THE PROGRAM
The School of Engineering and Applied Science (SEAS) at Gonzaga University offers traditional four-year Bachelor of Science degrees in Civil Engineering, Computer Engineering, Computer Science, Electrical Engineering, Mechanical Engineering, and Engineering Management.

Civil engineers are problem-solvers who utilize sophisticated technologies to find solutions to the challenges facing society. A civil engineer plans, designs, and supervises construction of the facilities required by modern society. These facilities exist in both the public and private sectors and vary tremendously in scope and size. Examples of civil engineering projects include space satellites and launching structures, offshore drilling platforms, bridges, highways, buildings, transportation systems, water supply and treatment systems, flood control facilities, solid and hazardous waste management, and environmental restoration. Civil engineers have roles in design, management, regulatory enforcement, and policy development.

Computer engineers are responsible for the design of general purpose computers (PCs and mainframes) and embedded computers inside video games, cell phones, appliances, aircraft, and medical equipment. A computer engineer must understand how things work, how to program software to operate these devices, how to design hardware that can run the software, and, finally, how to use an operating system to make hardware and software function in sync. A computer engineer receives the foundational training required in electrical engineering and in computer science. Knowledge in one or more fields of specialization may be pursued in a student’s senior year.

THE PASSION
Engineers apply knowledge of mathematics and the natural sciences to use the materials and forces of nature for human benefit. Engineers are creative problem-solvers who enjoy the satisfaction of pointing to tangible evidence of their efforts. The space shuttle, skyscrapers, Indy racing cars, satellite communication systems, and consumer goods like surround sound entertainment systems, computers, and cell phones are all created and designed by skilled and visionary engineers. Students interested in engineering must be inquisitive, interested in understanding how things work, and passionate about designing products that will help people and society. Engineers must also demonstrate a strong aptitude in math and science, excellent communication skills, and a commitment to the highest ethical standards. Gonzaga University students learn to apply the principles of engineering with economy and with concern for the environment and society.

Computer scientists study computing in all of its forms. Their work has led to the development of the software that runs on our computers. Software makes much of a computer’s everyday functionality possible. Web browsing, downloading music and videos, and even the very existence of digital music and videos are all made possible by software. Graduates of computer science programs typically work as software engineers, computer scientists, and computational scientists, though many also go on to careers in business and law. Built on a foundation of science, mathematics, intensive programming, and computer architecture, the Computer Science major at Gonzaga offers a broad range of advanced computer science topics such as artificial intelligence, computer graphics, robotics, computer networks, database management systems, cryptography, computer security, and computational linguistics.

Electrical engineering traditionally includes specialties in computers, control systems, electrical power, and telecommunications engineering, as well as electro-optics, information theory, signal processing, and image processing. Every time people make phone calls, turn on a light or the TV, or type on a computer, they are using inventions created by electrical engineers. Electrical engineering graduates find employment in many different industries including power utilities, telecommunications, computers, commercial electronics, aerospace, defense, education, government, medicine, and law.

Mechanical engineering is a broad field that encompasses activities varying from biomedical research to the design of rocket engines. Mechanical engineers apply the principles of the physical sciences to the production and use of energy, the design and production of goods and machines for human use, and the creation of equipment and systems for manufacturing. Gonzaga’s program emphasizes the thermal sciences and their application to the design and analysis of energy-producing systems. The program makes extensive use of computer-aided design (CAD), computer-aided engineering (CAE), and other computer-based applications.

Engineering Management is a program designed to provide students with a broad education and understanding of the practice
OUTCOMES
A wide variety of career opportunities await graduating engineers, including employment with large corporations, consulting firms, state agencies, federal agencies, and overseas companies. In recent years, engineering majors have been the most sought-after college graduates by companies that recruit on university campuses, and starting salaries for engineers are among the highest offered to all college graduates. An engineering degree is also versatile. Civil, electrical, and mechanical engineering students often cross over into related fields such as aerospace, biomedical, and nuclear engineering.

HIGH SCHOOL PREPARATION
High school students interested in studying engineering need to prepare themselves by taking four years of math, including algebra, geometry, trigonometry, and pre-calculus. Calculus is recommended but not required. In addition, students should take at least three years of science, including physics and chemistry. Computer-aided drafting courses are also helpful, and developing strong writing skills through English courses is essential. Transfer students from two-year or four-year colleges should consult with the School of Engineering and Applied Science regarding transfer credits.

ENGINEERING AT GONZAGA
In the Jesuit tradition, Gonzaga University focuses on educating all dimensions of a student’s development. In addition to a technical engineering curriculum, engineering students complete courses in English, speech, religious studies, and philosophy. These courses develop strong communication skills in speaking and writing, while emphasizing critical thinking and ethical reasoning.

In the engineering classroom, students interact with skilled faculty whose primary focus is teaching. Small classes ensure that students receive personal attention. All classes are taught by professors hired and retained based on teaching excellence and a commitment to the success of their students. Faculty members are always available for academic and professional mentoring.

ENGINEERING COURSES
In the School of Engineering and Applied Science, engineering students develop a technical concentration by taking a set of courses from one of five technical tracks. Each technical track draws from a wide selection of interests within a particular engineering discipline. This program is offered in conjunction with the School of Business Administration and provides students with the opportunity to stay for a fifth year to complete an accelerated Master’s in Business Administration (M.B.A.) degree.

Gonzaga’s degree programs in Civil, Computer, Electrical, and Mechanical Engineering are accredited by the Engineering Accreditation Commission of ABET (www.abet.org), and the other two programs are in the process of seeking ABET accreditation.

DISTINCTIVE OPPORTUNITIES
Since 2010, sophomores majoring in civil or mechanical engineering at Gonzaga have had the opportunity to study abroad in Florence, Italy during the Spring semester. Gonzaga-in-Florence courses are designed to fit into engineering students’ existing curricula and requirements. Study abroad gives engineering students insight into the past, present, and future of engineering technologies and an understanding of engineering practice in different cultures and locations.

True to the Jesuit mission of reaching out in compassion as men and women for others, Gonzaga students and faculty are committed to doing engineering with a purpose—even if it takes them halfway around the world. Gonzaga students have traveled as far as Benin, West Africa to install water filtration systems and windmills. They have helped design sustainable buildings for the new Catholic University of South Sudan in Juba. In Colombia, GU civil engineering students have developed home construction designs that use ecologically responsible materials that local residents can afford. Gonzaga computer science students have rebuilt donated computers for elementary schools in Africa and low-income families closer to home in eastern Washington.

Involvement in student organizations within SEAS is an important part of academic life at GU for engineering students as well. Opportunities for engineering students include chapters of the American Society of Civil Engineers (ASCE), the American Society of Mechanical Engineers (ASME), and the Institute of Electrical and Electronic Engineers (IEEE). Additional active groups on campus are the Society of Women Engineers (SWE), the prestigious Tau Beta Pi national honor society, Engineers Without Borders, the Society of Automotive Engineers (SAE), and Upsilon Pi Epsilon (UPE), an international honor society for computing and information disciplines.

Events and activities sponsored by these clubs include Tau Beta Pi’s free tutoring for freshman and sophomore engineering students, SWE’s Big Sister mentoring program, and SAE’s participation in a national Mini-Baja competition where a mini race car was designed, built, and driven by engineering students in a race in San Antonio, Texas.
RECENT GRADUATE PROGRAMS ATTENDED INCLUDE:
- Duke University
- Georgia Institute of Technology
- Northwestern University
- Stanford University
- University of Arizona
- University of California, Berkeley
- University of Colorado
- University of Minnesota
- University of New Mexico
- University of North Carolina
- University of Texas
- University of Washington
- Vanderbilt University

DESIGN PROJECTS
Gonzaga University’s Center for Engineering Design & Entrepreneurship (CEDE) organizes, supports, and advises students undertaking design projects defined and funded by sponsors. CEDE projects challenge students to solve real industrial problems with limited resources. Project teams consist of three to five Gonzaga students, a faculty advisor, and a liaison engineer from the sponsoring company or organization. All projects culminate in a formal presentation of results during the annual Design Exposition Day.

Sponsors often implement the student strategies created during this process and use the projects to evaluate students for possible employment. Recent sponsors include Alliance Machine Systems, Avista Corporation, Boeing, Coffman Engineers, United Technologies Aerospace Systems, Isothermal Systems Research, Kimball Office, LHC2, Pacific Northwest National Laboratories, Structural Design Northwest, Schweitzer Engineering Laboratories, and the Washington State Department of Transportation.

SEAS focuses on promoting character formation, particularly honesty, tenacity, courage, and citizenship. SEAS then encourages students to reflect upon the impact that formation may have in entrepreneurial engineering. These attributes work together with the Jesuit educational values of ethics, leadership, faith, service, and justice. Gonzaga is a member of the Kern Entrepreneurship Education Network (KEEN), which strives to instill the attributes of the entrepreneurial-minded engineer. The goal of this collaboration with KEEN is to develop curriculum that teaches students different aspects of an entrepreneurial mindset every year of their Gonzaga education. Freshman students are first exposed to engineering design in a cornerstone design class, and this experience builds until their senior level capstone design project.

THE PLACE
An excellent engineering program requires up-to-date technology and tools. SEAS enjoys support from both the University and private industry and offers students advanced facilities and lab equipment with the latest technology. Gonzaga students gain valuable research and learning experience. They can study environmental issues, robotics, propulsion, and a host of other fields in the engineering labs at the Herak building and the Gold-level LEED-certified PACCAR building. The CAD/CAE labs provide a fully-networked computer environment where both hardware and software are constantly updated to better support the engineering needs of students and faculty. All engineering students may use the CAD/CAE labs for their coursework, projects, and research. Each area of engineering at Gonzaga has its own lab facilities that provide opportunities for hands-on experiments and research in the field. For more detail on Gonzaga’s engineering labs, please visit: www.gonzaga.edu/engineering-facilities.
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