College of Engineering

Administration

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The University of Missouri College of Engineering recruits high-caliber students and offers research opportunities in laboratories, a wide variety of opportunities to develop leadership skills through more than 50 College-supported student organizations, and supports interdisciplinary collaboration through our many campus partnerships.

The College strives to develop a new generation of engineering leaders who are focused on using engineering creatively to solve the grand challenges facing the world, the nation and the state of Missouri.

With 10 undergraduate degree programs, eight master’s programs and seven doctoral programs, the College of Engineering offers opportunities in a wide variety of engineering fields. Through its four Pillars of Pursuit – Educating Engineering Leaders (https://engineering.missouri.edu/mission/pillars-of-pursuit/eng-leaders), Big Data Analytics (https://engineering.missouri.edu/mission/pillars-of-pursuit/big-data), Biomedical Innovations (https://engineering.missouri.edu/mission/pillars-of-pursuit/biomed-innovation) and Sustainability in (https://engineering.missouri.edu/mission/pillars-of-pursuit/sustainability) – the College seeks to produce graduates who collaborate to affect the world around them.

Mission

The mission of the College of Engineering is to provide students with the resources and services needed to reach their academic and professional goals. This is accomplished through a focus on four core values: Integrity, Accountability, Collaboration and Excellence.

This mission is supported by:

- Supporting the academic and research mission of the University of Missouri, the College of Engineering and College of Engineering departments
- Providing programs and resources to support student success
- Valuing and promoting diversity, multiculturalism and an inclusive environment within the College of Engineering
- Encouraging positive self-growth through academic planning and accountability
- Creating an environment that fosters development by focusing on individual student needs

Undergraduate

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The MU College of Engineering is committed to a longstanding tradition of educating future engineering leaders. Here, students are inspired and challenged. Students work, learn, research and create in an atmosphere where innovation, collaboration and finding ways to rise above challenges are more than aspirations — they are simply how we operate.

Admissions

Freshman Admission to Engineering

Entering freshmen are expected to have completed 17 units of approved high school course work (in grades 9-12), including 4 units in English, 4 in mathematics and 3 in science with laboratory. Mathematics should include 2 units of algebra, 1 unit of plane and solid geometry (combination course), and 1/2 unit of trigonometry. Additional senior mathematics is recommended.

The College of Engineering has three levels of admissions. Direct Program admits, Undeclared Engineering admits, and Pre-Engineering admits. The three levels are explained further below.

Direct Program Admits

For direct admission to one of the College of Engineering degree programs, the applicant must meet the qualifications listed below (these numbers are subject to change).

For the Bachelor of Science in Biological Engineering:

- ACT-Math of at least 31 AND
- ACT-Composite of at least 31 AND
- High school class rank in the top 10 percent

For the Bachelor of Science in Biomedical Engineering:

- ACT-Math of at least 31 AND
- ACT-Composite of at least 31 AND
- High school class rank in the top 10 percent AND
- AP or dual credit for BIO_SC 1500 - Introduction to Biological Systems, or equivalent

For other Engineering degree programs, excluding Information Technology:

- ACT-Math of at least 32 AND
- ACT-Composite of at least 32 AND
- High school class rank in the top 10 percent

Students pursuing Information Technology must meet MU’s General Admission Standard to be considered Direct Admits.

Undeclared Engineering

Freshmen engineering students who do not meet the requirements for direct program admission (see criteria above) will start in an undeclared status if students receive 26 overall ACT (or top 25% of graduating class) and a 26 Math ACT sub-score. Students admitted to the College of Engineering in undeclared status will work to complete a foundational curriculum consisting of math, science, and engineering courses. Upon completion of the foundational curriculum students will apply for entrance to available degree programs. The specific standards and capacity vary among the degree programs as necessary to align enrollments with educational resources.

Freshman and Transfer Admission Requirement

Bioengineering

Courses required before consideration for admission into Bioengineering

<table>
<thead>
<tr>
<th>MATH 1500</th>
<th>Analytic Geometry and Calculus I</th>
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</table>
Courses required before consideration for admission into Chemical Engineering

- **MATH 1500**: Analytic Geometry and Calculus I
- **MATH 1700**: Calculus II
- **CHEM 1320**: College Chemistry I
- **PHYSICS 2750**: University Physics I
- **CHEM 1330**: College Chemistry II
- **CHEM 1340**: College Chemistry III
- **ENGLISH 1000**: Exposition and Argumentation

Courses required before consideration for admission into Civil and Environmental Engineering

- **MATH 1500**: Analytic Geometry and Calculus I
- **MATH 1700**: Calculus II
- **CHEM 1320**: College Chemistry I
- **CHEM 1330**: College Chemistry II
- **PHYSICS 2750**: University Physics I
- **ENGLISH 1000**: Exposition and Argumentation

Courses required before consideration for admission into Computer Science

- **MATH 1500**: Analytic Geometry and Calculus I
- **MATH 1700**: Calculus II
- **CMP_SC 1050**: Algorithm Design and Programming I
- **CMP_SC 2050**: Algorithm Design and Programming II

Courses required before consideration for admission into Electrical and Computer Engineering

- **MATH 1500**: Analytic Geometry and Calculus I
- **MATH 1700**: Calculus II
- **CHEM 1320**: College Chemistry I
- **CHEM 1330**: College Chemistry II
- **PHYSICS 2750**: University Physics I
- **ENGLISH 1000**: Exposition and Argumentation

Courses required before consideration for admission into Industrial and Manufacturing Systems Engineering

- **MATH 1500**: Analytic Geometry and Calculus I
- **MATH 1700**: Calculus II
- **CHEM 1320**: College Chemistry I
- **PHYSICS 2750**: University Physics I
- **ENGLISH 1000**: Exposition and Argumentation

Courses required before consideration for admission into Mechanical and Aerospace Engineering

- **MATH 1500**: Analytic Geometry and Calculus I
- **MATH 1700**: Calculus II
- **CHEM 1320**: College Chemistry I
- **PHYSICS 2750**: University Physics I
- **ENGLISH 1000**: Exposition and Argumentation

Undeclared students should discuss course selection with the academic advisor each semester to keep options open among departmental curricula.

To transfer from one department to another, students must submit an application to the new department. Admittance to the new department will be based upon the student’s academic performance and departmental capacity. Students who transfer must satisfy the specific degree requirements of the new department.

**Pre-Engineering Program**

Freshmen who do not meet the criteria for Direct Program admit or Undeclared Engineering are admitted into the Pre-Engineering Program. Pre-Engineering students will utilize additional support systems; such as transition and onboarding programming for entering students, major and career exploration programming and advising, tutoring support, and early alert outreach.

Pre-Engineering students are eligible to transfer to Undeclared Engineering when they meet the following requirements:

- Satisfactory completion of 24 credits
- GPA of 2.0 or higher both Cumulative and last graded term
- A grade of C- or better in MATH 1500 Analytic Geometry and Calculus I
- Academic good standing
- Students with 60 credits or more must be admitted to their program of choice prior to being admitted to Engineering
- For admission to Information Technology, students must have GPA of 2.0 or higher in both Cumulative and last graded term

**Transfer Students**

Students wishing to transfer to MU from an accredited college or university are subject to University regulations described in this catalog. The MU College of Engineering cooperates with many colleges through articulation agreements that help students transfer to MU with maximum ease and minimum loss of credits. A student may contact the College of Engineering Admissions Office to determine if their home institution participates in an agreement with the College of Engineering.

Eligibility to enter the College with a departmental affiliation is based upon the student’s previous academic performance and department capacity. Transfer students who enter the College as undeclared or pre-engineering, are required to submit an application to enter a degree program. Admittance to the degree program is based upon previous academic performance and department capacity.

To be recommended for the BS degree from the College of Engineering, a student transferring from an accredited institution must complete at least 30 upper-level credits in the degree program at a UM System campus. At least 21 of the 30 credits must be upper-level engineering courses approved by the department awarding the degree.

A student transferring with senior standing from another UM System campus must complete the last 15 credits in residence on the campus where the degree program is located. Twelve of these 15 credits must be in engineering and approved by the department awarding the degree.

Any student whose enrollment in any college-level academic program resulted in dismissal, departure or who are on probation will not be admitted to the College of Engineering.
International Admission

Admission of international students is determined on an individual basis by a committee of representatives from the Admissions Office and the College of Engineering.

Before registering for classes at the University, international students must take the MU English Language Test, developed for international students. Students passing the test are eligible to take ENGLSH 1000 and any other required English courses.

International students whose test scores indicate that additional English training is needed, including those with transferred English credit, are required to register for English-language support courses. The course, developed for international students, should be taken during the first semester of enrollment. These courses do not count toward graduation credit, but regular attendance is required and failure to attend will result in dismissal. The English-language support course taken must be satisfactorily completed before the student can enroll in ENGLSH 1000. Students not satisfactorily completing the course in the first semester of enrollment must re-enroll in the second semester. If the student does not satisfactorily complete the English-language support class in the second term of enrollment, the student may not be permitted to re-enroll in the College of Engineering.

60 Credit Hour Rule

To remain in the College of Engineering, students must be admitted to an Engineering degree program by the end of the semester when their total credit hours earned are equal to or greater than 60. Students not admitted by 60 credit hours will become ineligible to remain in the College of Engineering and must transfer to another MU school or college in order to remain a student at the University of Missouri. Transfer students who enter the College of Engineering with 60 or greater credit hours will be given one semester to gain admittance to a degree program. If not admitted to a degree program after one semester, they will become ineligible to remain in the College of Engineering. If more than one semester is needed to complete the courses required to enter a degree program, a waiver may be granted at the discretion of the college. If students are pre-enrolled for the following term at the time they become ineligible to remain in the College of Engineering, all Engineering courses will be administratively dropped.

Graduation Requirements

The curriculum provides a solid foundation of mathematics and physical sciences followed by the application of these sciences in engineering specialties. The balance of the curriculum encompasses communication skills, English, social sciences and humanities courses.

Many freshmen are eligible to start with calculus. However, some can profit from additional pre-calculus preparation, which is an addition to the undergraduate curriculum.

Students should access the engineering web site (http://engineering.missouri.edu) for details regarding social and behavioral sciences and humanities and fine arts requirements.

In addition to the University’s general education and graduation requirements, the departments in the College of Engineering may require further specific courses to better equip students to perform in their chosen fields of study.

While many students complete the BS degree program in four years, some may find it advisable to extend the curriculum in order to carry lighter semester loads, add preparatory courses or compensate for part-time work.

GPA Requirements for Graduation from the College of Engineering

- GPA of record of at least 2.0
- GPA of at least 2.0 in all engineering courses offered by one of the four campuses of the UM System. "Engineering courses" include all courses that are offered through the College of Engineering or its equivalent on the four campuses, or that have "Engineering" in the curricular designator. Only the last grade in a repeated course will be used in the calculation.

Academic Regulations

Degree with Honors Requirements

A student must have earned 60 hours on this campus to be eligible for Latin Honors, which will be determined by the MU grade point average. Latin Honors are granted to students who meet the following cumulative GPA requirements:

<table>
<thead>
<tr>
<th>Latin Honor</th>
<th>GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>summa cum laude</td>
<td>3.9</td>
</tr>
<tr>
<td>magna cum laude</td>
<td>3.7</td>
</tr>
<tr>
<td>cum laude</td>
<td>3.5</td>
</tr>
</tbody>
</table>

Departmental Honors

The college maintains an undergraduate honors program to further challenge those who have established a minimum GPA of 3.0 at the beginning of the junior year. A comparable grade point average is required of transfer students. The program leads to an undergraduate honors thesis on a research or advanced design project, provides for additional curricula flexibility and contains features that ease the transition to graduate school.

Opportunities available to honors students include:

- More personal attention from an honors advisor
- Independent study or undergraduate research with a senior faculty member whose specialty interests the honors candidate

A student who successfully completes the engineering honors program, including the independent project, will be designated an “Honors Scholar in Engineering.” Interested students should contact their departmental office.

Qualified engineering students are also welcome to join the programs of the Honors College and may enroll in various honors courses and honors sections of regular courses.

Courses in Basic Skills

No basic skills courses may be taken to fulfill graduation requirements.

Curriculum of Record

The curriculum of record is the curriculum a student must satisfy to meet graduation requirements. For students who maintain continuous, full-time enrollment, the curriculum of record is the one approved by the College of Engineering at the time the student achieves upper-division status in the discipline of choice. For others, the curriculum of record is decided by the department faculty.
Academic Probation and Dismissal

1. A student whose term and cumulative UM GPA are 2.0 or higher is in good academic standing. A “term” is defined as a semester or summer session.

2. A student will be placed on academic probation if while in good academic standing the student has a term GPA less than 2.0 but equal to or greater than 1.0.
   - While on academic probation, a student must enroll in and complete each semester at MU at least 12 credits of course work necessary for the degree. Courses taken through MU’s Mizzou Online (self-paced) count as part of these 12 credits. Part-time students must enroll in at least as many credits each semester as the college rules governing part time enrollment.
   - A student will be removed from probation at the end of the term when the term and cumulative GPA are 2.0 or higher, provided the student completed 12 or more hours applicable toward the degree.
   - A student will be continued on probation if while on probation the student has a term GPA greater than or equal to 2.0, but whose cumulative GPA is below 2.0.

3. A student will be dismissed from the College of Engineering if the student:
   - Receives a term GPA of less than 1.0.
   - Receives a term GPA of less than 2.0 while on probation.

4. Readmission:
   - Students who are dismissed from the College of Engineering and who wish to appeal their case for continuation must write an appeal letter and submit it to the academic appeals committee.
   - If the appeals committee allows a student to re-enroll on final probation, it may set conditions such as courses to be taken, minimum grades, total hours, etc to which the student must adhere.
   - A student who has been dismissed for academic reasons may be readmitted upon a successful appeal to the academic appeals committee of the College of Engineering.
   - Similarly, students who wish to re-enroll in the college of Engineering after having been out of school as a result of a dismissal must write a letter of appeal to the College of Engineering academic appeals committee requesting readmission.
   - Letter of appeal may be addressed to: Engineering Academic Appeals Committee, W1002 Lafferre Hall, University of Missouri, Columbia, MO 65211. A personal visit with the director of undergraduate studies of the students’ department and advisor before appealing by letter is recommended and often helpful, both to the student and to the committee.
   - One of the primary objectives of the appeals committee is to evaluate indicators of the likelihood of future success of the student. Accordingly, any appeal letter should include an explanation for past poor performance and reason for expecting better outcomes in the future.

5. A student who is dismissed while on final probation will normally be ineligible for readmission.

Satisfactory/Unsatisfactory Grading Option

Under Satisfactory/Unsatisfactory (S/U) grading, an S is assigned for a grade in the A, B or C range, and a U is assigned for a grade in the D range or for an F. Neither an S nor a U will be calculated into a student’s grade point average. A student enrolled in the College of Engineering may not take any math, science or engineering course that counts toward degree requirements under the S/U grading option, unless the course is only offered S/U. In addition, any course specifically required (by course number) in the curriculum may not be taken S/U. This includes ENGLSH 1000 or ENGLSH 1000H. The 18 credits taken to fulfill the University general education distribution requirement may be taken S/U.

Restrictions

- First-semester freshmen are ineligible to take any course S/U unless it is only offered S/U.
- Only one course per semester may be taken S/U.
- Students on academic probation are not allowed to take any course S/U.
- To be eligible for the Dean’s List each term, a student must complete 12 graded credits (S/U courses are not considered “graded”).

Student Services

Advising

Each student in the College of Engineering is assigned an advisor from the College of Engineering Advising Office who assists the student in reaching academic and professional goals, as well as assist students with time management and academic success strategies. Students are encouraged to meet with their advisors as often as needed. Engineering students have advising holds placed on their accounts each semester and will work with their advisor to verify enrollment and degree progress before enrolling for the following semester. In addition, students have access to work with a faculty mentor in their degree program who can assist with career planning and selection of technical elective coursework.

Diversity and Outreach Initiatives

At Mizzou Engineering we honor our values by insuring a diverse and inclusive college. The College of Engineering Office of Diversity and Outreach Initiatives facilitates the outreach, recruitment, retention, and overall success of all members of our community, especially those from backgrounds traditionally underrepresented in engineering. The Office of Diversity and Outreach Initiatives provides professional development programming surrounding inclusion, equity, and diversity for all of our undergraduate and graduate students, staff, and faculty. The Office houses many programs including:

- The Inclusivity Center which provides a physical space where everyone is welcome as well as a venue for our events and activities.
- The Women in Engineering Program which focuses on all activities that support and recruit women students.
- The Multi-cultural Engineering Program which fosters a support network between students, faculty, and staff to ensure academic success by providing structured progress checks, professional development trainings, early research experience, counseling, academic enrichment, mentoring and information about graduate study for the Engineering Diversity Scholarship recipients.
- The Office of Diversity and Outreach Initiatives serves as a resource for the College of Engineering student organizations to further engage them in diversity and inclusion efforts.
Study Abroad

College of Engineering and STEM students have opportunities to pursue academic, leadership, and service opportunities around the world. Students can participate in short-term study abroad programs in Europe, Asia, and Latin America and earn college credit towards general education requirements, core engineering requirements, and engineering technical electives to complete graduation requirements. Students can also participate in semester long programs.

Learning Communities

The college cosponsors several learning/living options for engineering students. The college believes that an environment conducive to the formation of networks, with aspects of social and academic interaction, enhances the retention and ultimate success of students in the engineering curriculum. Students selecting these options generally earn higher grades and are more likely to graduate than the average engineering student.

The Engineering Learning Community (ELC) is a special co-ed environment that offers engineering majors a full range of academic support and activities. ELC allows engineering students to live together, study together and have fun together. Freshman Interest Groups (FIGs) support incoming freshmen. Members of a FIG are co-enrolled in three courses during the first semester of the freshman year with a group of up to 20 students. Each community has its own computer lab, peer tutors, study groups and quiet hours.

Professional Engineering Registration

The revised statutes of Missouri (Section 327.221) require that each applicant for registration as a professional engineer in Missouri must be a graduate of and hold a degree in engineering in a curriculum accredited by the Accreditation Board for Engineering and Technology. The MU undergraduate programs in bioengineering, chemical, civil, computer engineering, electrical, industrial and mechanical engineering, and computer science at MU are so accredited.

Senior students are strongly encouraged to take the Fundamentals of Engineering Exam leading to the Fundamentals in Engineering (FE) status as a first step toward registration.

The MU undergraduate programs in bioengineering, chemical, civil, computer engineering, electrical, industrial and mechanical engineering are accredited by the Engineering Accreditation Commission of ABET and computer science is accredited by the Computing Accreditation Commission of ABET www.abet.org (http://www.abet.org).

Naval Reserve Officers Training Corps (NROTC)

NROTC was established in 1926 to offer college students the necessary naval science courses to qualify for commissions in the Navy or Marine Corps Reserve. Today, NROTC is one of the primary accession sources of officers for the Navy and Marine Corps. MU represent one of 77 host colleges across the country with an NROTC program.

Navy students should major in a technical course of study while Marine students may major in any course of study leading to a baccalaureate degree. Academic credit for naval science courses is accepted toward a baccalaureate degree by most MU schools and colleges. Midshipmen take one naval science course for credit each semester, which provides education and training in various aspects of the Navy or Marine Corps. These courses are available to any student at MU, who can earn a Minor in Naval Science (http://catalog.missouri.edu/undergraduate/collegeofengineering/additionalminorsandcertificates/minor-naval-science). Associated with each course is a leadership laboratory for program students. NROTC activities include water survival, self-defense, physical fitness, orienteering, aviation, nuclear power indoctrination, pistol/rifle marksmanship and a variety of field trips.

Scholarship NROTC midshipmen incur no military obligation during their freshman year. This allows students to get a better understanding and appreciation of the life of a Navy or Marine Corps officer before committing. Navy NROTC graduates incur a minimum five years military obligation. Marine NROTC graduates incur a minimum four year military obligation. Upon graduation, midshipmen who successfully complete the program are commissioned as Ensigns in the Navy or Second Lieutenants in the Marine Corps.

For additional information, contact:
Department of Naval Science
105 Crowder Hall
(573) 882-6693 or 888-MU-NROTC
NROTCMU@missouri.edu
http://nrotc.missouri.edu/

Graduate

The College of Engineering graduate programs at the University of Missouri promotes technology, innovation and entrepreneurship with abundant interdisciplinary opportunities in research and education. MU Engineering sustains a variety of research centers, programs, groups and facilities along with other departmental groups that are designated as areas of exemplary expertise and success. The college contributes significantly to MU’s overall annual research and development spending. The College also offers exceptional business opportunities to corporations, small businesses and start-ups.

MU graduate students have gone on to become faculty at world-class academic institutions in the U.S. and around the world, have created start-up companies as successful entrepreneurs and have secured jobs with leading companies, including Oak Ridge National Laboratory, PepsiCo, Amazon, Google and more.

Graduate engineering programs include

- Bioengineering
- Chemical Engineering
- Civil & Environmental Engineering
- Computer Science
- Electrical & Computer Engineering
- Industrial Manufacturing & Systems Engineering
- Mechanical & Aerospace Engineering
- MU Informatics Institute

Note: Prospective graduate students must be accepted to both the degree program of interest and to the MU Graduate School. In most cases, the entire application process may be completed online. Find admission and application details by selecting the degree program of interest on the graduate admissions page.