Mechanical Engineering, B.S.E.

Educational Objectives
Within a few years of graduation, graduates of the mechanical engineering program will:

- have successful careers in engineering and beyond and will have assumed professional roles of increasing responsibility and impact;
- have acquired new knowledge and expertise through professional development opportunities or advanced education; and
- be engaged in workplace, professional, or civic communities.

Graduates of the Department in Mechanical Engineering B.S.E. program will be prepared to effectively contribute as engineers in a diverse and multidisciplinary work environment. They will have an ability to:

- identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics;
- apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare as well as global, cultural, social, environmental, and economic factors;
- communicate effectively with a range of audiences;
- recognize ethical and professional responsibilities in engineering situations and make informed judgments which consider the impact of engineering solutions in global, economic, environmental, and societal contexts;
- function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives;
- develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions; and
- acquire and apply new knowledge as needed, using appropriate learning strategies.

Requirements
The Bachelor of Science in Engineering requires a minimum of 128 s.h. The major in mechanical engineering lays a foundation in the basic disciplines of mathematics, physics, and chemistry and in the engineering sciences of statics, dynamics, thermodynamics, mechanics of deformable bodies, mechanics of fluids and transfer processes, materials science, and electrical sciences. An understanding of these sciences enables mechanical engineers to design parts of systems and understand whole systems, plan the production and use of energy, plan and operate industrial manufacturing facilities, and design automatic control systems for machines and other mechanical systems.

Mechanical engineering students develop an awareness of social and humanistic issues relating to business, environment, government, history, language, religion, and international relations. They also acquire an appreciation of professional and ethical responsibilities.

All engineering students complete the B.S.E. core requirements, which include RHET:1030 Rhetoric, ENGR:1100 Introduction to Engineering Problem Solving, ENGR:1300 Introduction to Engineering Computing, and courses in chemistry, engineering mathematics and fundamentals, and physics.

They also complete the curriculum designed for their major program, which covers four major stems: mathematics and basic sciences, engineering topics, an elective focus area, and the general education component. For information about the curriculum stems, see the Bachelor of Science in Engineering in the Catalog.

Upper-level students work on team projects in a senior capstone design course, ME:4086 Mechanical Engineering Design Project. Some students may arrange to participate in established research projects.

Students must select elective focus area courses according to guidelines established by the Department of Mechanical Engineering. See *Elective Focus Area* below.

**Elective Focus Area**
The mechanical engineering program offers a variety of elective focus area options, including standard focus areas developed and maintained by the program and flexible focus areas tailored to individual student interests. For more detailed information about elective focus areas, see the Bachelor of Science in Engineering in the Catalog. For a list of standard mechanical engineering elective focus area options and guidelines for tailored elective focus areas, see the undergraduate Mechanical Engineering Program page on the Department of Mechanical Engineering website.

**Combined Programs**

**B.S.E./M.S.**

The College of Engineering offers a combined Bachelor of Science in Engineering/Master of Science program for mechanical engineering undergraduate students who intend to earn a M.S. in mechanical engineering. B.S.E./M.S. students may take up to 12 s.h. of graduate-level course work, attend the program's graduate seminar, and participate in master's research while they are still undergraduates. They may count 6 s.h. of graduate course work toward both degrees. Once students complete the requirements for the bachelor's degree, they are granted the B.S.E., and they normally complete the M.S. one year later.

To be admitted to the combined degree program, students must have completed at least 80 s.h., have a cumulative g.p.a. of at least 3.25, and they must submit a letter of application to the chair of the Department of Mechanical Engineering.

**B.S.E./M.S. in Civil and Environmental Engineering**

Bachelor of Science in Engineering students majoring in mechanical engineering who are interested in earning a Master of Science in civil and environmental engineering may apply to the combined B.S.E./M.S. program offered by the College of Engineering. The combined program enables undergraduate students to begin work on the M.S. degree while completing their B.S.E. degree. Students admitted to the program may count 9 s.h. of course work toward both the B.S.E. and the M.S. degree requirements. They also may count...
an additional 3 s.h. toward the M.S. degree requirements before they have been awarded the B.S.E. degree. For more information, see the M.S. in civil and environmental engineering in the Catalog.

Academic Plans

Sample Plan of Study

Sample plans represent one way to complete a program of study. Actual course selection and sequence will vary and should be discussed with an academic advisor. For additional sample plans, see MyUI.

### Mechanical Engineering, B.S.E.

#### Course Title Hours

**First Year**

**Fall**

- MATH:1550 Engineering Mathematics I: Single Variable Calculus 4
- ENGR:1100 Introduction to Engineering Problem Solving 3
- CHEM:1110 Principles of Chemistry I 4
- RHET:1030 Rhetoric 4
- ENGR:1000 Engineering Success for First-Year Students 1
- CSI:1600 Success at Iowa 0

**Hours** 16

**Spring**

- MATH:1560 Engineering Mathematics II: Multivariable Calculus 4
- ENGR:1300 Introduction to Engineering Computing 3
- PHYS:1611 Introductory Physics I 4
- MATH:2550 Engineering Mathematics III: Matrix Algebra 2
- GE: Engineering Be Creative 3

**Hours** 16

**Second Year**

**Fall**

- MATH:2560 Engineering Mathematics IV: Differential Equations 3
- PHYS:1612 Introductory Physics II 3
- ENGR:2110 Engineering Fundamentals I: Statics 2
- ENGR:2120 Engineering Fundamentals II: Electrical Circuits 3
- ENGR:2130 Engineering Fundamentals III: Thermodynamics 3
- GE: CLAS General Education Component 3
- ME:2020 Mechanical Engineering Sophomore Seminar 0

**Hours** 17

**Spring**

- ENGR:2720 Materials Science 3
- ENGR:2750 Mechanics of Deformable Bodies 3
- ENGR:2760 Design for Manufacturing 3
- ENGR:2710 Dynamics 3
- Elective Focus Area: #1 3

**Hours** 15

**Third Year**

**Fall**

- MATH:3550 Engineering Mathematics V: Vector Calculus 3
- ENGR:2510 Fluid Mechanics 4
- STAT:2020 Probability and Statistics for the Engineering and Physical Sciences 3
- ENGR:2730 Computers in Engineering 2
- ME:3351 Engineering Instrumentation 2
- Elective Focus Area: #2 3
- ME:3091 Professional Seminar: Mechanical Engineering 0

**Hours** 17

**Spring**

- ME:3040 Thermodynamics II 3
- ME:3045 Heat Transfer 3
- ME:3052 Mechanical Systems 4
- Elective Focus Area: #3 3
- GE: Approved Course Subjects 3

**Hours** 16

**Fourth Year**

**Fall**

- ME:4048 Energy Systems Design 4
- ME:4055 Mechanical Systems Design 3
- Elective Focus Area: #4 3
- Elective Focus Area: #5 3
- GE: Approved Course Subjects 3
- ME:3091 Professional Seminar: Mechanical Engineering 0

**Hours** 16

**Spring**

- ME:4086 Mechanical Engineering Design Project 3
- ME:4080 Experimental Engineering 4
- Elective Focus Area: #6 3
- Elective Focus Area: #7 3
- GE: Approved Course Subjects 3

**Degree Application:** apply on MyUI before deadline (typically in February for spring, September for fall)

**Hours** 16

**Total Hours** 129

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a Enrollment in math courses requires completion of a placement exam.
b Enrollment in chemistry courses requires completion of a placement exam.
c Courses with prerequisites; students should complete a prerequisite waiver form.
d Students may select a course from all GE CLAS Core categories except Rhetoric, Quantitative or Formal Reasoning, and Natural Sciences.
e A full list of approved course subjects can be found on the College of Engineering General Education Component website.
f Please see Academic Calendar, Office of the Registrar website for current degree application deadlines. Students should apply for a degree for the session in which all requirements will be met. For any questions on appropriate timing, contact your academic advisor. For more information visit http://commencement.uiowa.edu/
Career Advancement

The engineering profession is a foundation for a variety of careers in industry, medicine, law, government, and consulting. Engineering majors hold eight of the top ten spots on the list of top-paid majors for bachelor’s degree graduates, according to the National Association of Colleges and Employers (NACE). On average, 93-98 percent of graduates are employed in their field of study or pursuing advanced education within seven months of graduation.

Engineering Professional Development (EPD) develops and promotes experiential education and professional opportunities for students in the College of Engineering. Professional staff coordinate the college’s co-op and internship program, engage in employer outreach, and provide opportunities for students to network with employers, including an engineering career fair each semester and other programming related to career development.

EPD also offers individual advising and class presentations on résumé and cover letter preparation, job and internship search strategies, interviewing skills, and job offer evaluation.