They conceive, design, and construct public works such as highways, streets, bridges, water distribution and wastewater collection systems, and wastewater and industrial waste-treatment plants. Civil engineers respond to society’s ecological and environmental problems by joining with other engineers, as well as with physical, biological, and social scientists, to protect our natural resources and create a better physical and social environment for all people.

Biomedical Engineering

Biomedical Engineering is the application of engineering tools to solve problems in biology and medicine. It is an interdisciplinary engineering discipline practiced by professionals trained as engineers, who often work in teams with physicians, biologists, nurses and therapists. Biomedical engineers assert their expertise in designing new medical instruments and devices, applying engineering principles to understanding and repairing the human body, and for medical decision-making. Fields of study in biomedical engineering include bioinstrumentation, medical imaging, biomechanics, biomaterials, tissue engineering, and health care systems.

Chemical Engineering

Chemical engineers create products, solve technological problems, and improve our quality of life. Chemical engineers can deal effectively with problems involving chemical, biological, and physical phenomena. They have made great contributions to developing the chemical, petroleum, pharmaceutical, electronics, and other process industries. Opportunities for chemical engineers lie in the areas of energy resources, materials, pulp and paper manufacturing, pharmaceuticals, food processing, plastics, personal care products, synthetic fibers, waste treatment, pollution abatement, public health and biotechnology.

Civil Engineering

Civil engineering deals with the science and art of engineering applied to the human environment and natural resource needs. The environment has long been the province and concern of civil engineers. Involved in planning our cities, communities, and larger regional areas, civil engineers build our world.

Computer Engineering

Computer engineers design, develop, and manage systems that process, store, and convey information. These systems include computers, networks, digital systems and any device or system with an electronic “brain.” They also conduct research on ideas for new computer technologies. Computer engineers are heavily involved in the growing Internet and e-commerce areas and also develop the computer-aided design tools that are used in every other type of engineering. A computer engineer typically has the hardware background of an electrical engineer and the software background of a computer scientist.

Electrical Engineering

Electrical engineers create and innovate electrical and electronic components and systems. They also conduct research on ideas for new technologies; examples include: electric power generation and distribution, biomedical devices and systems, mobile communications, robotics, alternative and sustainable energy sources, automotive electronics, electric and hybrid-electric transportation systems, consumer products, data processing tools, and electronic sensors and sensing systems. The electrical engineer is also concerned with the devices that make up such systems:

Can I double major?

Although you cannot double major in two engineering disciplines, College of Engineering students are able to pursue an additional major through the College of Letters & Science (L&S).

Does UW-Madison have minors?

UW-Madison has certificates rather than minors. There are certificates offered both through the College of Engineering and at a campus level. You can also customize your education through liberal and technical electives, as well as the experiences you gain inside and outside the classroom.
transistors, integrated circuits, antennas, computer memory devices, and fusion plasma confinement devices.

**Engineering Mechanics**

To an engineer, mechanics refers to the branch of physics dealing with the physical laws governing forces, motion, energy, and the deformations of materials under load. Engineers with expertise in mechanics are essential for the design of many projects, from nuclear reactors and energy storage systems to aircraft, automobiles and other mechanical systems. An exciting direction in engineering mechanics at UW-Madison is the astronautics option within the BS degree program. Students who choose this option will learn to apply the laws of physics to problems of rocket guidance and space flight, including orbits of the planets and moons, and the building and control of space stations.

**Engineering Physics**

Engineering physics provides students opportunities to study emerging technologies. Students in this major participate in original research in the technical focus area of their choice. The available focus areas will change as technology progresses. At present, students can select from nano-engineering, plasma science and engineering, and scientific computation. Graduates in Engineering Physics are well-suited for careers in high-tech start-up companies, research and development in traditional engineering firms, and pursuing advanced graduate degrees.

**Geological Engineering**

Geological engineering integrates geology and engineering. Geologists study Earth’s origins, composition and evolution. Engineers apply scientific principles to practical ends, such as designing and constructing structures. Geological engineers help find the best ways to use Earth’s resources to solve technical problems while protecting the environment. They may also be involved in discovering and maintaining alternative forms of energy. A geological engineer might be hired to design or investigate manufactured structures in rock or soil such as dams, tunnels and underground power plants; help mitigate naturally occurring phenomena; or develop safe and environmentally sound subsurface openings for mineral extraction, energy storage or waste disposal.

**Industrial Engineering**

Industrial engineering is a branch of engineering concerned with the modeling, analysis, control and evaluation of integrated systems of people, money, information, and equipment. Industrial and systems engineers make products and processes better: higher quality, more efficient, more productive, higher performance, more accurate, more user centered, or safer. They work to improve the quality of healthcare delivery and reduce medical errors, make U.S. manufacturing more competitive, and make computer systems more user-friendly. Industrial engineers manage systems of people, machines, material and information, and can work in almost any industry—from automobile manufacturing and aerospace, to healthcare, finance, leisure, and education.

**Materials Science and Engineering**

Everyone uses and consumes materials of all kinds: metals, ceramics, polymers, composites, semiconductors and superconductors. Materials scientists and engineers create new materials and develop processes to improve existing materials to suit the needs of everyday life. These materials can help conserve energy, make engines run more efficiently, improve high-resolution TVs, make faster computers, improve sensors for automobiles, and create environmental controls. The study and development of materials is one of the most rapidly growing areas in all of science and engineering.

**Mechanical Engineering**

Mechanical engineers design, analyze, test, produce, and use all types of mechanical equipment. They also solve problems brought about by ever-increasing demands from a growing world population. The diversity within the mechanical engineering curriculum gives graduates a breadth of career opportunities. Mechanical engineers must know how to design and manufacture products that achieve high efficiency and reliability while maintaining a competitive cost and low environmental impact. With these skills and broad training, mechanical engineers are in demand in practically every type of manufacturing and consulting organization.

**Nuclear Engineering**

Since the discovery of fission 75 years ago, a new field using energy from the atom’s nucleus has developed and electricity is being produced commercially in a several-hundred-billion-dollar industry. Applications of radioactive tracers have been made to medicine, science, and industry. Radiation from particle accelerators and materials made radioactive in nuclear reactors are used worldwide to treat disease, provide power for satellite instrumentation, preserve food, sterilize medical supplies, detect faults in welds and piping, and polymerize chemicals.