

Industrial Engineering and Engineering Management (IE)



Career Profile

Industrial engineering and engineering management is concerned with the design, improvement, installation, and management of integrated systems of people, material, and equipment. Graduates of the program employ a set of skills that includes mathematical modeling, probability and statistics, computer science, human factors, interpersonal skills, project management, and an ability to manage and administer large technical engineering and research projects. Thus, industrial engineering and engineering management may be thought of as applied problem solving, from inception to implementation and management.

Accreditation

The South Dakota School of Mines and Technology is accredited by the Higher Learning Commission of the North Central Association of Colleges and Secondary Schools, the recognized accrediting agency for the north central states.

The industrial engineering program is also accredited by the Accreditation Board for Engineering and Technology (ABET), and the combined industrial engineering and engineering management program will seek its first general review in 2010.

Faculty

Chair: Ervin Pietz Professor Dr. Stuart Kellogg

Professor: Dr. Carter Kerk

Associate Professor: Dr. Frank Matejcik

Assistant Professors: Dr. Dean Jensen and Dr. Jennifer Karlin

Instructor: Kelly Combs

Labs and Facilities

Laboratories are available for courses in work methods and measurements, and in human factors and ergonomics. To respond to changing industrial requirements, a new, state-of-the-art computer integrated manufacturing laboratory has been established. The major amount of laboratory activity, however, is involved in the senior design courses. As often as possible, these design projects utilize the facilities of local industries, service organizations, governmental agencies, and other types of business. In addition, modern computing

facilities and up-to-date industrial software are used for many of the courses.

Features and Strengths

The program provides the student with high-quality education and an excellent atmosphere in which to learn. The low student-to-faculty ratio reinforces the learning environment between the student and the professor. There are many laboratory classes that provide students with experience in work measurement, human factors and ergonomics, facilities design, computer application, and production control.

Program Overview

The curriculum is designed to give students a thorough knowledge in the fundamental principles within the four primary stems of industrial engineering: operations research and optimization, manufacturing, statistical processes, and human engineering. In addition, through a variety of coursework and experiential learning activities, students develop an understanding of the engineering relationships with the management tasks of planning, leading, organizing, and controlling as well as the integrative nature of management systems. Throughout the program of studies, special emphasis is placed upon application of systems principles in engineering design to assure proper integration of the individual (or individuals), procedures, materials, and equipment. Service learning components, laboratories, case work, simulations, and the capstone design sequence reinforce the managerial aspects of systems integration, systems design, and the global, societal, and business context for product and process improvement.

Outcomes

- School of Mines industrial engineering graduates received salary offers that average more than \$53,000.
- 92 percent of 2006-07 School of Mines industrial engineering graduates were placed in their field or entered a graduate program within a year of graduation.
- 75 percent of graduates gain real-life experience through internships and co-ops.
- Companies hiring industrial engineering graduates include UPS, Raytheon, Boeing, Caterpillar, and IBM.

Student Organizations

Students at the School of Mines also have a variety of opportunities for extra-curricular activities that range from music, intramurals, and drama to ski and snowboarding clubs, and more than 75 other clubs and professional student organizations. These are important activities for our students and we encourage them to take full advantage of out-of-classroom events. In particular, industrial engineering majors are encouraged to participate in the student chapter of the Institute of Industrial Engineers. Other opportunities that are available include the Center for Advanced Manufacturing and Production (CAMP), Engineers without Borders, Research Experience for Undergraduates (REU), undergraduate research projects, Co-ops and Internships, and Student Innovators for Free Enterprise (SIFE).

Research

Research in the industrial engineering department includes studies of colleges of engineering as learning organizations, funded by the National Science Foundation; aging equipment facilities design for the United States Air Force, statistical process control, computer aided manufacturing, operations, human engineering, and engineering education.

Curriculum Listing

<http://catalog.sdsmt.edu>

INDUSTRIAL ENGINEERING AND ENGINEERING MANAGEMENT CURRICULUM/CHECKLIST

FRESHMAN YEAR

First Semester

MATH 123	Calculus I	4
CHEM 112	General Chemistry I	3
Humanities or Social Sciences Elective(s)		3
PE	Physical Education ¹	1
ENGL 101	Composition I	3
CHEM 112L	General Chemistry I Lab	1
ME 110	Intro to Mechanical Engr	2
OR		
CEE 117	Computer Aided Design	2
TOTAL		17

Second Semester

MATH 125	Calculus II	4
PHYS 211	University Physics I	3
PE	Physical Education I	1
PSYC 101	General Psychology	3
General Elective		2
Humanities or Social Sciences Elective(s)		3
TOTAL		16

SOPHOMORE YEAR

First Semester

EM 216	Statics and Dynamics	4
ENGL 279	Technical Communications I	3
MATH 225	Calculus III	4
IENG 381	Intro to Probability and Stats	3
PHYS 213	University Physics II	3
PHYS 213L	University Physics II Lab	1
TOTAL		18

Second Semester

IENG 382	Probability Theory and Stats II	3
MATH 321	Differential Equations	4
IENG 215/216/217	Cost Estimating for Engineers	3
IENG 241	Production Tools for Quality Improvement	2
IENG 302	Engineering Economics	3
Humanities or Social Sciences Elective(s)		3
TOTAL		18

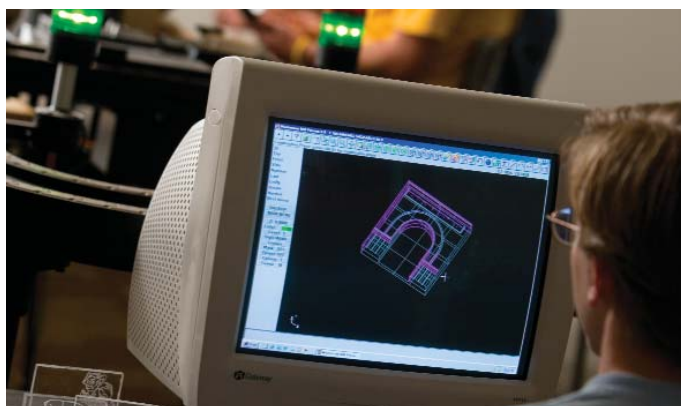
JUNIOR YEAR

First Semester

ENGL 289	Technical Communications II	3
IENG 311	Work Methods and Measurement	3
IENG 486	Statistical Quality and Process Control	3
IENG 352	Creativity and Innovation	1
IENG 354	Marketing Technology Innovations	1
IENG 362	Stochastic Models	3
Humanities or Social Sciences Elective(s)		1
TOTAL		15

For More Information contact:

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Second Semester

IENG 355	Financing Technology Innovations	1
ENG 441	Simulation	3
MATH 353	Linear Optimization	3
IENG 321	Ergonomics/Human Factors Engineering	3
EE 301	Intro Circuits, Machines, Syst	4
MET 232	Properties of Materials	3
TOTAL		17

SENIOR YEAR

First Semester

IENG 425	Production and Operation	3
IENG 331	Safety Engineering ²	3
IENG 471	Facilities Planning	3
IENG 464	Senior Design Project I	3
Dept. Approved Electives		6
TOTAL		18

Second Semester

IENG 366	Engineering Management	3
IENG 465	Senior Design Project II	3
IENG 475	Computer Controlled Manuf	3
Humanities or Social Sciences Elective(s)		3
Department Elective		4
TOTAL		16

136 credits required for graduation

Curriculum Notes

¹ Music ensemble courses may be substituted for physical education courses for qualified students. Any other substitutions must be approved in advance by the physical education department chair.

²IENG 341 (Industrial Hygiene) may be substituted during a second semester.

Elective courses must be chosen to satisfy all of the following requirements:

1. Sixteen (16) semester hours in humanities or social science. At least six (6) hours must be in humanities and at least six (6) hours must be in social sciences. This may include PSYC 101, which is required.
2. Six (6) hours of humanities or social science must be included in the list of approved cultural diversity courses.
3. At least three (3) hours of humanities or social science must be at the 300 or 400 level.