The College of Engineering prepares men and women for professional careers in engineering and related positions in industry, commerce, education, and government. Graduates at the bachelor's level are prepared to begin the practice of engineering or to continue their formal education at a graduate school of their choice. The curricula provide a comprehensive education emphasizing analysis and problem solving and an exposure to open-ended problems and design methods. The courses are taught in a manner that fosters teamwork, communication skills, and individual professionalism, including ethics and environmental awareness. The classroom experiences, along with outside activities, prepare students for lifetimes of continued learning and leadership. Thus, the engineering programs enable graduates to make significant contributions in their chosen fields while at the same time recognizing their responsibilities to society.

Table of Contents
Curricula, Mission, Vision (p. 1)
Educational Objectives (p. 1)
Outcomes and Assessment (p. 2)
Professional Component (p. 2)
Breadth of Programs (p. 2)
Engineering Career Services (p. 3)
Departments and Programs (p. 3)
Admission to Programs in the College of Engineering (p. 4)
Special Degree Programs (p. 5)
Special Off-Campus Programs (p. 6)
Technical Grade Point Average Requirements (p. 7)
Engineering Honors Programs (p. 9)
General Education Requirements (p. 9)
Elective Course Work (p. 9)
Combined B.S.-M.S. Engineering Degree Programs (p. 10)

Curricula
• Aerospace Engineering (http://catalog.illinois.edu/undergraduate/engineer/departments/aero)
• Agricultural and Biological Engineering (http://catalog.illinois.edu/undergraduate/engineer/departments/ag-bio-engin)
• Bioengineering (http://catalog.illinois.edu/undergraduate/engineer/departments/bioengin)
• Chemical Engineering (see Chemical Engineering (http://catalog.illinois.edu/undergraduate/las/academic-units/chem-bio-engin/#majorstext) in College of LAS)
• Civil Engineering (http://catalog.illinois.edu/undergraduate/engineer/departments/civil)
• Computer Engineering (http://catalog.illinois.edu/undergraduate/engineer/departments/electrical-computer-engin)
• Computer Science (http://catalog.illinois.edu/undergraduate/engineer/departments/comp-sci)
• Electrical Engineering (http://catalog.illinois.edu/undergraduate/engineer/departments/electrical-computer-engin)
• Engineering Mechanics (http://catalog.illinois.edu/undergraduate/engineer/departments/mech-engin)
• Engineering Physics (http://catalog.illinois.edu/undergraduate/engineer/departments/engin-physics)
• General Engineering (http://catalog.illinois.edu/undergraduate/engineer/departments/ind-gen-engin/gen-engin)
• Industrial Engineering (http://catalog.illinois.edu/undergraduate/engineer/departments/ind-gen-engin/ind-engin)
• Materials Science and Engineering (http://catalog.illinois.edu/undergraduate/engineer/departments/mtse)
• Mechanical Engineering (http://catalog.illinois.edu/undergraduate/engineer/departments/mech-engin)
• Nuclear, Plasma and Radiological Engineering (http://catalog.illinois.edu/undergraduate/engineer/departments/npre)

Mission
The University of Illinois at Urbana-Champaign was founded in 1867 as a state-supported, land-grant institution with a threefold mission of teaching, research, and public service. Based on that foundation, the mission of the College of Engineering is to meet the needs of the state and nation through excellence in education, research, and public service. The goals are to instill in students the attitudes, values, vision, and training that will prepare them for lifetimes of continued learning and leadership in engineering and other fields; to generate new knowledge for the benefit of society; and to provide special services when there are needs that the college is uniquely qualified to meet.

Vision
The vision of the College of Engineering is to be a distinguished institution, providing knowledge that focuses on the creation and management of systems and resources. This knowledge is to be shared by motivating and educating qualified students to master the most important components of science and engineering at all levels. The students are also to have an appreciation for human and ethical values and to master the skills of oral and written communication. The value of this combined knowledge is measured by its connection to effective products, processes, and services that address the needs of society.

Educational Objectives
The College of Engineering prepares men and women for professional careers in engineering and related positions in industry, commerce, education, and government. Graduates at the bachelor's level are prepared to begin the practice of engineering or to continue their formal education at a graduate school of their choice. Based on the mission and vision statement of the college, each engineering program has developed educational objectives which are broad statements that describe what graduates are expected to attain within a few years of graduation.
In general, all the programs provide students with a comprehensive education that includes in-depth instruction in their chosen fields of study. The programs are designed to emphasize analysis and problem solving and to provide exposure to open-ended problems and design methods. The courses are taught in a manner that fosters teamwork, communication skills, and individual professionalism, including ethics and environmental awareness. The classroom experiences, along with outside activities, prepare students for lifetimes of continued learning and leadership. Thus, the engineering programs enable graduates to make significant contributions in their chosen fields while at the same time recognizing their responsibilities to society.

Outcomes and Assessment
To accomplish the educational objectives and to fulfill current engineering accreditation criteria, all engineering programs provide the knowledge, experience, and opportunities necessary for students to demonstrate their attainment of the following outcomes:

- an ability to apply knowledge of mathematics, science, and engineering
- an ability to design and conduct experiments, as well as to analyze and interpret data
- an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- an ability to function on multidisciplinary teams
- an ability to identify, formulate, and solve engineering problems
- an understanding of professional and ethical responsibility
- an ability to communicate effectively
- the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- a recognition of the need for, and an ability to engage in life-long learning
- a knowledge of contemporary issues
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

An assessment system for continuous measurement, evaluation, and improvement is in place in each academic department. In addition, the college collects college-wide data and provides coordination and assistance to the departments for the overall process.

Professional Component
Each engineering program also contains a professional component, as required for accreditation, that is consistent with the objectives of the program and the institution. The professional component includes:

- one year of a combination of college-level mathematics and basic sciences (some with experimental experience) appropriate to the discipline. Basic sciences are defined as biological, chemical, and physical sciences.
- one and one-half years of engineering topics, consisting of engineering sciences and engineering design appropriate to the student’s field of study.
- a general education component that complements the technical content of the program and is consistent with the objectives of the program and the institution.

Students in engineering programs are prepared for engineering practice through a curriculum culminating in a major design experience based on the knowledge and skills acquired in earlier course work and incorporating appropriate engineering standards and multiple realistic constraints.

The paragraphs below further describe these elements of the programs and expected student outcomes and experiences.

Breadth of Programs
The college provides training in the mathematical and physical sciences and their application to a broad spectrum of technological and social requirements of society. The engineering programs, although widely varied and specialized, are built on a general foundation of scientific theory applicable to many different fields. Work in the classroom and laboratory is brought into sharper focus by practical problems that the student solves by methods similar to those of practicing engineers. Engineering design experience is introduced early in the programs, is integrated throughout, and culminates in a major design project team-work experience in the senior year.

Although each student pursues a program chosen to meet individual career goals, all students take certain courses. Basic courses in mathematics, chemistry, physics, rhetoric, and computer science are required in the first two years. The scientific and technical portion of the majors provides the rudimentary development of technical skills, the modern engineering tools and methods for solving problems in practice, the design of experiments and associated data analysis, an understanding of values and cost, an understanding of the ethical characteristics of the engineering profession and practice, a sensitivity to the socially related technical problems that confront health and safety, and the ability and emphasis for maintaining professional competence through lifelong learning. Although the programs are progressively specialized in the third and fourth years, each student is required to take some courses outside his or her chosen field.

Non-technical courses are included in each program; they may be required or elective. Many non-technical courses satisfy the broad objectives of the humanities and social sciences requirements of the engineering programs, enabling strong, effective communications, making the student keenly aware of the urgent contemporary problems of society, and developing a deeper appreciation of human cultural achievements in a global context. The humanities and social sciences courses are usually drawn from the liberal arts and sciences, economics, and approved courses in fine and applied arts. A student who desires a broader cultural background may wish to consider a combined engineering-liberal arts and sciences program.

Illinois Engineering Freshman Experience (IEFX)
The Illinois Engineering First-Year Experience (http://iefx.engineering.illinois.edu) is an interdisciplinary program for all first-year engineering students. Students’ aspirations are respected, supported, and fostered within program initiatives that lay a solid foundation for your collegiate career.

You have the opportunity to begin your experience by participating in Summer Scholars, a program centered on helping you transition to Illinois and increase your academic performance for the first year. You attend the eight-week Summer Session II and take the IEFX Projects course and another class of your choice.
For the fall semester, all first-year students attend Launch, your official welcome event to Engineering at Illinois, the Saturday before classes begin. You will meet faculty, staff, and other students at this popular party event that helps you build community and get a strong start.

Your experience continues with ENG 100, a fall-semester orientation course where you will learn important skills and information regarding engineering and the University, and you connect with a peer mentor that is trained and eager to assist you for academic success. You are also encouraged to enroll in one or more of the IEFX Electives. These courses offer variety to and enhancement of the first year.

Along with the opportunities mentioned previously there are other events and sub-programs in IEFX that build community and helps students establish a strong sense of engineering identity.

For further information regarding IEFX, visit the IEFX website (http://iefx.engineering.illinois.edu), contact the IEFX Office (First Floor, Engineering Hall, iefx@engineering.illinois.edu) or visit the Office of the Associate Dean for Undergraduate Programs, 206 Engineering Hall.

Engineering Career Services

The College of Engineering is committed to your success as a student and beyond. Our Engineering Career Services (ECS) office offers support, guidance, and resources to help you with every step of your job search. Whether you are interested in gaining practical experience through a co-op position or an internship, or entering the professional world upon your graduation, ECS provides a variety of services from career planning to offer evaluation and negotiation. We encourage you to take advantage of these services both as a student and as an alum of the College.

ECS provides comprehensive services and programs designed to enable students to identify, facilitate, and negotiate successful career opportunities. ECS offers an online job system that employers use to communicate with students by posting job opportunities and promoting on-campus recruiting activities.

ECS services include:

• Workshops and seminars
• Career exploration and counseling
• Resume and cover letter reviews
• Mock interviews
• Career fairs and on-campus recruiting events
• Job shadows, internships, co-ops, and full-time job postings
• Company databases and contact information
• Salary and placement statistics
• Offer evaluation and negotiation
• Presentations for classes and student organizations
• Personal consultation appointments

To take advantage of these services and many more, students simply need to register with the Engineering Career Services office (3270 Digital Computer Lab, 217-333-1960, ecs@engr.illinois.edu), or visit the Engineering Career Services website. (http://ecs.engineering.illinois.edu)

Departments and Programs

The engineering degree programs offered at Illinois awarding Bachelor of Science degrees are listed in the table below. The programs accredited by an accreditation commission of ABET (http://www.abet.org) and the year in which first accredited are indicated. The Computer Science program is accredited by the Computing Accreditation Commission (CAC); all others are accredited by the Engineering Accreditation Commission (EAC).

<table>
<thead>
<tr>
<th>Department</th>
<th>Engineering B.S. Degree Programs and First Year Accredited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerospace Engineering</td>
<td>Aerospace Engineering</td>
</tr>
<tr>
<td>Agricultural and Biological Engineering (ACES)</td>
<td>Agricultural and Biological Engineering</td>
</tr>
<tr>
<td>Bioengineering</td>
<td>Bioengineering</td>
</tr>
<tr>
<td>Chemical and Biomolecular Engineering (LAS)</td>
<td>Chemical Engineering</td>
</tr>
<tr>
<td>Civil and Environmental Engineering</td>
<td>Civil Engineering</td>
</tr>
<tr>
<td>Computer Science</td>
<td>Computer Science</td>
</tr>
<tr>
<td>Electrical and Computer Engineering</td>
<td>Electrical Engineering</td>
</tr>
<tr>
<td>Industrial and Enterprise Systems Engineering</td>
<td>General Engineering</td>
</tr>
<tr>
<td>Materials Science and Engineering</td>
<td>Materials Science and Engineering</td>
</tr>
<tr>
<td>Mechanical Science and Engineering</td>
<td>Engineering Mechanics</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>Mechanical Engineering</td>
</tr>
<tr>
<td>Nuclear, Plasma, and Radiological Engineering</td>
<td>Nuclear, Plasma, and Radiological Engineering</td>
</tr>
<tr>
<td>Physics</td>
<td>Engineering Physics</td>
</tr>
</tbody>
</table>

1 Accredited program name was Aeronautical and Astronautical Engineering until August, 2004.
2 The program in agricultural and biological engineering in the Department of Agricultural and Biological Engineering is administered jointly by the College of Agricultural, Consumer, and Environmental Sciences and the College of Engineering with the degree granted by the College of Engineering. It succeeds a program named Agricultural Engineering until August 2008 that was first accredited in 1950.
3 The program in chemical engineering is administered by the Department of Chemical and Biomolecular Engineering in the College of Liberal Arts and Sciences with the degree granted by the College of Liberal Arts and Sciences.
4 The Department of Computer Science also sponsors two majors administered by the College of Liberal Arts and Sciences: a Mathematics and Computer Science Major and a Statistics and Computer Science Major.
5 Accredited program name was Nuclear Engineering until August 2008.
6 The Department of Physics also offers a B.S. degree program in Physics and a Physics Major in the Science and Letters Curriculum, both administered by the College of Liberal Arts and Sciences.

Information listed in this catalog is current as of 10/2017
Admission to Programs in the College of Engineering

Entering Freshman Admissions

Students seeking admission to the College of Engineering who are current high school students, recent high school graduates, or who have earned fewer than 12 semester hours of credit at other collegiate institutions are classified as new freshmen and must meet the entrance requirements to the College of Engineering (http://engineering.illinois.edu/admissions/undergraduate) that are specified for new freshmen. Students are admitted to the college on a best-qualified basis as determined by a number of factors. These include ACT and SAT scores, high school percentile rank, high school grades, high school class selections, extracurricular activities, awards, and essays by the applicant.

Placement in chemistry, mathematics, rhetoric, and foreign languages is required and is based upon ACT and SAT scores, ALEKS (http://citl.illinois.edu/services/for-students/placement-testing/current-cutoffs/mathematics) math assessment results, or specific placement tests. Proficiency exams in many subjects, including chemistry, mathematics, and physics, are administered shortly after the fall semester begins. A student with advanced placement (AP or IB) credit in mathematics, chemistry, or physics will receive credit toward graduation and will be placed in advanced course work consistent with academic preparation.

All of the engineering curricula are built around a common core of courses. In addition all students in engineering curricula have 18 hours of social sciences and humanities electives and at least 6 hours of free electives; those choices are generally not prescribed by the curriculum. These common elements allow a student to transfer from one curriculum to another early in their college career with minimal loss of credit.

The following table gives an indication of the common elements in the early stages of the engineering curriculum. There are math, chemistry, physics, and rhetoric courses required in all curricula. There are also several courses that are common to many curricula. When a course substitution applies (e.g., MATH 286 for MATH 285, or MATH 415 for MATH 225) the most flexible option is to take the more demanding course as it meets the requirements of the less demanding course (and that curriculum). Each case will be considered individually on its own merits. Approval of an IDT petition will depend upon the reasons given by the petitioner for wanting to transfer, the comments of current and prospective departments, and availability of space in the target curriculum. Each case will be considered individually on its own merits.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Core Courses Common to All Engineering Curricula</th>
<th>Core Courses Common to Many Engineering Curricula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math</td>
<td>MATH 221, MATH 231, MATH 241, MATH 285³</td>
<td>MATH 225, MATH 415³</td>
</tr>
<tr>
<td>Physics</td>
<td>PHYS 211, PHYS 212</td>
<td>PHYS 213, PHYS 214</td>
</tr>
<tr>
<td>Chemistry</td>
<td>CHEM 102, CHEM 103</td>
<td>CHEM 104, CHEM 105</td>
</tr>
<tr>
<td>Composition</td>
<td>RHET 105⁴</td>
<td></td>
</tr>
<tr>
<td>Other Foundational Courses</td>
<td>GE 101, ME 170, ECE 110, CS 101</td>
<td></td>
</tr>
</tbody>
</table>

¹ Students with no background in calculus should take MATH 220 instead of MATH 221. Four of the five credit hours of MATH 220 apply to the degree requirements.
² MATH 286 is required in some curricula and is an acceptable substitute for MATH 285 in all curricula.
³ MATH 415 is an acceptable substitute for MATH 225 in all curricula that require MATH 225. Note that MATH 415 can be used in the Mathematics Minor whereas MATH 225 cannot.

Transferring into Engineering from Other Institutions

The College of Engineering admits qualified transfer students from both community and four-year colleges and has worked closely with many of these schools in Illinois to implement coordinated engineering programs.

Students may complete courses at other accredited institutions and transfer to Illinois with little or no loss of credit, provided that they follow the proper program. A suggested list of courses that should be completed before transferring may be viewed at the College of Engineering Transfer website (http://engr.illinois.edu/students/prospective/transfer_admission.php).

For more information, view the Office of Admissions Transfer website, (http://admissions.illinois.edu/apply/requirements_transfer.html) or visit the Office of the Associate Dean for Undergraduate Programs, 206 Engineering Hall.

Changing Curricula within Engineering

Students enrolled in the College of Engineering may petition for transfer to another department within the college. Such a transfer is considered an interdepartmental transfer (IDT).

Approval of an IDT petition will depend upon the reasons given by the petitioner for wanting to transfer, the comments of current and prospective departments, and availability of space in the target curriculum. Each case will be considered individually on its own merits.

For more information, view the College of Engineering Changing Majors website (https://wiki.cites.illinois.edu/wiki/pages/viewpage.action?pageld=397279242) or visit the Office of the Associate Dean for Undergraduate Programs, 206 Engineering Hall.

Information listed in this catalog is current as of 10/2017
Most engineering programs can be combined with one of a variety of engineering and liberal arts programs may be completed in ten semesters. Advisors in both colleges assist in planning a program of study to meet the needs and requirements for both degrees. Most combinations of engineering and liberal arts programs may be completed in ten semesters if the student does not have deficiencies in the entrance requirements of either college.

Most engineering programs can be combined with one of a variety of liberal arts and sciences majors, including science, languages, social sciences, humanities, speech communication, and philosophy. This combined program operates under the following conditions:

- Students entering the program must meet admission requirements for both colleges. Students planning completion of the two degrees in 8 semesters are recommended to submit the application in the fifth term of enrollment but no later than the first week of classes in the seventh term. Students planning completion in 10 semesters are recommended to submit the application in the seventh term of enrollment but no later than the first week of classes in the eighth term.
- Beginning with students who matriculated in Fall 2005, an Illinois GPA of 3.25 (or above for certain programs) will be required at the time of application for a second degree.
- Students must complete all of the requirements specified for the additional LAS degree as well as at least an additional 30 hours over and above those required for the first degree. The candidate must also complete 12 distinct advanced hours in the LAS major that are not used in meeting the requirements for any other degree program.
- All second degree candidates in LAS must be enrolled in the College of Liberal Arts and Sciences for a minimum of two semesters. Also, campus regulations on second degrees require at least 30 additional semester hours of Illinois credit that is not counted for the other degree.
- A student who starts in the program and decides to transfer from it is subject to the existing graduation requirements of the college of his or her choice.
- The degrees of Bachelor of Science in engineering and Bachelor of Arts or Bachelor of Science in liberal arts and sciences may be awarded simultaneously. If not, a student must complete the LAS degree first, having fulfilled the two-semester residency requirement in LAS, and transfer back to the College of Engineering to complete the other degree.
- Participants must satisfy the College of Liberal Arts and Sciences foreign language graduation requirement.
- Students electing advanced Reserve Officers’ Training Corps and Naval ROTC programs are required to meet these commitments in addition to the combined program as outlined.
- Students with 75 or more hours of transfer credit are not advised to enter this program because they cannot ordinarily complete it in five years.
- Students transferring from other colleges and universities must plan to complete at least one year in the College of Liberal Arts and Sciences at Urbana-Champaign and one year in the College of Engineering at Urbana-Champaign to satisfy residency requirements if both degrees are to be granted here.

For further information about this program, students should contact the Office of the Associate Dean in either the College of Engineering or the College of Liberal Arts and Sciences at the Urbana-Champaign campus.

**Dual-Degree Programs within the College of Engineering**

Students enrolled in any department of the College of Engineering may pursue a second engineering degree if the following requirements are fulfilled:

- Students seeking a second engineering degree must apply for the program no later than the first week of classes of the term they intend to graduate with the first degree. The two engineering degrees may be awarded simultaneously or consecutively. All candidates for engineering degrees are accorded a maximum of 10 semesters of Illinois enrollment to complete their degrees. Students must petition to request an extension beyond this limit, which must be approved by the Associate Dean for Undergraduate Programs in the College of Engineering.
- The Department offering the curriculum for the second degree must approve the double-degree request. The criteria for approval are the same as the ones applied for transfer into that curriculum.
- Campus regulations on second degrees require at least 30 additional semester hours of Illinois credit that is not counted for the other degree. The candidate must also complete at least 12 distinct advanced hours in the second degree that are not used in meeting the requirements for the first degree program.

Advanced students with multidisciplinary ambitions may also consider pursuing a graduate master’s degree as an alternative to a second undergraduate engineering degree, particularly if interested in research. Students should seek the advice of advisors and faculty members in the specific departments of interest to gather information on graduate programs and on available research opportunities.

**Program Modification**

A student can seek to modify his or her program of studies using course substitutions by submitting a Curriculum Modification form to the Office of the Associate Dean for Undergraduate Programs in the College of Engineering, 206 Engineering Hall (note that the forms can be obtained there too). The student should seek an endorsement of the change from his or her academic advisor and the Chief Advisor of the department responsible for the student’s program. The Associate Dean for Undergraduate Programs is responsible for approving all curriculum modifications. No program modification is automatically granted, and each request must come through the formal process. Once approved the
student is notified by return copy of the form and the program change is entered in the graduation audit.

**Custom Degree Program**

Some program changes do not fit the direct course substitution mode anticipated by a Program Modification. In such a case a student may seek permission to vary the program requirements of one of the standard Engineering degree programs by written petition to the Associate Dean for Undergraduate Programs. There is no standard form for this transaction. A student should submit a letter proposal outlining the nature of the request and the justification. The special program must be approved by the Associate Dean for Undergraduate Programs in the College of Engineering, who will consult with the head of the department in which the student is registered.

**Affiliations with Other Liberal Arts Colleges**

Through a program of affiliation between the College of Engineering and a number of liberal arts colleges, a student may enroll in a five-year program, earn a bachelor’s degree from one of these colleges, and at the same time earn a bachelor’s degree in engineering from Illinois. In general, students spend the first three years at the liberal arts college and the final two years at Illinois. At the time of transfer, students must meet competitive transfer admission requirements and must meet certain residency requirements to participate in this program.

The five-year program encourages a student to develop a broad understanding of the social sciences and humanities while striving for excellence in technical studies. These affiliations have the added benefit of allowing students to take core engineering studies (including mathematics, physics, and chemistry) at liberal arts schools. Students interested in this dual degree program should meet with advisors from both schools to develop an individual plan of study.

Colleges affiliated with the College of Engineering are:

- Augustana College, Rock Island, Illinois
- De Paul University, Chicago, Illinois
- Eastern Illinois University, Charleston, Illinois
- Elmhurst College, Elmhurst, Illinois
- Greenville College, Greenville, Illinois
- Illinois Benedictine College, Lisle, Illinois
- Illinois College, Jacksonville, Illinois
- Illinois State University, Normal, Illinois
- Illinois Wesleyan University, Bloomington, Illinois
- Knox College, Galesburg, Illinois
- Lewis University, Romeoville, Illinois
- Loyola University of Chicago, Chicago, Illinois
- North Central College, Naperville, Illinois
- Olivet Nazarene College, Kankakee, Illinois
- Western Illinois University, Macomb, Illinois
- Wheaton College, Wheaton, Illinois

For more information, view the Office of Admissions Transfer website (http://admissions.illinois.edu/apply/requirements_transfer.html).

**Special Off-Campus Programs**

**Experiential Learning Programs**

Co-ops and internships (summer and semester) provide students with a competitive advantage when seeking full-time career opportunities in industry. These Experiential Learning Programs not only enable students to gain up to a full year of professional work experience while paying for their education, but also offer the opportunity to explore engineering-related fields in-depth, to apply what you learn in the classroom to a real situation, and to provide insight into some of the nation’s leading companies.

As a Co-op, a student alternates terms of work with terms of school, working at least two semesters and one summer with the same company. Students that participate in a Co-op opportunity graduate with one year of professional work experience increasing their marketability throughout the recruiting process. Semester Interns work for a period of 4-7 months with one company (a spring or fall semester may be combined with a summer). Many students also participate in summer internships, working for one company during a summer (2-3 months). Students may complete multiple internships, and all internships and co-ops are paid employment positions.

Students find these Experiential Learning Programs valuable and rewarding for a number of reasons:

- They are able to explore opportunities within a specific field.
- They gain industry experience prior to graduation.
- They improve their overall communication and team skills.
- Time spent with an employer inspires their performance in their course work and expands their classroom experiences.
- The practical experience helps them to identify if they have really chosen the right field of interest for them and offers numerous alternative ideas.
- They earn money that can be applied to college expenses.

ECS also offers a job shadow program, which takes place each year during winter break. The Job Shadow Program is a one day program for freshmen and sophomores interested in spending time with an engineer to better understand what it means to work in a specific industry or company. This program provides students with an opportunity for a brief yet valuable introduction to the daily demands of an engineer during the course of a day. Each student is matched with an engineer in the student’s field of interest and spends time at the engineer’s firm. This unique interactive experience will give participants a better idea of how the professional world “feels” in their chosen field of study.

For more information regarding Experiential Learning Programs visit the Engineering Career Services website (http://ecs.engineering.illinois.edu), contact Engineering Career Services (3270 Digital Computer Lab, 217-333-1960, ecs@engineering.illinois.edu) or visit the Office of the Associate Dean for Undergraduate Programs, 206 Engineering Hall.

**Study Abroad Programs**

Engineering students at Illinois are presented with very attractive opportunities to study overseas as part of their university experience. Students may spend a summer, semester, or even an entire academic year abroad. Credits earned during this time may be transferred to Illinois to satisfy curricular requirements. Additionally, a student may even elect to pursue an International Minor in Engineering (http://catalog.illinois.edu/undergraduate/engineer/international-minor-engineering) that is focused on the country or region of the student’s choice.

A variety of study abroad and international work programs are available to provide students an international experience. Currently, International Programs in Engineering (IPENG) has programs at universities in Argentina, Australia, Austria, Belgium, Brazil, Chile, China, Denmark, France, Germany, Ireland, Italy, Japan, Netherlands, Singapore, S. Korea,
and the U.K. More are continually being developed in these and other countries. IPENG’s membership in the Global Engineering Education Exchange (GE3) consortia provides additional overseas locations and fellowships for study abroad. Students can also participate through the main campus programs in several other countries. For information on these programs visit the International Programs in Engineering website (http://engineering.illinois.edu/ipeng) or the Study Abroad Office website (http://studyabroad.illinois.edu) or contact the Engineering Study Abroad Office (210 Engineering Hall, ipeng@illinois.edu).

To help new students gain an understanding of the importance of an international experience during their academic career at Illinois, the College of Engineering offers short programs for freshman level students to “get their feet wet”. These are 10-14 day trips in either the winter break (Guatemala) or spring break (Cuba) and also one for women in engineering at the end of the spring semester to Uruguay. Some of these programs include the opportunity to earn credit towards degree requirements.

An overseas academic experience can begin as early as the summer after the first year at Illinois. An academic semester or year exchange program provides an even greater depth to the undergraduate experience and will greatly enhance a resume when a student begins their professional job search.

The personal and academic advantages gained by participating in the program are numerous and reflect many financial incentives. These advantages can include: IPENG help with round-trip airfare for all engineering students who study or work abroad on approved programs and a reduced on campus tuition charge when studying. The result is that Illinois provides the opportunity to earn credit overseas at only a fraction of the cost of studying on campus.

The College of Engineering also offers scholarships for Study Abroad participants. The College of Engineering believes in this opportunity so firmly that much has been done to make this as affordable as possible for students. In addition to help with round-trip airfare and tuition incentives, newly admitted students are offered an opportunity to apply for the International Engineering Scholarship. This scholarship provides a one-time payment of $2,000 during the Study Abroad program. Additional scholarships are also provided to students upon acceptance to a study abroad program.

For more information about study abroad, visit the International Programs in Engineering website (http://engineering.illinois.edu/ipeng) or contact IPENG (210 Engineering Hall, 217-244-0054, ipeng@illinois.edu).

Other International Opportunities

New Internship programs through Global Experiences and Sage Corps have been included in the College of Engineering’s repertoire of programs. These are non-paid experiential internships that will help enhance a student’s resume and provide hands-on engineering related experiences. See the International Programs in Engineering Website (http://www.engineering.illinois.edu/studyabroad).

Engineers Without Borders (EWB) Illinois works with disadvantaged communities to improve their quality of life through implementation of environmentally and economically sustainable engineering projects, while developing international responsible engineering students. Current international projects include biofuel electricity generation, charge controller circuit design, and wood-stove emissions control. Furthermore, EWB-Illinois holds local events to create awareness on campus of international development and environmental issues. EWB-Illinois is open to all majors and, indeed, is always in need of dedicated people from all fields. For more information, visit the Engineers Without Borders website (http://www.ewb-usa-uiuc.org).

Advanced ROTC Training

A student in the College of Engineering may elect to participate in the Reserve Officers’ Training Corps Program and earn a commission in the U.S. Army Reserve, Air Force Reserve, or Naval Reserve. A commission is awarded simultaneously with the awarding of the bachelor of science degree in an engineering field. Participation in these programs is limited to students who apply to and are selected by the army, air force, and navy units at Illinois. Monthly stipends are paid to those selected for advanced military training.

These programs require from one to three summer camps or cruises and the earning of specified numbers of credits in advanced military courses. Credits earned appear in all academic averages computed by the College of Engineering. Basic military courses do not count toward graduation. A maximum of 6 hours of upper-level military science courses may be used as free electives. A student should plan on taking nine semesters to obtain both a bachelor’s degree in engineering and a commission in the ROTC program. For further information, write directly to the professor of military science, aerospace studies, or naval science.

Technical Grade Point Average Requirements

Technical grade point average (TGPA) requirements for graduation and advanced-level course registration apply to students enrolled in certain College of Engineering curricula. These rules apply in addition to the Illinois campus-wide drop and probation rules. The table below summarizes the TGPA rules applicable.

Note: TGPA rules for the General Engineering and Industrial Engineering curricula shown in the table below are under review and subject to change. Click here (https://wiki.cites.illinois.edu/wiki/display/ugadvise/Technical+GPA+Requirements) for the most current information.

<table>
<thead>
<tr>
<th>Curriculum</th>
<th>Technical Grade Point Average (TGPA) Requirements for Graduation</th>
<th>Technical Grade Point Average (TGPA) requirements for Advanced-Level Course Registration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerospace Engineering</td>
<td>Must earn a GPA of 2.00 (unless otherwise noted) in the following technical subset of courses:</td>
<td>Must earn a GPA of 2.25 (unless otherwise noted) in order to register for:</td>
</tr>
<tr>
<td>Agricultural Engineering</td>
<td>n/a</td>
<td>AE 311, AE 312, AE 321, AE 323, AE 352, AE 353, AE 370</td>
</tr>
<tr>
<td>Bioengineering</td>
<td>Math, Eng, and Science courses</td>
<td>BIOE 302, BIOE 414, BIOE 435</td>
</tr>
<tr>
<td></td>
<td>Eng Core + Bio Core</td>
<td></td>
</tr>
<tr>
<td></td>
<td>+Mech Core</td>
<td></td>
</tr>
<tr>
<td></td>
<td>+AE 202+ME 300</td>
<td></td>
</tr>
</tbody>
</table>

Information listed in this catalog is current as of 10/2017
### Chemical Engineering
- GPA of 2.5: all courses excluding military training
- CHBE 430, CHBE 431, CHBE 440

### Civil Engineering
- n/a

### Computer Engineering
- ECE courses
- Eng Core (minus CHEM) + CompE Core
- ECE 329, ECE 385, ECE 391, ECE 430

### Computer Science
- CS and Math courses
- n/a

### Electrical Engineering
- ECE courses
- Eng Core (minus CHEM) + EE Core
- ECE 329, ECE 385, ECE 391, ECE 430

### Engineering Mechanics
- Required Engineering courses, 200-level and above; MATH 415, 441, and 442; secondary field classes
- Eng Core + EMech Core + ECE 205 + ME 300
- TAM 302, TAM 324, TAM 335, TAM 412, TAM 445, TAM 470

### Engineering Physics
- GPA of 2.5: required Math and Physics courses
- n/a

### General Engineering
- n/a

### Industrial Engineering
- Required Eng and Tech Elect courses; MATH 415
- Eng Core + Mech Core + ECE 110 + IE 310, IE 330, IE 340, IE 430, ME 330

### Materials Sci & Eng
- n/a

### Mechanical Engineering
- Required Engineering courses, 200-level and above; MATH 415; technical elective courses
- Eng Core + Mech Core + ECE 205, 206 + MCB 150 (if taken) + ME 300
- ME 310, ME 330, ME 340, ME 370

### Nuclear, Plasma, & Radiological Engineering
- n/a

### Bio Core
- BIOE 120 Introduction to Bioengineering
- BIOE 201 Conservation Principles Bioeng
- BIOE 202 Cell & Tissue Engineering Lab
- MCB 150 Molec & Cellular Basis of Life
- CHEM 232 Elementary Organic Chemistry I

### CompE Core
- ECE 110 Introduction to Electronics
- ECE 120 Introduction to Computing
- ECE 210 Analog Signal Processing
- ECE 220 Computer Systems & Programming
- CS 173 Discrete Structures
- or MATH 213 Basic Discrete Mathematics

### EE Core
- ECE 110 Introduction to Electronics
- ECE 120 Introduction to Computing
- ECE 210 Analog Signal Processing
- ECE 220 Computer Systems & Programming

### EMech Core
- TAM 195 Mechanics in the Modern World
- TAM 210 Introduction to Statics
- TAM 211 Statics
- TAM 212 Introductory Dynamics
- TAM 251 Introductory Solid Mechanics
- TAM 252 Solid Mechanics Design

### MechE Core
- TAM 210 Introduction to Statics
- TAM 211 Statics
- TAM 212 Introductory Dynamics
- TAM 251 Introductory Solid Mechanics

### Math courses
Include any course offered by the Mathematics department under the MATH rubric and by the Statistics department under the STAT rubric

### Engineering (Eng) courses
Means any course offered by a unit of the College of Engineering (i.e., under the rubrics AE, ABE, BIOE, CEE, etc.)

### Science courses
Means any course in the basic sciences (physics, chemistry, biology, etc.)

Information listed in this catalog is current as of 10/2017
Required
Means that the course is called out by name in the curriculum (i.e., not an elective)

Engineering Honors Programs (https://wiki.cites.illinois.edu/wiki/display/ugadvise/Honors?src=search)

Honors at Graduation
Honors awarded at graduation to superior students are designated on the diploma as honors, high honors, or highest honors. A student receives honors with a cumulative Illinois grade point average of at least 3.50, and high honors with at least a 3.80 grade point average at graduation. Highest honors may be awarded to any student eligible for high honors upon recommendation of his or her department. The criteria used by departments in selecting individuals for highest honors recognition include outstanding performance in course work and in supplementary activities of an academic or professional nature. Ordinarily, such a citation requires completion of an undergraduate thesis or a special project of superior quality.

Tau Beta Pi
Tau Beta Pi is a national engineering honor society that recognizes students, alumni, and engineers for outstanding academic achievements and exemplary character. The Alpha chapter at Illinois was founded in 1897 and is the fifth oldest chapter. In addition to gaining scholastic recognition, members participate in a range of activities that serve the chapter, the College of Engineering, and the community. The scholastic requirement for membership in Tau Beta Pi is that juniors must be in the upper one-eighth of their graduating class and seniors must be in the upper one-fifth of their graduating class.

Edmund J. James Scholars
The honors program in engineering is part of the Illinois James Scholar program, which was established to recognize and develop the talents of academically outstanding students. Engineering students in this program are known as "James Scholars in Engineering." Each is assigned to an honors advisor and receives special consideration in the selection of courses to meet specific needs.

Admission for incoming freshmen is based on a holistic review of the application rather than on standardized test scores alone. Students selected as James Scholars for Fall freshman admission will be notified in late February. If you did not qualify upon freshman admission, you may still apply to be a Freshman James Scholar during the first two weeks of your second semester if you have achieved a 3.5 Grade Point Average or higher in your first semester. Upon completion of the freshman honors requirement, you will still get honors recognition for the full year on the transcripts.

Continuation in the program or joining as an upperclass student requires a minimum 3.50 GPA and the development and approval of an honors contract, which is a coherent plan of special academic work. For more information about the James Scholar Program, visit the college’s James Scholar website (https://wiki.cites.illinois.edu/wiki/display/engrjames/Home) or contact the Office of the Associate Dean for Undergraduate Programs, 206 Engineering Hall.

Good standing in the James Scholar program at graduation requires completion of the honors contract.

Dean's List
The names of undergraduates who have achieved a grade point average in the top 20 percent of their college class for a given semester will be included on a list prepared for the dean of the college.

To be eligible for Dean’s List recognition, students must successfully complete at least 12 academic semester hours taken for a letter grade. Students who are registered with the Center for Wounded Veterans (CWV) or with Disability Resources and Educational Services (DRES) who are enrolled in less than 12 but a minimum of nine graded academic semester hours who are in the top 20 percent of their college are also eligible. Such students must sign a release with CWV or DRES indicating their consent for consideration for Dean’s List eligibility and have submitted to their home unit’s academic affairs office no later than Reading Day in the semester in which they wish to be considered for Dean’s List. These consent forms are valid only for the semester in which they are issued, and students must submit by the deadline updated consent forms for each semester in which they wish to be considered for Dean’s List.

Courses must be taken for a letter grade (A-F). Credits earned during the semester through proficiency examinations or for courses taken as Credit/No Credit or Satisfactory/Unsatisfactory are not counted.

General Education Requirements
The campus General Education requirements fall into several categories. Those in Composition I, Natural Sciences and Technology, and Quantitative Reasoning are met by courses required in engineering curricula. Beginning with the class that entered in fall 2000, students must complete a third-level college language course. Most students satisfy this requirement by completing three years of high school instruction in a single language.

The campus General Education requirements in social and behavioral sciences and in humanities and the arts can be met while satisfying the College of Engineering’s liberal education course work requirements (see below). Proper choices will assure that these courses also satisfy the campus requirements in the areas of Western and non-Western cultures. Many of these courses satisfy the campus Advanced Composition requirement, which assures that students have the advanced writing skills expected of all college graduates.

Students may obtain credit from different academic sources, i.e., residential instruction, advanced placement (AP or IB) tests, and transfer credits. All course work taken to satisfy campus general education requirements must be taken for grade.

For more information about General Education course work requirements, consult the campus’ General Education website (https://courses.illinois.edu).

Elective Course Work
Liberal Education Electives
The College of Engineering requires eighteen hours of liberal education course work. The courses are normally chosen to also satisfy the campus General Education requirements consisting of six hours of social and behavioral sciences (S&B) and six hours of humanities and arts (H&A) course work. All twelve hours of these hours must be taken for grade. The remaining six hours of liberal education course work may include more approved General Education S&B or H&A credit, foreign language credit beyond the basic requirement, and liberal education courses from
a list approved by the College (https://wiki.cites.illinois.edu/wiki/display/ugadvise/Liberal+Education+Course+List?src=search).

Credit for this course work may come from different academic sources, i.e., residential instruction, advanced placement (AP or IB) tests, and transfer credits.

For more information about College of Engineering liberal education course work requirements, consult the college’s Liberal Education website (https://wiki.cites.illinois.edu/wiki/display/ugadvise/Liberal +Education+Electives).

Technical Electives
All technical elective courses must be selected in accordance with departmental requirements. Technical electives generally include 300- and 400-level courses in engineering, mathematics, and the natural sciences.

Free Electives
These unrestricted electives are selected at the prerogative of the student with certain exceptions as noted at the College of Engineering advising website (https://wiki.cites.illinois.edu/wiki/display/ugadvise/Free+Electives?src=search). Every curriculum administered by the College of Engineering has at least six free elective hours. This course credit insures the required number of credit hours for the degree is earned.

Credit-No Credit Option
The credit-no credit grade option is available for students who want to explore areas of academic interest that they might otherwise avoid for fear of poor grades. All students considering this option are cautioned that many graduate and professional schools consider applicants whose transcripts bear a significant number of non-grade symbols less favorably than those whose transcripts contain none or very few. Required courses in the College of Engineering may not be taken on this basis. For more details, consult the College of Engineering advising website (https://wiki.cites.illinois.edu/wiki/display/ugadvise/Grades).

Combined B.S.-M.S. Engineering Degree Programs

Computer Science (M.S.) (http://cs.illinois.edu/academics/graduate/fifth-year-masters-programs)
The five-year B.S.-M.S. program in Computer Science combines two degrees: a B.S. in Computer Science with an M.S. (with thesis) in Computer Science. Current Illinois Computer Science students enrolled in the College of Engineering with junior standing who maintain superior academic performance are eligible to apply for this program. Students admitted to the program will receive both degrees once all requirements for the 5-year B.S.-M.S. degree program have been successfully completed.

Course Requirements
B.S. Component (120 hours plus three 400-level courses for 9-12 graduate hours):

• Same required courses as the traditional B.S. degree with the minimum hours required – not counting technical electives taken for graduate credit (see below) – reduced from 128 to 120.
• Course work shared by the B.S. and M.S. components must include three courses and at most 12 credit hours of 400-level CS courses required for the B.S. which also count towards the Breadth Requirement course work of the M.S. component, all of which must be taken for graduate credit. (Students must take the graduate section of the courses if offered and are strongly encouraged to take the 4-hour section if available). The CS Graduate academic advisor will assist students in mapping out this course work.
• Illinois undergraduate student minimum residence requirement satisfied
• Overall grade point average (GPA) of 3.00 maintained through completion of B.S. component of the program.

M.S. Component (minimum 16 additional credit hours plus 4 hours of CS 599):

• Identical to the traditional M.S. program with the Breadth Requirement course work satisfied while still classified as undergraduate (though held to the standards of a graduate student). A total of 32 credit hours (including the shared course work) are required.
• Satisfy Illinois’ graduate student minimum residence requirement.
• Overall GPA of 3.00 must be maintained through completion of M.S. component of the program.

Admission
For deadlines and procedures, consult the department website (http://cs.illinois.edu/current-students/graduate-students/b-s-m-s-5-year-program). Current Illinois Computer Science students who are in their junior year (normally at least 90+ credit hours, including those in progress, and at least one year of undergraduate course work remaining) with an overall GPA of at least 3.50 may apply for provisional admission to the program. The 5-year program is highly competitive. Admission is based on overall academic performance, letters of reference, and statement of purpose. The GRE General Test is not required.

Students provisionally admitted to the program:

• are assigned a graduate academic advisor when admitted.
• must maintain an overall GPA of 3.00 through completion of the B.S. component of the program, to remain in the program.
• may register for graduate courses and earn graduate hours credit, with approval from their graduate academic advisor, even if they are more than 10 hours from completing the B.S. component.
• must earn at least 120 hours of undergraduate credit, 9 hours of graduate credit (in the Breadth Requirement courses), and satisfy all B.S. requirements to be officially admitted to the Graduate College.

Upon successful completion of the B.S. component (including grades of B- or better in the Breadth Requirement), and an overall GPA of at least 3.00 in all graduate course work, students:

• will be officially admitted into the Graduate College.
• will be issued letters of admission from the Office of Admissions and Records and the Computer Science Department, at which time they will be considered graduate students and assessed graduate tuition the following semester.
• may apply or be considered for graduate research or teaching assistantships, tuition waivers, as well as fellowships and scholarships available to graduate students.
• must continue to maintain a graduate GPA of 3.00 or better in order to remain in the combined program.
Withdrawal
Students may withdraw from the program at any time by notifying the Office of the Associate Dean for Undergraduate Programs and the Assistant Director of CS Graduate Programs. Students who do not complete all 5-year B.S.-M.S. degree program requirements may upon request have all graduate hours earned, including the Breadth Requirement course work converted to undergraduate hours and applied toward a traditional B.S. in Computer Science degree. Students reverted back to the B.S. degree program must earn the minimum number of hours and satisfy all degree requirements of whichever version of the B.S. curriculum is appropriate. Graduate credit not used to fulfill the B.S. degree requirements will remain on the transcript and may, at some future point, be considered for transfer to another degree program.

Continued Graduate Study
Students in the program are eligible to apply for the Ph.D. program in Computer Science near completion of the M.S. component. If admitted, the combined degree will count as Stage 1 of the Ph.D. program, as if the student is admitted with a master's degree. Students are strongly advised to seek faculty counsel about the 5-year program to be sure they understand the pros and cons of pursuing a master's degree via the 5-year program. If their intention is to ultimately pursue a Ph.D., then it may be preferable to avoid the rapid pace of the 5-year program and instead invest time in research as an undergraduate. For admission to competitive Ph.D. programs, the expectation of publications and extensive research experience is higher for M.S. graduates. Therefore, as an alternative to the 5-year program, many top students may prefer to conduct research, possibly leading to a B.S. thesis, as a way to improve their admissions chances into top Ph.D. programs.

Computer Science (M.C.S.) (http://cs.illinois.edu/current-students/graduate-students/bs-mcs-5-year-program)
The 5-year program in Computer Science combines two degrees: a B.S. in Computer Science with an M.C.S. in Computer Science. This program is competitive and admission is based on overall academic performance, letters of recommendation, and statement of purpose.

Course Requirements

B.S. Component: 120 hours plus 3 "Breadth Requirement" courses for 9-12 graduate hours
- Same required courses as the traditional B.S. degree with the minimum hours required reduced to 120 hours.
- Must complete 3 out of the 4 "Breadth Requirement" courses: four different courses, each from a different area, from the following eight core areas with a grade of B- or higher.
- University undergraduate minimum residency requirement satisfied.
- Overall GPA of 3.0 or higher maintained through the completion of the B.S. component of the program.

M.C.S. Component: Minimum 20-23 additional coursework hours
- Program is identical to the traditional M.C.S. program with the 3 out 4 "Breadth Requirement (http://cs.illinois.edu/prospective-students/graduate-students/professional-masters-mcs/professional-masters-mcs-degree-requ"") courses satisfied while still classified as an undergraduate.
- Students who take the "Breadth Requirement (http://cs.illinois.edu/prospective-students/graduate-students/professional-masters-mcs/professional-masters-mcs-degree-requ"") courses for 3 credit hours instead of 4 will need to complete a minimum of 23 additional graduate level coursework hours.
- Students must satisfy the university's graduate student minimum residence requirement.
- Students must complete remaining M.C.S. degree requirements in two semesters (fall-spring, spring-summer, or spring-fall).
- Students must maintain an overall GPA of 3.0 through completion of the M.C.S. component of the program.

Admission
For deadlines and procedures, please consult the department website (http://cs.illinois.edu/current-students/graduate-students/bs-mcs-5-year-program). Current Illinois Computer Science students enrolled in the College of Engineering with a junior standing (must have at least one year left of their undergraduate study after admitted into the program) who maintain an excellent academic performance are eligible to apply for this program. Students admitted to this program will receive both degrees once all requirements for both degrees have been successfully completed. Transfer students entering the CS undergraduate program their junior year are also eligible to apply to this program.

Students provisionally admitted to the program:
- are assigned a graduate academic advisor.
- must maintain an overall GPA of 3.0 through completion of the B.S. component of the program to remain in the program.
- may register for graduate courses and earn graduate credit hours, with approval from their graduate academic advisor, if they have 12 hours or less to complete in their FINAL semester of their undergraduate studies. Please note that students cannot transfer more than 12 credit hours of coursework over to their M.C.S. degree, which includes the shared coursework.
- must earn at least 120 hours of undergraduate credit, 9 hours of graduate credit (this is the "Breadth Requirement (http://cs.illinois.edu/prospective-students/graduate-students/professional-masters-mcs/professional-masters-mcs-degree-requ"")
- must satisfy all B.S. requirements to be officially recommended for admission to the Graduate College.

Upon successful completion of the B.S. component (including grades of B or better in the "Breadth Requirement (http://cs.illinois.edu/prospective-students/graduate-students/professional-masters-mcs/professional-masters-mcs-degree-requ"")
- must earn an overall GPA of at least 3.0 GPA, students
- will be officially admitted into the Graduate College, with the application fee paid by the department.
- will be issued letter of admission from the Graduate College Admission Office and the Department of Computer Science, at which time they will be considered graduate students and assessed graduate tuition the following semester. International students may be required to submit additional documentation at this time.
- must continue to maintain a graduate GPA of 3.0 or better in order to remain in the combined program.
- must complete all the remaining M.C.S. degree requirements within two semesters (fall-spring, spring-summer, or spring-fall). Please note that if you finish your B.S. requirements in less than four years, you will not be given extra time to complete the M.C.S. degree.
requirements. You will just finish this joint program in less than 5-years and be able to start working sooner!

Withdrawal

Students who do not complete all 5-Year B.S.- M.C.S. degree program requirements may request by petition to have graduate hours earned, including the Breadth Requirement coursework, converted to undergraduate hours and applied toward a traditional B.S. in Computer Science degree. Students reverted back to the B.S. degree program must earn the minimum number of hours and satisfy all degree requirements of whichever version of the B.S. curriculum appropriate. Graduate credit not used to fulfill the B.S. degree requirements will remain on the transcript and may, at some future point, be considered for transfer to another degree program.

Electrical and Computer Engineering (https://www.ece.illinois.edu/academics/ugrad/jointbsmeng.asp)
The joint B.S. - M.Eng. program in Electrical and Computer Engineering combines two degrees: a B.S. in EE or CompE with a M.Eng. in ECE. Current Illinois ECE students enrolled in the College of Engineering with junior standing (normally at least 90 credit hours, including those in process, and at least one year of undergraduate coursework remaining) who maintain superior academic performance are eligible to apply for this program. The program is designed to broaden a student’s knowledge beyond that possible in the standard 4-year curriculum. Students admitted to the program will receive both degrees once all requirements for both the B.S. - M.Eng. degree have been successfully completed. Students may participate in the graduation ceremonies for their B.S. degree once the 120 credit-hour requirement is met. There will be no Graduate College or BOT waivers allowed for students in this program. This program is not intended for students intending to pursue the Ph.D. degree--such students should apply to the traditional M.S. (with thesis) degree program.

Course Requirements

B.S. Component (120 hours)*
- Same required courses as the traditional B.S. degree with minimum hours required reduced from 128 to 120.
- The reduction of 8 credit hours includes:
  - 6 hours in Free Electives in both EE and CompE curricula
  - 2 hours in ECE courses in EE Technical Electives or 2 hours in ECE or CS courses in CompE Technical Electives.
- Overall GPA of 3.40 must be maintained through completion of B.S. component of the program.
- Illinois undergraduate student minimum residence requirement must be satisfied.

M.Eng. Component (32 additional hours of coursework)
- Identical to stand-alone M.Eng. degree requirements:

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Required Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coursework</td>
<td>32</td>
</tr>
<tr>
<td>ECE 600 registration (0 hours) every 0 term while in residence</td>
<td>0</td>
</tr>
<tr>
<td>500-level ECE courses (subject to Other Requirements and Conditions below)</td>
<td>12</td>
</tr>
</tbody>
</table>

Professional Development: ECE 596 4 Master’s Project supervised by ECE (or affiliate) graduate faculty or course(s) in leadership, entrepreneurship, or other business-related topic from approved list or as approved by ECE Director of Graduate Studies

Elective courses (subject to Other Requirements and Conditions below)

Other Requirements and Conditions (may overlap)

A minimum of 12 credit hours of ECE coursework at 500-level must be applied toward the degree.

Up to 4 hours of ECE 596 and/or ECE 597 (or other individual study) may be applied toward this degree requirement.

Coursework must include at least 18 credit hours of ECE coursework; 15 of these hours must be from no more than 2 different focus areas.

The ECE Graduate Committee maintains the Focus area course lists.

Credit in ECE 411, ECE 415, ECE 445, ECE 590, PHYS 404, PHYS 405, PHYS 435, PHYS 436, and STAT 400 do not count toward the degree.

No course used to fulfill any degree requirement may be taken using the "Credit/No Credit" option.

This degree option is non-thesis only.

Maintain a minimum program GPA of 3.0.

Admission to the Program
For deadlines and procedures, consult the department website. Current Illinois ECE students with at least 90 credit hours and an overall GPA of at least 3.40 may apply for provisional admission to the program. Admission decisions are based on overall academic performance, letters of reference, and statement of purpose. The GRE general test is not required.

Students provisionally admitted to the program:
- are assigned a graduate academic advisor when admitted.
- must maintain an overall GPA of 3.40 through completion of the B.S. component of the program in order to remain in the program.
- may register for graduate courses and earn graduate hour credits, with approval from their graduate academic advisor, when they have less than 12 credit hours remaining in their B.S. component.
- must earn at least 120 hours of undergraduate credit and satisfy all B.S. requirements of this program to be officially admitted to the Graduate College.

Upon successful completion of the B.S. component students:
Information listed in this catalog is current as of 10/2017
work and thesis research during their fourth year of study. It also offers the possibility to earn both degrees on an accelerated schedule. The educational objectives of the combined program are the same as for the individual degrees.

**Course Requirements**

The combined program requires 120 hours of undergraduate credit and 32 hours of graduate credit. This compares to 128 hours of undergraduate credit and 32 hours of graduate credit when the B.S. and M.S. degrees are earned separately. The undergraduate requirements are identical to the four-year B.S. program shown above, except that the following requirements are waived:

- one IE technical elective — 3 hours
- Free electives — 5 hours

In addition, independent study project courses may not be used as IE or technical electives in the B.S. portion of the combined program.

In the M.S. portion of the program, 32 hours of credit and a thesis are required. There must be at least 24 hours of formal graded course work at the 400 level or greater, eight of which must be at the 500 level, and four of the eight must be in the major field. A Master’s thesis, for which at least four and no more than eight hours of IE 599 credit is required. Students must also register for the graduate seminar course (IE 590) every semester following formal admission into the graduate portion of the program.

A student in the combined program must spend at least two academic years in residence, full time in the combined degree program, and at least one of these years must be with graduate status. Students must maintain a graduate GPA of 3.00 in order to remain in the combined program.

The B.S. and M.S. degrees are granted simultaneously at the end of the program.

**Admission**

Formal admission to the combined program normally occurs late in the junior year or early in the senior year. Undergraduate students in IE may apply for formal admission to the combined program with the following provisions:

- Students must have a minimum Illinois GPA of 3.60 or higher, and have earned 96 credit hours towards the B.S.I.E. requirements at the time they are invited to apply.
- A special B.S.-M.S. application is provided to the student with the invitation. This application along with supporting documents must be submitted to the ISE Graduate Programs Office, Room 111 Transportation Building. There are two annual application deadlines: September 15 and January 15.
- GRE scores are not required for admission to the program. However, students are strongly encouraged to take the GRE in their senior year in order, for example, to be eligible for national fellowship competitions.
- Students in the combined program will be recommended by the department for admission to the Graduate College after they complete the 120 hours required for the B.S. portion of the combined program.
- The department will pay the application fee for these students.
- Each student is required to identify a graduate advisor and file a graduate course plan in the semester the student is granted formal admission to the graduate portion of the program.

- Once the student is admitted into the B.S.-M.S. program, the Director of Graduate Programs will act as the student’s advisor until a permanent advisor is found.

**Withdrawal**

Students may withdraw from the program at any time by notifying the Undergraduate Programs Office. Students who do not meet the Graduate College and departmental requirements for admission to the graduate program at the time they complete the 120-hour B.S. portion of the combined program will be required to leave the program.

Students who withdraw from the program for any reason may continue in the regular four-year B.S. degree program, which currently requires 128 hours, provided they meet the normal GPA requirements of that program. Students who withdraw from the combined program after they have taken courses for graduate credit may petition to have those credits counted toward their undergraduate program requirements.

**Continued Graduate Study**

Students who complete the combined program may petition to continue in graduate school for a Ph.D. These students will hold the same status (post M.S.) as students entering the Ph.D. program with an M.S. degree, and will be required to take the department’s qualifying examination no later than the second calendar semester after graduation from the combined program.

**Materials Engineering**

The five-year B.S.-M.Eng. program in Materials Science and Engineering combines two degrees: a B.S. in Materials Science and Engineering (MatSE) with an M.Eng in Materials Engineering. Current Illinois MatSE students enrolled in the College of Engineering, who maintain appropriate academic performance, are eligible to apply for this program. The program is designed to enhance the students experience in the engineering aspects of materials, broaden their knowledge beyond that possible in the standard 4-year curriculum and obtain a foundation in business, technology management, and/or entrepreneurship. Two semesters (or equivalent, a minimum of 30 weeks) of industrial co-op or internship are required; a research thesis is not required. In addition the students are expected to complete, during the combined program, at least 10 hours of courses in the areas of business, technology management and/or entrepreneurship from an approved list (available from the department). Students admitted to the program will receive both degrees once all requirements for the 5-year B.S.-M.Eng. degree program have been successfully completed but will be required to participate in the B.S. graduation ceremonies with their class if they have completed the equivalent number of credit hours. Once graduate student status is achieve, students in the program would be eligible for a teaching assistantship in MatSE (only).

Deadline: Completed application and reference letters must be returned to the MatSE Office, 201 MEB, 2 months before the end of the Fall semester of the students Junior year. The application and letter of reference forms for the B.S.-M.Eng. Program are available from the MatSE department office.

**Admission to the Program**

Current Illinois MatSE students with Junior standing and with an overall grade point average (GPA) of at least 3.00 (A = 4.00) may apply for provisional admission to the program. Admission is based on overall
Course Requirements

B.S. Component (120 hours)

- Same required courses as the traditional B.S. degree with minimum hours reduced to 120 hours
- The reduction of 8 credit hours includes:
  - 5 hours of elective courses
  - 3 hours of the area specialty course in a different area (the latter becomes part of M.Eng. program requirements)
- At least one semester (or 2 summers) devoted to an industrial internship or co-op.
- It is strongly suggested that the student take 2 courses in some aspect of business, economics, environmental studies, labor and industrial relations, technology entrepreneurship or technology and management as the elective component of their Liberal Education requirements. Partial or complete fulfillment of the Technology and Management or Business minor or the Technology Commercialization Certificate is recommended for those admitted by application if available hours permit. The students are expected to complete, during the combined program, at least 10 hours of courses in the areas of business, technology management and/or entrepreneurship from an approved list (available from the department), with additional hours recommended. It is noted that since receipt of the B.S. degree is delayed until the requirements for the M.Eng are completed, the student has the opportunity to complete the undergraduate minors while taking the M.Eng requirements.

- Overall GPA of 3.00 maintained through completion of B.S. component of the program and minimum residency requirements satisfied.

M.Eng. Component (minimum 36 additional hours of coursework)

- 36 hours course work, including at least 19 graduate hours of MatSE courses with 12 hours credit overall in 500-level courses. The course work shall include MSE 585 (two semesters or equivalent, 30 weeks total, of industrial internships or co-ops; one of the semesters can be during the B.S. program), 6 hours of 400- or 500-level area specialty courses in the student’s area, 3 hours of 400- or 500-level MSE courses from a different area, 2 hours of MSE 595, and 2 hours of MSE 529 or MSE 559. Ten hours of courses in one or more of the areas of business or technology management, and entrepreneurship are required to be included in the overall program. Completion of the requirements for the various Certificates granted by the Technology Entrepreneur Center is recommended.

- MSE 492; credit does not count toward degree.

Withdrawal

Students who do not complete all of the 5-year B.S.-M.Eng. degree program requirements may request, by petition to the Graduate College after obtaining approval by their advisor, the department, and the Associate Dean for Undergraduate Programs in the College of Engineering, to have graduate hours earned converted to undergraduate hours and applied toward a traditional B.S. degree in MatSE. Students reverting to the traditional B.S. degree program must satisfy all degree requirements, including completion of the required “area specialty course(s) in a different area” and the stated credit hour requirements. Graduate credit not used to fulfill the B.S. degree requirements will remain on the transcript and may, at some future point, be considered for transfer to another degree program.

1 The B.S. degree from the B.S.-M.Eng. Program is not ABET accredited, but would be if the student withdrew from the M.Eng. component and completed the requirements of the traditional B.S. program or if the student completed all of the requirements of the standard B.S. degree (8 additional hours, as specified).

2 Students find internship companies and positions with the help of the departmental and College Placement offices. The MSE 585 internship requires approval by the departmental Director of Graduate Studies to insure that it matches the student’s individual career objectives and meets the learning goals of the program. Students taking an internship as part of their undergraduate B.S program should also check with the Director of Graduate Studies; his/her approval is required if the student is already accepted in the combined B.S./M. Eng. Program. Students will be expected to present an oral report on their internship in either MSE 529 or MSE 559, as appropriate, the semester following completion of the internship.

Materials Science and Engineering (http://www.matse.illinois.edu/academics/undergraduate/combined-degree-program.html)

The five-year B.S.-M.S. program in Materials Science and Engineering combines two degrees: a B.S. in MatSE with an M.S. (with thesis) in MatSE. Current Illinois MatSE students enrolled in the College of Engineering who maintain superior academic performance are eligible to apply for this program. Students admitted to the program will receive both degrees once all requirements for the 5-Year B.S.-M.S. degree program have been successfully completed but will be permitted to...
participate in the Graduation Ceremonies with their class if they have completed 128 hours.

Deadline: Completed application and reference letters must be returned to the MatSE Office, 201 MSEB, two months before the end of the Fall semester of the student’s Junior year. Application and letter of reference forms for the B.S.-M.S. Program are available from the MatSE department office.

Admission to the Program
Current Illinois MatSE students with Junior standing with an overall grade point average (GPA) of at least 3.50 may apply for provisional admission to the program. The 5-year program is highly competitive. Admission is based on overall academic performance, letters of reference, and statement of purpose. The GRE General Test is not required.

Students provisionally admitted to the program:

• are assigned a graduate academic advisor when admitted.
• must maintain an overall GPA of 3.50 through completion of the B.S. component of the program, in order to remain in the program.
• may register for graduate courses and earn graduate hours credit, with approval from their graduate academic advisor, even if they are more than 10 hours from completing the B.S. component.
• must earn at least 120 hours of undergraduate credit, 9 hours of graduate credit in advanced level area courses, and satisfy all B.S. requirements to be officially admitted to the Graduate College.

Upon successful completion of the B.S. component, with grades of B or better in the advanced area course work, and an overall GPA of at least 3.00 in all graduate course work, students:

• will be officially admitted into the Graduate College
• will be issued letters of admission from the Office of Admissions and Records and the MatSE Department, at which time they will be considered graduate students and assessed graduate tuition the following semester.
• may apply or be considered for graduate research or teaching assistantships, and tuition waivers, as well as fellowships and scholarships available to graduate students.
• must continue to maintain a graduate GPA of 3.00 or better in order to remain in the combined program.

Students in the program are eligible to apply for the Ph.D. program in MatSE near completion of the M.S. component. If admitted, the combined degree will count as Stage 1 of the Ph.D. program, as if the student is admitted with a master’s degree.

Course Requirements
B.S. component (120 hours including 3 advanced (graduate level) area courses for at least 9 hours):

• Same required courses as the traditional B.S. degree with minimum hours reduced to 120 hours; except MSE 395\(^2\) is dropped (i.e., 1 hour)
• Two of the required remaining four area specialty courses are to be taken at the graduate level (i.e., the students will be held to the course and grading requirements of a graduate student). The third advanced level course can be either in the specialty area or in another specialty area.
• The reduction of 8 credit hours includes:
  • 5 hours of free electives.

• 3 hours of the area specialty course in a different area (becomes part of M.S. program requirements) for all concentrations.
• Senior thesis is to be taken in lieu of MSE 395\(^2\) and one area specialty course (5 hours total recommended, with 1 hour being the remaining hour of free elective).
• An overall GPA of 3.50 must be maintained through completion of B.S. component of the program and minimum residency requirements satisfied.

M.S. component (minimum 24 additional hours of course work plus 8 hours of MSE 599):

• Same overall requirements as for traditional M.S. with thesis.
• At least one 400-500 level course (for the B.S. or M.S.) will be a MatSE area specialty course from a different area.
• Complete a M.S. thesis according to MatSE department requirements; research for the senior thesis will often serve as a beginning for the M.S. thesis but the student may change thesis advisors.

Withdrawal
Students that do not complete all of the 5-year B.S.-M.S. degree program requirements may request, by petition to the Graduate College with approval of their advisor, the department, and the Associate Dean for Undergraduate Programs of the College of Engineering, to have graduate hours earned, including the three advanced area courses, converted to undergraduate hours and applied toward a traditional B.S. in MatSE degree. Students reverting back to the traditional B.S. in MatSE degree program must earn a minimum of 128 hours and satisfy all traditional degree requirements, including MSE 395\(^2\) and the area specialty course(s) in a different area, to receive the B.S. degree in MatSE. Graduate credit not used to fulfill the B.S. degree requirements will remain on the transcript and may, at some future point, be considered for transfer to another degree program.

1 The B.S. degree from the B.S.-M.S. Program is not ABET accredited.
2 At present, students in their fourth or fifth year considering withdrawing from the M.S. portion of the program should register for MSE 395 in the Spring semester; the resulting B.S. degree would then be ABET accredited. It is anticipated that, in the near future, senior thesis will be accepted by ABET as an appropriate “design experience;” when approved, and if accepted in terms of satisfying the objectives of MSE 395 by the MSE 395 instructor, it can be used for the MSE 395 design project.

Mechanical Engineering
The department offers a combined Bachelor of Science and Master of Science program. This program allows students who wish to earn both degrees to become involved in graduate course work and thesis research during their fourth year of study. It also offers the possibility to earn both degrees on an accelerated schedule. The educational objectives of the combined program are the same as for the individual degrees.

Course Requirements
The combined program requires 120 hours of undergraduate credit and 32 hours of graduate credit. This compares with 128 hours of undergraduate credit and 32 hours of graduate credit when the B.S. and M.S. degrees are earned separately. The undergraduate requirements are identical to the four-year B.S. program, except that the following requirements are waived:

• one MechSE elective — 3 hours
• one Technical elective — 3 hours
in the regular four-year B.S. degree program, which currently requires
Students who withdraw from the program for any reason may continue
program at the time they complete the 120-hour B.S. portion of the
College and departmental requirements for admission to the graduate
Undergraduate Programs Office. Students who do not meet the Graduate
Students may withdraw from the program at any time by notifying the
Withdrawal
following provisions:
• Each student is required to identify a graduate advisor and provide a
tentative thesis topic at the time of application to the program.
• The department will pay the application fee ($60 US, $75
International) for these students.
• Students in the combined program will be recommended by the
department for admission to the Graduate College after they
complete the 120 hours required for the B.S. portion of the combined
program.
• The department will pay the application fee ($60 US, $75
International) for these students.
• Each student is required to identify a graduate advisor and provide a
tentative thesis topic at the time of application to the program.

Admission
Formal admission to the combined program normally occurs late in the
junior year or early in the senior year and is by invitation only with the
following provisions:
• Students must have a minimum Illinois GPA of 3.80 or higher, and
have earned 96 credit hours toward the B.S.M.E. requirements at
the time they are invited to apply (60 of these hours must have been
earned at Illinois).
• A special B.S.-M.S. application is provided to the student with the
invitation. This application along with supporting documents must
be submitted to the ME Graduate Programs Office, Room 164 MEB.
There are two annual application deadlines: October 15 and March
15.
• GRE scores are not required for admission to the program. However,
students are strongly encouraged to take the GRE in their senior
year in order, for example, to be eligible for national fellowship
competitions.
• Students in the combined program will be recommended by the
department for admission to the Graduate College after they
complete the 120 hours required for the B.S. portion of the combined
program.
• The department will pay the application fee ($60 US, $75
International) for these students.
• Each student is required to identify a graduate advisor and provide a
tentative thesis topic at the time of application to the program.

Withdrawal
Students may withdraw from the program at any time by notifying the
Undergraduate Programs Office. Students who do not meet the Graduate
College and departmental requirements for admission to the graduate
program at the time they complete the 120-hour B.S. portion of the
combined program will be required to leave the program.

Continued Graduate Study
Students who complete the combined program may petition to continue
in graduate school for a Ph.D. These students will hold the same status
(post M.S.) as students entering the Ph.D. program with an M.S. degree,
and will be required to take the department’s qualifying examination
no later than the second calendar semester after graduation from the
combined program.

• Aerospace Engineering (http://catalog.illinois.edu/undergraduate/
engineer/departments/aero)
• Agricultural and Biological Engineering (http://catalog.illinois.edu/
undergraduate/engineer/departments/ag-bio-engin)
• Bioengineering (http://catalog.illinois.edu/undergraduate/engineer/
departments/bioengin)
• Civil Engineering (http://catalog.illinois.edu/undergraduate/engineer/
departments/civil)
• Computer Engineering (http://catalog.illinois.edu/undergraduate/
engineer/departments/electrical-computer-engin/computer-
engineering-major)
• Computer Science (http://catalog.illinois.edu/undergraduate/
engineer/departments/comp-sci)
• Electrical Engineering (http://catalog.illinois.edu/undergraduate/
engineer/departments/electrical-computer-engin/electrical-
engineering-major)
• Engineering Mechanics (http://catalog.illinois.edu/undergraduate/
engineer/departments/mech-engin/engin-mech)
• Engineering Physics (http://catalog.illinois.edu/undergraduate/
engineer/departments/engin-phys)
• Innovation, Leadership and Engineering Entrepreneurship (ILEE)
(http://catalog.illinois.edu/undergraduate/engineer/ilee)
• Systems Engineering and Design (formerly General Engineering)
(http://catalog.illinois.edu/undergraduate/engineer/departments/ind-
gen-engin/gen-engin)
• Industrial Engineering (http://catalog.illinois.edu/undergraduate/
engineer/departments/ind-gen-engin/ind-engin)
• Materials Science and Engineering (http://catalog.illinois.edu/
undergraduate/engineer/departments/mtse)
• Mechanical Engineering (http://catalog.illinois.edu/undergraduate/
engineer/departments/mech-engin/bs-mechanical-engineering)
• Nuclear, Plasma and Radiological Engineering (http://
catalog.illinois.edu/undergraduate/engineer/departments/npre)

128 hours, provided they meet the normal GPA requirements of that
program. Students who withdraw from the combined program after they
have taken courses for graduate credit may petition to have those credits
counted toward their undergraduate program requirements.

Information listed in this catalog is current as of 10/2017
Minors Offered by the College of Engineering

Students are generally eligible to take many campus minors (http://provost.illinois.edu/educational-innovation/advising-resources/pursuing-undergraduate-minor). Several of those administered by the College of Engineering are described in this section. To obtain recognition for the College of Engineering minors, students must register in the Office of the Associate Dean for Undergraduate Programs, 206 Engineering Hall.

- Bioengineering (http://catalog.illinois.edu/undergraduate/engineer/bioengineering)
- Computational Science and Engineering (http://catalog.illinois.edu/undergraduate/engineer/computational-science-eng)
- Computer Science (http://catalog.illinois.edu/undergraduate/engineer/computer-science)
- Electrical and Computer Engineering (http://catalog.illinois.edu/undergraduate/engineer/electrical-computer-eng)
- International Minor in Engineering (http://catalog.illinois.edu/undergraduate/engineer/international-minor-engineering)
- Materials Science and Engineering (http://catalog.illinois.edu/undergraduate/engineer/materials-science-engin)
- Physics Minor (http://catalog.illinois.edu/undergraduate/engineer/physics)
- Polymer Science and Engineering (http://catalog.illinois.edu/undergraduate/engineer/polymer-science-engin)
- Technology and Management (http://catalog.illinois.edu/undergraduate/engineer/technology-management)