# ENGINEERING

## What can I do with this degree?

| AREAS | EMPLOYERS | DESCRIPTIONS/STRATEGIES |
|---|---|---|
| **ANY ENGINEERING DISCIPLINE**<br>Production<br>Sales and Marketing<br>Management<br>Consulting<br>Research and Development<br>Teaching<br>Law | Industry<br>Business<br>Federal, state, and local government<br>Colleges and universities | Obtain related experience through co-op or internships for business/industry-related career.<br>MBA degree provides best opportunities in technical management.<br>Obtain Ph.D. for optimal teaching and research careers.<br>Develop strong verbal and written communication skills.<br>Learn federal, state, and local government job application procedures. |
| **AEROSPACE**<br>Propulsion<br>Fluid Mechanics<br>Thermodynamics<br>Structures<br>Celestial Mechanics<br>Acoustics<br>Guidance and Control | Aircraft, guided missile, and space vehicle industries<br>Communications equipment manufacturers<br>Commercial airlines<br>Federal government departments:<br>Defense<br>National Aeronautics and Space Administration (NASA)<br>Business and engineering firms | ***Discipline uses cutting edge technology to deal with challenges of aeronautics, space, mass transportation, environmental pollution, and medical science.***<br><br>Keep abreast of status of federal funding for defense and space programs.<br>Seek co-op opportunities.<br>Develop effective verbal and written communication skills.<br>Learn to work well within a team. |
| **BIOSYSTEMS ENGINEERING**<br>Natural Resources<br>Soil and Water Conservation<br>International Consulting<br>Environmental Control<br>Agricultural Structures<br>Power and Machinery<br>Electronic Systems<br>Food Engineering<br>Genetic Engineering<br>Engineering Technology | Technological agricultural industries<br>Land grant universities:<br>Experimental farm stations<br>Research laboratories<br>Consulting firms<br>Equipment design, testing, and manufacturing firms<br>Equipment and food industries including processing, packaging, and storing<br>Quality control for food, feed, fiber, etc.<br>Biotechnology research firms<br>Foreign Service | ***A broad, basic engineering discipline with a close relationship to the environment, food production, and agricultural productivity.***<br><br>Participate in internship or co-op programs.<br>Acquire strong computer skills.<br>Learn a foreign language for work in foreign service.<br>Develop strong math and problem solving skills. |

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|---|---|---|
| **BIOMEDICAL** | | |
| Bioengineering<br>Design<br>Development<br>Manufacturing<br>Medical Engineering<br>Instrumentation<br>Materials<br>Diagnostic/Therapeutic Devices<br>Artificial Organs<br>Medical Equipment<br>Rehabilitation Engineering<br>Bio-environmental Engineering | Manufacturers of medical and surgical devices<br>Hospitals and healthcare facilities<br>Federal government:<br>Regulatory agencies<br>Veteran's Administration<br>National Institutes of Health<br>National Aeronautics and Space Administration (NASA)<br>Industry<br>Research facilities of educational and medical institutions | ***Discipline combines engineering and human anatomy to develop and maintain medical and healthcare systems and equipment.***<br><br>Develop strong team work skills.<br>Many positions require a graduate or professional degree.<br>Serves as a good background for medical school. |
| **CHEMICAL** | | |
| Administration<br>Design and Construction<br>Project Engineering<br>Control Systems<br>Field Engineering<br>Process Engineering<br>Operations/Production<br>Environmental and Waste Management<br>Development<br>Design | Independent research institutes<br>Consulting organizations<br>Chemical industry including:<br>Agricultural chemicals<br>Plastics<br>Industrial chemicals<br>Petroleum<br>Pharmaceutical<br>Cosmetic<br>Food processing<br>Atomic energy development<br>Environmental<br>Federal government including:<br>Department of Energy<br>Environmental Protection Agency<br>Manufacturing plants including automotive, air plane, paper, microelectronics, textiles, metals, rubber, food, and beverage | ***Combines science of chemistry with discipline of engineering to solve problems and develop efficiency.***<br><br>Develop exceptional interpersonal skills.<br>Acquire technical work experience during college years. |

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|---|---|---|
| **CIVIL**<br>Structural<br>Urban and Community Planning<br>Construction<br>Environmental<br>Water Resources<br>Transportation and Pipeline<br>Geotechnical<br>Photogrammetry, Surveying and Mapping<br>Materials | Construction industry<br>Engineering or architectural firms<br>Utility companies<br>Oil companies<br>Telecommunications businesses<br>Manufacturing companies<br>Consulting firms<br>Railroads<br>State and federal government agencies | ***Broad discipline of "doers" providing service to the community through development and improvement. Works extensively with other professionals involved with the community. Provides opportunity to work outdoors.***<br><br>Learn to work well within a team.<br>Develop strong communication and interpersonal skills.<br>Develop physical stamina for outdoor work.<br>Get experience in organizing and directing workers and materials.<br>Ability to visualize objects in three dimensions is helpful.<br>Demand has remained steady due to broad nature of discipline.<br>States may require licensing or registration. |
| **ELECTRICAL/COMPUTER**<br>Power Electronics<br>Power Systems<br>Communications<br>Electronics<br>Control Systems<br>Digital Signal Processing<br>Microelectronics<br>Image Processing & Robotics<br>Computer Engineering<br>Plasma Engineering<br>Computer Vision | Manufacturing firms and industry including:<br>Aeronautical/Aerospace<br>Automotive<br>Business machines<br>Professional and scientific equipment<br>Consumer products<br>Chemical and petrochemical<br>Computers<br>Construction<br>Defense<br>Electric utilities<br>Electronics<br>Environmental<br>Food and beverage<br>Glass, ceramics, and metals<br>Machine tools | ***A field in touch with a wide and growing range of applications such as high speed and wireless communication, exploration of outer space, and a revolution in medical diagnosis and treatment.***<br><br>Develop effective verbal and written communication skills.<br>Gain experience in team work.<br>Acquire capacity for details.<br>Develop interpersonal skills.<br>Obtain research experience. |

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| | Electrical/Computer, Continued<br>Mining and metallurgy<br>Nuclear<br>Oceanography<br>Pulp and paper<br>Textiles<br>Transportation<br>Water and wastewater<br>Public utilities<br>Federal government including:<br>Armed forces<br>National Aeronautics and Space Administration (NASA)<br>National Institutes of Health<br>Bureau of Standards<br>Department of Defense<br>Various commissions<br>Consulting firms<br>Free-lance consulting | |
| **INDUSTRIAL**<br>Operations Research<br>Applied Behavioral Science Systems<br>Manufacturing Management<br>Information Engineering<br>Computer Systems Design and Development | Manufacturing industries<br>Accounting firms<br>Retail distribution organizations<br>Banks and financial institutions<br>Hospitals and healthcare organizations<br>Educational and public service agencies<br>Transportation industries<br>Construction industries<br>Public utilities<br>Electrical and electronics machinery industries<br>Consulting firms | ***Discipline links management and operations by improving productivity through a "big picture" approach; serves human needs and works with people.***<br><br>Take courses in psychology, sociology and anthropology to learn more about people and how they behave.<br>Earn an MBA for advancement in management or administration. |

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| **MATERIALS SCIENCE AND ENGINEERING** | | |
| Metallurgy<br>Ceramics<br>Plastics/Polymers<br>Composites<br>Research<br>Extractive<br>Process<br>Applications<br>Management<br>Sales<br>Service<br>Consulting | Materials producing companies<br>Manufacturing companies including automobiles, appliances, electronics, aerospace equipment, machinery, medicine<br>Service companies including airlines, railroads, and utilities<br>Consulting firms<br>Government agencies:<br>Department of Defense<br>National Aeronautics Space Administration (NASA)<br>Research institutes<br>Publishers | ***Studies properties of various types of materials and how they are made and behave under different conditions.***<br><br>Many positions require a graduate degree.<br>Some areas benefited by additional study in business administration, medicine, management and/or law.<br>Develop good communication skills.<br>Gain laboratory and research experience as an undergraduate. |
| **MECHANICAL** | | |
| Mechanical Power Generation<br>Internal Combustion Engines<br>Jet Engines<br>Steam Power Plants<br>Rockets<br>Energy Utilization and Conservation<br>Thermal/Fluids<br>Thermodynamics<br>Environmental Control<br>Refrigeration<br>Instrumentation and Control<br>Machine Sciences<br>Mechanical Design<br>Manufacturing and Production<br>Robotics<br>Operation and Maintenance | Transportation<br>Automotive industry, aerospace industry, military laboratories<br>Utilities<br>Steam driven electric power stations<br>Equipment Design<br>Plants<br>Nuclear power stations<br>Electronics industry<br>Petro-Chemical<br>Drilling & production, plant operations<br>Manufacturing<br>Consumer products, chemical products, farm equipment, industrial equipment, paper and wood products, textile equipment<br>Consulting engineering firms | ***Takes broad outlook on solving complex problems. Involves design, development and production. Keeps pace with technology. Acts as an interface between society and technology.***<br><br>Obtain related experience through internships or co-op.<br>Take additional courses in area(s) of interest.<br>Develop strong interpersonal and communication skills. |

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| **ENVIRONMENTAL**<br>Design<br>Planning<br>Operations<br>Administration<br>Regulations | Private industry and businesses involved with air pollution control, industrial hygiene, radiation protection, hazardous waste management, toxic materials control, water supply, storm water and wastewater management, solid waste disposal, public health, and land management<br>Private engineering consulting firms<br>Construction firms<br>Research firms<br>Testing laboratories<br>International organizations | ***Discipline plays vital role in reducing toxicity and pollution of water, ground and air for a better quality of life for all living things.***<br><br>Consider a master's degree for advancement.<br>Foreign language ability beneficial for international work. |
| **NUCLEAR**<br>Environment and Pollution<br>Health<br>Space Exploration<br>Consumer and Industrial Power<br>Food Supply<br>Transportation<br>Water Supply | Electric and gas utility companies<br>Guided missile and space vehicle companies<br>Engineering consulting firms<br>Business services including medical industry<br>Manufacturers of nuclear power equipment<br>Research facilities<br>Military services<br>Defense manufacturers | ***Discipline studies basic components of neutrons, protons, electrons and all matter; deals with inanimate substances.*** |
| **ENGINEERING SCIENCE AND MECHANICS**<br>Engineering Mechanics<br>Biomedical Engineering<br>Computational Mechanics<br>Engineering Materials | Industry<br>Manufacturing<br>Research organizations | ***Interdisciplinary program with broad training in engineering science, mathematics, and physical or biological science.*** |

## GENERAL INFORMATION

- Bachelor's degree provides wide range of career opportunities in industry, business, and government.
- Graduate degrees offer more opportunities for career advancement.
- Bachelor's degree is good background for pursuing technical graduate degrees as well as professional degrees in Business Administration, Medicine or Law.
- Related work experience obtained through co-op, internships, part-time or summer jobs, or regular employment is extremely beneficial.
- Develop computer expertise within field.
- Engineers need to think in scientific and mathematical terms, have ability to study data, sort out important facts, solve problems, and be logical thinkers. Creativity is useful.
- Other helpful traits include intellectual curiosity, technical aptitude, perseverance, ability to communicate and work well with others, a commitment to teamwork, and a basic understanding of the economic and environmental context in which engineering is practiced.
- Develop excellent verbal and written communications skills including presentation and technical report writing.
- 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.
- Join related professional organizations.
- Most fields offer overseas opportunities with businesses or government agencies.
- Because of rapid changes in most engineering fields, both continued education and keeping abreast of new developments are very important.
- Most states require an EIT (Engineer-In-Training) test before taking a state examination to become a Professional Engineer (PE).
- Search the Internet for additional information about individual disciplines.

Prepared by the Career Planning staff at Career Services of The University of Tennessee, Knoxville. (1998, Revised 1999, Revised 2004)