Engineers and computer scientists apply knowledge of mathematics, logic, and the natural sciences to develop products and solutions to meet human needs. They are creative problem-solvers. Rockets, skyscrapers, smart phones and their apps, satellite communication systems, and any number of consumer goods are created and designed by skilled and visionary engineers and computer scientists. Students interested in these disciplines are often inquisitive individuals who are interested in understanding how things work and who have a desire to develop solutions that address needs. Demonstrating a strong aptitude in math and science, excellent communication skills, and a commitment to the highest ethical standards are important qualities in future students. Gonzaga University engineering and computer science students go beyond the basic theory to application of their disciplines with concern for society and the environment.

THE PROGRAM
The School of Engineering and Applied Science (SEAS) at Gonzaga University offers ABET accredited Bachelor of Science degrees in Civil Engineering, Computer Engineering, Computer Science, Electrical Engineering, Engineering Management, and Mechanical Engineering. These programs emphasize a well-rounded education founded in the Jesuit and humanistic tradition, thereby placing technical disciplines within the larger context of the human experience and preparing our students to be engineers and computer scientists for and with others.

Civil engineers help optimize the design and use of both built and natural environments. A civil engineer plans, designs, and supervises the creation of the infrastructure and environmental solutions required by society. Examples of civil engineering projects include analysis of structures, design of transportation systems, geotechnical assessment, and environmental/water resource development and management. Civil engineers have roles in design, management, regulatory enforcement, and policy development.

Computer engineers are responsible for the design of computer technologies ranging from laptop/desktop/tablet computing platforms, to technologies embedded in devices such as smart phones, appliances, aircraft, and medical equipment. They are also at the cutting edge of supercomputing technologies, including consideration of energy efficiency in computing design and use of novel materials to enhance efficiency. A computer engineer must understand circuitry and microelectronics, software design, design of physical hardware, and finally, how to use an operating system to make hardware and software function in sync. As a result, a computer-engineering student receives foundational courses in both electrical engineering and computer science.

Computer scientists study computing in all of its forms and across all of its platforms. The impact of computer scientists can be found in PCs, tablets, iPads, and also in both high-end and consumer technologies ranging from cell phones to autonomous vehicles. Based on coursework in mathematics, programming languages, design of algorithms, architecture, and theory of computation, graduates of our computer science program commonly enter careers as software engineers, computer scientists, computational scientists, or pursue graduate studies. In addition, many also go on to careers in business and law. 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 engineers study application of electronics and circuitry to such diverse purposes as electrical power production and distribution, use of electronic circuitry to provide automated control, telecommunications, electronics, information theory, 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.
Engineering Management is a program designed to provide students with a broad education and understanding of the practice and concepts of engineering, as well as principles from the business disciplines. Engineering Management is especially well suited for students interested in obtaining a combination of engineering, business, and management skills. The program contains a set of engineering core courses that provide a solid basis in engineering principles. These courses are augmented with relevant courses in business and management. Students also develop technical concentrations by taking courses focused in one of five tracks—Civil, Computer, Electrical, or Mechanical Engineering, or Computer Science. 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.

Mechanical engineers strive to make a positive impact on society through a broad range of activities varying from bioengineering research, to the design of rockets, to advanced manufacturing processes. They apply the principles of the physical sciences to such needs as the production and selection of specialized materials for specialized applications, the production of energy, and the design and control of machines. Mechanical engineering careers cover a wide range of industries and applications, requiring a wide range of skills. Gonzaga's program therefore emphasizes a well-rounded approach, but stressing rigor within the engineering skill sets.

**HIGH SCHOOL PREPARATION**
High school students interested in studying engineering or computer science need to prepare themselves by taking four years of math. Completion of a first course in calculus prior to enrollment at Gonzaga is strongly recommended. In addition, students should take at least three years of science, including physics. Transfer students from two-year or four-year colleges should consult with Audrey Minton (minton@gonzaga.edu) of the Office of Admission regarding transfer credits.

**ENGINEERING AND COMPUTER SCIENCE AT GONZ AGA**
In the Jesuit tradition, Gonzaga University focuses on all dimensions of a student’s development. In addition to a technical curriculum, our students complete a University Core curriculum that emphasizes philosophy, religion, ethics, and written/oral communication. These courses develop strong communication skills in speaking and writing, while also developing skills in critical thinking and ethical reasoning.

In particular, SEAS focuses on promoting character formation, particularly honesty, tenacity, courage, and citizenship. Students are encouraged to reflect upon the role of that formation throughout their undergraduate experience. These attributes work together with the Jesuit educational values of ethics, leadership, faith, service, and justice.

All of the SEAS undergraduate programs are accredited through either the Engineering Accreditation Commission of ABET (EAC/ABET) or the Computer Accreditation Commission of ABET (CAC/ABET).

**DISTINCTIVE OPPORTUNITIES**
Since 2010, SEAS sophomores have had the opportunity to study abroad in Florence, Italy during the spring semester. Specific Gonzaga in Florence courses are designed to fit into civil and mechanical engineering students’ existing curricula and requirements. Gonzaga has also developed an immersion study abroad program at the University of Auckland in New Zealand, and encourages individual study abroad options identified by individual students.

True to the Jesuit mission of reaching out in compassion as women and men for and with others, SEAS students and faculty are committed to pursuing their disciplines with a purpose. SEAS students have traveled to the African nations of Benin, Zambia, and Tanzania to work on challenges involving water supply, waste minimization, safe cook stoves, and provision of computing equipment. They are also very active in central and eastern Washington through collaborative projects on regional tribal lands, projects with government agencies focused on control of water-borne pollutants, tutoring to local K-12 students, and working in local sustainability gardens.

Involvement in student organizations is an important part of academic life at GU for engineering and computer science students. Formal and informal professional societies and club opportunities include chapters of the American Society of Civil Engineers (ASCE), the American Society of Mechanical Engineers (ASME), the American Society of Engineering Management (ASEM), the Institute of Electrical and Electronic Engineers (IEEE), the Society of Women Engineers (SWE), Tau Beta Pi (the national engineering honor society), and Upsilon Pi Epsilon (UPE), an international honors society for computing and information disciplines.

**SENIOR DESIGN PROJECTS**
Gonzaga University's Center for Engineering Design & Entrepreneurship (CEDE) organizes, supports, and advises students undertaking senior capstone projects, commonly defined either by external partners or through the efforts of our students and faculty. CEDE projects challenge students to solve real world problems subject to real world constraints. Most project teams consist of three to five students, a faculty advisor, and a liaison engineer or computer scientist from the sponsoring company or organization. All projects culminate in a formal presentation of results during the annual Design Exposition Day.

Recent sponsors include Avista, Boeing, the City of Spokane, Coffman Engineers, Eclipse Engineering, Eigen Wireless, FL Smith, Galaxy Compounds, Gray and Osborne, Integrus Architecture, Grand Coulee Dam, Haakon Industries, HDR Engineering, Hotstart Inc., HP Inc., Indiana DNR, Kaiser Aluminum – Trentwood Works, KEEN, KRN Services, MSADA Architects, NIOSH, SCAFCO, Schweitzer Engineering Laboratories, Skills’Kin, Spokane County, the Spokane Tribe of Indians, THr3, Inc., Tate Technologies, UTC Aerospace Systems, the US EPA, and the Washington State Departments of Ecology and Transportation.
Additional active groups associated with the SEAS programs include the Society of Automotive Engineers (SAE), the Association for Computing Machinery, the Robotics Club, Women in Computing, and the Materials Advantage Club.

**OUTCOMES**
A wide variety of career opportunities await graduating engineers and computer scientists, including employment with large corporations, consulting firms, state agencies, federal agencies, start-up companies, and overseas companies. Many of our students also pursue graduate studies in the technical disciplines, business, and law. The SEAS technical degrees are also versatile. Our students find that their undergraduate degree has prepared them to contribute in such diverse fields as aerospace, biomedical, bioengineering, and power engineering.

**EMPLOYERS**
- Amazon
- Apple
- Avista
- Boeing
- Coffman Engineers
- HP, Inc.
- Kaiser Aluminum
- McKinstry
- Microsoft
- Northrup Grumann
- Parker Hannifin Corp.
- Peace Corps
- Schweitzer Engineering Laboratories
- SpaceX
- United States Military
- Washington State Department of Transportation

**GRADUATE SCHOOLS**
- Colorado School of Mines
- Duke University
- Missouri University of Science and Technology
- Purdue University
- Stanford University
- University of California, Los Angeles
- University of Colorado
- University of Florida
- University of Notre Dame
- University of Southern California
- University of Washington
- Washington State University

**THE PLACE**
Excellent engineering and computer science programs require up-to-date technology and tools. SEAS enjoys support from both the University and private industry and offers students modern facilities and lab equipment. Gonzaga’s engineering and computer science programs have their own lab facilities that provide opportunities for hands-on experiments and research in each field. Through the facilities at the Herak building and the Gold-level LEED-certified PACCAR building, Gonzaga students gain valuable learning experiences in a variety of applications including environmental protection, robotics, propulsion, computing, electronic circuitry, and machining. The CAD/CAE labs provide a fully-networked computer environment where both hardware and software are regularly updated to better support the needs of students and faculty.
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