

at a glance PROGRAMS OF STUDY



AEROSPACE ENGINEERING

It is largely about artifacts that fly – airplanes, rockets, satellites, missiles, etc. It is also about flow (think about how air flows around a car), about control systems, and about how strong things are (and how to make them strong).



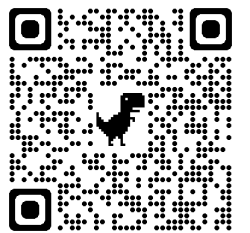
BIOLOGICAL SYSTEMS ENGINEERING

This engineering discipline applies concepts of biology, chemistry, and physics, along with engineering science and design principles, to solve problems in biological systems. The biological systems range broadly, from natural systems, such as watersheds with a focus on water resources, to built systems, such as bioreactors and bioprocessing facilities; all with a sustainable focus.



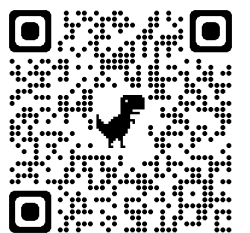
BIOMEDICAL ENGINEERING

This engineering discipline emphasizes fundamental engineering principles combined with technology, biology, chemistry, physics, and medicine to improve human health. It focuses on the development of new medical devices, therapies, and diagnostic tools to understand and revamp medical care and health care delivery. BME has a strong humanistic component coupled with advanced technology.



BUILDING CONSTRUCTION

This discipline involves the creation of vertical structures, spaces, and systems with a focus on business and construction management; innovation and emerging technologies; and the performance and sustainability of these structures.



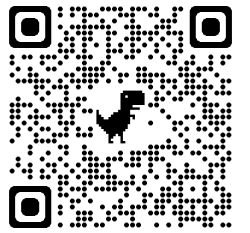
CHEMICAL ENGINEERING

This branch of engineering applies physical sciences (physics and chemistry), and life sciences (microbiology and biochemistry), together with applied mathematics and economics to produce, transform, transport, and properly use chemicals, materials, and energy.



CIVIL ENGINEERING

This is the study of the design and construction of public works, such as dams, bridges, and other large infrastructure projects. It is one of the oldest branches of engineering, dating back to when people first started living in permanent settlements and began shaping their environments to suit their needs.



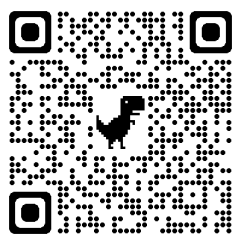
COMPUTER ENGINEERING

This discipline involves the design of computer systems (hardware and software) and related devices. It uses the techniques and principles of electrical engineering and computer science but also covers areas such as artificial intelligence (AI), machine learning, robotics, chip development, computer architecture, cybersecurity, and operating systems.



COMPUTER SCIENCE

This is the study of computers and computational systems; dealing mostly with software and software systems; this includes their theory, design, development, and application. Although knowing how to program is essential to this major-- it is only one element of the field. Computer scientists design and analyze algorithms to solve programs and study the performance of computer hardware and software.



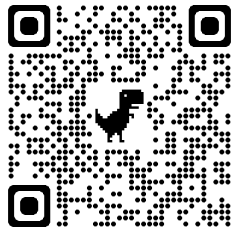
CONSTRUCTION ENGINEERING & MANAGEMENT

This discipline deals with the designing, planning, construction, and management of infrastructures such as highways, bridges, airports, railroads, buildings, dams, and utilities. These engineers are unique in that they are a cross between civil engineers and construction managers.



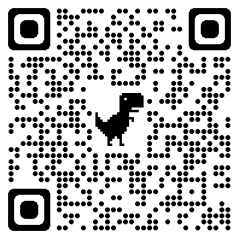
ELECTRICAL ENGINEERING

In this discipline, you will study and apply the physics and mathematics of electricity, electronics, and electromagnetism to both large and small-scale systems to process information and transmit energy.



INDUSTRIAL & SYSTEMS ENGINEERING

This discipline uses mathematical modeling and scientific tools to extract meaning from a sea of data to find the key to unlocking a system’s true potential. ISE combines mathematics, statistics, physical and social sciences, problem-solving, designing things, and working with people all in one.



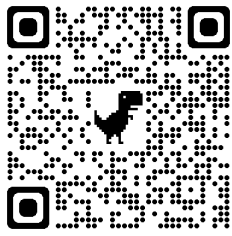
MATERIALS SCIENCE & ENGINEERING

This is the study of all materials, from those we see and use every day such as a glass or a piece of sports equipment to those used in aerospace and medicine. MSE combines engineering, physics, and chemistry, and uses them to solve real-world problems in nanotechnology, biotechnology, information technology, energy, manufacturing, and other major engineering fields.



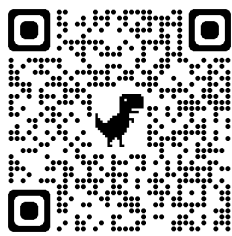
MECHANICAL ENGINEERING

This is a discipline of engineering that applies the principles of physics and materials science for the analysis, design, manufacturing, and maintenance of mechanical systems.



MINING ENGINEERING

This engineering discipline applies science and technology to the extraction of minerals from the earth. Mining engineering is associated with many other disciplines, such as geology, mineral processing, metallurgy, geotechnical engineering, and surveying.



OCEAN ENGINEERING

Ocean engineers study the effects of the ocean on ships, vehicles, and other structures. They design dams, levees, canals, and complex tide abatement systems. Essentially, ocean engineering is the marine-based branch of civil engineering. It merges classical courses in civil and mechanical engineering with oceanography and naval architecture.



EXPLORE ENGINEERING AT VIRGINIA TECH

This resource has been designed to assist students with engineering major exploration and includes the following for each engineering degree: overview, interests areas, related majors and minors, and ways to get involved.

