# Electrical Engineering

The undergraduate electrical engineering degree program seeks to produce graduates who are trained in the theory and practice of electrical and computer engineering and are well prepared to handle the professional and leadership challenges of their careers. The program allows students to specialize in high performance and embedded computing, microelectronics and nanotechnology, power and energy, signal processing and communications, high frequency circuits and fields, and control systems, among others.

## Degree Requirements

The following curriculum meets the requirements for a B.S. in Electrical Engineering, provided the student satisfies UK Core requirements and graduation requirements of the College of Engineering.

### Freshman Year

| First Semester | Hours |
|---|---|
| EGR 101 Engineering Exploration I § Δ | 1 |
| EGR 102 Fundamentals of Engineering Computing | 2 |
| CIS/WRD 110 Composition and Communication I | 3 |
| PHY 231 General University Physics **or** CHE 105 General College Chemistry I º | 4 |
| PHY 241 General University Physics Laboratory ‡ | 1 |
| MA 113 Calculus I | 4 |

| Second Semester | |
|---|---|
| EGR 103 Engineering Exploration II Δ | 2 |
| MA 114 Calculus II | 4 |
| CHE 105 General College Chemistry I **or** PHY 231 General University Physics º | 4 |
| CIS/WRD 111 Composition and Communication II | 3 |
| UK Core – Social Sciences **or** CS 215 Introduction to Program Design, Abstraction, and Problem Solving | 3-4 |

### Sophomore Year

| First Semester | Hours |
|---|---|
| MA 213 Calculus III | 4 |
| PHY 232 General University Physics | 4 |
| PHY 242 General University Physics Laboratory | 1 |
| EE 211 Circuits I | 4 |
| EE/CPE 282 Digital Logic Design | 4 |

| Second Semester | |
|---|---|
| MA 214 Calculus IV | 3 |
| EE 223 AC Circuits | 4 |
| EE/CPE 287 Introduction to Embedded Systems | 4 |
| CS 215 Introduction to Program Design, Abstraction, and Problem Solving **or** UK Core – Social Sciences | 3-4 |
| UK Core – Humanities | 3 |

### Junior Year

| First Semester | Hours |
|---|---|
| EE 415G Electromechanics | 3 |
| EE 421G Signals and Systems | 3 |
| Elective EE Laboratory [L] | 2 |
| EE 461G Introduction to Electronics | 3 |
| MA 320 Introductory Probability **or** STA 381 Engineering Statistics – A Conceptual Approach | 3 |
| Technical Elective [T] | 3 |

| Second Semester | |
|---|---|
| EE 468G Introduction to Engineering Electromagnetics | 4 |
| Elective EE Laboratory [L] | 2 |
| Technical Elective [T] | 3 |
| Engineering/Science Elective [E] | 3 |
| UK Core – Citizenship - USA | 3 |

### Senior Year

| First Semester | Hours |
|---|---|
| EE/CPE 490 ECE Capstone Design I†† | 3 |
| EE Technical Electives** | 6 |
| Math/Statistics Elective [M] | 3 |
| UK Core – Global Dynamics | 3 |

| Second Semester | |
|---|---|
| EE/CPE 491 ECE Capstone Design II† | 3 |
| EE Technical Electives** | 6 |
| Engineering/Science Elective [E] | 3 |
| Supportive Elective* | 3 |
| UK Core – Statistical Inferential Reasoning | 3 |

§ *Transfer students who declare a major will take EGR 112, Engineering Exploration for Transfer Students, in place of EGR 101.*

Δ *Students must complete both EGR 101 and EGR 103 to fulfill the UK Core Arts and Creativity requirement.*

º *Based on advisor consult.*

‡ *Only if enrolled in PHY 231.*

\**Supportive elective* *is to be chosen from any University courses, excluding more elementary versions of required courses, such as pre-calculus mathematics or PHY 211. EE students are strongly encouraged to partially or completely fulfill this requirement by enrolling and participating in experiences credits such as: EGR 399 – Coop; EAP 599 – Education Abroad; EE 391 – UG Research Experience; EE 396; Community or Campus Experiential Learning; EGR 390 – Experiential learning in Engineering or CS; EXP 396 – Experiential Education; EGR 549 – Energy Experiences; or other experiences courses approved by the Director of Undergraduate Studies for Electrical Engineering.*

[M] **Math/Statistics Elective:** *Any upper-division (300-level or higher) math or statistics course excluding MA 308 and MA 310 (3 credit hours total).*

[E] **Engineering/Science Electives:** *Any engineering, physics, computer science, or math course at the 200-level or higher, other than an electrical engineering course and excluding MA 308, MA 310, and more elementary versions of required courses (6 credit hours total). Cooperative education credit may not be used to satisfy this requirement.*

[T] **Technical elective** may be selected from upper-division (300-level or higher) engineering, mathematics, statistics, computer science, physics, or other technically-related fields excluding MA 308, MA 310, EE 305, and more elementary versions of required courses, to be selected in consultation with the academic advisor (6 credit hours total). Cooperative education credit may not be used to satisfy this requirement.

[L] **Electrical Engineering Laboratory Elective:** EE 416G, EE 422G, EE 462G (4 credit hours total).

†EE/CPE 490 is only taught in the fall semester. EE/CPE 491 is only taught in the spring semester.

††Graduation Composition and Communication Requirement (GCCR) course.

**\*\*EE Technical Electives** (must be 500-level courses). Courses recommended as electrical engineering technical electives are listed below (each course is 3 credit hours):
EE 511 Introduction to Communication Systems
EE 512 Digital Communication Systems
EE 513 Audio Signals and Systems
EE 517 Advanced Electromechanics
EE 518 Electric Drives
EE 521 Introduction to Wireless Communications
EE 522 Antenna Design
EE 523 Microwave Circuit Design
EE 525 Numerical Methods and Electromagnetics
EE 527 Electromagnetic Compatibility
EE 531 Alternative and Renewable Energy Systems
EE 532 Smart Grid: Automation and Control of Power Systems
EE 535 Power Systems: Generation, Operation and Control
EE 536 Power System Fault Analysis and Protection
EE 537 Electric Power Systems I
EE 538 Electric Power Systems II
EE 539 Power Distribution Systems
EE 546 Electric Power System Fundamentals
EE 560 Semiconductor Device Design
EE 567 Introduction to Lasers and Masers
EE 568 Fiber Optics
EE 569 Electronic Packaging Systems and Manufacturing Processes
EE 571 Feedback Control Design
EE 572 Digital Control of Dynamic Systems
EE 582 Hardware Description Languages and Programmable Logic
EE 584 Introduction of VLSI Testing and Design
EE 585 Fault Tolerant Computing
EE 586 Communication and Switching Networks
EE 587 Microcomputer Systems Design
EE 588 Real-Time Computer Systems
EE 589 Advanced VLSI
EE 599 Topics in Electrical Engineering (Subtitle required)