



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

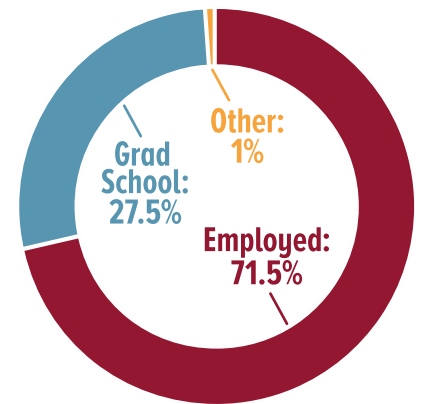
Electrical engineers learn how to design systems based on electronics, optics, and magnetics technology to create hardware solutions including biomedical, communications, computing, energy and imaging applications. Undergraduate programs teach how materials, devices, and circuits operate as well as how 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.

CSE Career Outcomes

Average Starting Salary:
\$64,406*

Post-graduation Outcomes:*



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
- MISO
- 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



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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| • Active Energy Club | • Institute for Electrical and Electronic Engineers – Women in Engineering | • Society of Hispanic Professional Engineers |
| • CSE K-12 Outreach | • National Society of Black Engineers | • Society of Women Engineers |
| • CSE Ambassadors | • Science and Engineering Student Board | • Solar Vehicle Project |
| • CSE International Ambassadors | • Society of Asian Scientists and Engineers | • Tau Beta Pi |
| • Engineers Without Borders | | • TeslaWorks |
| • Eta Kappa Nu | | • Theta Tau |
| • Institute for Electrical and Electronic Engineers | | |

RESOURCES

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