MICHIGAN ENGINEERING
UNIVERSITY OF MICHIGAN

Electrical Engineering

WHAT IS ELECTRICAL ENGINEERING?

Electrical engineers design, develop, test and supervise the manufacture of electrical equipment, including: electric motors; machinery controls; lighting; wiring in buildings; automobiles; aircraft, radar and navigation systems; and power-generating, controlling, and transmission devices used by electric utilities. Electrical engineers also work on small-scale applications of electricity to control systems or signal processing, and are responsible for a wide range of technologies, from portable music players to the global positioning system (GPS). Many electrical engineers also work in areas closely related to computers and may specialize in a specific sub-field such as communications, signal processing, and control systems, or have a specialty within one of these areas – such as industrial robot control systems or aviation electronics.*

NEEDED SKILLS:

- Active listening and communication skills
- Trouble shooting
- Critical thinking
- Computer skills
- Reading comprehension
- Technology design skills
- Visualization skills
- Mathematical reasoning skills
- Physics reasoning skills**

INDUSTRIES AND OCCUPATIONS

- Electric power generation, transmission, and distribution
- Semiconductor & electronic components industry
- Navigational, measuring, control, and electromedical instruments manufacturing
- Scientific research
- Communications equipment industry
- Aerospace industry
- Business consulting & management
- Federal Government**

JOB TITLES

- Solar Engineer
- Power Generation Engineer
- Lighting Engineer
- Wire Communications Engineer
- Microwave Supervisor
- Radio Frequency Engineer
- Electrical Designer
- Cable Engineer**

JOB OUTLOOK

Employment of electrical engineers is expected to show little to no change from 2014 to 2024. Job growth is expected because of electrical and electronics engineers' versatility in developing and applying emerging technologies. On the other hand, employment growth could be tempered by slow growth or decline in most manufacturing sectors in which electrical and electronics engineers are employed.*

SALARIES

$95,230*

The nationwide average salary for employees with a bachelor's degree in Electrical Engineering

$70,383

UM graduates average starting salaries

Courtesy of the Engineering Career Resource Center

MORE INFORMATION

- www.myplan.com
- stats.bls.gov/ooh
- http://www.ieeeusa.org/ (Institute of Electrical and Electronics Engineers)
- Engineering Career Resource Center, 230 Chrysler
- See an EE advisor. Sign up on the EAC website or contact the EE Department at 763-2305; 3415 EECS

Information from http://www.bls.gov/ooh/
**Information from: www.myplan.com*

MICHIGAN ENGINEERING
UNIVERSITY OF MICHIGAN

Electrical Engineering

WHICH EE CLASSES SHOULD YOU START WITH?

To begin the EE major, a good option is to take EECS 215, followed by EECS 216, EECS 280, and TCHNCLCM 300. TCHNCLCM 300 is a technical communication course that can be taken independently of any EECS course, but it is a prerequisite for TCHNCLCM 495, which much be taken with a Major Design Experience course during your senior year. Note that it is recommended that you finish your Chemistry and Physics requirements by the end of your first semester, sophomore year. Read more about the EE major and the EECS Department at: https://www.eecs.umich.edu

COURSE DESCRIPTIONS

EECS 215 – 4 credits

Introduction to Electronic Circuits

Prerequisites: Math 116, Engr 101.
Corequisite: Physics 240.
Cannot receive credit for both EECS 314 and EECS 215.
Introduction to electronic circuits. Basic concepts of voltage and current, Kirchhoff's voltage and current laws; Ohm's law; voltage and current sources; Thevenin and Norton equivalent circuits; DC and low frequency active circuits using operational amplifiers, diodes, and transistors; small signal analysis; energy and power. Time- and frequency-domain analysis of RLC circuits. Basic passive and active electronic filters. Laboratory experience with electrical signals and circuits.

EECS 216 – 4 credits

Introduction to Signals and Systems

Prerequisites: EECS 215, Preceded or accompanied by Math 216.
Theory and practice of signals and systems engineering in continuous and discrete time. Continuous-time linear time-invariant systems, impulse response, convolution. Fourier series, Fourier transforms, spectrum, frequency response and filtering. Sampling leading to digital signal processing using the discrete-time Fourier and the discrete Fourier transform. Laplace transforms, transfer functions, poles and zeros, stability. Applications of Laplace transform theory to RLC circuit analysis. Introduction to communications, control, and signal processing. Weekly recitations and hardware/Matlab software laboratories.

EECS 280 – 4 credits

Programming and Introductory Data Structures

Prerequisites: Math 115 and prior programming experience.
Techniques and algorithm development and effective programming, top-down analysis, structured programming, testing, and program correctness. Program language syntax and static and runtime semantics. Scope, procedure instantiation, recursion, abstract data types, and parameter passing methods. Structured data types, pointers, linked data structures, stacks, queues, arrays, records, and trees.

TCHNCLCM 300 – 1 credit

Technical Communication for Electrical and Computer Science

Professional communication to the general public, managers, and other professionals about electrical and computer engineering ideas as presented in written reports and oral presentations. Functional, physical, and visual/diagrammatic descriptions, job letters and resumes.