ENGINEERING

What can I do with this major?

AREAS	EMPLOYERS	STRATEGIES
ANY ENGINEERING DISCIPLINE Research and development Design Production Operations Management Teaching Consulting Sales and marketing Law Manufacturing Healthcare	Engineering companies Consulting companies Industry Local, state and federal government Colleges and universities	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	EMPLOYERS	STRATEGIES
CHEMICAL and BIOMOLECULAR Bulk and fine chemicals Consumer products Biotechnology and pharmaceuticals Electronics Environmental safety and health Fuels and energy conversion Materials Process design	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	***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	EMPLOYERS	STRATEGIES
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	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	***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	EMPLOYERS	STRATEGIES
INDUSTRIAL Project, program or operations management Manufacturing systems Computer-integrated manufaturing 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	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	***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, pharmecuetical, 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.

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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 con text 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.