Choices

College of Engineering
Why Choose Engineering?

You’ve been told, “You’re good in math and science. You should be an engineer.”
But what does it mean to be an engineer?
What do engineers do?

What engineers do
Engineers conceptualize, design, and innovate products, processes and systems to help people. They design bridges, roads, vehicles, cell phones, medical implants, computer games, and more. They use math and science in their work as software designers, professors, product developers, transportation engineers, and presidents of large corporations. They work in a wide range of fields, including new areas like biomedical engineering, cybersecurity, and nanotechnology. (For more information about engineering careers, visit www.asee.org/precollege/ and www.bls.gov/oco/)

In demand and with some of the highest starting salaries of all graduates
Engineers do just about everything. Visualize a classroom, a kitchen, an auditorium, a hospital room. Everything in those rooms has been touched by an engineer—the floor, the walls, the windows, the lighting, the furniture, the equipment, and even the artificial heart valve inside of that hospital patient. Engineers are involved in every aspect of life. And engineers are in demand with some of the highest starting salaries for graduates. Once you choose to become a Spartan Engineer at MSU, you still have many choices to personalize your education.

“With a degree in engineering, you can do anything that you want in life. An engineering education teaches you how to think analytically. The ability to think this way is exactly what employers are looking for. For me choosing engineering as a field of study was easy. I knew that no matter what I wanted to do, I would be prepared and marketable. You can't go wrong.”
—Adam Zemke
Why Choose MSU Engineering?

You will have many opportunities to enhance your education. From top faculty to internships and study abroad, the choices are endless.

Faculty in the classrooms
Ninety-five percent of all MSU faculty are actively connected with undergraduate students, usually through teaching courses. In your engineering classes, you can expect to see regular faculty teaching most sections.

“I’ve had many experiences with the faculty from getting homework help to deciding how to take a class when you are not actually on campus. I had a co-op in Indiana and my professor helped me to do a class online so I could graduate on time.”
– Michelle Slavin

Undergraduate research opportunities
Qualified undergraduate students who are interested in gaining research experience can do so in many ways—for instance, through a summer research program, through the Honors College, or by direct connections with professors. (www.msu.edu/unit/honcoll/opportunities.html)

“I have had two undergraduate research experiences. It was these experiences that opened my mind to scholarship and helped me realize how applicable my class work is to real-life problems.”
– Rayshawn Holbrook

Freedom to choose
Many freshmen are not sure which engineering degree they’d like to work toward. You can explore for one to two years, and we are here to help you.
Degree and Program Concentrations

Since engineering deals primarily with the design of products and processes, our engineering students acquire the knowledge, skills, and experience to work on projects in interdisciplinary teams in a global environment. A Spartan Engineer leaves with the kind of knowledge and skills that are highly prized by the world’s top companies.

Applied Engineering Sciences

is an interdisciplinary program that enables students to develop a broad foundation in the engineering sciences and core engineering disciplines and combine it with one of the available cognate areas: Business/Supply Chain Management, Telecommunication, or Information Technology.

Biosystems Engineering

prepares students to combine engineering with biology to take a systems approach to address complex issues in areas of food quality and safety; sustainable ecosystems including environmental protection and natural resource conservation; and biobased renewable energy systems. Many students find that a degree in biosystems engineering prepares them well for medical school as well as advanced degrees in biomedical engineering. Potential employers include: food processing companies, environmental consulting firms, government agencies, and manufacturers of health care products.

Civil Engineering

is concerned with the planning, designing, and construction of society’s civil infrastructure—including bridges, buildings, roads, water and wastewater systems, and environmental protection systems. The MSU program offers an environmental engineering specialization. Careers are available in government, consulting, construction, research, and education.

Computer Engineering

examines the theory, design, and applications of computers and information processing techniques. It emphasizes integrated-circuit and information technologies, with a focus on “embedded systems”—computers embedded in consumer products like televisions, car stereos, and cell phones. This curriculum is more hardware-oriented than the computer science curriculum. Computer engineering graduates are prepared for careers in industries such as manufacturing, automotive, consumer products, aerospace, defense, and communications.

Chemical Engineering

explores the processing of materials and the production or utilization of energy through chemical and biochemical reactions. Current research in the department is in energy and sustainability, nanotechnology and materials, and biotechnology and medicine. Graduates typically work in the chemical processing industry, biotechnology, environmental remediation, food processing, pharmaceuticals, and plastics.

Computer Science

offers a foundation that permits graduates to adapt to new technologies and new ideas. It spans the range from theory through programming to cutting-edge development of computing solutions. The work of computer scientists falls into three categories: designing and building software, developing effective ways to solve computing problems, and devising new and better ways of using computers.
processes for the benefit of society, our programs provide our students with the knowledge, skills, and experience to work in interdisciplinary teams in a global environment. They are highly prized by the world’s top companies.

**Electrical Engineering**

majors explore the analysis and synthesis of electrical and electronic circuits and devices, signal processing, and the design and analysis of modern electrical systems. Career opportunities include circuit design, materials processing, communications, robotics, and biomedical engineering.

**Materials Science and Engineering**

investigates the structure, properties, and processing of metals, ceramics, polymers, and composites, then applies that knowledge to the design of new materials. Current research in the department is in energy and sustainability, nanotechnology and materials, and biotechnology and medicine. Graduates in this field are recruited by many industries, including aerospace, electronics, automotive, and biomedical.

**Mechanical Engineering**

applies the fundamental principles of mechanics and thermal sciences to design. A mechanical engineer might be involved in the design, building, and testing of power conversion devices like turbines, internal combustion engines, and fuel cells; of mechatronic devices like disk drives, washing machines, and robots; transportation vehicles including automobiles and aircraft; and of medical devices like surgical instruments, prostheses, and heart pumps.

**Where is Biomedical Engineering?**

Biomedical engineering is offered as a departmental concentration in mechanical engineering, chemical engineering and materials science, and as a college concentration in the other majors. An engineering degree with the biomedical concentration prepares students for traditional engineering as well as bioengineering. Engineers trained in biomedical engineering find work designing, for example, prosthetics, robotics for telemedicine, heart valves, pacemakers, deep-brain stimulators, and a whole range of medical devices. Research by biomedical engineers includes studies of tissue engineering, mechanobiology, biosensors, and systems biology.

**Where is Environmental Engineering?**

Environmental engineering is a concentration available in chemical engineering, civil engineering, and biosystems engineering.
Residential Experience for Spartan Engineers (formerly ROSES)
This residential option places freshman engineering majors in a common living environment and common classes. Applicants must meet minimum criteria for selection.

Academic Advising
Engineering advisers are accessible to students year-round, are your connection to a variety of resources, and make your success their priority. (www.egr.msu.edu/advising)

Experiential Engineering Education
Approximately 200 employers—locally, regionally, and nationally—and nearly one-half of MSU engineering students each year participate in an out-of-classroom experience related to their major. This is an opportunity for students to gain employment experience in positions directly related to their fields of study.

Approximately 80 percent of these students receive an offer for permanent employment from the organization for which they work. (www.egr.msu.edu/thecenter/)

“The College of Engineering has provided a lot of opportunities for me outside of the classroom. I am a member of Women in Computing, a student group. Thanks to help from The Center I had a co-op at Media Balance, which has helped me in my major.”
– Freya Yu

Employer Connections and Sponsorships
More than 300 firms attend our annual employment fairs, and many more interview throughout the year. Many prominent companies and agencies view MSU as a “preferred campus for recruiting engineers.” They also support the College of Engineering through gifts, sponsorship of student competitions, and service on department visiting boards. For more details about the employment fairs, go to http://careernetwork.msu.edu/employers/fairs/.

Career Services & Counseling
As part of the Career Services Network, The Center for Spartan Engineering provides students with easy access to a career consultant in the engineering building. Information about career advisory networks and career development workshops is also available. (www.csp.msu.edu/)

Diversity Programs Office (DPO) and Guided Learning Center (GLC)
The DPO is proud to support and provide resources for all students, with a particular emphasis on assisting groups underrepresented in engineering. The DPO provides academic assistance, professional development, resource materials, programs, and opportunities for students to network with faculty, staff, and career professionals. These services are made possible through cooperation with other engineering and MSU departments, the volunteerism of our alumni and friends, and generous grants and gifts resulting from partnerships with numerous corporations and nonprofit organizations. (www.egr.msu.edu/dpo)

Student Organizations and

Spartan Engineers are supported and encouraged.
Competitions
There are student chapters of professional organizations in every discipline, and our national competition teams include Formula SAE, Baja SAE, Concrete Canoe, Steel Bridge, and others. ([www.egr.msu.edu/student-groups](http://www.egr.msu.edu/student-groups))

“My time as part of the Formula Racing Team has been the highlight of my college career. I feel that the experiences that I’ve had and relationships that I’ve made through that organization have been vital to preparing me for success upon graduation.”
– Adam Zemke

Engineering Study Abroad
This program helps prepare students to be strong candidates for engineering positions anywhere in the world. Programs are available in Australia, Germany, Russia, France, Mexico and Taiwan. Typically, nearly 100 engineering students participate each year in study abroad. Scholarships are available. ([www.egr.msu.edu/study-abroad](http://www.egr.msu.edu/study-abroad))

“You will have a lot of great experiences here. You can do study abroad, residential experience, and make great friends with your classmates and professors.”
– Freya Yu

The College of Engineering offers nine BS degree programs, and a number of available concentrations within the BS degree programs, to prepare students for the future challenges of business, industry, and academia. More information for prospective BS students can be found online at [www.egr.msu.edu](http://www.egr.msu.edu).

In addition to traditional, mainstream engineering programs, the applied engineering sciences major provides students the opportunity to complete a program that includes a core foundation across the engineering sciences with a cognate (focused coursework) in business or telecommunications.
“Engineering lab classes have been the best part of my student experience. In these labs, I got a lot of hands-on experience that gave me the chance to practice what I was learning from the textbook.” – Freya Yu

“If you are looking for a great engineering experience in a supportive and fun environment, then MSU is the place for you. The College of Engineering is a wonderful learning environment complete with many of the world’s leading researchers, brightest students, and excellent staff.” – Rayshawn Holbrook

“The energy at MSU is amazing; from sports to class there is always a positive and exciting energy here. MSU was the only college I applied to because I love the campus and school so much.” – Michelle Slavin

“If you can’t go wrong coming to MSU’s College of Engineering. Not only does the college provide you with a top academic education and environment in which to learn and grow professionally, but the alumni affiliation that you have with the university pre- and post-graduation is extremely valuable.” – Adam Zemke

“If you are looking for a great engineering experience in a supportive and fun environment, then MSU is the place for you.” – Rayshawn Holbrook
How to Apply

MSU Admission
Applications for MSU admission are available through your high school or community college guidance office, or by accessing the MSU Web site at http://admissions.msu.edu. Academic grades, grade trends, test scores (ACT or SAT), and counselor comments are all included in determining the acceptance of a freshman candidate. Transfer students are evaluated on the basis of prior college education, completion of basic courses, grades in prerequisite courses, and grade trends.

College of Engineering Admission
Students enter as pre-engineering and are admitted upon completing five core courses and attaining a weighted GPA (typically 2.8 or higher) that emphasizes technical courses. (www.egr.msu.edu/admission)

MSU Honors College
Academically talented students are encouraged to apply to the MSU Honors College, which coordinates honors courses and programs university-wide. Through the Honors College, selected high-achieving engineering students may be offered a professorial assistantship—an opportunity to work on research projects alongside engineering faculty in their first year. (www.msu.edu/unit/honcoll/opportunities.html)

Scholarships
Freshmen are automatically considered for scholarships using information from their admission application and FAFSA form. Returning students fill out a form annually for scholarship consideration. For more information, go to http://admissions.msu.edu and www.egr.msu.edu/scholarships.

Come Visit Us!
For the most comprehensive look at what MSU’s College of Engineering has to offer, come to the Future Engineers Open House held annually on the MSU campus. For more information see http://www.egr.msu.edu/future-engineer/programs. In addition, tours of the College of Engineering are available weekly during fall and spring semesters. For more details, please go to www.egr.msu.edu/future-engineer/visit or call (517) 355-6616, ext. 1. If you’d like to meet one-on-one with one of our academic advisers, please call to set an appointment.

Contact: Drew Kim
Assistant to the Dean for Recruitment and K-12 Outreach
The Center/Spartan Engineering
1340 Engineering Building
Michigan State University
East Lansing, MI 48824-1226
Telephone: (517) 353-7282
Web: www.egr.msu.edu/future-engineer/
E-mail: future-engineer@egr.msu.edu