

INDUSTRIAL & SYSTEMS ENGINEERING, MASTER OF SCIENCE

Mission

The MSISE program prepares students from diverse educational backgrounds to function as engineers in advanced projects in industrial engineering and operations research and to continue their studies and obtain other advanced degrees especially at doctoral level.

Expected Student Learning Outcomes

Each MSE and MSISE graduate will be able to:

- Demonstrate advanced understanding of the fundamental knowledge which serves as the basis for practice in their chosen specialization.
- Apply those principles in the design and analysis of a system or process to meet specified needs.
- Communicate effectively in writing and orally.

By applying the following rules, the MSE and MSISE programs are designed to ensure these additional learning outcomes:

- Each student who does not have the required prerequisites in the chosen specialization takes the necessary leveling courses.
- Every MSE or MSISE graduate must demonstrate knowledge of material in the core courses in the chosen specialization.

Assessment Activities

The MSE and MSISE programs are assessed by periodically reviewing the results of various metrics such as final course exams, homework assignments, projects, project report evaluations, presentations, paper evaluations, student surveys, and exit interviews with MSE and MSISE graduated. Assessment results are used to improve the two programs.

Specific Program Requirements

The MSISE Program consists of three components:

1. **Core Component:** 15 credit hours
2. **Track Component:** 9 credit hours
3. **Elective Component:** 9 credit hours (non-thesis option), or 6 credit hours (thesis option)

Non-Thesis Total: 33 credit hours

Thesis Total: 30 credit hours

Core Component

The Core Component consists of 15 credit hours in five fundamental industrial engineering topics. These core courses include content that is necessary for success as an industrial engineer working in industry or continuing in graduate study. The Core Component topic areas are Simulation, Operations Research, Facility Design, Operations Planning, and a seminar on conducting academic research as a graduate student.

Course	Title	Credits
EN 520	Simulation Experiments	4
EN 571	Operations Research	3

EN 575	Facilities Planning and Design	3
EN 577	Operations Planning and Control	3
EN 593	Graduate Seminar	2
Total Credits		15

If the student has an undergraduate degree in industrial engineering or a related field, some or all of the core (except EN 593 Graduate Seminar (2 c.h.)) may be waived; additional electives will replace the waived courses.

Track Component

The Track Component consists of 9 credit hours of coursework selected by the student and his or her adviser to advance the professional and/or educational goals of the student. Currently available tracks include the Industrial Engineering and Engineering Management tracks.

Alternately, any student may pursue an Individualized Track tailored to the needs of the student. An Individualized Track must consist of 9 credit hours of graduate coursework, subject to the approval of the adviser and department.

In order to count towards graduation, any Special Projects, Special Topics, Graduate Projects or Independent Study course must consist of content appropriate for the track selected. The determination of an appropriate topic is at the discretion of the adviser and department.

The Industrial Engineering Track

Course	Title	Credits
Select at least 9 hours from the following:		9
EN 503	Ergonomics	3
EN 504	Scheduling and Sequencing	3
EN 530	Project Planning and Control	3
EN 541	Engineering of Manufacturing Processes	3
EN 541L	Engineering & Manufacturing Proc Lab	1
EN 543	Quality Control and Reliability	3
EN 544	Advanced Engineering Economics	3
EN 573	Computer Integrated Manufacturing	2
EN 573L	Computer Integrated Mfg Lab	1
EN 588	Graduate Projects	3
EN 590	Special Projects (credits vary)	1-3
EN 591	Special Topics (credits vary)	1-3
EN 595	Independent Study (credits vary)	1-5
EN 598	Internship (credits vary)	1-6

The Engineering Management Track

The Engineering Management Track consists of 9 credit hours of graduate level coursework in Accounting, Business Administration, Computer Information Systems, Economics, Finance, Management and/or Marketing. These credit hours must represent a coherent plan of study as approved by the adviser and department.

Elective Component

Non-Thesis Option

The Elective Component consists of 9 credit hours of coursework of courses approved as electives by the department.

Thesis Option

MS and MSISE Students choosing the Thesis Option will apply 6 credit hours of EN 599 Thesis Research (1-9 c.h.) to the Elective Component. A

program of study may include more than 6 credit hours of EN 599 Thesis Research (1-9 c.h.), but no more than 6 may count towards graduation.

Prerequisites for the MS in Industrial & Systems Engineering (CSU Pueblo Course Equivalents)

Note that some of the courses listed below may have prerequisites not listed here.

- Problem Solving for Engineers (EN 103 Problem Solving for Engineers (3 c.h.))
- Engineering Economy (EN 343 Engineering Economy (3 c.h.))¹
- Stochastic Systems Engineering (EN 375 Stochastic Systems Engineering (3 c.h.))
- Calculus I and II (MATH 126 Calculus & Analytic Geometry I (GT-MA1) (5 c.h.) and MATH 224 Calculus and Analytic Geometry II (5 c.h.))
- Calculus-Based Physics I and II (PHYS 221 General Physics I (4 c.h.) and PHYS 222 General Physics II (4 c.h.))

¹ Any material substituted for EN 343 Engineering Economy (3 c.h.) must include the time value of money topic.