What can I do with a major in... Electrical Engineering

Electrical engineers learn how to design systems based on electronics, optics, and magnetics technology to create hardware solutions including biomedical, communications, computing, energy and imaging applications. Undergraduate programs teach how materials, devices, and circuits operate as well as how to create devices and systems with these. Electrical engineers design analog and digital hardware like analog sensors, digital circuits, embedded systems and mixed signal circuit boards. They also design controls for circuit and system hardware as well as algorithms to process information from signals.

Electrical engineers further develop next generation materials, devices, and circuits needed to improve things like energy circuits using renewables, computer hardware using “spintronic” magnetic devices and optical circuits using plasmonics. Electrical engineering knowledge is used to design a wide range of analog and digital systems; some system examples include computers, radio frequency (RF) or optical communications, radars, radio frequency identification tags (RFID), magnetic resonance imaging systems, embedded systems and power systems.

INDUSTRIES

- Acoustics
- Antennas and propagation
- Automation
- Automotive
- Broadcasting
- Circuits and systems
- Consulting
- Electrical insulation
- Geoscience
- Healthcare
- HVAC systems
- Industrial/food products
- Lasers and electro-optics
- Magnetics
- Medical technologies
- Nuclear and plasma sciences
- Oceanic engineering
- Power electronics
- RF Communications
- Robotics
- Supercomputing
- Supercomputing
- Telecommunications
- Ultrasonics

EMPLOYERS

- 3M
- Boston Scientific
- Cummins
- Daikin Applied
- Emerson
- Entrust Datacard
- Honeywell
- Fluke Thermography
- Ford Motor Company
- Graco
- IBM
- Medtronic
- MIS0
- Open Systems International
- Seagate
- Starkey Hearing Technologies
- Ulteig
- UTC Aerospace
- Wold Architects and Engineers
- Xcel Energy

TECHNICAL SKILLS

- Breadboards
- C/C++
- ChemDraw
- Circuit Analysis
- Digital Multi Meter (DMM)
- Feedback and control system modeling
- LoggerPro
- Mathematica
- MATLAB
- Microsoft Excel
- Oscilloscope
- Power systems analysis
- Soldering
- Splicing

CSE Career Outcomes

Average Starting Salary: $64,406*

Post-graduation Outcomes:*
POSSIBLE POSITIONS

- **Application engineer**: Develop, create, and modify general computer applications software or specialized utility programs.
- **Computer hardware engineer**: Design and develop computer hardware, such as computer chips, circuit boards, modems, and printers. Also test hardware and supervise its installation.
- **Control engineer**: Focuses on the modeling of a diverse range of dynamic systems and the design of controllers that will cause these systems to behave in the desired manner.
- **Electronic engineer**: Employ knowledge of electronic theories and material properties to research, design, develop, and test electronic components and systems that are used in industrial, military, scientific, or commercial uses.
- **Firmware engineer**: Creates software used in electronic devices.
- **Power engineer**: Deals with generation, transmission, and distribution of electricity as well as design of related devices. These devices include transformers, electric generators, electric motors, high voltage engineering, and power electronics.
- **Software engineer**: Applies the principles and techniques of computer science, engineering, and mathematical analysis to the design, development, testing, and evaluation of the software and systems that enable computers to perform applications. Must possess strong programming skills, but are more concerned with developing algorithms and analyzing and solving programming problems than with writing code.
- **Substation engineer**: Inspect, test, repair, or maintain electrical equipment in generating stations, substations, and in-service relays.
- **Test engineer**: Lay out, build, test, troubleshoot, repair, and modify developmental and production electronic components, parts, equipment, and systems.

**Some of these positions may require an advanced degree.**

GET INVOLVED

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RESOURCES

- American Association of Artificial Intelligence: [aaai.org](http://aaai.org)
- American Council of Engineering Companies: [acec.org](http://acec.org)
- American Council of Engineering Companies-MN chapter: [acecmn.org](http://acecmn.org)
- Computer Work: [computerwork.com](http://computerwork.com)
- Computing Careers: [acm.org](http://acm.org)
- Department of Electrical and Computer Engineering: [ece.umn.edu](http://ece.umn.edu)
- EE Web: [eeweb.com](http://eeweb.com)
- Engineer Info: [engineer.info](http://engineer.info)
- Engineer Jobs: [engineerjobs.com](http://engineerjobs.com)
- Engineer.net: [engineer.net](http://engineer.net)
- Engineering Central: [engcen.com](http://engcen.com)
- Engineering.com: [engineering.com](http://engineering.com)
- Graduating Engineer: [graduatingengineer.com](http://graduatingengineer.com)
- International Society for Optical Engineering: [spie.org](http://spie.org)
- ThinkJobs.com: [thinkjobs.com](http://thinkjobs.com)

See the Major Binders available in the CSE Career Center’s Resource Center for more information about this major and career. *Salary and Career Outcomes gathered from the 2016-2017 CSE Graduation Survey. Post-graduation outcomes reflect the percentage of students who were employed full-time in their field or were enrolled in a graduate program. For detailed starting salary information see the CSE Career Center website.*