

ENGINEERING

What can I do with this major?

AREAS

ANY ENGINEERING DISCIPLINE

Research and development
Design
Production
Operations
Management
Teaching
Consulting
Sales and marketing
Law
Manufacturing
Healthcare

EMPLOYERS

Engineering companies
Consulting companies
Industry
Local, state and federal government
Colleges and universities

STRATEGIES

Obtain relevant experience through co-ops or internships for industry-related career.
Develop strong verbal, written, teamwork and problem-solving skills.
Pursue Master of Science (MS), Master of Engineering (ME), or Master of Business Administration (MBA) degrees for increased opportunities in technical management.
Obtain Ph.D. for teaching and research careers.
Learn federal, state and local government job application procedures.
Pursue professional engineering licensure.

AEROSPACE

Propulsion
Fluid mechanics
Thermodynamics
Structural design
Celestial mechanics
Acoustics
Guidance and control systems

Aerospace product and parts manufacturing industries (engines, communication systems, navigation systems, electronic devices)
Aircraft, missile and space vehicle industries
Communications equipment manufacturers
Commercial airlines
Research and development firms
Federal government:
Department of Defense
National Aeronautics and Space Administration

Discipline develops technologies for use in aviation, defense and space exploration.

Anticipate specializing in the development of new technologies or in particular aerospace products.
Stay abreast of status of federal funding for defense and space programs.
Seek knowledge of computer-aided design (CAD) software, robotics, optics and lasers.
Seek co-op or internship opportunities in the aerospace industry.
Develop effective verbal and written communication skills and learn to work well on a team.
Join chapters of national organizations such as the American Institute of Aeronautics and Astronautics to build a network of professional contacts and participate in design competitions.
Note, job prospects in aerospace engineering may be influenced by economic conditions and the demand for military products.

AREAS

EMPLOYERS

STRATEGIES

BIOMEDICAL

Bioinstrumentation
Biomechanics
Biomaterials
Systems physiology
Clinical engineering
Rehabilitation engineering

Medical equipment and supplies manufacturers
Pharmaceutical manufacturers
Hospitals and healthcare facilities
Research facilities of educational and medical institutions
Federal government:
Regulatory agencies
Veteran's Administration
National Institutes of Health

Discipline combines engineering and biomedical sciences to study and develop tools, techniques and products to improve human health.

Build laboratory and research skills through courses and/or work with professors.
Seek internships, part-time employment or volunteer experiences in the biomedical field.
Join related professional organizations such as the Biomedical Engineering Society to network with professionals in the field and submit research and design projects.
Develop strong teamwork skills, as biomedical engineers often work closely with other engineers in related specialty areas, i.e. biomechanics and biomaterials as well as with medical personnel.
Many positions require a graduate or professional degree; some biomedical engineers pursue medical school.
Maintain an outstanding grade point average; seek experiences in hospital or healthcare settings through volunteering, shadowing, part-time positions or internships, secure strong faculty recommendations and plan to meet with a pre-health advisor periodically.

BIOSYSTEMS ENGINEERING

See What can I do with a major in Biosystems Engineering?

AREAS

CHEMICAL and BIOMOLECULAR

Bulk and fine chemicals
Consumer products
Biotechnology and pharmaceuticals
Electronics
Environmental safety and health
Fuels and energy conversion
Materials
Process design

EMPLOYERS

Private and national research laboratories
Industries including:
Agricultural chemicals, industrial bulk and fine chemicals, plastics, biotechnology, pharmaceutical, cosmetics, textiles, petroleum, food processing, energy, environmental, automotive, pulp and paper, rubber and rubber products, electronics, consumer products
Federal government:
Department of Energy
Environmental Protection Agency
Nuclear Regulatory Commission
Department of Agriculture

STRATEGIES

Discipline combines chemistry, physics, biology and engineering to solve problems involving the use or production of chemicals and biological systems to develop new materials and processes and to increase efficiency and lower cost.

Pursue a strong foundation in fundamentals in lower division classes as well as specialized knowledge for specific career opportunities in upper division classes.
Develop exceptional communication and interpersonal skills for work on multidisciplinary teams. Attention to detail is crucial.
Pursue experimental design, data interpretation and problem solving competence through coursework and research with professors.
Seek internship or co-op experiences in the chemical engineering field.
Join professional associations such as American Institute of Chemical Engineers to maintain current knowledge of opportunities in the field.
Prepare for professional license via review classes.

CIVIL

Structural
Urban planning
Construction
Environmental
Water resources
Transportation
Geotechnical

Construction industry
Utility companies
Oil companies
Telecommunications businesses
Manufacturing companies
Railroads
Airports
Road construction companies
Engineering, architectural, consulting companies
City, state and federal government:
Department of Transportation
Army Corps of Engineers
Federal Aviation Administration
Department of Energy

Broad discipline providing for communities through development and improvement of services including construction, transportation, city planning, water, energy, pollution.

Pursue a strong background of engineering fundamentals as preparation for entering the work force or graduate school.
Develop the ability to communicate effectively, as civil engineers are likely to collaborate with professionals in a variety of disciplines.
Seek experience organizing and directing people and materials through related internships, co-ops, summer jobs and leadership experiences in student organizations.
Join the American Society of Civil Engineers to participate in projects and activities to increase marketability beyond graduation.
Note, states may require licensing or registration.

AREAS

COMPUTER

Information protection
Communications and wireless networks
Computational science
Operating systems
Computer networks
Computer systems
Embedded systems
Computer vision and robotics
Circuit design
Signal, image and speech processing
VLSI
Bioinformatics

EMPLOYERS

Industries including:

Aerospace, automotive, computer and electronics manufacturers, transportation, telecommunications, guidance and control systems, defense, electric power and energy, semiconductor, electronics, environmental, medical equipment, chemical, pharmaceutical, computer, pulp, paper, textile, metal
Financial and business service companies
Scientific service companies (instruments, lab equipment, software)
Technical service companies (intelligence, information systems, defense)
Federal government:
Armed forces
National Aeronautics and Space Administration
Federal Bureau of Investigation
National Institute of Standards and Technology
Departments of Defense, Energy, Transportation
National Institutes of Health

STRATEGIES

Discipline involves the design and development of computer hardware and software and hardware-software integration.

Expect to take classes in engineering fundamentals, math, science and computer science.
Develop strong attention to detail, analytical skills and the ability to persevere through lengthy projects.
Seek ways to enhance interpersonal, communication and teamwork skills for work with people of differing backgrounds.
Join student chapters of organizations such as Institute for Electrical and Electronics Engineers (IEEE) and Association for Computing Machinery (ACM) to build contacts with peers and mentors, participate in student competitions and develop job leads.

ELECTRICAL

Automatic controls
Bioelectronics
Digital systems
Electromagnetics
Analog electronics
Power and energy systems
Communications and signal processing

Industries including:

Aerospace, automotive, computer and electronics manufacturers, transportation, telecommunications, guidance and control systems, defense, electric power and energy, semiconductor, electronics, environmental, medical equipment, chemical, pharmaceutical, computer, pulp, paper, textile, metal
Scientific service companies (instruments, lab equipment, software)
Technical service companies (intelligence, information systems, defense)
Federal government:
Armed forces
National Aeronautics and Space Administration
Federal Bureau of Investigation
National Institute of Standards and Technology
Departments of Defense, Energy, Transportation
National Institutes of Health

Broad discipline applies engineering principles to the design and production of electronic systems and electrical devices.

Prepare for a course load including engineering fundamentals, math, science and electrical engineering.
Pursue design projects and laboratory experience throughout college career.
Seek related experience through research, internships, co-ops or part-time employment.
Join student chapters of industry organizations such as Institute for Electrical and Electronics Engineers (IEEE) to develop communication and leadership skills, to participate in competitions and to take advantage of professional networking opportunities.

AREAS

EMPLOYERS

STRATEGIES

ENGINEERING PHYSICS

Engineering (process and testing)
Quality control
Research
Development
Instrumentation

Industries including:
High technology, semiconductor, chemical, aerospace, agriculture, energy, fuel, computer, transportation, healthcare
National laboratories
National Aeronautics and Space Administration
Federal government:
Department of Commerce
Department of Defense

Broad interdisciplinary field involves applying physics principles in engineering contexts.
Choose a major in engineering physics or supplement physics major with engineering minor; both science and math aptitude are fundamental.
Seek internship, co-op and/or research experience with professors in area of interest.
Develop strong oral, written communication and experimental design skills through coursework and laboratory practice.
Pursue advanced degree in engineering, engineering physics or physics for increased employment opportunities.

ENVIRONMENTAL

Air quality
Water quality
Solid/Water waste management
Toxic waste management
Hazardous waste clean-up/Bioremediation
Industrial hygiene
Radiation protection
Public health
Land/Wildlife management
Recycling

Consulting companies specializing in water/waste water treatment, water resource management, solid and hazardous waste management, air pollution control, hazardous waste remediation
Industries including:
chemical, energy, pharmaceutical, mining and manufacturing
Local water, sewer, health and public works departments
Testing laboratories
Public interest organizations
Research firms
Construction companies
State departments of Environment and Conservation
Federal government:
Department of Energy
Department of Defense
Environmental Protection Agency

Discipline plays vital role in preventing and developing solutions for environmental problems.
Plan to supplement engineering coursework with classes in biology, hydrology, chemistry, geology and computational methods.
Seek experience in the environmental engineering field through co-ops, internships and part-time positions.
Develop strong interpersonal and communication skills for interacting with legal and business professionals to solve environmental issues.
Expect to work outdoors at least part of the time for environmental testing, quality control and site investigation work.
Join community groups or service organizations such as Student Conservation Association that focus on environmental awareness; attend public meetings about waste management.
Maintain current knowledge of environmental issues, regulations and statutes.
Consider membership in professional engineering organizations such as the American Association for Environmental Engineers for networking and job leads.

AREAS

INDUSTRIAL

Project, program or operations management
Manufacturing systems
Computer-integrated manufacturing automation
Supply chain management and logistics
Productivity, methods and process engineering
Quality measurement and improvement
Human factors and ergonomics
Strategic planning
Management of change
Financial engineering
Engineering management
Lean, six sigma
Systems design
Modeling and simulation
Optimization
Data analytics

EMPLOYERS

Industries including:
Manufacturing, aerospace, transportation,
construction, communications, electrical and
electronics machinery
Retail companies
Consulting companies
Banks and financial institutions
Hospitals and healthcare organizations
Education and public service agencies
Utility companies
Not-for-profit organizations
Small businesses and start-ups (entrepreneurship)
State and federal government including armed
forces

STRATEGIES

Discipline focuses on effectively utilizing people, products, machines, materials, energy, etc. to improve processes or systems.

Plan to take courses in engineering and business.
Seek experiences in student organizations to develop leadership, interpersonal and communication skills. Diplomacy is important in the field, as people are considered a factor of production.
Pursue practical experience through part-time jobs, co-ops or internships to develop a professional network and increase marketability.
Consider membership in student chapters of organizations such as the Institute of Industrial & Systems Engineers to participate in competitions on topics including operations research, manufacturing, human factors, ergonomics, management science, lean practices and simulation.
Earn MS or MBA for advancement in management or administration; some programs offer dual degrees.

MATERIALS SCIENCE AND ENGINEERING

Metallurgy
Ceramics
Plastics/Polymers
Composites
Semiconductors and electronic materials
Optical materials
Biomaterials
Nanomaterials
Material research and development
Extraction/Synthesis
Processing
Structure analysis
Performance
Failure analysis
Material selection

Industries/manufacturers including:
Automobile, appliance, electronic, aerospace equipment, machinery, biomedical, communications, sporting goods, security, alternative energy production
Airlines, railroads, and utility companies
Research institutes
Federal government:
Department of Energy
Department of Defense
National Aeronautics Space Administration

Discipline focuses on the development of new materials and the improvement of existing ones.

Gain laboratory and research experience as an undergraduate through coursework, projects with professors, co-ops or internships.
Develop effective problem solving, communication and teamwork skills.
Seek undergraduate membership in professional organizations such as the American Society for Materials to learn more about opportunities in the field and to build professional contacts.
Note, some areas benefit by additional study in business administration, medicine, management and/or law.
Plan to pursue a graduate degree to specialize in a particular material, process or characterization technique.

AREAS

EMPLOYERS

STRATEGIES

MECHANICAL

Machine design
Systems design
Manufacturing and production
Energy conversion
Energy resources
Transportation and environmental impact
Materials and structures

Industries including:
Automotive, aerospace, electronics, chemical products, petroleum, textiles, industrial equipment, heating and air conditioning systems
Utility companies
National laboratories
Federal government:
Department of Energy
Department of Defense
Federal Aviation Administration
National Aeronautics and Space Administration

Very broad discipline incorporating the research, design, development, manufacturing and testing of mechanical devices.

Learn computer-aided design (CAD) and computer-aided manufacturing (CAM).
Obtain related experience through engineering internships, co-ops or part-time jobs.
Develop strong interpersonal and communication skills; consider a class in public speaking to enhance presentation skills. Plan to collaborate with other types of engineers and with those in industry.
Join student chapter of American Society of Mechanical Engineers to take advantage of mentorship programs, learn more about specialties in the field and participate in design competitions.

MECHATRONICS

Robotics
Automation
Control systems
Computer-integrated manufacturing
Analog and digital systems
Microprocessors and microcontrollers
Machine design
Systems design
Manufacturing processes
Smart materials and structures
Intelligent systems
Artificial intelligence, machine learning
Internet of things

Industries including:
Automotive, aerospace, computer and electronics manufacturing, transportation, telecommunication, guidance and control systems, defense, electric power and energy, semiconductor, electronics, environmental, medical equipment, chemical, pharmaceutical, computer, paper, textile, metal, plastic
Scientific service companies:
Instruments, lab equipment and software
Technical service companies:
Intelligence, information systems, and defense
Federal government:
Department of Energy
Department of Defense
Federal Bureau of Investigation
National Aeronautics and Space Administration
National Institute of Standards and Technology
Patent and Trademark Office

Discipline involves the design and development of smart electromechanical systems and devices.

Prepare for a course load including engineering fundamentals, math, and computer science, Computer Engineering, mechanical and electrical engineering.
Pursue design projects and laboratory experience throughout college career.
Seek related experience through research, internships, co-ops or part-time employment.
Develop effective problem solving, communication, and teamwork skills.
Join student chapters of professional organizations such as Institute of Electrical and Electronics Engineers (IEEE), American Society of Mechanical Engineers (ASME), Society of Manufacturing Engineers (SME), and Society of Women Engineers (SWE) to develop communication and leadership skills, to participate in competitions and to take advantage of professional networking opportunities.

AREAS

EMPLOYERS

STRATEGIES

NUCLEAR

Electrical power reactor facilities
Nuclear fuel cycle facilities
Nuclear instrumentation for industrial applications
Radioactive waste management
Environmental science
Medical research and technology
Space exploration
Food supply

Nuclear utility companies
Industries including:
 Medical equipment, power equipment, defense,
 aerospace, environmental, waste management,
 food preservation
National laboratories
Hospitals
Federal government:
 Department of Energy
 National Aeronautics and Space Administration
 Nuclear Regulatory Commission
 Environmental Protection Agency
 Department of Homeland Security
 Department of Defense

Discipline focuses on research and development to derive benefits from nuclear processes.
Develop strong research skills as an undergraduate through coursework, internships or co-ops related to nuclear energy.
Exhibit curiosity, attention to detail, problem-solving skills and perseverance for success in the field.
Travel to some off-site locations including reactors, laboratories or installations sites may be required.
Consider student membership in the American Nuclear Society to learn more about specialties in the field, build contacts and cultivate leadership potential.

PETROLEUM

Research and development
Design
Management
Reservoir engineers
Drilling engineers
Production engineers
Subsurface engineers
Completions engineers
Support activities for mining
Oil and gas extraction
Petroleum and coal product manufacturing
Maintenance and inspection
Sales

Energy production companies
Drilling companies
Oil companies
Health and safety
Geosciences
Procurement and construction
Oilfield services
Pipelines
Petroleum companies and refineries
Government:
 Department of U.S. Army: Corp of Engineers
 Department of Interior
 Bureau of Indian Affairs
 Bureau of Land Management
 Bureau of Ocean Energy Management
 Geological Survey
 Bureau of Safety and Environmental Enforcement

Discipline works in the production of hydrocarbons, in relation to crude oil or natural gas. Designing, developing, investigating and producing methods for extracting oil and gas.
Seek knowledge of computer-aided design (CAD), software, drill, optics and lasers.
See co-op or internship opportunities in petroleum engineering industry.
Develop effective verbal and written communication skills, research and analytical skills and mathematical reasoning and problem sensitivity skills.
Prepare for the initial Fundamentals of Engineering (PE/FE) exam that can be taken after earning a bachelor's degree.
Join the Society of Petroleum Engineers and pursue SPE certification.
Note, states may require licensing, registration, or continuing education (CEUs).

GENERAL INFORMATION

- Utilize Sloan Career Cornerstone Center's website to learn more about opportunities in engineering.
- A bachelor's degree provides a wide range of career opportunities in industry, business and government.
- A bachelor's degree is good background for pursuing technical graduate degrees as well as professional degrees in Engineering, Business Administration, Medicine or Law.
- Graduate degrees offer more opportunities for career advancement, college or university teaching positions.
- Related work experience obtained through co-op, internships, part-time or summer jobs is extremely beneficial.
- Develop excellent verbal and written communications skills including presentation and technical report writing. Learn to work well on a team to maximize collaborations with other engineers and those outside of the profession.
- Develop computer expertise within field.
- Engineers need to think in scientific and mathematical terms and exhibit the abilities to study data, sort out important facts, solve problems and think logically.
- Other helpful traits include intellectual curiosity, creativity, technical aptitude, perseverance and a basic understanding of the economic and environmental context in which engineering is practiced.
- Because of rapid changes in most engineering fields, both continued education and keeping abreast of new developments are very important.
- Join relevant professional associations, attend meetings, participate in design competitions and stay up-to-date on research/publications.
- All states and the District of Columbia require registration of engineers whose work may affect the life, health or safety of the public.
- Professional or technical societies confer certification in some areas.
- Research Fundamentals of Engineering (FE) exam requirements, as this exam is typically the first step in becoming a Professional Engineer (PE).
- Professional Engineer (PE) licensing guidelines vary by state. Check with the National Council of Examiners for Engineering and Surveying (NCEES) for links to state boards.
- Become familiar with the federal job application and employment procedures.