

**LIFE AS A****ELECTRICAL ENGINEER****WORK SKILLS, INTEREST & COMPETENCIES****Introduction**

Electrical Engineering (EE) – the largest engineering branch - deals with the study of the theories of Electricity, Electronics, and Electromagnetism and the way they are applied to sub-disciplines such as:

- Generation, Transmission and Distribution of Electric Power,
- Telecommunication Systems including Wireless Communications,
- Automatic Controls Systems and Robotics,
- Aviation Electronic (Avionics) Systems,
- Aerospace and Electronics Systems,
- Computers and Microprocessors,
- Lasers, Optoelectronic and Superconductor Devices,
- Microelectronic Devices and Integrated Circuit Technology,
- Signal Processing,
- Microwave Systems & Electromagnetic Wave Propagation & Antennas,
- Audio, Speech, Video and Image Processing,
- Automotive Electronics,
- Industrial Sensors and Instrumentation,
- Power Electronics, Fuel Cells, Renewable Energy
- Nanoelectronics and Nanofabrication,
- Ultrasonic Imaging, Bio-Engineering and Medical Electronics

Electrical Engineers design products ranging from huge electric Power generators and transformers to miniature microprocessor chips, affecting everything from public health to safety, and including:

- Devices for the generation & delivery of electric power to Homes / businesses / industry,
- Electronic Instruments to measure temperature, speed, pressure and flow rate.
- Computers incorporated into devices and systems enriched with methods of data processing & storage,
- Communications systems: radio, television, satellite systems, telephones and fiber-optic systems,
- Aircraft flight control and collision-avoidance systems,
- Systems used in medical electronics, medical lasers,
- Systems that educate and entertain: computers and computer networks,

compact-disk players, and multimedia systems.

Job Prospects

Engineering and Business Consulting Companies,

- Government Agencies,
- Manufacturers of Electrical and Electronic Equipment,
- Manufacturers of Computer and/or Industrial Equipment,
- Transportation, Communications and Utility Companies,
- Computer and Data Processing Services Companies.

Sample of Companies that Hire Electrical Engineers

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| • AT&T | • Microsoft | • Ericsson, Inc. |
| • General Electric | • Sun Microsystems | • NSA |
| • Procter & Gamble | • IBM | • Cisco Systems |
| • Ford Motor | • Intel Corporation | • L & T |
| • General Motors | • Honda | • Hewlett-Packard |
| • Honeywell | • Reliance | • Tatas |
| • Bajaj | • Steel Plants | • Ambuja Cement |

Tasks

- Prepare technical drawings, specifications of electrical systems, or topographical maps to ensure that installation and operations conform to standards and customer requirements.
- Operate computer-assisted engineering or design software or equipment to perform engineering tasks.
- Confer with engineers, customers, or others to discuss existing or potential engineering projects or products.
- Direct or coordinate manufacturing, construction, installation, maintenance, support, documentation, or testing activities to ensure compliance with specifications, codes, or customer requirements.
- Design, implement, maintain, or improve electrical instruments, equipment, facilities, components, products, or systems for commercial, industrial, or domestic purposes.
- Prepare specifications for purchases of materials or equipment.
- Perform detailed calculations to compute and establish manufacturing, construction, or installation standards or specifications.
- Investigate customer or public complaints, determine nature and extent of problem, and recommend remedial measures.
- Oversee project production efforts to assure projects are completed on time and within budget.

- Plan or implement research methodology or procedures to apply principles of electrical theory to engineering projects.
- Develop budgets, estimating labor, material, and construction costs.
- Compile data and write reports regarding existing or potential electrical engineering studies or projects.
- Supervise or train project team members as necessary.
- Investigate or test vendors' or competitors' products.
- Plan layout of electric power generating plants or distribution lines or stations.
- Inspect completed installations and observe operations to ensure conformance to design and equipment specifications and compliance with operational and safety standards.
- Conduct field surveys or study maps, graphs, diagrams, or other data to identify and correct power system problems.
- Assist in developing capital project programs for new equipment or major repairs.
- Collect data relating to commercial or residential development, population, or power system interconnection to determine operating efficiency of electrical systems.
- Design electrical systems or components that minimize electric energy requirements, such as lighting systems designed to account for natural lighting.
- Develop systems that produce electricity using renewable energy sources, such as wind, solar, or biofuels.
- Integrate electrical systems with renewable energy systems to improve overall efficiency.

Knowledge

Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.

Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.

Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics,

and their applications.

Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.

English Language — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.

Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.

Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.

Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.

Skills

Critical Thinking — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

Reading Comprehension — Understanding written sentences and paragraphs in work related documents.

Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

Complex Problem Solving — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

Writing — Communicating effectively in writing as appropriate for the needs of the audience.

Active Learning — Understanding the implications of new information for both current and future problem-solving and decision-making.

Monitoring — Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.

Speaking — Talking to others to convey information effectively.

Judgment and Decision Making — Considering the relative costs and benefits of potential actions to choose the most appropriate one.

Time Management — Managing one's own time and the time of others.

Abilities

Problem Sensitivity — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

Deductive Reasoning — The ability to apply general rules to specific problems to produce answers that make sense.

Oral Comprehension — The ability to listen to and understand information and ideas presented through spoken words and sentences.

Oral Expression — The ability to communicate information and ideas in speaking so others will understand.

Written Comprehension — The ability to read and understand information and ideas presented in writing.

Inductive Reasoning — The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

Information Ordering — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).

Written Expression — The ability to communicate information and ideas in writing so others will understand.

Category Flexibility — The ability to generate or use different sets of rules for combining or grouping things in different ways.

Near Vision — The ability to see details at close range (within a few feet of the observer).

Work Activities

Making Decisions and Solving Problems — Analyzing information and evaluating results to choose the best solution and solve problems.

Interacting With Computers — Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.

Getting Information — Observing, receiving, and otherwise obtaining information from all relevant sources.

Drafting, Laying Out, and Specifying Technical Devices, Parts, and Equipment — Providing documentation, detailed instructions, drawings, or specifications to tell others about how devices, parts, equipment, or structures are to be fabricated, constructed, assembled, modified, maintained, or used.

Analyzing Data or Information — Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.

Communicating with Supervisors, Peers, or Subordinates — Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.

Updating and Using Relevant Knowledge — Keeping up-to-date technically and applying new knowledge to your job.

Processing Information — Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data.

Evaluating Information to Determine Compliance with Standards — Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards.

Thinking Creatively — Developing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions.