Mechanical Engineering, BS

Emphases: Aerospace Engineering
Department: Mechanical and Aerospace Engineering Department
College: College of Engineering

Overview

About This Degree

Mechanical engineering deals with the creation of the mechanical systems and machines that serve society. Mechanical engineers are involved in researching and designing mechanical devices of all types, including engines, tools, and machines. The broad discipline allows graduates to work in nearly every area of industry.

The Department of Mechanical and Aerospace Engineering at USU is second in the nation for research funding received for aerospace engineering. Students consistently take top spots in national engineering competitions, giving them hands-on engineering and research experience and recognition for their work as undergraduates. The department also partners with the Space Dynamics Lab (at the USU Research Foundation), an internationally recognized research institution that brings in more than $50 million per year in funding. Students also have opportunities to work at the Space Dynamics Laboratory.

The department offers a sound framework of engineering courses taught by a faculty with extensive academic and industrial experience. Coursework includes topics such as mechanics, design, dynamics, fluid mechanics, thermal science, and material science. Students' culminating experience in the program is a year-long capstone where they work in groups to design and build a product. These projects are often commissioned by actual clients, so their designs and creations are actually used in various real-world capacities.

The mechanical engineering degree is accredited by the EAC Accreditation Commission of ABET. The job placement rate for students graduating from USU's engineering programs is extremely high.

Concurrent Bachelor's/Master's Program:

The department also offers a concurrent bachelor's/master's program, which allows USU engineering students to begin taking graduate classes during their senior year as an undergraduate and to complete requirements for both the bachelor's degree and the master's degree concurrently over two years.

Career Options

With a degree in mechanical engineering, students can pursue careers in a variety of industries:

- Equipment maintenance
- Automotive design
- National defense
- Electrical utilities
- Electronics design
- Fluids engineering
- Food processing
- Physical planning
- Medical device
- Robotics design
- Solar energy structure
- Design engineer (Designs products or systems, such as instruments, controls, robots, engines, machines)
- Test engineer (Plans and directs engineering personnel in fabrication of test control apparatus and equipment)
- Plan engineer (Plans, directs, and coordinates the activities concerned with design, construction, modification and maintenance)
- Applications engineer (Develops and writes equipment specifications, performance requirements, cost analysis, and proposals for integrating machinery in the manufacturing process)

Aerospace Engineering Emphasis

- Aircraft design and development
- Aircraft flight testing
- Spacecraft and space systems design
- Spacecraft trajectory design and analysis

Career Services provides counseling and information on hundreds of job and internship opportunities and even helps students apply and interview.

What it takes

Admissions Requirements

In addition to Utah State University's admissions requirements, the mechanical engineering program has additional requirements:

- **Freshmen:** Students that meet the USU admission requirements can be admitted as pre-engineering majors. In order to get into the professional engineering program, students must complete two years of prerequisite coursework, have a C- or better in every required class, no more than three classes repeated, and entrance GPA of 2.8 or above.
- **Transfer Students:** Students transferring from other institutions will be referred to the Engineering Admission Committee for evaluation. Evaluations will include transfer GPA and evaluation of the program of the former college or university. Students transferring from other USU majors must be approved by the Engineering Admission Committee before transferring to the College of Engineering. Students in this category must have demonstrated a potential to succeed in engineering through courses taken at USU.
- Recommended high school courses: two or three years of algebra, one year of geometry, one-half year of trigonometry, four years of English, and courses in computer programming, chemistry, and physics are preferred.

International students have additional admissions requirements.

Major Requirements

Click here to see course requirements for the **Bachelor of Science**.

Students majoring in mechanical engineering must complete a capstone design project during their senior year.

Passing the Fundamentals of Engineering examination, which is the first step in becoming a licensed professional engineer, is required for graduation.

Contact

Advising

All new USU students participate in a New Student Orientation program, where they receive detailed information about major requirements, registering for classes, and other important advising information.

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Get Involved

Professional Organizations, Honor Societies, and Clubs

American Council of Engineering Companies: ACEC is the voice of America's engineering industry. Council members are engaged in a wide range of engineering works that propel the nation's economy and enhance and safeguard America's quality of life. The council's mission is to contribute to America's prosperity and welfare by advancing the business interests of member firms.

American Institute of Aeronautics and Astronautics: The AIAA is a national professional society whose members serve the aerospace engineering community. The mission of the AIAA is to serve the profession and to benefit the

institute's individual members and member institutions.

Engineers Without Borders: The purpose of the student chapter of Engineers Without Borders at USU is to identify and solve engineering and humanitarian problems for impoverished orphanages and communities. The principal activities include providing clean water and solar power, improving sanitary conditions, enhancing educational programs, improving classroom structures, and assisting with other tasks requested by the local people.

International Society of Aviation Maintenance Professionals: ISAMP is a national organization that offers scholarships and networking opportunities for students. It is active in more than 200 basic industries, as defined by the U.S. Department of Labor, and it maintains one or more agreements with almost every major employer in the U.S. and Canada.

National Engineers Week Foundation: This foundation strives to be the global leader in cultivating and celebrating the engineering profession. Its cornerstone program is Engineers Week. All programs are designed to reach out to current and future generations of engineering talent.

Society of Automotive Engineers International: SAE International is a global association of engineers and related technical experts in the aerospace, automotive, and commercial vehicle industries. Its core competencies are lifelong learning and voluntary consensus standards development.

Utah Engineers Council: The UEC is an umbrella organization of local chapters and sections of engineering societies. The purpose of the UEC is to advance the art and science of engineering and to provide a forum for communication between the varying engineering societies.

American Society of Mechanical Engineers: ASME promotes the art, science, and practice of mechanical and multidisciplinary engineering and allied sciences around the globe.

Future Association of Tomorrow's Engineers: FATE is the USU regional campus engineering club. It aims to promote and support engineering throughout the USU regional campus system via social networking, community outreach, recruitment, and fun activities.

National Society of Black Engineers Student Chapter: NSBE is one of the largest student-governed organizations in the country. NSBE's mission is to increase the number of culturally responsible black engineers who excel academically, succeed professionally, and positively impact the community. NSBE offers its members leadership training, professional development, mentoring opportunities, career placement services, and more.

Society of Hispanic Professional Engineers Student Chapter: SHPE is a national organization that aims to build unity through diversity of engineering students. The club holds fund-raising and service activities, participates in engineering-related campus-wide activities and competitions, and hosts activities with local middle and high school students aimed at science and technology.

Society of Women Engineers: Utah State University's Society of Women Engineers is open for both male and female members. SWE is committed to encouraging women engineers to attain high levels of educational and professional achievement, serve as a center of information for women in engineering, and promote the value of diversity.

Tau Beta Pi: This is the only engineering honor society representing the entire engineering profession. It is the nation's second-oldest honor society, founded at Lehigh University in 1885 to recognize those exhibiting distinguished scholarship and exemplary character as students in engineering, or by their attainments as alumni in the field of engineering, and to foster a spirit of liberal culture in engineering colleges.

Labs, Centers, Research

With the second oldest undergraduate research program in the nation, USU offers students a wide range of opportunities to gain hands-on research experience. The Undergraduate Research and Creative Opportunities program allows students to apply for grants and receive funding. USU's Honors Program prepares students for excellent graduate programs by helping them build relationships with professors, participate in research projects, take smaller, more intensive classes, and develop leadership skills.

Buried Structures Laboratory: The Buried Structures Laboratory conducts research into the performance of buried pipes. The lab has performed research on both flexible and rigid pipes.

Center for Atmospheric and Space Sciences: CASS is recognized nationally and internationally as a progressive research center with advanced space and upper atmospheric research programs. CASS scientists are tackling the adverse consequences of space weather. Undergraduate and graduate students are involved in numerous research projects in CASS that provide opportunities to program computers, analyze data, and build instrumentation.

Center for Control of Flows in Manufacturing: This center focuses on the application of flow control technologies, commonly studied for aerospace applications, as applied to manufacturing processes.

Center for High Performance Computing: HPC at USU is a research service center that serves and expands the computational needs of the USU community. HPC at USU houses a 256-processor cluster called “Uinta,” with three networks.

Center for Self-Organizing and Intelligent Systems: CSOIS is a multi-disciplinary research group at USU that focuses on the design, development, and implementation of intelligent, autonomous mechatronic systems, with a focus on ground vehicles and robotics.

Center for Space Engineering: CSE is a multi-disciplinary group of faculty at USU involved in space technology, systems, and science. The center brings together academics, industry, and government to advance the understanding of the space environment and to train the next generation.

Energy Laboratory: This lab seeks to develop solutions to America's most intractable energy problems through scientific and technological innovation. It provides a cohesive framework permitting faculty, students, and partnering institutions to focus on contemporary energy-related research issues.

Experimental Fluid Dynamics Laboratory: The EFDL encompasses 3,000 square feet of laboratory space and is equipped with the latest in velocity diagnostics, particle sizing instrumentation, data acquisition equipment, and imaging sys-tems.

Materials Processing and Testing Laboratory: With more than 4,000 square feet of lab space, MPTL houses a complete set of modern materials processing and test equipment. With funded projects from NSF, NASA, and industry, MPTL has developed a significant research and education program in materials processing, thermo-mechanical properties, and microstructure characterization.

Mechanical Properties Research Laboratory: The MePRL researches mechanical properties evaluation and modeling for metals, polymers, and composites based on multiscale experiments and simulations.

Micro/Nano Mechanics Laboratory: The Micro/Nano Laboratory explores and investigates damage evolution in material under different types of environments using experimental and modeling techniques. Advanced mechanical testing facilities allows multi-scale experiments of material under different types of loading and temperatures.

Rocky Mountain NASA Space Grant Consortium: RMNSGC is one of 52 National Space Grant Consortia in the United States. As a member of the consortium, USU has awarded more than 100 fellowships to students interested in aerospace-related education and careers. The majority of Space Grant student awards include a mentored research experience with university faculty and NASA scientists, engineers, and technologists.

Space Dynamics Laboratory: SDL is known for sending 500+ successful experiments into space and brings in $54 million per year in revenue, the majority coming from grants, contracts, and appropriations. SDL’s expertise in the development of sensors and calibration, small satellites and real-time intelligence has made it an internationally known organization in the space arena.

Space Weather Center: SWC is developing innovative applications for mitigating space weather in technical systems. The ionosphere is a key region that affects communication and navigation systems of the space environments that are affected by space weather. The USTAR initiative is developing products to reduce adverse effects of the ionosphere on these types of systems.

Thermophysical Properties Research Laboratory: Thermophysical properties, such as thermal conductivity, thermal diffusivity, heat capacity, and melt viscosity, are essential for the development of advanced materials. A major thrust of the research in TPRL is for fuels and materials in nuclear applications and is closely coordinated with

the Idaho National Lab of the U.S. Department of Energy.