MECHANICAL ENGINEERING

Mechanical engineers are problem-solvers who make things work better, more efficiently, and more economically. They are innovators, coming up with original ideas to apply scientific knowledge in new ways. Mechanical engineers are builders, designing and developing machines and systems that make life easier. Mechanical engineers have strong science, mathematics, and technology backgrounds.

Manufacturing processes, design of mechanical equipment and systems, and energy generation and utilization are traditional mechanical engineering fields. Students receive basic preparation in all of these areas. Through choice of elective courses they may further specialize in areas such as automatic control systems, renewable energy systems, robotics, product design, biomedical engineering, computational mechanics, manufacturing systems engineering, etc. Mechanical engineering prepares students for entrance into industry, for independent business (e.g., consulting, contracting, or manufacturing), or for work in government agencies. A degree in mechanical engineering may be used as a background for medicine, law, or business, as well as for graduate work in engineering.

Work in these areas requires a solid background in mathematics, statistics, mechanics, physics, machine design, thermal sciences, materials, the use of computers, and manufacturing processes. Mechanical engineers must also possess good communication skills and be able to work in teams. Mechanical engineers should be aware of social and environmental consequences of their work.

With these skills, broad training, and an emphasis on systems design, mechanical engineers are in demand in practically every type of manufacturing, consulting, sales, and research organization. Mechanical engineers may work in automotive, materials processing, heavy equipment, paper, plastics, power, aerospace, chemical, electronics, or many other large and small industries. Their work may involve research and development of new products, design of equipment or systems, supervision of production, plant engineering, administration, sales engineering, or testing of individual components or complete assemblies.

Although many special areas exist in the profession, mechanical engineering can be subdivided into energy systems and mechanical systems.

The energy systems field has taken on special significance with the current awareness of the limited energy sources and the effects of energy use on the environment. In this field, mechanical engineers carry out work on the behavior of liquids, gases, and solids as they are used in all types of energy-conversion systems. Automotive engines, gas turbines, steam power plants, refrigeration systems, air pollution control, cryogenics and energy utilization require this type of background. To be proficient in this the engineer must have a knowledge of thermodynamics, fluid dynamics, heat transfer, and related subjects.

The mechanical systems field covers the design and manufacturing of products and equipment. Mechanical engineers who focus on design conceive of new devices and machines and also refine and improve existing designs. The design engineer must be proficient in kinematics, machine elements, mechanics, strength and properties of materials, dynamics, vibrations, etc. Mechanical engineers who focus on manufacturing are involved with planning and selecting manufacturing methods, with designing and developing manufacturing equipment, and with increasing the efficiency and productivity of current manufacturing technologies for polymer, metal, and ceramic products. The manufacturing engineer uses chemistry, materials science, mechanics of materials, materials processing principles and practices, principles of computer control, engineering statistics, and other physical and thermal sciences to improve manufacturing operations and systems, and the products they produce. Increasingly, the systems that mechanical engineers work with incorporate biological and information technology components.

DEGREES/MAJORS/CERTIFICATES

- Engineering Thermal Energy Systems, Certificate (http://guide.wisc.edu/undergraduate/engineering/mechanical-engineering/engineering-thermal-energy-systems-certificate/)
- Manufacturing Engineering, Certificate (http://guide.wisc.edu/undergraduate/engineering/mechanical-engineering/manufacturing-engineering-certificate/)
- Mechanical Engineering, B.S. (http://guide.wisc.edu/undergraduate/engineering/mechanical-engineering/mechanical-engineering-bs/)

PEOPLE

PROFESSORS

Darryl Thelen (Chair)
Jaal Ghandhi
Dan Negrut
Gregory F. Nellis
Tim Osswald
Frank Pfefferkorn
John Pfotenhauer
Xiaoping Qian
Douglas Reindl
David Rothamer
Scott T. Sanders
Vadim Shapiro
Krishnan Suresh
Lih-sheng Turng

ASSOCIATE PROFESSORS

Melih Eriten
Christian Franck
Sage Kokjohn
Tom N. Krupenkin
Franklin Miller
Mario F. Trujillo
Michael Zinn

ASSISTANT PROFESSORS

Peter Adamczyk
Mark Anderson
Joseph Andrews
Lianyi Chen
Corinne Henak
Sangkee Min
Wenxiao Pan
Alejandro Roldan-Alzate
Josh Roth
Shiva Rudraraju

Stephan Rudykh
Dakota Thompson
Mike Wagner
Xiangru Xu

See also Mechanical Engineering Faculty Directory (https://directory.engr.wisc.edu/me/faculty/).

RESOURCES AND SCHOLARSHIPS

FACILITIES

Facilities available for instruction and research include:

Automatic Controls Lab
Automotive Lab
Computer-Aided Design Lab (CADLAB)
Energy Lab
Engineering Graphics Labs
Fluid Power Lab
Instrumentation Lab
Maker Space
Mechatronics and Manufacturing Automation Lab
Polymer Processing Lab
Research Labs
Senior Design Studio
Solar Energy Lab
TEAM Lab