Mechanical Engineering

Mechanical engineering is one of the most diverse and exciting branches of engineering. Its scope ranges from the design of very fine and sensitive instruments to the design of mammoth power plants. Mechanical engineering can encompass aerodynamics, lasers, high performance engines, electronic controllers, computer modeling and simulation, composite materials, and robotics.

Mechanical engineering involves the creative design, manufacturing, testing, evaluation, and distribution of such devices as automobiles, prosthetic limbs, home appliances, spacecraft, all types of engines, air conditioning equipment, artificial organs, nuclear and fossil fuel power plants, controls, robotics, and many types of instruments.

In order to prepare for such a broad field, mechanical engineers must have a solid foundation in physics, chemistry, and mathematics. This field also includes studies in basic mechanics of solids and fluids, electricity and electronics, controls, dynamic analysis, mechanical design, thermodynamics, applied mechanics, and heat transfer.

Pursuing Mechanical Engineering at Ohio State

Students who wish to major in mechanical engineering should have a solid high school background in math and science. They should also have a natural interest in how mechanical things work and how they might be improved. Perseverance, imagination, and the ability to invent and analyze are also important.

Students who come to Ohio State to study engineering that have a minimum ACT Math score of 24 or SAT Math score of 560 will be directly enrolled as pre-engineering students in the College of Engineering. Those students not eligible to directly enroll in engineering may enroll in the Science and Technology Exploration Program that is part of our Exploration Program described further at exploration.osu.edu.

Acceptance into a major is based on a numerical ceiling (200 students) and the cumulative point-hour ratio (CPHR) and secondary point-hour ratio (SPHR) after completion of the specified program of pre-major courses. Students who have completed the required pre-major courses with a SPHR of 2.0 or higher will be admitted into the designated major if the demand for admission is below the numerical ceiling. Otherwise, admission will be on a rank-order basis using the SPHR until the ceiling is reached.

Program Educational Objectives

The program educational objectives of the Department of Mechanical Engineering are to educate graduates who will be ethical, productive, and contributing members of society. As they progress professionally after graduation, our alumni will do the following:

1. Use their engineering foundation for success in
   - Technical careers in industry, academia, government, or other organizations
   - Graduate school in engineering
   - Nontechnical careers in areas such as law, medicine, business, public policy, secondary education, service industries, etc.
   - Careers involving engineering practice, research and development, or engineering education, management, or service
   - Careers involving management or entrepreneurship

2. Use lifelong learning skills to
   - Take advantage of professional development opportunities in their disciplines
   - Develop new knowledge and skills and pursue new areas of expertise or careers
   - Adapt to changing global markets and workforce trends

3. Engage in professional service by
   - Using their engineering background to advance society and to help solve technical and societal problems
   - Developing new knowledge and products that will promote sustainable economic development to improve the quality of life
   - Promoting the practice of engineering as a source of societal good

Mechanical Engineering Requirements

A summary of college requirements for mechanical engineering includes the following:

- Fundamentals of Engineering (2 courses)
- Chemistry (2 courses)
- Electrical Engineering (2 courses)
- Industrial and Systems Engineering (2 courses)
- Materials Science (1 course)
- Mathematics (5 courses)
- Mechanical Engineering (20 courses)
- Physics (3 courses)
- Technical Electives (15 credit hours)

The college requirements total 157 hours of course work. The university requires that students take 35 hours of General Education Curriculum courses which total 192 hours required for graduation.

For more information, check these web sites:

Mechanical Engineering: mecheng.osu.edu
College of Engineering: engineering.osu.edu
Women in Engineering Program: wie.eng.ohio-state.edu
Engineering Admissions: www.eng.ohio-state.edu/prospective/admissions/enroll_coe.html
Multicultural Center: multiculturalcenter.osu.edu

Curriculum Sample

This is a sample list of classes a student will take to pursue a degree in mechanical engineering. Since university students need more than specific education in a narrow field, they also will take classes to complete the General Education Curriculum (GEC). The GEC will allow students to develop the fundamental skills essential to collegiate success across major programs. Course work options satisfying the GEC often come from a variety of academic areas of study allowing students to tailor their GEC toward their interests. Note: This sample represents one of several possible paths to a degree in Mechanical Engineering. Consult the departmental web site, mecheng.osu.edu, for details on each specific track.

Freshman Year:	
Engineering Survey	1
Introduction to Engineering	6
Calculus & Analytic Geometry	15
Chemistry	9
Physics	10
GEC (English composition)	5
Total hours	**46**

Sophomore Year:	
Calculus & Analytic Geometry	5
Dynamics	4
Electrical Circuits	3
Materials Science	3
Numerical Methods	4
Ordinary and Partial Differential Equations	4
Physics	5
Statics	4
Strength of Materials	4
Thermodynamics	4
GEC (ethics)	5
GEC (historical study)	5-10
Total hours	**50-55**

Junior Year:	
Electronic Devices	3
Engineering Economics	3
Fluid Dynamics	6
Heat Transfer	3
Kinematics	4
Manufacturing Engineering	3
Mechanical Design	8
System Dynamics	7
Thermodynamics	3
GEC (arts and humanities)	5-10
GEC (second writing course)	5
Total hours	**50-55**

Senior Year:	
Automatic Controls	4
Design Capstone	4
Design Lab	4
Fluids/Heat Transfer Lab	2
Measurements	5
Mechanical Design	3
Technical Electives	15
GEC (social sciences)	5-10
Senior Program Review	
Total hours	**42-47**

Co-Curricular Opportunities

There are many opportunities for undergraduates to get involved in student chapters of national societies and organizations. The student organization link on the Mechanical Engineering web page, mecheng.osu.edu, lists those organizations associated with the Department of Mechanical Engineering. The Cooperative Education and Internship Program in the College of Engineering helps undergraduate engineering students obtain career-related employment of three types: cooperative education, internships, and part-time jobs. For more information, consult the Engineering Co-op & Internship Program web site, career.eng.ohio-state.edu.

Honors Programs

The Department of Mechanical Engineering offers two programs for high-achieving and creative students: the honors program and the combined BS/MS program. The department honors program consists of special honors courses and the opportunity for students to pursue an independent research project under the guidance of a faculty mentor. Students report the results of their research in the form of an honors thesis and the words "Graduation with Distinction" are printed on their diplomas and in the official graduation program. A minimum CPHR of 3.4 is required for the honors program. Honors students are eligible for many research scholarships granted by the department and the College of Engineering. For more information, consult the Freshman Engineering Honors Program web site, feh.osu.edu.

The combined BS/MS program is designed to give outstanding students an opportunity to reduce the amount of time required to meet the master's degree requirements. Students in this program are normally accepted at the end of the junior year and begin taking graduate-level courses as seniors. These courses are double counted toward the BS and MS degrees. This enables most students to complete the MS requirements in four quarters after completion of the BS degree.

Career Prospects in Mechanical Engineering

Perhaps the greatest single reason for studying mechanical engineering is to prepare students for employment in a wide range of exciting industries including aerospace, automotive, biomedical, chemical, computers, electronics, fossil and nuclear power, manufacturing, pharmaceuticals, robotics, and textiles.

Mechanical engineers find employment in eight broad classifications within the field: research, development, design, testing and evaluation, production and manufacturing, operation and maintenance, marketing and sales, and administration. The breadth of the mechanical engineering program also provides for greater mobility for career shifts later in life. Additionally, a Bachelor of Science in Mechanical Engineering (BSME) can open the door to post-graduate study in several engineering fields, business, law, and medicine.

Beginning salaries for graduates with a Bachelor of Science in Mechanical Engineering range from $50,000 to $56,000 with the average being around $54,000. Differences depend on candidates' skills, previous work experience, and other factors determined by various employers including the willingness to relocate. The Engineering Career Services Office maintains a web site at career.eng.ohio-state.edu.

Revised February 2009. For the most up-to-date information on the mechanical engineering program, please visit mecheng.osu.edu.

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Ohio State's mechanical engineering program is accredited by the Engineering Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, (410) 347-7700.