Bachelor of Science in Engineering

Undergraduate degree: B.S.E.
Web site: http://www.engineering.uiowa.edu/

Undergraduate Program of Study

- Bachelor of Science in Engineering
  The College of Engineering offers the Bachelor of Science in Engineering (B.S.E.) with majors in biomedical engineering, chemical engineering, civil engineering, electrical engineering, industrial engineering, and mechanical engineering. The undergraduate majors are designed to attract the best and brightest students and prepare them to be engineers who will succeed in a workplace filled with diverse people, attitudes, and ideas; to compete in the global marketplace; to work effectively in multidisciplinary teams; and to confidently understand, use, and develop modern technology.

All six B.S.E. programs of study are accredited by the Engineering Accreditation Commission of ABET. Each has its own set of articulated program educational objectives, and all are designed to ensure that graduates possess the following general attributes:

- ability to apply knowledge of mathematics, science, and engineering;
- ability to design and conduct experiments as well as to analyze and interpret data;
- ability to design a system, component, or process to meet desired needs;
- ability to function on multidisciplinary teams;
- ability to identify, formulate, and solve engineering problems;
- understanding of professional and ethical responsibility;
- ability to communicate effectively in oral, written, and graphical forms;
- a broad education necessary to understand the impact of engineering solutions in a global and societal context;
- recognition of the need to engage in lifelong learning and the ability to do so;
- knowledge of contemporary issues; and
- ability to use the techniques, skills, and modern engineering tools necessary for successful engineering practice.

The University of Iowa B.S.E. programs of study distinguish the College of Engineering from other engineering colleges in the region. They draw on the University's recognized strengths to offer unique opportunities for students who wish to pursue a wide range of career options and an education that goes beyond technology.

Each program emphasizes a broad understanding of fundamental principles common to all engineering disciplines and provides students with the opportunity to specialize in a selected engineering discipline. All build on the University's research strengths. Program flexibility is provided by a curriculum in which each student develops engineering competency within a particular academic program and complements it with a tailored thematic option in support of chosen career objectives (e.g., engineering practice, project management, research and development).

This Catalog section provides information about requirements that all B.S.E. students must fulfill, regardless of their engineering major, as well as admission information and academic rules and procedures; see "Bachelor of Science in Engineering" below.

Engineering students may earn more than one B.S.E. degree. They also may earn joint undergraduate degrees in the College of Liberal Arts and Sciences or the Tippie College of Business, a joint B.S.E./master's degree in urban and regional planning, or a joint B.S.E./M.S. in engineering; see "Joint and Dual Degrees" later in this section.

The undergraduate Certificate in Technological Entrepreneurship is tailored specifically for engineering students who intend to start and operate their own businesses or who would like to understand and learn about managing innovation in business environments. The undergraduate Certificate in Wind Energy introduces students to a developing field that has a growing need for professionals with knowledge of wind energy fundamentals. The University offers a wealth of other certificates and minors in a wide range of disciplines that are open to all undergraduate students; see "Minors" and "Certificates" below.

DIVERSITY AND INCLUSION IN THE COLLEGE OF ENGINEERING

The College of Engineering strives to be a national leader in including women and men of all races and ethnic groups in its student body and providing a model for other institutions that are interested in strengthening inclusion of all peoples in engineering. The Ethnic Inclusion Effort for Iowa Engineering develops integrative programs and activities which serve to build and nourish the engineering community. This includes support of diversity programming and diversity in student organizations. Women in Science and Engineering (WISE) offers a variety of services for undergraduate students including the WISE Peer Mentoring Program and the Be-WISE Women in Science and Engineering Living-Learning Community (LLC). The Be-WISE-LLC is the University of Iowa's longest continuously running living-learning community that provides academic and social support programming, as well as a positive community of scholars, for women majoring in STEM fields. To learn more, see Diversity at the UI College of Engineering on the college's web site.

Bachelor of Science in Engineering

The Bachelor of Science in Engineering (B.S.E.) requires a minimum of 128 s.h. Students must be enrolled in the UI College of Engineering for the last 30 s.h. of work toward the degree, or 45 of the last 60 s.h., or a total of 90 s.h. They must have a g.p.a. of at least 2.00 on all college work used to satisfy degree requirements as well as on all work undertaken at the University of Iowa.

Engineering students earn the B.S.E. degree in one of six undergraduate programs of study (majors): biomedical engineering, chemical engineering, civil engineering, electrical engineering, industrial engineering, or mechanical engineering.
All students complete a core of common B.S.E. requirements, usually during their first three semesters; see "Core Requirements" below. They also must complete a curriculum—a set of required and elective courses—designed specifically for their major program. The curriculum prepares students to practice engineering in that program's field of engineering. It is designed by the program's faculty members according to guidelines provided by the national accrediting body of ABET.

Each program's curriculum is divided into four major stems: mathematics and basic sciences; engineering topics; an elective focus area; and the general education component (humanities and social sciences). All of the courses in the curriculum stems are integrated and sequenced to help students understand the interrelationships and importance of each stem. See "Curriculum Stems" below.

Courses below the level of the beginning courses in each program's curriculum count toward students' overall grade-point averages and are recorded on their transcripts, but they do not count toward requirements for the B.S.E. degree.

**Core Requirements**

All B.S.E. students must complete a core of courses that constitute approximately one-third of the courses required for the degree. They complete most of the core during their first three semesters, so most students may postpone making a decision about which engineering major to pursue or may change their engineering major during their first three semesters with little or no loss of time or credit.

The core includes RHET:1030 Rhetoric, a first-year course in writing, speaking, and critical reading; ENGR:1100 Engineering Problem Solving I and ENGR:1300 Engineering Problem Solving II, which cover a breadth of topics from engineering as a profession to team design projects to engineering computations and computer programming; and courses in chemistry, engineering mathematics and fundamentals, and physics. Students must earn a grade of C-minus or higher in the core requirements MATH:1550 Engineering Mathematics I: Single Variable Calculus and MATH:1560 Engineering Mathematics II: Multivariable Calculus.

Students should complete the core requirements according to the following three-semester plan. Those who do not follow this plan may encounter a delay in graduation because of scheduling problems for courses that must be taken in a specific sequence or that are offered only once a year.

**First Semester**

All of these:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR:1000 Engineering Success for First-Year Students (all majors; credit does not count toward B.S.E. degree)</td>
<td>1 s.h.</td>
</tr>
<tr>
<td>ENGR:1100 Engineering Problem Solving I (all majors)</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>CHEM:1110 Principles of Chemistry I (all majors)</td>
<td>4 s.h.</td>
</tr>
<tr>
<td>MATH:1550 Engineering Mathematics I: Single Variable Calculus (all majors)</td>
<td>4 s.h.</td>
</tr>
<tr>
<td>RHET:1030 Rhetoric (all majors)</td>
<td>4 s.h.</td>
</tr>
</tbody>
</table>

**Second Semester**

One of these:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM:1120 Principles of Chemistry II (biomedical, chemical, and environmental majors)</td>
<td>4 s.h.</td>
</tr>
<tr>
<td>General education component (civil, electrical, industrial, and mechanical majors)</td>
<td>3 s.h.</td>
</tr>
</tbody>
</table>

All of these:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR:1300 Engineering Problem Solving II (all majors)</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>MATH:1560 Engineering Mathematics II: Multivariable Calculus (all majors)</td>
<td>4 s.h.</td>
</tr>
<tr>
<td>MATH:2550 Engineering Mathematics III: Matrix Algebra (all majors)</td>
<td>2 s.h.</td>
</tr>
<tr>
<td>PHYS:1611 Introductory Physics I (all majors)</td>
<td>4 s.h.</td>
</tr>
</tbody>
</table>

**Third Semester**

One of these:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS:1612 Introductory Physics II (biomedical, civil, electrical, industrial, and mechanical majors)</td>
<td>3-4 s.h.</td>
</tr>
<tr>
<td>General education component (optional, chemical and environmental majors)</td>
<td>3 s.h.</td>
</tr>
</tbody>
</table>

All of these:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR:2110 Engineering Fundamentals I: Statics (all majors)</td>
<td>2 s.h.</td>
</tr>
<tr>
<td>ENGR:2120 Engineering Fundamentals II: Electrical Circuits (all majors)</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>ENGR:2130 Engineering Fundamentals III: Thermodynamics (all majors)</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>MATH:2560 Engineering Mathematics IV: Differential Equations (all majors)</td>
<td>3 s.h.</td>
</tr>
</tbody>
</table>

**Requirements for Each Engineering Major**

The curriculum for each B.S.E. major is described in that program's departmental Catalog section; see Biomedical Engineering, Chemical and Biochemical Engineering, Civil and Environmental Engineering, Electrical and Computer Engineering, or Mechanical and Industrial Engineering.

Each program's curriculum is divided into four major stems, which are described below.

**CURRICULUM STEMS**

The curriculum for each B.S.E. program of study is divided into four major stems: mathematics and basic sciences, engineering topics, an elective focus area, and the general education component (humanities and social sciences). All of the courses in the curriculum stems are integrated and sequenced to help students understand the interrelationships and importance of each stem.

**Mathematics and Basic Sciences**

The mathematics and basic sciences stem provides the foundation upon which the engineering courses for each engineering major are based. It includes a minimum of five courses in mathematics and statistics and one each in chemistry and physics. The faculty of each engineering program has specified at least one additional chemistry or physics course and other additional mathematics or
science courses beyond these minimum requirements to provide a base appropriate for the program's major.

**Engineering Topics (Science and Design)**

The engineering topics stem builds upon the math and science stem, providing a bridge from fundamental principles to applications and creative practice.

The stem's engineering science courses use the underlying principles learned in the mathematics and basic sciences stem to understand and predict the behavior of idealized models of real components or systems encountered in engineering. These courses include fundamentals of statics, thermodynamics, and electrical circuits, as well as other engineering courses relevant to each major.

The stem's engineering design courses focus on the process of devising a system, component, or process to meet a stated objective. Engineering design integrates decision making and the optimal application of basic sciences, mathematics, and engineering sciences to reach a desired outcome. Elements of the design process include the establishment of objectives and criteria, synthesis, analysis, construction, testing, evaluation, and consideration of realistic constraints such as economic factors, safety, reliability, aesthetics, ethics, and social and environmental impact.

**Elective Focus Area**

The elective focus area stem provides a set amount of credit that students use to build strength in a technical focus area by completing a minor, earning a certificate, or pursuing a tailored program of study.

Students choose elective focus area courses consistent with traditional career goals or nontraditional career goals. Their choice of degree plan and courses may affect the number and type of employment opportunities available to them after graduation. Program advisors help students develop coherent, well-focused plans that fit their goals.

Students who pursue a traditional focus area may replace up to 21 s.h. of traditional technical electives with course work toward a minor or certificate. Students who choose nontraditional focus areas work closely with an advisor to build a rigorous, well-focused program. They must define and justify their career goals; provide a detailed plan of study and obtain their B.S.E. program's approval for the plan before beginning the plan's course work; and complete the plan as approved.

Each B.S.E. program is responsible for approving proposed plans of study, ensuring that the program's ABET accreditation criteria are met, and that students' choices are consistent with their career aspirations and with the college's educational mission.

Guidelines for elective focus areas vary by program. For details, see Engineering Curriculum Guides on the college's web site.

**General Education Component**

The general education component stem promotes understanding of and appreciation for community, culture, and learning through course work. All summer 2015 incoming students and those admitted later are held to the following requirements.

Students earn 15 s.h. in courses chosen from approved departments and programs as outlined below.

Completion of at least 3 s.h. from the "Be Creative: course list as follows.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTS:1510</td>
<td>Basic Drawing</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>ARTS:1520</td>
<td>Design Fundamentals</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>CERM:2010</td>
<td>Exploring Forms in Clay I</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>CINE:1834</td>
<td>Modes of Film and Video Production</td>
<td>4 s.h.</td>
</tr>
<tr>
<td>CNW:1620</td>
<td>Introduction to Creative Nonfiction</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>CNW:2680</td>
<td>The Art and Craft of Creative Nonfiction</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>CNW:2700</td>
<td>The Art and Craft of Personal Writing</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>CNW:2770</td>
<td>The Art and Craft of Writing for New Media</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>CNW:2790</td>
<td>The Art and Craft of Humor Writing</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>CNW:2830</td>
<td>The Art and Craft of Immersion Journalism</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>CNW:2850</td>
<td>The Art and Craft of Writing About Politics</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>CNW:2910</td>
<td>Writing for Applications and Awards</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>CNW:3640</td>
<td>Writing for Business and Industry</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>CNW:4355</td>
<td>Approaches to Teaching Writing</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>CW:2100</td>
<td>Creative Writing</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>CW:2870</td>
<td>Fiction Writing</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>CW:2875</td>
<td>Poetry Writing</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>CW:3003</td>
<td>Writing and Reading Science Fiction</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>CW:3005</td>
<td>Professional and Creative Business Communication</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>CW:3107</td>
<td>Creative Writing for the Health Professions</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>CW:3210</td>
<td>Creative Writing and the Natural World</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>CW:3215</td>
<td>Creative Writing and Popular Culture</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>CW:3218</td>
<td>Creative Writing for New Media</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>CW:4745</td>
<td>The Sentence: Strategies for Writing</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>CW:4751</td>
<td>Creative Writing for the Musician</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>CW:4760</td>
<td>The Art of Revision: Rewriting Prose for Clarity and Impact</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>DANC:1020</td>
<td>Beginning Jazz</td>
<td>1-2 s.h.</td>
</tr>
<tr>
<td>DANC:1030</td>
<td>Beginning Ballet</td>
<td>1-2 s.h.</td>
</tr>
<tr>
<td>DANC:1040</td>
<td>Beginning Modern Dance</td>
<td>1-2 s.h.</td>
</tr>
<tr>
<td>DANC:1050</td>
<td>Beginning/Contact Improvisation</td>
<td>1-2 s.h.</td>
</tr>
<tr>
<td>DANC:1140</td>
<td>Continuing Modern Dance</td>
<td>1-2 s.h.</td>
</tr>
<tr>
<td>DANC:2020</td>
<td>Intermediate Jazz</td>
<td>1-2 s.h.</td>
</tr>
<tr>
<td>DANC:2030</td>
<td>Intermediate Ballet</td>
<td>1-2 s.h.</td>
</tr>
<tr>
<td>DANC:2040</td>
<td>Intermediate Modern</td>
<td>1-2 s.h.</td>
</tr>
<tr>
<td>MTL5:2910</td>
<td>Introduction to Jewelry and Metal Arts</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>MUS:1007</td>
<td>Garage Band: The Basics</td>
<td>2 s.h.</td>
</tr>
<tr>
<td>MUS:1012</td>
<td>Creativity in Music</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>THTR:1140</td>
<td>Basic Acting</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>THTR:2140</td>
<td>Acting I</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>THTR:2215</td>
<td>Theatre Technology</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>THTR:2220</td>
<td>Production Lab</td>
<td>1-3 s.h.</td>
</tr>
<tr>
<td>THTR:2610</td>
<td>Acting for Success</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>THTR:3202</td>
<td>Graphic Design and Identity</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>THTR:3230</td>
<td>Scene Design I</td>
<td>3 s.h.</td>
</tr>
<tr>
<td>THTR:3240</td>
<td>Costume Design I</td>
<td>3 s.h.</td>
</tr>
</tbody>
</table>
THTR:3250 Lighting Design I 3 s.h.
THTR:3270 Entertainment Design 3 s.h.

Completion of at least 3 s.h. from one of the following CLAS GE categories below. (Industrial engineering students must complete this requirement with PSY:1001 Elementary Psychology.)

Interpretation of Literature
World Languages
Historical Perspectives
International and Global Issues
Literary, Visual, and Performing Arts
Values, Society, and Diversity
Social Sciences

Completion of at least 9 s.h. as follows. The remaining GE courses can be selected from the "Be Creative" list, from courses in the seven CLAS GE lists above, or from the College of Engineering approved course subject list. See General Education Component for departments and programs that offer approved courses. Most general education component courses are offered by the College of Liberal Arts and Sciences (CLAS).

Credit may be earned by examination; see "Academic Rules and Procedures"/"Academic Standards"/"Credit by Examination" later in this section.

Students who enter the College of Engineering with a B.A. or B.S. are considered to have satisfied the general education component requirement.

Students who enroll in a joint degree program in the College of Engineering and the College of Liberal Arts and Sciences or the Tippie College of Business are considered to have satisfied the College of Engineering's general education requirement once they have completed all requirements for the liberal arts and sciences degree or the business degree.

Honors in Engineering

Outstanding undergraduate students who demonstrate exceptional accomplishment through research, directed independent study, teaching internships, or other approved nondegree enrichment activities may graduate with honors in engineering. They must maintain a University of Iowa g.p.a. of at least 3.33, complete an honors project with a faculty member, and participate in a college-wide honors seminar with faculty members and other honors students. Successful completion of the honors requirements leads to a B.S.E. with honors, which is noted on the student's transcript. See the College of Engineering Honors Education Opportunities web page for details.

In addition to honors in engineering, undergraduate students have a variety of opportunities for honors study and activities through membership in the University of Iowa Honors Program; visit Honors at Iowa to learn about the University's honors program.

Second B.S.E. Degree

Current College of Engineering students and recent graduates may earn a second Bachelor of Science in Engineering. The second degree must include all courses required by the second engineering degree program, including the senior-level design course sequence and any specific social science elective requirements. Elective focus area courses selected for the second B.S.E. must be of a variety and level that permit students to meet at least the minimal level of competence usually expected of graduates of that program.

Students must file an academic study plan, which must be approved by the faculty of the second degree program, submitted to the Student Development Center, and placed in a student's permanent file before a student may begin coursework in the second B.S.E. The study plan should include a list of the courses to be taken in the second program along with a list of the courses already completed and yet to be completed for the first engineering degree program. Any changes in the plan must be approved by a student's faculty advisor in the second program and by the department chair of that program (the college petition form may be used for this purpose), submitted to the Student Development Center, and placed in a student's permanent file.

Joint and Dual Degrees

Joint B.B.A./B.S.E.

The College of Engineering and the Tippie College of Business offer a joint degree program in which students earn two University of Iowa bachelor's degrees: a Bachelor of Business Administration (B.B.A.) from the Tippie College of Business and a Bachelor of Science in Engineering (B.S.E.) from the College of Engineering.

Students in the joint program must complete all requirements for both degrees, including all General Education requirements. They must enroll in appropriate mathematics and engineering courses early in their course of study in order to complete the program in a timely way. Because courses in natural sciences, mathematics, humanities, and social sciences count toward the B.B.A. and the B.S.E., students may count a single course toward both degrees.

B.B.A./B.S.E. students usually meet the degree requirements of both colleges in about five years; time required depends on a student's choice of major study areas.

Students in the joint B.B.A./B.S.E. program should consult with their advisors about whether the second-grade option is available to them.

Students are assigned two advisors, one in the Tippie College of Business Undergraduate Program Office and the other in their College of Engineering major department.

To enter the joint degree program, students must have approval from both colleges and must be admitted to both colleges. Interested students should contact Engineering Student Services.

For information about the B.B.A., including requirements for the degree, see Bachelor of Business Administration (Tippie College of Business) in the Catalog.

Joint B.S.E./Liberal Arts and Sciences Degree

Students may earn two University of Iowa bachelor's degrees in a joint program in the College of Engineering and the College of Liberal Arts and Sciences. Successful candidates are awarded a B.S.E. (Bachelor of Science in Engineering) by the College of Engineering and a B.A. (Bachelor of Arts), B.S. (Bachelor of Science), B.F.A.
Students in joint degree programs must complete all requirements for both degrees, including the College of Liberal Arts and Sciences General Education Program and the College of Engineering general education component.

Student in the joint program usually are able to meet the degree requirements of both colleges in about five academic years. The exact length of time necessary to complete the program is determined by the major areas of study selected in each college. Students who enter the joint degree program are assigned two faculty advisors, one in their major department in the College of Engineering and the other in their major department in the College of Liberal Arts and Sciences.

To enter the joint degree program, students must be admitted to both the College of Engineering and the College of Liberal Arts and Sciences and must have College of Engineering approval to enter the joint degree program. Joint degree program applicants must meet the high school course or unit requirements for admission to each of the two colleges.

It is crucial that students enroll in the proper mathematics and engineering courses early in their course of study to expedite the completion of the program. The specific engineering courses taken by each student vary according to his or her engineering major. Since courses in natural sciences, mathematics, humanities, and social sciences are accepted for credit by both colleges, students may be able to count a particular course toward both degrees.

Contact Engineering Student Services for information about specific requirements. To learn about liberal arts and sciences majors, visit College of Liberal Arts and Sciences Majors, visit College of Liberal Arts and Sciences Majors in the Catalog and select majors in departments from the college index.

**B.S./B.S.E. Dual Degree with Northern Iowa**

The 3+2 dual degree program leads to a B.S. in applied physics from the University of Northern Iowa (UNI) and a B.S.E. from the University of Iowa. It requires approximately three years of study at UNI followed by approximately two years of study at Iowa. There is no guarantee that students can complete the 3+2 degree in five years.

Students interested in the program are guaranteed admission to the University of Iowa portion of the program if they have a g.p.a. of at least 3.00 (B average) in all course work and in the chemistry, mathematics, and physics courses required by the University of Northern Iowa physics department.

During the first three years of the program, students complete at least 90 s.h. of course work at the University of Northern Iowa. They must successfully complete courses in each of the following areas: chemistry, mathematics through differential equations, physics to satisfy the applied physics major requirements, and courses to satisfy the General Education requirements. Credit for courses passed with a grade of C or higher is transferred to the University of Iowa as credit for equivalent courses there.

At the University of Iowa, students complete the B.S.E. requirements that were current at the time of their admission to the UI College of Engineering. Course work completed at the University of Iowa is transferred to the University of Northern Iowa and applied toward the requirements for that institution's B.S. in applied physics.

When transferring to Iowa from UNI, students must submit applications for admission, housing, and financial aid to the University of Iowa by the University's established deadlines.

**Joint B.S.E./M.S. in Engineering**

Engineering students may be eligible to enroll in one of the College of Engineering's joint B.S.E./M.S. programs, which allow students to begin working toward a master's degree in engineering while they are completing the bachelor's degree. The joint programs, which are offered by each of the college's departments, permit students to count certain courses toward both degrees, completing both programs in less time than they would need to complete them separately. See "Joint B.S.E./M.S." in each College of Engineering department section of the Catalog.

**Joint B.S.E./M.A. or M.S. in Urban and Regional Planning**

The College of Engineering and the School of Urban and Regional Planning offer the joint Bachelor of Science in Engineering/Master of Arts or Master of Science program in urban and regional planning. The program, which is completed in five years, is designed for students who wish to pursue a public or private sector career in planning, a field that encompasses the development of alternatives to improve the quality of life in cities and regions.

Graduates are technically oriented professionals who have a clear understanding of policy development and implementation, which they apply to civil and industrial engineering problems. They fill positions such as public works director, transportation engineer, and public utilities staff member.

Each student in the joint program has two advisors, one in engineering and one in urban and regional planning. Students enroll in the College of Engineering for their first four years in the program and in the Graduate College for their fifth year. They follow the standard curriculum of their B.S.E. program during the first two years and begin adding courses from the urban and regional planning program during the third year. Successful students receive a B.S.E. at the end of the fourth year and an M.A. or M.S. in urban and regional planning at the end of the fifth year.

Students in the joint program must maintain a cumulative g.p.a. of at least 3.00 in order to graduate with an M.A. or M.S. in urban and regional planning.

See Urban and Regional Planning (Graduate College) in the Catalog for information about the graduate degree. Contact Engineering Student Services for information about applying to the joint program.

**Minors**

Engineering students may complete minors in a number of disciplines. For instance, students interested in heading an engineering firm might choose to earn a minor in business administration. For a list of minors and links to the departments and programs that offer them, see Undergraduate Minors in the Catalog.

B.S.E. programs generally allow students to satisfy their elective focus area requirement by completing a minor.
Students who choose this option must work closely with program advisors to ensure that the minor is compatible with their engineering career aspirations.

In order to have the minor noted on their transcript, students must designate that they have fulfilled a minor’s requirements when they apply for degree on ISIS. See “Academic Rules and Procedures”/“Application for Degree” later in this section.

Certificates

Engineering students may earn certificates offered by colleges across the University. The College of Engineering partners with the Tippie College of Business to offer the Certificate in Technological Entrepreneurship, which is tailored specifically for engineering students who intend to start and operate their own business or who would like to understand and learn about managing innovation in business environments. The College of Engineering also teams with the College of Liberal Arts and Sciences to offer the undergraduate Certificate in Wind Energy, which introduces students to a developing field that has a growing need for professionals with knowledge of wind energy. Other certificates of particular interest to engineering students include the Certificate in International Business and the Certificate in Sustainability.

See Undergraduate Certificates in the Catalog for a complete list of certificates and links to their individual Catalog sections.

Cooperative Education and Internship Program

The Cooperative Education and Internship Program offers students the opportunity to explore engineering careers and develop engineering skills through periods of professional practice while they are still students. Supervised professional engineering-related experiences in business, industry, education, or government expose students to the challenges and opportunities of the day-to-day life of an engineer. Students with co-op and/or internship experience are sought by employers and usually receive higher starting salaries upon graduation.

A portion of registered co-op and/or internship experience before graduation can be credited toward the experience requirements for professional licensure in Iowa and some other states.

Qualified students may choose to alternate periods of on-campus study with full-time work experience, or they may elect to work half time while taking at least 6 s.h. of classes. The co-op experience may cover one to three semesters, a series of summer placements, or a single summer. Students may apply to the program following their first year. Academic record and class status are considered in acceptance decisions. Interested students and employers or organizations must register with the College of Engineering director of professional development. For details, see Engineering Professional Development.

Admission

Applicants for admission to the College of Engineering as first-year students must have successfully completed at least four years of English/language arts; four years of mathematics, which must include at least two years of algebra, one year of geometry, and one year of higher mathematics (trigonometry, analysis, calculus); two years of a single foreign language; three years of natural science, which must include at least one year of chemistry and at least one year of physics; and at least two years of social studies. A high school computer programming course is recommended but not required.

Applicants are guaranteed admission to the College of Engineering if they have no high school unit deficiencies, an ACT composite score of 25 or higher, an ACT math score of 25 or higher, and a Regent Admission Index score of at least 265. Students who do not meet these requirements, or who attend a high school that does not rank its students, are encouraged to send recommendations from math and science teachers and a personal statement, which will be considered in an individual review by the College of Engineering.

Students who are admitted through the individual review process may be required to make up deficiencies by taking a lower-level course in their area of deficiency before enrolling in the first required course in that area. For example, students who have high math grades and standardized test scores, but who are deficient by one unit in mathematics, may be required to complete a course such as MATH:1020 Elementary Functions before enrolling in the first engineering calculus course.

Incoming first-year and transfer students who do not meet the foreign language requirement may be admitted on conditional status for a maximum of four semesters in order to complete two semesters of an introductory college-level foreign language.

Students who are unsure whether to pursue a degree in engineering or a degree in liberal arts and sciences are strongly encouraged to begin in engineering if they meet the admission requirements.

Information about admission to the College of Engineering is available on the college’s web site.

Transfer Applicants

Transfer applicants must have completed the same high school unit requirements as entering first-year students and must submit an official high school transcript as well as a transcript of college work undertaken at other institutions. To transfer to the College of Engineering, students must have demonstrated success in math, science, and engineering courses, ideally earning all As and Bs with no grade lower than a C in these foundation subjects. Transfer students must have completed calculus I and the equivalent of either CHEM:1110 Principles of Chemistry I or PHYS:1611 Introductory Physics I (the first semester of chemistry designed for majors, or the first semester of calculus-based physics). Overall grade-point average also is considered in transfer applications.

Information about admission requirements for transfer students is available on the college’s web site.

Academic Rules and Procedures

Academic Advising

Undeclared engineering students and declared first-year students are advised by the staff of Engineering Student Services. After the first year, engineering students who have declared an academic program are advised by faculty advisors assigned to that program. Students may request a change of advisor when it is deemed appropriate. All students are required to have
a conference with their advisors before registering for classes each semester.

Application for Degree

Students who wish to be considered for graduation must submit an Application for Degree through ISIS the session before they are eligible to graduate or before the deadline date during the session in which their degree is to be conferred.

Students who do not graduate in the session they submitted their Application for Degree must submit another application through ISIS for the next applicable session. Students do not need to be registered to apply for a degree.

See Applying for Degree on the Office of the Registrar website.

Academic Recognition

GRADUATION WITH HONORS

Graduation with honors recognizes high academic achievement based on both grades and exceptional accomplishment. To be eligible for graduation with honors, students must be approved by a selected honors committee and the director of the honors program, and they must complete honors requirements. See “Honors in Engineering” earlier in this Catalog section.

GRADUATION WITH DISTINCTION

Graduation with distinction recognizes high academic achievement based on grades. The college awards degrees "with highest distinction" to students in the highest 2 percent of their graduating class, "with high distinction" to students in the next-highest 3 percent, and "with distinction" to students in the next-highest 5 percent. Ranking is based on students' grade-point average for all college-level study taken up to their final registration.

To be eligible to be considered for graduation with distinction, students must complete their final 60 s.h. of study in residence at the college and must have completed at least 45 s.h. in the college before their final registration. Students in the combined engineering/liberal arts and sciences program are eligible to graduate with distinction regardless of the college in which they complete their residency requirement.

DEAN'S LIST

Undergraduate students in the Colleges of Liberal Arts and Sciences and Engineering and the Tippie College of Business who achieve a g.p.a. of 3.50 or higher on 12 s.h. or more of University of Iowa graded course work during a given semester or summer session and who have no semester hours of I (incomplete) or O (no grade reported) during the same semester are recognized by inclusion on the Dean's List for that semester.

PRESIDENT'S LIST

University of Iowa undergraduate students who achieve a g.p.a. of 4.00 on 12 s.h. or more of University of Iowa graded course work and who have no semester hours of I (incomplete) or O (no grade reported) for two consecutive semesters (excluding summer sessions) are recognized by inclusion on the President's List.

Academic Standards

MAXIMUM SCHEDULE

Course schedules of more than 19 s.h. for a semester, 12 s.h. for a summer session, or 3 s.h. for a winter session require approval of the advising staff in Engineering Student Services. The Permission to Register for Additional Hours form is available online.

CLASSIFICATION OF STUDENTS

Students in the College of Engineering are classified by the number of semester hours of credit they have earned toward the Bachelor of Science in Engineering.

First-year: 0-29 s.h. earned toward the B.S.E.
Sophomore: 30-59 s.h. earned toward the B.S.E.
Junior: 60-89 s.h. earned toward the B.S.E.
Senior: 90 s.h. or more earned toward the B.S.E.

GRADING SYSTEM

The college uses a letter grading system. A denotes superior performance, B denotes above average, C denotes average, D denotes below average, and F denotes failure of the course. Plus and minus designate gradations of performance between letter grades. Letter grades and their numerical equivalents are as follows.

A–plus: 4.33
A (superior): 4.00
A–minus: 3.67
B–plus: 3.33
B (above average): 3.00
B–minus: 2.67
C–plus: 2.33
C (average): 2.00
C–minus: 1.67
D–plus: 1.33
D (below average): 1.00
D–minus: 0.67
F (failing): 0

This grading system is used for all students in both undergraduate and graduate engineering courses. Grades of D-minus are passing grades; that is, courses completed with grades of D-minus or higher count toward collegiate requirements, with the exception of MATH:1550 Engineering Mathematics I: Single Variable Calculus and MATH:1560 Engineering Mathematics II: Multivariable Calculus, which have a minimum grade requirement of C-minus or higher.

ACADEMIC PROBATION AND DISMISSAL

Students who do not achieve or surpass University of Iowa cumulative and semester minimum grade-point averages of 2.00 are placed on academic probation.

Students on academic probation are restored to good standing when they successfully complete an additional 9 s.h. toward an engineering degree, either in one semester or cumulatively, and their University of Iowa cumulative and semester grade-point averages equal or exceed 2.00.
The college reviews academic records for all students at the end of the fall and spring semesters. There is no review at the end of the summer session. Students are placed on probation, dismissed for unsatisfactory progress (with or without previous probationary status), or restored to good standing only at the end of the fall and spring semesters. Students on academic probation are not permitted to continue their enrollment without written expectations for their future performance.

Students who do not make satisfactory progress may be dismissed from the college without an intervening probationary period. Students who are dismissed from the college for unsatisfactory academic progress due to circumstances beyond their control, such as a death in their immediate family or extended personal illness, may appeal for a revocation of the dismissal. A student dismissed in January must submit a written appeal by the second day of spring semester classes. A student dismissed in May must submit the written appeal by June 15.

Students dismissed from the college for poor scholarship may appeal to re-enroll after an interval of at least one calendar year. A written appeal for reinstatement must be submitted to the Appeals Committee at the Student Development Center. Appeals must be submitted before June 15 for reinstatement in a fall semester or before December 1 for reinstatement in a spring semester.

For details, see Academic Policies and Appeal Procedures under Current Students on the college's web site.

DROPPING AND ADDING COURSES
Courses may be added with permission of the advisor and the instructor during the first two weeks of the semester or first one-and-one-half weeks of the summer session.

Courses may be dropped with permission of the advisor and the instructor at any time during the first 10 weeks of the semester. Only under compelling circumstances may courses be dropped after the 10th week, in which case special approval must be granted by the advisor, the course instructor, and the dean’s office. Under no circumstance are students permitted to drop after the beginning of the scheduled final examination period.

LIMITS ON WITHDRAWING FROM COURSES
Undergraduates receive the mark of W for any course dropped after the second week of the semester or the first one-and-one-half weeks of the summer session. Students may not drop the same course with a mark of W more than twice. Special courses that may be repeated are exempt from this rule.

Students who have a legitimate reason for dropping a course (e.g., disabling illness, death of an immediate family member) and can document that reason are permitted to exclude that drop from the maximum, but the W is not removed from the record. Requests for such exclusions are made at Engineering Student Services.

WITHDRAWAL OF REGISTRATION
Students who withdraw their entire registration must consult the staff at Engineering Student Services. A student on scholastic probation who withdraws registration at any time without good cause may not be permitted to enroll for the following semester without specific approval from Engineering Student Services staff. Withdrawal forms for students enrolled in the college are signed by the associate dean for academic programs.

PASS/NONPASS OPTION
A maximum of two courses taken pass/nonpass (P/N) may be applied toward satisfaction of the general education (humanities and social sciences) requirement. P/N registration must be approved by the student’s advisor and the instructor of the course and must be completed during the first 10 days of a semester or the first two weeks of a summer session. P/N registration may not be changed after the deadline for adding courses. The pass/nonpass option may not be used for courses taken to satisfy the rhetoric requirement. Guided Independent Study courses taken for humanities or social science credit may not be taken P/N.

Students enrolled in courses taught in the College of Engineering may choose to be graded pass/nonpass under the following conditions:

- the signatures of the advisor and instructor must be obtained on the proper form, and the completed form must be submitted to the registrar’s service center by the student within the time period established by University policy;
- the mark of P (pass) is awarded where the final course grade earned was C-minus or higher; the mark of N (nonpass) is given for grades of D-plus or below; marks of P and N are not used in computing the grade-point average, and the mark of N does not count as earned credit.

No course work taken in the College of Engineering on the pass/nonpass option may be used to satisfy requirements for an engineering degree.

SECOND-GRADE-ONLY OPTION
A student may elect to repeat a course with only the new grade being counted in his or her grade-point average. The option may be applied to no more than three courses, and it may be applied only once to a particular course. Transfer students may apply the option on a prorated basis.

A course may not be repeated under the second-grade-only option once it has been used as a prerequisite for a more advanced course that the student has completed successfully.

To exercise the second-grade-only option, students register as usual for the course that is to be repeated, then they complete a Second Grade Option form at Engineering Student Services. The Second Grade Option form is available online. Students must complete the form during the session in which they repeat the course, within the first 12 weeks of the fall or spring semester or the first six weeks of the summer session. Students must follow this procedure or both grades will be counted in their University of Iowa grade-point average.

Under the second-grade-only option, the registrar marks the permanent record to show that a particular course has been repeated. Both grades remain on the permanent record, but only the second is used in calculating the grade-point average and semester hours earned. The course must be taken the second time under the same circumstances and with the same grade option as it was taken the first time.

The second-grade-only option cannot be used to remove a grade of incomplete, which must be removed in the usual
manner. A student who holds a degree from the University of Iowa may not apply the second-grade-only option to a course taken before the degree was conferred.

**SATISFACTORY/FAIL COURSES**
The noncredit professional seminar courses required in each of the professional programs are offered only satisfactory/fail (S/F). No other engineering courses are offered on this basis. An F (fail) grade earned for such a class does not satisfy any portion of the professional seminar requirement.

**INCOMPLETE AND NO REPORT GRADES**
A mark of I (incomplete) that is not replaced by a final grade will automatically be converted to an F at the end of the next fall or spring semester (summer and winter sessions excluded), even if a student does not enroll after the session the incomplete was posted.

A mark of O (no grade reported) will remain on a student's permanent record until a valid grade is submitted.

**CREDIT BY EXAMINATION**
Students who have acquired knowledge in subject areas from sources other than formal course registrations may be granted credit toward graduation by examination, under the following conditions and limitations.

No more than 32 s.h. of credit by examination may be applied toward B.S.E. degree requirements.

College-Level Examination Program (CLEP) credit may be counted toward the lower-level general education (humanities and social science) requirements. CLEP credit earned in natural science areas does not count toward the engineering degree. Credit also may be earned through Advanced Placement (AP) Exams. For details about CLEP and AP credit, see Credit by Exam Options on the Office of Admissions web site.

Engineering students may earn credit for equivalent experience or former course work in any of the required common core courses through successful completion of examinations prepared and graded by the core course committees. Students who fail a core course are not permitted to earn credit by examination for the failed course. Students who wish to earn credit for core courses by examination must obtain approval from the associate dean for academic programs.

With approval of the departmental faculty, credit in three or fewer courses (totaling no more than 6 s.h.) may be awarded upon successful completion of final examinations in program elective courses.

**LANGUAGE INCENTIVE PROGRAM**
The University's Furthering Language Incentive Program (FLIP) gives entering engineering students two options for earning college credit for study of a world language.

**Option 1**: Entering students who place into a fifth-semester language course and complete the course with a grade of B-minus or higher receive 4 s.h. of exam credit for the fourth-semester course. The credit is ungraded but may be counted toward the hours required for graduation. Incentive credit is not granted for college course work for which credit has been received.

Students are eligible for incentive credit only during their first and second registrations at the University of Iowa.

**Option 2**: Students may receive 2 s.h. of exam credit for earning a grade of B-minus or higher in a first-semester-level course in a language different from the language used to satisfy their world languages requirement. They may earn another 2 s.h. for completing the second-semester-level course in that language for a grade of B-minus or higher.

Visit the college's web site for more information about FLIP credit. For more information on eligibility and restrictions, consult Engineering Student Services.

**CREDIT FROM OTHER COLLEGES**
Course requirements in engineering may be satisfied with credit earned in courses taken in other University of Iowa colleges or at other accredited colleges or universities. When students apply for admission to the College of Engineering, they must submit official transcripts from each college attended along with their application for admission. After the credit has been certified by the Office of Admissions as college-level work from an accredited institution and after admission has been granted, the credit is evaluated by the Student Development Center either before or during the student's first semester of enrollment in the college.

Satisfaction of engineering course requirements by transfer course work may be approved by the Student Development Center if, course-by-course, there is a match in the content and level of the transfer courses, and if the grades earned for such courses are C-minus or higher. Students who want to satisfy the engineering General Education Component (social sciences and humanities) requirements or the University of Iowa rhetoric requirement by transfer work must follow the College of Engineering transfer credit guidelines.

Students planning to attend a two- or four-year institution before transferring to the College of Engineering should discuss the planned transfer with officials at both schools before embarking on a transfer program. The College of Engineering has recommended transfer course lists for most Iowa community colleges and some four-year colleges. Once students are enrolled in the College of Engineering, they must have prior approval for course work taken at other institutions.

Contact Engineering Student Services for more information.

By policy of the Board of Regents, State of Iowa, a student may apply a maximum of 64 s.h. of transfer credit earned at a two-year college toward the minimum 128 s.h. required for the B.S.E. However, transfer credit from a two-year school in excess of 64 s.h. is used in computing grade-point average and may be used to satisfy course requirements, even though the semester hours cannot be counted toward the total required for graduation. A grade of C-minus or higher is required in order for transfer credit to be applied toward a degree requirement.

**COURSE SUBSTITUTIONS**
For students in the College of Engineering, the substitution of an alternate course for a required course requires the approval of a petition. The Petition for Course Substitution form is available on the college's web site or at Engineering Student Services. The form must be completed by a student and must be approved by a student's advisor and by the chair of the engineering program in which a student is majoring.
If the petition involves a required engineering core course or a General Education Component (social sciences or humanities) course, then it also must be approved by Engineering Student Services. Substitutions for required engineering core courses should be made infrequently and only under compelling circumstances. Substitutions of courses that are required by a student's program are governed by the faculty of that program; approval of these course substitutions is needed only from the faculty advisor and the department chair. All petitions must be forwarded to Engineering Student Services for inclusion in a student's permanent file.

AUDITING COURSES

Students in the College of Engineering may register for a course for zero credit (audit) with the permission of the course instructor and the advisor. The mark of AUS (audit successful) is assigned to students registered for zero credit if attendance and performance in the course are satisfactory; if unsatisfactory, the mark of AUU (audit unsuccessful) is assigned. Courses completed with a mark of AUS do not meet any requirements nor do they carry any credit toward graduation. Auditing may not be used as a second-grade-only option.

To register for a course on an audit basis, students must obtain the instructor's authorizing signature and their advisor's signature and must register for 0 s.h. To change registration from audit to credit or from credit to audit, a drop-add form is used. These changes must be made during the first three weeks of a semester or the first one-and-one-half weeks of a summer session.

Misconduct, Complaints

STUDENT ACADEMIC MISCONDUCT

Policies regarding cases of cheating or plagiarism are outlined on the College of Engineering web site; see Academic Misconduct. In cases of cheating on an exam or a quiz, the policy recommends that the instructor reduce a student's grade, including the assignment of F for the course. When a course grade has been reduced to an F, a student may not drop the course or use the second-grade-only option to eliminate the failing grade.

At the beginning of each semester, course instructors individually announce and explain their policies on acceptable levels of collaboration between students on graded work, which includes homework assignments and lab or design projects. When a policy is violated, a zero is assigned for the total portion of the course grade allocated to the requirement in which the violation occurs. The instructor sends a written report of any disciplinary action to the office of the dean and the report is placed in a student's file. Students are notified by the office of the dean of reported disciplinary action and are informed of appeal procedures.

STUDENT COMPLAINTS CONCERNING FACULTY ACTIONS

In cases where complaints do not involve alleged student academic misconduct, students with complaints against engineering faculty members should attempt to resolve the issue with the faculty member first; see Faculty Complaints on the college’s web site. Lacking a satisfactory outcome, a student should discuss the matter with the chair of the faculty member’s department.

Students who are uncomfortable dealing directly with a faculty member or a department chair may seek assistance from the engineering faculty ombudsperson when attempting to resolve a complaint related to an engineering course. Students taking non-engineering courses should seek assistance from the University ombudsperson. However, grievances generally can be satisfactorily resolved most expeditiously at the faculty or chair level. If students are not satisfied with the outcome of this procedure, they should discuss their complaints with the dean of engineering.

Student Organizations

The College of Engineering student body is represented by the Engineering Student Council. The council plans and carries out activities involving the entire college, including the electronic newsletter E-Week. Several engineering professional societies have student chapters at the University, as do a number of engineering honor societies. In addition, students may join a wide variety of engineering student organizations. See “Student Organizations” in the College of Engineering section of the Catalog or visit Student Organizations on the college's web site.