

Bachelor of Science in Electrical Engineering

B.S. in Electrical Engineering Program

Educational Objectives

Graduates who have earned the bachelor's degree in electrical engineering, within a few years following graduation, will have demonstrated technical proficiency, collaborative activities, and professional development.

Technical Proficiency

Graduates will have achieved success and visibility in their chosen careers as shown by technical accomplishments in industry, government, entrepreneurial activities, or academia.

Collaborative Activities

Graduates will have exercised shared responsibilities through activities such as contributions to multiperson or multidisciplinary technical projects, participation in professional society/organization functions, or performing collaborative research. In all such cases, graduates will have contributed to documentation of the collaborative activities.

Professional Development

Graduates will have demonstrated continual updating to extend their expertise and adapt to a changing environment through graduate studies; short courses, conferences, and seminars; or professional self-study. In addition, graduates will have demonstrated evidence of increasing technical and/or managerial impact.

Careers

Professional Opportunities

Electrical engineers may work in circuit design, electronic devices, electrical and optical communications, control and automation, electromagnetics, instrumentation, energy and power, or signal processing. Electrical engineers may work in telecommunications, consumer electronics, or public utility companies; government agencies; and defense-related or consulting firms.

Undergraduate Admission to the School of Engineering

Admission to the KU School of Engineering and its degree programs is selective. Students may be admitted to an engineering or computer science degree program (<https://enr.ku.edu/admission-requirements/>) as freshmen (first-year) students, but all admissions, for both in-state and out-of-state students, are selective. Applications are judged on several factors, such as high school record, scores on national tests, academic record at college or university level, and trend of grades and more. High school transcripts are required.

Freshman Admission Standards to the School of Engineering

To be considered for admission to the School of Engineering, beginning freshmen (first-year) students must meet or exceed the following minimum standards:

- Must be admissible (<https://admissions.ku.edu/major-specific-requirements/>) to the University of Kansas by assured admissions or individual review, **AND**
- Have a 3.0+ high school GPA, **AND**
- Demonstrate mathematics preparedness by:
 - Obtaining a mathematics ACT score of 22+ (or math SAT score of 540+), **OR**
 - Achieving a B or better in college algebra or a more advanced mathematics course, **OR**
 - Achieving a C or better in a high school calculus course; **OR**
 - Earning credit via IB or AP credit for the above-mentioned courses in accordance with KU placement credit requirements; **OR**
 - Achieving at minimum a qualifying score for MATH 104 on the ALEKS mathematics placement exam.

Pre-Engineering

Students not admitted directly to the School of Engineering and their department but who are admissible to the university may be admitted to the College of Liberal Arts and Sciences as a pre-engineering student. They can later re-apply to the School of Engineering during the semester they are completing the admission requirements for current students at KU.

Transfer Student Admission Standards to the School of Engineering

Applications from all transfer students, whether from other institutions or from other academic schools at the University of Kansas, are evaluated on a case-by-case basis. Transfer students must:

- Be admissible (<http://admissions.ku.edu/apply/requirements/ustransfer/>) to KU, **AND**
- Earn a cumulative college transferable grade-point average of 2.5+, **AND**
- Earn a grade of C or better in MATH 125 (Calculus I, or its direct equivalent), **AND**
- Earn grades of C or better in math, science, and engineering courses applicable to the engineering degree.

Students must also complete their last 30 hours of credit at KU (<http://policy.ku.edu/governance/FSRR/#art4sect5>). For more information on transfer credits, see KU Undergraduate Admissions (<https://admissions.ku.edu/i-am/transfer/>).

Current Student Admission Standards to the School of Engineering

Students who are currently enrolled at KU, need to meet the following:

- Earn a 2.5+ KU GPA, **AND**
- Earn a grade of C or better in MATH 125 (Calculus I, or its direct equivalent), **AND**
- Earn a grade of C or better in all math, science, and engineering courses.

Current KU Students admitted to other academic units may apply to the School of Engineering by completing a Change of School form (<https://inowformsprivate.ku.edu/imagenowforms/fs/?form=OUR%20Change%20of%20School%20Form>). Per University Registrar deadlines for processing, Change of School applications each semester are processed

up until the 20th day of classes. If received and processed after the 20th day of classes, students will be active in the new program the following semester.

Already Applied to KU, But Not Engineering?

Don't worry. It's not too late to change your mind if you've already applied to KU and selected a major outside the School of Engineering. If you think one of the 12 engineering or computer science majors is a better fit for your talents, you can still change your requested major — preferably before May 1 — and be considered for admission to the School of Engineering and all the benefits that go with it.

To update your application, visit Undergraduate Admissions (<http://admissions.ku.edu/update-your-application/>) and click on "Change application term, major, mailing address, and/or email address."

Please contact a member of our recruitment team (studyengineering@ku.edu), 785-864-3881, if you have any difficulty.

Application Deadlines For New Freshman and Transfer Applicants

| | |
|------------------------|--|
| November 1 | Priority scholarship deadline for incoming freshmen. |
| December 1 | Deadline to apply for the Self Engineering Leadership Fellows Program for incoming freshmen. |
| May 1 | Enrollment Deposit due. |
| Last Friday in October | Deadline to submit Change of School applications for fall semester admission. |
| Last Friday in March | Deadline to submit Change of School applications for spring semester admission. |

Bachelor of Science in Electrical Engineering Degree Requirements

| Code | Title | Hours |
|--|--|-------|
| Core 34 General Education | | |
| Select courses to meet Core 34 General Education requirements. | | 27 |
| Basic Science | | |
| CHEM 150 | Chemistry for Engineers | 5 |
| or CHEM 130 | General Chemistry I | |
| or CHEM 170 | Chemistry for the Chemical Sciences I | |
| or CHEM 190 | Foundations of Chemistry I, Honors | |
| & CHEM 191 | and Foundations of Chemistry I Laboratory, Honors | |
| EPHX 210 | General Physics I for Engineers (Core 34: Natural & Physical Science (SGE)) ⁰⁴⁰ | 3 |
| or PHSX 211 | General Physics I | |
| or PHSX 213 | General Physics I Honors | |
| PHSX 216 | General Physics I Laboratory (Core 34: Natural & Physical Science (SGE)) ⁰⁴⁰ | 1 |
| or PHSX 213 | General Physics I Honors | |

| | | |
|-------------|-----------------------------------|---|
| or PHSX 114 | College Physics I | |
| EECS 220 | Electromagnetics I | 4 |
| PHSX 313 | General Physics III | 3 |
| PHSX 316 | Intermediate Physics Laboratory I | 1 |

| Mathematics | | |
|--------------------|--|---|
| MATH 125 | Calculus I (Core 34: Math and Statistics (SGE)) ⁰³⁰ | 4 |
| or MATH 145 | Calculus I, Honors | |
| or MATH 115 | Calculus I | |
| & MATH 116 | and Calculus II | |
| MATH 126 | Calculus II | 4 |
| or MATH 146 | Calculus II, Honors | |
| MATH 127 | Calculus III | 4 |
| or MATH 147 | Calculus III, Honors | |
| MATH 220 | Applied Differential Equations | 3 |
| or MATH 221 | Applied Differential Equations, Honors | |
| or MATH 320 | Elementary Differential Equations | |
| MATH 290 | Elementary Linear Algebra | 2 |
| or MATH 291 | Elementary Linear Algebra, Honors | |
| EECS 461 | Probability and Statistics | 3 |

| Electrical Engineering Required Courses | | |
|--|--|---|
| EECS 101 | New Student Seminar | 1 |
| EECS 140 | Introduction to Digital Logic Design | 4 |
| or EECS 141 | Introduction to Digital Logic: Honors | |
| EECS 168 | Programming I | 4 |
| or EECS 169 | Programming I: Honors | |
| EECS 202 | Circuits I | 4 |
| EECS 212 | Circuits II | 4 |
| EECS 312 | Electronic Circuits I | 3 |
| EECS 361 | Signal and System Analysis | 3 |
| EECS 388 | Embedded Systems | 4 |
| EECS 412 | Electronic Circuits II | 4 |
| EECS 420 | Electromagnetics II | 4 |
| EECS 443 | Digital Systems Design | 4 |
| EECS 444 | Control Systems | 3 |
| EECS 470 | Electronic Devices and Properties of Materials | 3 |
| EECS 501 | Senior Design Laboratory I | 3 |
| EECS 562 | Introduction to Communication Systems | 4 |

| Capstone Course | | |
|------------------------|--|---|
| EECS 502 | Senior Design Laboratory II (Capstone) | 3 |

| Electrical Engineering Electives | | |
|--|--|---|
| Senior electives (Any EECS course numbered 400 or above excluding EECS 498 and EECS 692. Only one of EECS 643 and EECS 645 may be used to satisfy EE degree requirements. Under unusual circumstances other courses can be considered but only with an accompanying petition.) | | 9 |

Total Hours **128**

Course Prerequisites and Corequisites

Students must pass (with an appropriate grade) all prerequisite courses for a given course **before** taking the subsequent course. If Course A is a Corequisite for Course B, Course A must be taken in the same semester as Course B or be completed prior to taking Course B.

Upper Level Eligibility

In addition to prerequisites and co-requisites, EECS undergraduates are required to earn **Upper Level Course Eligibility** by attaining grades of C or better (C- does not qualify) in each of the following 16 courses:

Core 34 English (both)

EPHX 210 & PHSX 216

MATH 125, 126, 127, 220, 290

EECS 101, 140, 168, 202, 212, 220

CHEM 130 or 150

If students earn less than a C in any of the above listed courses, they must repeat the course at the next available opportunity and must **not** take a course for which that course is a prerequisite. It is the *students' responsibility* to contact their advisors *before beginning the new semester* regarding any required repetitions and the associated enrollment adjustments (drops and adds).

To enroll in *any* upper#level EECS course beyond the ULE list, students must have fulfilled the **Upper Level Eligibility Requirements** detailed above. Exceptions: EECS 312, EECS 330, EECS 361, and EECS 388 may be taken in the same semester as students are completing their upper level eligibility. Students may also petition for a *Partial Waiver of Upper Level Eligibility Requirements* by completing the appropriate petition, found in the EECS office or at www.eecs.ku.edu (<http://www.eecs.ku.edu>).

Double Major

If students wish to double-major (earn two degrees), they must fulfill all the requirements for the degrees in question. They must also consult the Engineering Dean's office and the department and/or school of the second major to find out if there are any additional requirements. If they wish to obtain two degrees offered by the EECS department, the following rule applies: a course that is required for one EECS degree program may not be used to satisfy a Senior Elective or General Elective requirement of another EECS degree program.

Electrical Engineering 4-Year Graduation Plan

Freshman

| Fall | Hours Spring | Hours |
|---|---|-----------|
| EECS 101 | 1 EECS 168 | 4 |
| EECS 140 | 4 MATH 126 | 4 |
| Core 34: English (SGE) ⁰¹⁰ | 3 EPHX 210 or PHSX 211 (Core 34: Natural and Physical Sciences (SGE)) ^{040***} | 3 |
| MATH 125 (Core 34: Math and Statistics (SGE)) ^{030***} | 4 PHSX 216 (Core 34: Natural and Physical Sciences (SGE)) ^{040***} | 1 |
| ECON 142 or 144 (Core 34: Social and Behavior Science (SGE)) ^{050**} | 3 Core 34: English (SGE) ⁰¹⁰ | 3 |
| 15 | | 15 |

Sophomore

| Fall | Hours Spring | Hours |
|--|---|-----------|
| EECS 202 | 4 EECS 212 | 4 |
| MATH 127 | 4 EECS 220 | 4 |
| MATH 220 | 3 CHEM 130 or 150 | 5 |
| MATH 290 | 2 Core 34: Arts and Humanities (SGE) ⁰⁶⁰ | 3 |
| Core 34: Communications (SGE) ⁰²⁰ | 3 | |
| 16 | | 16 |

Junior

| Fall | Hours Spring | Hours |
|--|--|-----------|
| EECS 312 | 3 EECS 412 | 4 |
| EECS 361 | 3 EECS 444 | 3 |
| PHSX 313 & PHSX 316 | 4 EECS 461 | 3 |
| EECS 388 | 4 EECS 562 | 4 |
| Core 34: US Culture (SGE) ⁰⁷⁰ | 3 PHIL 375 (Core 34: Arts and Humanities (SGE)) ^{060**} | 3 |
| 17 | | 17 |

Senior

| Fall | Hours Spring | Hours |
|---|--|-----------|
| EECS 420 | 4 EECS 443 | 4 |
| EECS 470 | 3 EECS 502 (Capstone) | 3 |
| EECS 501 | 3 EECS Senior elective 2 | 3 |
| EECS Senior elective 1 | 3 EECS Senior elective 3 | 3 |
| Core 34: Social and Behavior Science (SGE) ⁰⁵⁰ | 3 Core 34: Global Culture (SGE) ⁰⁷⁰ | 3 |
| 16 | | 16 |

Total Hours 128

¹ Means of satisfying KU Core Goals are chosen from a variety of options (see kucore.ku.edu (<http://kucore.ku.edu/>)). Hours listed are assuming the goals are satisfied with course work.

Notes:

* - This course is a Required major course and is also part of Core 34: Systemwide General Education. If this course is not taken to fulfill the Core 34:SGE requirement, it must be taken in place of elective hours.

** - This course is a Recommended Core 34: Systemwide General Education course. This specific course is not required but is recommended by the program's faculty.

*** - This course is a Required Core 34: Systemwide General Education course. This program is approved by the Kansas Board of Regents to require this specific Core 34: Systemwide General Education course. If a student did not take this course it must be taken in addition to other degree requirements.

At the completion of this program, students will be able to:

- Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

- Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- Communicate effectively with a range of audiences.
- Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- Acquire and apply new knowledge as needed, using appropriate strategies.

Departmental Honors

An undergraduate student may graduate with departmental honors in electrical engineering, computer engineering, computer science, or interdisciplinary computing by graduating with a minimum grade-point average requirement while maintaining full-time status. In addition, students must enroll in EECS 498 Honors Research for their last 2 semesters and must complete an independent research project paper and oral presentation to a panel of 3 judges. See the EECS Undergraduate Handbook for full details.