ENGINEERING
VIRGINIA TECH.

AT A GLANCE

Programs of Study

aerospace engineering

The aerospace engineering curriculum includes the areas of aerodynamics, flight dynamics and controls, propulsion, and aerospace structures. The program culminates in a nationally recognized senior-level design sequence including analysis and design of aircraft, spacecraft, and their related technologies. The program is closely related to ocean engineering, and the two programs share a major portion of their course requirements. Students in the department may major in either degree program or may choose to combine the programs of study in a double major program with either major as their primary.

Kevin T. Crofton Department of Aerospace and Ocean Engineering
215 Randolph Hall
540-231-6611
www.aoe.vt.edu

biological systems engineering

Biological systems engineering (BSE) combines biology, chemistry, and engineering to solve problems associated with environmental protection, conservation of natural resources, the environmentally sound production of renewable resources, and the conversion of these resources to value-added products such as food, pharmaceuticals, polymers, and biofuels. The curriculum includes a minimum of 15 hours of biology and chemistry and differs from other engineering programs in its focus on natural resources and biological materials. Students may pursue a general BSE degree with focused electives in biomedical engineering, biomolecular engineering, environmental health engineering, food engineering, health professions, or watershed science & engineering. Students are encouraged to pursue opportunities in undergraduate research and education abroad offered by the department. Examples of employers of graduates include biotechnology, pharmaceutical, energy, and food companies, as well as environmental protection government agencies and environmental consulting firms. Graduates are also prepared for admission to professional schools in medicine, dentistry, and veterinary medicine and graduate schools in a variety of disciplines.

Department of Biological System Engineering
200 Seitz Hall
540-231-6615
bseadvising@vt.edu
www.bse.vt.edu

biomedical engineering

Biomedical engineering focuses on advances that improve human health, safety, and healthcare at all levels while decreasing financial and social costs to society. This unique engineering program produces interdisciplinary trained engineers who can solve problems associated with complex biological systems by applying the principles of biology, chemistry, medicine, physics, and engineering. Using engineering principles combined with medical and biological sciences, biomedical engineers assess the behavior and response of biological systems in a variety of conditions and develop novel equipment, devices, materials, and procedures for applications that range from the mitigation of injuries and fatalities in various loading environments to the advancement of medical diagnostics and treatments. Graduates are prepared for employment in a variety of fields including but not limited to medical devices, tissue engineering, cancer research, automotive and military safety, product and sports safety, and consulting. Biomedical engineering also helps prepare individuals for admission to advanced degree programs such as medical school and biomedical engineering graduate programs.

Department of Biomedical Engineering and Mechanics
317 Kelly Hall
540-231-8191
www.beam.vt.edu

chemical engineering

Chemical engineering students learn to skillfully and creatively apply the principles of chemistry, biochemistry, biology, mathematics, and physics to problems involving energy, food, health, electronics, consumer products, and environmental quality. Students must complete a minimum of 16 credit hours in advanced chemistry, including organic chemistry plus lab and physical chemistry plus lab. Several elective focus areas are offered, including polymers, biomedical, and chemical distribution and marketing. Common minors for chemical engineering students include chemistry, mathematics, and microelectronics engineering.

Department of Chemical Engineering
245 Goodwin Hall
540-231-6631
www.che.vt.edu

civil engineering

Civil engineers are the principal designers, constructors, operators, and maintainers of many of the constructed facilities in our society. The Charles E. Via, Jr. Department of Civil and Environmental Engineering strives to prepare its graduates to meet evolving infrastructure challenges while continuing the tradition of public service associated with civil and environmental engineering. The department offers depth and breadth of study in all major areas of civil engineering practice, including construction engineering and management, environmental and water resources engineering, geotechnical engineering, land development, structural engineering and materials, and transportation and infrastructure systems engineering.

The Charles E. Via, Jr. Department of Civil & Environmental Engineering
200 Patton Hall
540-231-6635
www.cee.vt.edu

computer engineering

The Bradley Department of Electrical and Computer Engineering administers the degree in computer engineering (CPE). CPE provides the critical technology base for a broad range of industries, including bioinformatics, computing hardware, computer networking and security, embedded computing, telecommunications, and video/image processing. The program builds on a strong foundation in mathematics, physical science, and computer programming. The curriculum covers a variety of technical areas, including computer architecture, digital system design, VLSI, embedded systems, networking, real-time systems, and artificial intelligence. The program emphasizes industry related hands-on experiences and opportunities for undergraduate research and co-op/internships.

The Bradley Department of Electrical and Computer Engineering
302 Whittemore Hall
540-231-6646
www.ece.vt.edu

computer science

Computer scientists study the design, implementation, performance, and usability of computer systems. The program emphasizes software—the aspect of computation that makes computing the powerful and transforming technology it is. Students acquire a strong foundation in algorithms, problem-solving and software development. A diverse set of elective courses provides experience with emerging technologies in areas such as artificial intelligence, bioinformatics, data mining, graphics, human computer interaction, internet programing, networking, parallel computing, and software engineering. A computer science degree prepares students for a wide range of employment options. The degree also serves as good preparation for graduate study in computer science or other information technology fields, as well as business and law.

Department of Computer Science
114 McBryde Hall
540-231-6931
www.cs.vt.edu

construction engineering & management

The construction engineering and management program is administered by the Myers-Lawson School of Construction. Graduates possess the requisite technical, managerial and business knowledge to design construction operations and processes that are safe, efficient, cost effective, environmentally sensitive and socially aware. They are prepared to integrate and manage the technical, material, financial and human resources that support construction operations and lead to project teams toward common objectives with an emphasis on values-based principles. The degree draws the majority of its courses from existing curricula in civil engineering and building construction with complementary courses from the Pamplin College of Business providing the balance.

Myers-Lawson School of Construction
430 Bishop-Favrao Hall
540-231-5376
www.cem.mlsoc.vt.edu

electrical engineering

The Bradley Department of Electrical and Computer Engineering administers the degree in electrical engineering (EE). EE provides the fundamental basis for many key industries, including bioengineering, micro/nanoelectronics, power systems, robotics, telecommunications, and space science. The program builds on strong foundation in mathematics, physical science, and computer programming. The curriculum covers a variety of technical areas, including control systems and robotics, communications, digital design, networking, electromagnetics, electronics, power systems, and signal processing. The program emphasizes hands-on experiences and broad opportunities for undergraduate research and co-op/internships in industry. The department also offers a concentration in power electronics and a minor in microelectronics.

The Bradley Department of Electrical and Computer Engineering
302 Whittemore Hall
540-231-6646
www.ece.vt.edu

engineering education (ge)

All first-year and transfer students admitted to the College of Engineering at Virginia Tech are classified as General Engineering in the Department of Engineering Education. General Engineering provides an innovative learning environment that embraces a hands-on, minds-on approach, which leverages the latest advances in educational technologies to fully engage students in the learning experience. The first-year course sequence integrates professional and technical skills to give students tools for tackling the grand challenges of the 21st century. The program introduces students to the wide range of engineering majors in the College of Engineering so that students are able to make informed decisions about the educational pathways. After completing the first year curriculum, students are eligible to declare any of the 14 undergraduate degree granting engineering majors.

Engineering Education
345 Goodwin Hall
540-231-6555
www.enge.vt.edu

industrial & systems engineering

Industrial and systems engineering is concerned with the design, development, improvement, implementation and evaluation of integrated work systems comprised of people, information and knowledge, equipment, energy, materials, and processes. The industrial and systems engineering department utilizes innovative and creative practices and technologies to achieve the highest quality of instruction and student learning. Course work encompasses operations research, manufacturing systems engineering, human factors engineering and ergonomics, and management systems engineering. The curriculum addresses not only the physical and technical aspects of systems, but also the organization, economic, business, and human elements of systems. Students develop not only technical capabilities but also professional skills such as teamwork, communication, ethics, and lifelong learning.

Grado Department of Industrial and Systems Engineering
250 Durham Hall
540-231-6656
www.ise.vt.edu

materials science & engineering

Materials science and engineering pertains to the structure, properties, design, development, manufacturing, and engineering application of materials of all types. Students may specialize in a number of materials technology areas including ceramics, metals, polymers, or electronic and photonic materials. Students also can design a special program of elective study, such as biomaterials or green engineering, among others. Graduates are employed in aerospace, automotive, chemical and material, communications, electronics, petroleum and energy, and basic materials-producing industries. Students may qualify for graduate study in engineering, the sciences, medicine, law, and business.

Materials Science and Engineering
109A Surge
540-231-6640
www.mse.vt.edu

mechanical engineering

Mechanical engineering is perhaps the broadest of the engineering disciplines with students working in a wide range of technical areas. These include acoustics, biomechanics, computer aided design and analysis, controls, energy conversion and management, mechanical design, mechatronics, and propulsion, among many others. Several courses in nuclear engineering have been added in the mechanical engineering program in recent years. The curriculum provides a strong fundamental background in the engineering sciences as well as mathematics, statistics, thermal-fluid engineering, vibrations and controls, and mechanical design. This background is strengthened with instructional laboratories and design courses. Graduates are prepared for professional engineering careers or graduate study.

Department of Mechanical Engineering
445 Goodwin Hall
540-231-7183
www.me.vt.edu

mining engineering

Mining and minerals engineering is a field where aspects of geosciences are combined with engineering and management for the development and recovery of the world's mineral resources. Areas of study include mineral exploration, evaluation, development, extraction, mineral processing, and environmental management. The program provides a general background in all aspects of the mining industry. Graduates find employment in the mining of construction aggregates, coal, copper, gold, phosphate, mineral sands, and many other commodities.

Department of Mining and Minerals Engineering
Surge Building 118A
540-231-6671
www.mining.vt.edu

ocean engineering

Ocean engineering deals with the design of ships of all types. The field is often called naval architecture. It involves fluid mechanics, propulsion, structures, vehicle dynamics, and marine engineering. The curriculum culminates in an international award-winning design sequence in which students design a complete ship. The program is closely related to aerospace engineering, and the two programs share a major portion of their course requirements. Students in the department may major in either degree program or may choose to combine the programs of study in a double major program with either major as their primary.

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