engineers (IISE) has a society focused on engineering management. When designing curriculum, the IISE body of knowledge (IISE BOK) is cross-referenced to provide an additional perspective.

Other disciplines that guide curriculum include the Project Management Institute (PMI), the International Council on Systems Engineering (INCOSE) and the American Society for Engineering Education (ASEE).

Program Objectives:

The Engineering Management program provides STEM undergraduates with a path to managing and leading technical organizations.

Program objectives include:

1. Providing students with the foundations of up-to-date, research-based engineering management knowledge around planning, organizing, leading, and controlling a technical organization.
2. Creating critical thinkers who are able to integrate technical knowledge with strategy to provide innovative solutions to real-world problems.
3. Creating efficient communicators who can flexibly engage with a broad range of stakeholders.

Programmatic focus:

The program focuses on alignment with the eleven domains of ASEM. These domains are:

- Functions of management
- Leadership & organizational management

- Strategic planning
- Financial resource management
- Project management
- Quality management system
- Operations & supply chain management
- Management of technology
- Systems engineering
- Legal issues
- Ethics

Degree, certificate, minor, and concentrations offered:

1. Master of Engineering
2. Certificate of Engineering Management
3. Micro-credential in Engineering Management
4. Micro-credential in Engineering Project Management

Manner in which the program will be delivered, including program location (if offered outside of the main campus), course scheduling, and the use of technology (for both on-campus and off-campus delivery)

Program delivery:

1. Online and asynchronous.
2. Delivered through OSU's Ecampus.
3. Delivered through the Canvas learning management system.

Course Scheduling:

Most courses are offered once per year. Two of the required courses (Introduction to Management for Engineers & Scientists and Project Management for Engineers) are offered three times per year. Students from other programs and colleges have enrolled in both courses as electives.

Technology Use:

Students have access to Microsoft Windows products including spreadsheet, word processing, and project management software. Other software applications utilized through Canvas integration include: Peerceptiv, Turnitin, Google Docs, Google Jamboard, and Perusall.

Adequacy and quality of faculty delivering the program

Adequacy of Delivery:

Current faculty are adequate to meet instructional and advising needs for students in the program.

Adequacy of Re-development/Development of Courses:

The time commitment necessary for development/re-development of a high-quality Ecampus course can be considerable. Additional faculty may be needed to help meet this demand.

Quality:

Four of the five instructors have PhDs in Industrial Engineering or one of the engineering management domains of knowledge. One instructor has over 20 years of industry experience and an MBA.

Adequacy of faculty resources – full-time, part-time, adjunct

Current faculty: Five part-time adjuncts.

We are recruiting for one full-time (9-month) adjunct in anticipation of program growth.

Three of the five adjuncts work 12 months.

One adjunct works 9 months.

One adjunct works one term a year.

Other staff

One part-time director who is also the advisor and one of the five part-time adjuncts.

The external review of July 2022 noted the lack of advising resources. It is anticipated that as the program grows, the advising duties will be supported by the advising team within CCE.

Adequacy of facilities, library, and other resources

Library:

The Oregon State University library is well-equipped for online learning, with access to many online journals and books. The availability of learning materials allows many of the Engineering Management courses to utilize no-cost or low-cost materials in support of the Oregon Legislature's efforts to increase textbook affordability.

Of the five required courses, four courses use no-cost or low-cost materials. Of the current courses, over 61% use low-cost or no-cost materials. We anticipate this percentage will increase as courses are re-developed.

Other Resources:

Oregon State University, the Graduate School, and Ecampus provide additional student support including:

1. Computer support (from help with Canvas, to support for individual software applications)
2. Accommodations for all learners through Disability Access Services

3. Ecampus student services to help connect distance learners with OSU services
4. Ecampus career hub
5. Mental health support online through Counseling & Psychological Services
6. Tutoring
7. OSU writing center
8. Graduate School online orientation sessions
9. GradAdvantage skills assessment
10. Grad-focused career support through the Graduate School

Relationship to Mission and Goals

Manner in which the proposed program supports the institution's mission, signature areas of focus, and strategic priorities

How the Program Supports OSU's Mission:

The Engineering Management program provides an accessible, cost-effective education to students from a broad range of backgrounds, supporting the mission to provide economic, social, and cultural progress. Our students are not limited by geography or time zone and are able to participate from anywhere in the world.

The program emphasizes active learning and application of knowledge. Students from the Engineering Management program are expected to develop critical thinking skills because of this emphasis. Reflection on how knowledge can be applied to real-world problems is built into several of the courses.

How the program supports the signature areas of focus:

In terms of advancing economic prosperity and social progress, the program has worked to streamline the admissions process, considering applications holistically, creating more access to students who may have traditionally been unsuccessful in applying to graduate school. The modality of the program provides a cost-effective opportunity for those students who work full-time to continue their education, increasing access to students who may not have previously had the chance to enroll in a traditional, campus-based program. Expanded access provides opportunities for non-traditional students to increase their influence in the technical sector and lend their voices to a culture that has not always been diverse.

How the program supports strategic priorities:

Transformative education that is accessible to all learners:

All courses are asynchronous, allowing non-traditional students to participate from anywhere in the world. All materials are monitored for accessibility by Ecampus. In addition, materials for re-developed courses are curated with the goal of providing information in different formats, supporting students with different learning preferences.

Significant and visible impact in Oregon and beyond:

The curriculum provides peer-to-peer interaction, allowing students the opportunity to learn from multiple, real-world perspectives.

The program is committed to providing a curriculum that produces critical thinkers and flexible problem solvers. With the support of Ecampus, the program is working to have courses certified through Quality Matters™ a nationally recognized standard of course quality. As curriculum development continues, the program will request certification for all courses.

A culture of belonging, collaboration, and innovation:

Most of the courses require virtual projects and discussions, providing a collaborative experience and preparing students for more realistic employment scenarios. Ecampus provides our instructors with the latest in online teaching practices and supports continuous improvement efforts before full-scale re-development of courses. The Center for Teaching and Learning also provides opportunities for instructors to incorporate the latest developments in teaching pedagogies.

Manner in which the proposed program contributes to institutional and statewide goals for student access and diversity, quality learning, research, knowledge creation and innovation, and economic and cultural support of Oregon and its communities

The online nature of the program allows students from any part of Oregon to participate, without the need to commute or relocate. Students may continue their current employment, integrating knowledge from the program into Oregon organizations and communities.

Manner in which the program meets regional or statewide needs and enhances the state's capacity to:

Improve educational attainment in the region and state:

Offering the program online, asynchronously, allows students from any region within the Pacific Northwest to access the curriculum. In addition, students who are close to any of the physical Oregon State University campus locations have the option of taking a select number of electives from other programs such as Industrial Engineering or Construction and Civil Engineering.

Currently, 68% of our students are from Oregon. We continue to meet the needs of the technology organizations of the Pacific Northwest by providing access to educational opportunities that will enable their technical employees to gain the skills necessary to move into leadership positions.

Respond effectively to social, economic, and environmental challenges and opportunities:

This program allows students to continue to advance their education, without disrupting their lives or their careers. Moving to a new city to begin graduate school can mean losing key support relationships. Allowing students to remain in their home communities ensures those relationships remain intact. The flexibility of the program allows students the opportunity to continue to work, minimizing economic impact. Over 75% of our students are given tuition help by their employers. The online program means students are not using physical resources on the Oregon State University campus or engaging in increased travel to visit their home communities, reducing environmental impacts.

Address civic and cultural demands of citizenship

The curriculum of this program is intended to engage students at a global level. Courses are offered in ethics and legal aspects of management. The challenges facing all communities continue to grow. This program strives to create graduates who will not only be aware of those challenges but be prepared to address them.

Accreditation**Accrediting body or professional society that has established standards in the area in which the program lies, if applicable**

Accrediting is not anticipated.

The American Society for Engineering Management, the Project Management Institute, and the International Council on Systems Engineering all regularly publish guiding bodies of knowledge. These resources are utilized to guide program development.

In the future, we will explore ASEM program certification through the American Society for Engineering Management.

Ability of the program to meet professional accreditation standards. If the program does not or cannot meet those standards, the proposal should identify the area(s) in which it is deficient and indicate steps needed to qualify the program for accreditation and date by which it would be expected to be fully accredited

N/A

If the proposed program is a graduate program in which the institution offers an undergraduate program, proposal should identify whether or not the undergraduate program is accredited and, if not, what would be required to qualify it for accreditation

N/A - an undergraduate Engineering Management program does not exist at OSU

If accreditation is a goal, the proposal should identify the steps being taken to achieve accreditation. If the program is not seeking accreditation, the proposal should indicate why it is not

N/A

Need**Anticipated fall term headcount, FTE enrollment, and expected degrees/certificates produced over each of the next five years****Year One:****Fall Term Headcount:**

45

FTE Enrollment:

18

Expected Degrees/Certificates

12

Year Two:**Fall Term Headcount:**

62

FTE Enrollment:

25

Expected Degrees/Certificates:

25

Year Three:**Fall Term Headcount:**

67

FTE Enrollment:

27

Expected Degrees/Certificates

30

Year Four:**Fall Term Headcount:**

70

FTE Enrollment:

28

Expected Degrees/Certificates

32

Year Five:

Fall Term Headcount:

76

FTE Enrollment:

30

Expected Degrees/Certificates

34

Characteristics of students to be served (resident/nonresident/international; traditional/ nontraditional; full-time/part-time, etc.)

Students served by the Engineering Management program include:

Oregon residents, out-of-state students, on campus students who complete classes as electives, international students.

Over 90% of students are nontraditional and work in full-time positions.

Evidence of market demand

The Bureau of Labor (2023) identified the following data for architectural and engineering managers:

- 2021 median pay: \$152,350/year
- Job outlook for architectural and engineering managers: 2021-2031: 2% growth
- Job outlook for all management occupations: 2021-2031: 8% growth

In addition, the Future of Jobs Survey 2020 by the World Economic Forum identified several in-demand skills that link to outcomes of the Engineering Management program (World Economic Forum, 2020). Some of the skills include:

- Analytical thinking and innovation
- Complex problem-solving
- Critical thinking and analysis
- Technology use, monitoring and control
- Systems analysis and evaluation

The external review of July 2022 questioned the projected program growth, especially with respect to areas outside of the Northwest region. In response:

1. Many of the students in the program are either located in the state of Oregon or they are alumni of other Oregon State University undergraduate engineering programs. With the large number of engineering undergraduates at Oregon State, the projected program growth seems realistic.
2. CCE enjoys strong ties with an active CCE alumni base. CCE anticipates high interest in the EM degree from alumni and expects to use those connections to market the EM degree to the industries those alumni lead and manage.
3. In 2020, a small benchmarking project of other online EM programs was completed. The benchmarking project revealed strong inconsistencies in terms of coursework and cost across the United States. We will continue to benchmark our program against other U.S. programs, as well as gather data from employers to find where we can add unique value.
4. We would like to pursue certification with the American Society for Engineering Managers. Currently, there are a total of eight certified programs. Anecdotal information indicates certification would increase visibility and drive more students to the program.
5. Ecampus continues to pursue innovative partnerships with companies that offer tuition reimbursement. We have received several applications tied to these partnerships and anticipate this will continue to increase.
6. To date, little formal marketing has been completed for the degree. Once approved, we anticipate marketing efforts will increase program growth.

Citations:

Bureau of Labor Statistics, U.S. Department of Labor. (n.d.) Occupational Outlook Handbook, Architectural and Engineering Managers. <https://www.bls.gov/ooh/management/architectural-and-engineering-managers.htm>

World Economic Forum. (2020, October). The future of jobs report 2020. <https://www.weforum.org/reports/the-future-of-jobs-report-2020>

If the program's location is shared with another similar Oregon public university program, the proposal should provide externally validated evidence of need (e.g., surveys, focus groups, documented requests, occupational/employment statistics and forecasts)

Portland State University offers an M.S. in Engineering & Technology Management. The degree shares some overlap with OSU, but it does not have the breadth of the OSU degree. It does not align with the subject domains identified by the American Society for Engineering Management. The Portland State program is offered on-campus. It does not offer an asynchronous, online version during normal campus operations.

The external review of July 2022 questioned the overlap with the Systems Engineering program at Portland State University. The website for the Master of Engineering in Systems Engineering indicates the program is no longer accepting new applications for this degree.

Estimate the prospects for success of program graduates (employment or graduate school) and consideration of licensure, if appropriate. What are the expected career paths for students in this program?

Over 90% of our students are working full-time and over 75% of the students are provided full or partial tuition reimbursement. Anecdotally, many students indicate the return to graduate school was motivated by an interest in gaining skills/education to move to another position or to gain needed credentials for promotion.

This degree will help students transition to roles such as:

- Project manager
- Program manager
- Engineering manager
- Construction manager
- Director of engineering
- Clinical manager
- Systems engineer
- Plant manager
- Production manager

Outcomes and Quality Assessment

Expected learning outcomes of the program

Graduate learning outcomes (GLOs):

- Conduct research or produce some other form of creative work
- Demonstrate mastery of subject material
- Conduct scholarly or professional activities in an ethical manner

The program has identified the following program-level learning outcomes (PLOs):

- Communicate effectively and flexibly with a range of audiences
- Demonstrate critical thinking skills in application of engineering management program knowledge

Methods by which the learning outcomes will be assessed and used to improve curriculum and instruction

Learning outcomes will be assessed once per year, as outlined in the process for the graduate learning outcomes.

Learning outcomes are reported to the Department of Assessment and Accreditation each fall.

The assessments will be shared with CCE's Associate Head of Graduate Affairs and EM faculty. Appropriate action to improve the program, curriculum and/or instruction will follow as needed.

Nature and level of research and/or scholarly work expected of program faculty; indicators of success in those areas

At this time, instructor position descriptions do not include any expectation of future research and/or scholarly work, though most of the instructors do have prior research experience and publications based on their research.

Program Integration and Collaboration

Closely related programs in this or other Oregon colleges and universities

Oregon State University – Master of Business Administration

Oregon State University – Master of Engineering in Industrial Engineering

Portland State University – Engineering & Technology Management

Ways in which the program complements other similar programs in other Oregon institutions and other related programs at this institution. Proposal should identify the potential for collaboration

Oregon State University – Master of Business Administration

The MBA and the Master of Engineering in Engineering Management do share a fair amount of overlap as far as domain knowledge. Organizations that are engineering or technical in nature often prefer the engineering management degree as it leverages the technical background of the undergraduate degree into a position of management or leadership. As a result, much of the Engineering Management curriculum is focused around applying management knowledge to engineering or technical types of projects. Likewise, organizations from other industries often prefer the MBA as it provides a curriculum that has a broader focus.

In collaboration with the College of Business, the Engineering Management curriculum committee approved twelve Ecampus courses from the College of Business to be used as electives for the current degree. The College of Business electives also offer students the opportunity to study certain subject areas in more depth. We have enjoyed our partnership with the College of Business and appreciate that they have generously allowed EM students into the MBA courses.

The Engineering Management program looks forward to continued collaboration with the College of Business. In particular, students have expressed an interest in the certificates offered by the College of Business, but the difference in tuition has proven to be a barrier.

Oregon State University – Master of Engineering in Industrial Engineering

Industrial Engineering and Engineering Management share some overlap, but the focus of the two disciplines differs. The Institute of Industrial & Systems Engineers (IISE) defines industrial engineering as “the design, improvement, and installation of integrated systems of people, materials, information, equipment, and energy” (Institute of Industrial & Systems Engineers, 2021, p. 2).

In contrast, Engineering Management focuses on “planning, organizing, allocating resources, and directing and controlling activities that have a technological component” (Shah and Nowocin, 2019, p. 3).

The Engineering Management program offers students in Industrial Engineering an opportunity to further explore topics around management. Likewise, it is possible for Engineering Management students who are close to the Corvallis campus to take a small number of Industrial Engineering classes as electives. For example, during the pandemic some students chose to take a course on decision analysis.

Portland State University – Engineering & Technology Management

The Master of Science in Engineering and Technology Management at Portland State University does share some overlap with the Engineering Management program at Oregon State University, but with more of an emphasis on technology. The program focuses on four areas:

- Decision and Analysis
- Project Management
- Innovation, Product Management, and Business Development
- Managing the Technology Life Cycle

The program at Portland State University is not listed as an online program, making it more difficult to collaborate as far as courses.

References:

Shah, H. and Nowocin, W. (Eds.). (2019). A guide to the engineering management body of knowledge. American Society for Engineering Management.

Institute of Industrial & Systems Engineers. (2021). Industrial and systems engineering body of knowledge. <https://www.iise.org/details.aspx?id=43631>

If applicable, proposal should state why this program may not be collaborating with existing similar programs

The Portland State University program could be a potential collaborator as far as allowing students in the area to take courses at the PSU campus, but as our program is online, it would be difficult to formalize collaboration at this time.

Potential impacts on other programs

As most of our students are working adults who require the flexibility of an online program, the impact to Industrial Engineering at Oregon State University or the Engineering and Technology Management program at Portland State University is minimal.

The impact to the online MBA program at Oregon State University is also likely minimal. Most of our potential students are working in technology driven organizations. These organizations often prefer the Master of Engineering Management because of the technical focus.

Graduate Learning Outcomes (GLOs) for Graduate Students

Will this program fulfill more than one learning outcome?

Yes

Conduct research or produce some other form of creative work

List the measures or instruments used to assess each outcome. How do students demonstrate their attainment of the learning outcome? How is their learning evaluated? At least one of these must be a direct measure. In order to explore trends in the data, we advise that assessment method remain consistent from year-to-year

1. IE 582: Engineering Failure Analysis Final Draft: Rubric will be used by instructor of record to assess this GLO.
2. Final oral exam presentation (based on project from EMGT 595 capstone course): Rubric will be used by program committee members to assess this GLO

Has this assessment method changed since the last reporting cycle?

Yes

Explain any changes

Previous assessment of this GLO relied on the reflection paper written for the final oral exam, yielding inconsistent results. The program committee often expressed frustration in trying to assess this learning outcome.

The use of rubrics will help to quantify the data. Collection of rubric data from two separate works will provide a better assessment of the overall program.

What benchmark or milestone - related to the specific measure or instrument - is used to determine whether the outcome has been satisfactorily met by the students? In order to explore trends in the data, we advise that benchmarks remain consistent from year-to-year

1. IE 582 Engineering Failure Analysis Final Draft: At least 85% of students achieve a "Meets Requirements" or above in the rubric category.
2. Final oral exam presentation (based on project from EMGT 595 capstone course): For at least 95% of students, the average score of the program committee for this rubric category is "Meets Requirements" or above.

Describe any changes to the benchmark or milestone since the last reporting cycle

Previously, the program committee assessed this learning outcome at the final exam by examining a reflection paper. Assessments were qualitative in nature and benchmarks or milestones were not utilized.

Describe the data collection process (e.g., Who is involved? How is the data collected?)

The instructor of record will collect the rubric score for IE 582.

The program director or major professor will collect the rubric scores from the final oral exam.

What do the data show about student learning relative to the specific learning outcome? Describe any result, pattern, or trends that you identify as meaningful or that highlights an area(s) of concern or success

This learning outcome has never been analyzed at a program level. No trends have been noted.

Describe any course-level (content, pedagogical, structural, etc.) changes that are an outgrowth of the current year's assessment of this outcome. Include timelines

The course-level content will change as follows:

The EMGT 595 capstone course will include a final project to be presented in the final oral exam.

The EMGT 595 capstone course will be developed in late 2023 or early 2024 based on availability of Ecampus resources.

Describe any program or degree-level changes that are an outgrowth of the current year's assessment of this outcome. Include timeline

Program changes will include:

1. The addition of one required course: EMGT 595.
2. The development of a structured rubric for the final oral exam, with a rubric category mapped to this GLO.

If this learning outcome has been assessed previously and is being reported on again this year, what impact have the changes had (if any) on student learning? If you have not previously assessed this learning outcome, indicate the year you will revisit this outcome

The learning outcome has never been assessed in the form described above. It is anticipated the program will be able to assess this outcome using the new process in 2024-2025 (based on data collected in 2023-2024).

Demonstrate mastery of subject material**List the measures or instruments used to assess each outcome. How do students demonstrate their attainment of the learning outcome? How is their learning evaluated? At least one of these must be a direct measure. In order to explore trends in the data, we advise that assessment method remain consistent from year-to-year**

1. IE 582 Final Project: Rubric will be used by instructor of record to assess this GLO.
2. EMGT 595 Capstone course Final Project: Rubric will be used by instructor to assess this GLO
3. Final oral exam questions: Rubric will be used by program committee members to assess this GLO

Has this assessment method changed since the last reporting cycle?

Yes

Explain any changes

Previous assessment of this GLO was based on the program of study and broad questions around coursework. Basing assessment on two projects and exam questions will provide a more direct assessment of this learning outcome with rubrics that can be collected for data trend assessment.

What benchmark or milestone - related to the specific measure or instrument - is used to determine whether the outcome has been satisfactorily met by the students? In order to explore trends in the data, we advise that benchmarks remain consistent from year-to-year

1. IE 582 Final Project: At least 85% of students achieve a "Meets Requirements" or above in the rubric category.
2. EMGT 595 Capstone course Final Project: At least 95% of students achieve a "Meets Requirements" or above in the rubric category.
3. Final oral exam questions: For at least 95% of students, the average score of the program committee for this rubric category is "Meets Requirements" or above.

Describe any changes to the benchmark or milestone since the last reporting cycle

Milestones or benchmarks were not previously utilized.

Describe the data collection process (e.g., Who is involved? How is the data collected?)

The instructors of record will collect the rubric scores for IE 582 and EMGT 595.

The program director or major professor will collect the rubric scores from the final oral exam.

What do the data show about student learning relative to the specific learning outcome? Describe any result, pattern, or trends that you identify as meaningful or that highlights an area(s) of concern or success

The learning outcome has never been analyzed with regards to student learning. No trends have been noted.

Describe any course-level (content, pedagogical, structural, etc.) changes that are an outgrowth of the current year's assessment of this outcome. Include timelines

Course level changes include:

1. The IE 582 final project rubric will include a category to assess mastery of subject material.
2. The EMGT 595 capstone course final project will be developed with a corresponding rubric category for this GLO. The EMGT 595 capstone course will be developed in late 2023 or early 2024 based on availability of Ecampus resources.

Describe any program or degree-level changes that are an outgrowth of the current year's assessment of this outcome. Include timeline

Program changes will include:

1. The addition of one required course: EMGT 595.
2. The development of a structured rubric for the final oral exam, with a rubric category mapped to this GLO.

If this learning outcome has been assessed previously and is being reported on again this year, what impact have the changes had (if any) on student learning? If you have not previously assessed this learning outcome, indicate the year you will revisit this outcome

The learning outcome has never been assessed in the form described above. It is anticipated the program will be able to assess this outcome using the new process in 2024-2025 (based on data from 2023-2024).

Conduct scholarly or professional activities in an ethical manner

List the measures or instruments used to assess each outcome. How do students demonstrate their attainment of the learning outcome? How is their learning evaluated? At least one of these must be a direct measure. In order to explore trends in the data, we advise that assessment method remain consistent from year-to-year

1. CE 507 Seminar simulation activity: Rubric will be used by instructor of record to assess this GLO.
2. EMGT 595 Capstone course Final Project: Rubric will be used by instructor to assess this GLO
3. Final oral exam question based on ethics scenario: Rubric will be used by program committee members to assess this GLO

Has this assessment method changed since the last reporting cycle?

Yes

Explain any changes

Current practice requires students to complete ethics CITI research training. This was an indirect measure. By incorporating ethical training within required coursework and basing assessment on coursework and oral exam responses, the program will be able to better assess this GLO over time.

What benchmark or milestone - related to the specific measure or instrument - is used to determine whether the outcome has been satisfactorily met by the students? In order to explore trends in the data, we advise that benchmarks remain consistent from year-to-year

1. CE 507: At least 85% of students achieve a "Meets Requirements" or above in the rubric category.
2. EMGT 595 Capstone course Final Project: At least 95% of students achieve a "Meets Requirements" or above in the rubric category.
3. Final oral exam question: For at least 95% of students, the average score of the program committee for this rubric category is "Meets Requirements" or above.

Describe any changes to the benchmark or milestone since the last reporting cycle

Benchmarks or milestones were not previously utilized. Students were assessed as meeting requirements upon completion of the CITI training.

Describe the data collection process (e.g., Who is involved? How is the data collected?)

The instructors of record will collect the rubric scores for CE 507 and the EMGT 595 capstone course. The program director or major professor will collect the rubric scores from the final oral exam.

What do the data show about student learning relative to the specific learning outcome? Describe any result, pattern, or trends that you identify as meaningful or that highlights an area(s) of concern or success

The learning outcome has never been analyzed with regards to student learning. No trends have been noted.

Describe any course-level (content, pedagogical, structural, etc.) changes that are an outgrowth of the current year's assessment of this outcome. Include timelines

Course level changes include:

1. The CE 507 seminar will include a unit on ethical training and a simulation learning activity. The online version of the seminar will be developed in late 2023, based on availability of Ecampus resources.
2. The EMGT 595 capstone project will include an ethical dimension. The EMGT 595 capstone course will be developed in late 2023 or early 2024 based on availability of Ecampus resources.
3. The program director, the program committee, and the CCE associate school head for graduate affairs will work together to create a pool of ethical questions for final oral exams in late 2023.

Describe any program or degree-level changes that are an outgrowth of the current year's assessment of this outcome. Include timeline

Program changes include:

1. The addition of two required courses: CE 507 and EMGT 595.
2. The addition of an ethical question to the final oral exam.
3. The development of a structured rubric for the final oral exam, with a rubric category mapped to this GLO.

If this learning outcome has been assessed previously and is being reported on again this year, what impact have the changes had (if any) on student learning? If you have not previously assessed this learning outcome, indicate the year you will revisit this outcome

The learning outcome has never been assessed in the form described above. It is anticipated the program will be able to assess this outcome using the new process in 2024-2025 (based on 2023-2024 data).

Process

Describe the process the program used to reflect on the outcome data

Currently, the program does not reflect on the outcome data. With an approved assessment strategy, the Engineering Management program looks forward to analyzing the new data for trends and opportunities for improvement. We are a program that continually looks to improve courses to better engage online learners. Formalizing data collection will allow us to make better decisions at the program level.

Were there any challenges or concerns?

N/A

How are the results of your assessment effort related to strategic planning and overall program review?

To remain a viable and competitive program it is recognized that continual assessment of learning outcomes is a necessity. It is anticipated the learning outcomes will point to opportunities for improvement at the course and program levels.

Are there specific data archiving notes for the outcome(s) you are reporting on in this report?

N/A

Plans

Describe the unit's (or sub-units) assessment plans for the upcoming year

1. Instructor instructions for collecting data will be created for IE 582, CE 507, and EMGT 595.
2. Structured rubrics will be re-evaluated and/or created for IE 582, CE 507, and EMGT 595 course assignments tied to GLO and/or PLO assessment.
3. A structured rubric will be created for the oral exam with input from the the CCE graduate faculty committee and the CCE associate school head of graduate affairs.
4. Upon approval of the assessment plan, data collection will begin.

Additional Graduate Level Student Learning Outcomes (optional)

Learning Outcome

Communicate effectively and flexibly with a range of audiences.

What year was this program level learning outcome developed or most recently changed?

2022-2023

List the measures or instruments used to assess each outcome. How do students demonstrate their attainment of the learning outcome? How is their learning evaluated? At least one of these must be a direct measure. In order to explore trends in the data, we advise that assessment method remain consistent from year-to-year

1. IE 582 final project: Rubric will be used by instructor of record to assess this PLO.
2. EMGT 595 final project: Rubric will be used by instructor of record to assess this PLO.
3. CE 507 learning activity: Rubric will be used by instructor of record to assess this PLO.
4. Final oral exam: Rubric will be used by program committee members to assess this PLO.

Has this assessment method changed since the last reporting cycle?

Yes

Explain any changes

This is a new outcome. The program did not have any program-level outcomes.

What benchmark or milestone - related to the specific measure or instrument - is used to determine whether the outcome has been satisfactorily met by the students? In order to explore trends in the data, we advise that benchmarks remain consistent from year-to-year

1. IE 582 Final Project: At least 85% of students achieve a "Meets Requirements" or above in the rubric category.
2. CE 507 Learning Activity: At least 85% of students achieve a "Meets Requirements" or above in the rubric category.
3. EMGT 595 Final Project: At least 95% of students achieve a "Meets Requirements" or above in the rubric category.
4. Final oral exam: For at least 95% of students, the average score of the program committee for this rubric category is "Meets Requirements" or above.

The difference in percentages is based on when the courses are completed. IE 582 and CE 507 are completed within the first three terms. It is expected that improvement will be made in this PLO by the end of the program.

Describe any changes to the benchmark or milestone since the last reporting cycle

This is a new learning outcome

Describe the data collection process (e.g., Who is involved? How is the data collected?)

The instructor of record will collect the rubric scores for IE 582, CE 507, and EMGT 595.
The program director or major professor will collect the rubric scores from the final oral exam.

What do the data show about student learning relative to the specific learning outcome? Describe any result, pattern, or trends that you identify as meaningful or that highlights an area(s) of concern or success

This is a new learning outcome

Describe any course-level (content, pedagogical, structural, etc.) changes that are an outgrowth of the current year's assessment of this outcome. Include timelines

It is anticipated that course-level content may be updated or require adjustment to help students better meet this outcome.

Describe any program or degree-level changes that are an outgrowth of the current year's assessment of this outcome. Include timeline

It is anticipated that program level changes may be required such as the addition of dedicated seminars.

If this learning outcome has been assessed previously and is being reported on again this year, what impact have the changes had (if any) on student learning? If you have not previously assessed this learning outcome, indicate the year you will revisit this outcome

This is a new learning outcome.

Learning Outcome

Demonstrate critical thinking skills in application of program knowledge.

What year was this program level learning outcome developed or most recently changed?

2022-2023

List the measures or instruments used to assess each outcome. How do students demonstrate their attainment of the learning outcome? How is their learning evaluated? At least one of these must be a direct measure. In order to explore trends in the data, we advise that assessment method remain consistent from year-to-year

1. IE 582 Engineering Failure Analysis Final Draft: Rubric will be used by instructor of record to assess this PLO.
2. EMGT 595 Final Project: Rubric will be used by instructor of record to assess this PLO.
3. Final oral exam: Rubric will be used by program committee members to assess this PLO.

Has this assessment method changed since the last reporting cycle?

Yes

Explain any changes

This is a new outcome. The program did not have any program-level outcomes.

What benchmark or milestone - related to the specific measure or instrument - is used to determine whether the outcome has been satisfactorily met by the students? In order to explore trends in the data, we advise that benchmarks remain consistent from year-to-year

1. IE 582 Engineering Failure Analysis: At least 85% of students achieve a "Meets Requirements" or above in the rubric category.
2. EMGT 595 Final Project: At least 95% of students achieve a "Meets Requirements" or above in the rubric category.
4. Final oral exam: For at least 95% of students, the average score of the program committee for this rubric category is "Meets Requirements" or above.

The difference in percentages is based on when the courses are completed. IE 582 is completed within the first three terms. It is expected that improvement will be made in this PLO by the end of the program.

Describe any changes to the benchmark or milestone since the last reporting cycle

This is a new learning outcome

Describe the data collection process (e.g., Who is involved? How is the data collected?)

The instructors of record will collect the rubric score for IE 582 and EMGT 595.
The program director or major professor will collect the rubric scores from the final oral exam.

What do the data show about student learning relative to the specific learning outcome? Describe any result, pattern, or trends that you identify as meaningful or that highlights an area(s) of concern or success

This is a new learning outcome

Describe any course-level (content, pedagogical, structural, etc.) changes that are an outgrowth of the current year's assessment of this outcome. Include timelines

It is anticipated that course-level content may be updated or require adjustment to help students better meet this outcome.

Describe any program or degree-level changes that are an outgrowth of the current year's assessment of this outcome. Include timeline

It is anticipated that program level changes may be required (such as adding further courses or seminars that include complex problem-solving).

If this learning outcome has been assessed previously and is being reported on again this year, what impact have the changes had (if any) on student learning? If you have not previously assessed this learning outcome, indicate the year you will revisit this outcome

This is a new learning outcome

Information for the Catalog**How many total credits are required for completion of this program?**

45

Catalog Description (this will display on the Overview tab in the Catalog)

The Engineering Management program provides STEM professionals with an opportunity to advance their careers in technology-driven organizations. Career opportunities may include positions in aerospace, energy, construction, consulting, computer hardware and software, and manufacturing. Students will gain knowledge in the management of a technical organization, project management, and engineering economics.

Requirements (this will display on the Requirements tab in the Catalog and be coded into MyDegrees)

Code	Title	Credits
Required Core		
IE 571	PROJECT MANAGEMENT IN ENGINEERING	3
IE 582	INTRODUCTION TO MANAGEMENT FOR ENGINEERS AND SCIENTISTS	4
IE 583	ADVANCED ENGINEERING ECONOMICS ANALYSIS	4
CE 507	SEMINAR	1
EMGT 595	ENGINEERING MANAGEMENT CAPSTONE	3
Electives		
Select 30 credits from the following courses: ¹		30
EMGT 530	LEAN FOR ENGINEERING MANAGERS	
EMGT 560	ELEVATING PROBLEM-SOLVING TO DRIVE CHANGE	
IE 581	OPERATIONS MANAGEMENT	
IE 584	SYSTEMS ENGINEERING	
IE 585	LEGAL ASPECT OF ENGINEERING MANAGEMENT	
IE 586	PROJECT RISK MANAGEMENT	
IE 587	MANAGEMENT OF INFORMATION SYSTEMS	
IE 588	MANAGEMENT OF NEW PRODUCT DEVELOPMENT	
IE 589	PROFESSIONAL RESPONSIBILITY AND ETHICS	
IE 590	STRATEGIC PLANNING IN ENGINEERING ORGANIZATIONS	
IE 591	STATISTICAL CONCEPTS FOR ENGINEERING MANAGERS	
BA 513	BUSINESS LEGAL ENVIRONMENT	
BA 515	MANAGERIAL DECISION TOOLS	
BA 550	LEADERSHIP AND TEAMS IN ORGANIZATIONS	
BA 561	SUPPLY CHAIN MANAGEMENT	
BA 569	ADVANCED STRATEGIC MANAGEMENT	
BA 572	ADVANCED INFORMATION SYSTEMS	
BA 590	MARKETING MANAGEMENT	
BANA 560	DATA ANALYTICS FOR COMPETITIVE ADVANTAGE	

MGMT 548	EMPLOYEE RECRUITMENT AND SELECTION
MGMT 552	ORGANIZATIONAL BEHAVIOR
MGMT 559	MANAGING ETHICS AND CORPORATE SOCIAL RESPONSIBILITY
SCLM 550	SUPPLY AND SOURCING MANAGEMENT

Total Credits

45

1

Students may take up to four non-IE or non-EMGT courses to achieve the 45 credit minimum. Students should meet with an advisor to discuss all elective course choices

Letters of Support

External Letters of Support

Support for EM program at OSU.pdf
MENG letter of support_S Riggs_Ecampus.pdf

Accessibility Form

Accessibility Guidelines

I have reviewed the listed documents

Faculty Guidelines

I have reviewed the listed documents

Information Technology Guidelines

I have reviewed the listed documents

By submitting this form, we affirm that we have reviewed the listed documents and will apply a good faith effort to ensure accessibility in curricular design, delivery, and supporting information.

External Review of New Graduate Program

Review Documents

Oregon MEM Program External Review 8Jul22.pdf

Library Evaluation

Will this program require the creation of new courses?

No

Faculty CVs

I will provide individual CVs if requested by Faculty Senate Curriculum Council

Acknowledge

Enter faculty below: (click the green plus button to add faculty members)

Faculty Name	Academic Home	Highest Degree	Position Title	Area of Expertise/ Interest	Role Within Program
Frances Alston	MIME	PhD	Instructor	Generalist	Instructor
Jennifer Wilby	MIME	PhD	Instructor	Systems Engineering	Instructor
Jiun-Yin Jian	MIME	PhD	Instructor	Project Management	Instructor
June Worley	MIME	PhD	Director/ Instructor	Management, Information Technology, Lean Manufacturing	Director, Instructor, Advisor
Sue Galatz	MIME	MBA	Instructor	New Product Development, Systems	Instructor

Budget Information

Budget Worksheet and Narrative

Engineering Management Budget Narrative.docx

Copy of Engineering Management budget worksheet_Feb 3_BEBC Sig.xlsx

Reviewer Comments

Janice Nave-Abele (Curriculum Management, Curriculum Coordinator) (janice.nave-abele) (Thu, 19 Jan 2023 23:24:55 GMT):

Rollback: Per originator's request.

Glencora Borradaile (School of Electrical Engineering Computer Science, Associate Dean of Graduate Programs) (glencora.borradaile) (Mon, 06 Mar 2023 21:18:52 GMT): Yes please!

Jack Istok (School of Civil Construction Engineering, Associate Head of Undergraduate Affairs) (jack.istok) (Mon, 06 Mar 2023 23:01:07 GMT): ok with CCE

Joseph Fradella III (School of Civil Construction Engineering, Senior Instructor I) (joe.fradella) (Tue, 07 Mar 2023 01:00:59 GMT): ok

Carley Ries (College of Engineering, Assistant Dean-Online Learning) (carley.ries) (Tue, 07 Mar 2023 16:52:38 GMT): Supportive of this degree.

Frank Chaplen (Biological Ecological Engineering, Associate Professor) (frank.chaplen) (Wed, 19 Apr 2023 00:12:03 GMT): Rollback: Originator should provide additional justification for the trend in enrollment growth rates. The tuition assumptions should also be justified.

June Worley (School of Mechanical, Industrial Manufacturing Engineering, Instructor) (worleyj) (Tue, 09 May 2023 15:24:35 GMT):

Email sent to Frank W. Chaplen with additional information on 4/24/2023. Information will be reviewed by budget committee at 5/8/2023 meeting.

Key: 711