

Bachelor of Science in Applied Computing

B.S. in Applied Computing Program

Educational Objectives

Graduates who have earned the bachelor's degree in interdisciplinary computing, 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.

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 transfer students.

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>).

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 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>). Contact the engineering recruitment team (studyengineering@ku.edu) if you have any questions. Per University Registrar deadlines for processing, Change of School applications for the fall semester will be accepted until the last Friday in October of each school year; Change of School applications for the spring semester will be accepted until the last Friday in March of each school year.

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 Applied Computing Degree Requirements

Through the applied computing major, students receive an enriched computer science experience, with a focus in one of 6 fields:

1. Astronomy,
2. Biology,
3. Chemistry,
4. Economics
5. Journalism, or
6. Physics

A minimum of 122 to 130 credit hours^A is required for the B.S. degree in applied computing, as follows:

Core Courses

| Code | Title | Hours |
|-------------------------|---------------------------------------------------|-------|
| Computer Science | | |
| 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 268 | Programming II | 4 |
| EECS 330 | Data Structures and Algorithms | 4 |
| EECS 348 | Software Engineering I | 4 |
| EECS 388 | Embedded Systems | 4 |
| EECS 468 | Programming Language Paradigms | 3 |
| EECS 565 | Introduction to Information and Computer Security | 3 |

| | | |
|----------|-----------------------------------|---|
| EECS 581 | Software Engineering II | 3 |
| EECS 678 | Introduction to Operating Systems | 4 |

Capstone Course

| | | |
|----------|-----------------------------------------------------------|---|
| EECS 582 | Computer Science and Interdisciplinary Computing Capstone | 3 |
|----------|-----------------------------------------------------------|---|

For AC majors, 2 or 3 (depending on concentration) CS electives must be chosen from the following courses. Under unusual circumstances, other courses can be considered but only with an accompanying petition.

| | | |
|----------|-----------------------------------------|--|
| EECS 447 | Introduction to Database Systems | |
| EECS 465 | Cyber Defense | |
| EECS 510 | Introduction to the Theory of Computing | |
| EECS 563 | Introduction to Communication Networks | |
| EECS 568 | Introduction to Data Mining | |
| EECS 569 | Computer Forensics | |
| EECS 639 | Introduction to Scientific Computing | |
| EECS 645 | Computer Systems Architecture | |
| EECS 649 | Introduction to Artificial Intelligence | |
| EECS 658 | Introduction to Machine Learning | |
| EECS 630 | Advanced Data Structures and Algorithms | |
| EECS 662 | Programming Languages | |
| EECS 665 | Compiler Construction | |
| EECS 672 | Introduction to Computer Graphics | |
| EECS 675 | Multicore and GPU Programming | |
| EECS 690 | Special Topics: _____ | |

Any EECS course numbered 700 or above

Mathematics

| | | |
|------------------------|-------------------------------------------------------|---|
| MATH 125 | Calculus I (Core 34: Math/Stats (SGE)) ⁰³⁰ | 4 |
| or MATH 145 | Calculus I, Honors | |
| or MATH 115 & MATH 116 | Calculus I 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 290 | Elementary Linear Algebra | 2 |
| or MATH 291 | Elementary Linear Algebra, Honors | |
| EECS 210 | Discrete Structures | 4 |
| EECS 461 | Probability and Statistics | 3 |

Course Prerequisites and Corequisites

Students must pass (at the appropriate grade level) 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 courses:

IC ASTR: (17 courses) Core 34: English (Both); EPHX 210, & PHSX 216, 212 & 236; MATH 125, 126, 127, 220, 290; EECS 101, 140, 168, 210, 268, 348

IC BIOL: (16 courses) Core 34: English (Both); MATH 125, 126, 127, 290; EECS 101, 140, 168, 210, 268, 348; CHEM 130, 135; BIOL 150, 152, and 154

IC CHEM: (19 courses) Core 34: English (Both); EPHX 210 & PHSX 216, 212 & 236; MATH 125, 126, 127, 220, 290; EECS 101, 140, 168, 210, 268, 348; CHEM 130, 135

IC ECON: (15 courses) Core 34: English (Both); MATH 125, 126, 127, 290; EECS 101, 140, 168, 210, 268, 348; ECON 142, 144, 520

IC JOUR: (11 courses) Core 34: English, JMC 104, MATH 125, 126, 127, 290; EECS 101, 140, 168, 210, 268, 348

IC PHSX: (16 courses) Core 34: English (Both); EPHX 210 & PHSX 216, 212 & 236; MATH 125, 126, 127, 220, 290; EECS 101, 140, 168, 210, 268, 348

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 eecs.ku.edu (<http://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.

Astronomy Concentration

In addition to the core courses above, students in the astronomy concentration take the following courses:

| Code | Title | Hours |
|----------------------------------------------|---------------------------------------------------------------------------------|-------|
| Natural Science and Other Disciplines | | |
| MATH 220 | Applied Differential Equations | 3 |
| or MATH 221 | Applied Differential Equations, Honors | |
| or MATH 320 | Elementary Differential Equations | |
| EPHX 210 | General Physics I for Engineers (Core 34: Natural Science (SGE)) ⁰⁴⁰ | 3 |
| or PHSX 211 | General Physics I | |
| PHSX 216 | General Physics I Laboratory (Core 34: Natural Science (SGE)) ⁰⁴⁰ | 1 |

or PHSX 114 College Physics I

Above two classes can also be satisfied with PHSX 213 or (PHSX 114 + PHSX 201)

| | | |
|----------|-------------------------------|---|
| PHSX 212 | General Physics II | 3 |
| PHSX 236 | General Physics II Laboratory | 1 |

Above two classes can also be satisfied with PHSX 214

| | | |
|----------|--------------------------------------|---|
| PHSX 313 | General Physics III | 3 |
| PHSX 316 | Intermediate Physics Laboratory I | 1 |
| ASTR 391 | Physical Astronomy, Honors | 3 |
| ASTR 503 | Undergraduate Research | 2 |
| ASTR 591 | Stellar Astronomy | 3 |
| ASTR 592 | Galactic and Extragalactic Astronomy | 3 |
| ASTR 596 | Observational Astrophysics | 4 |

Select one of the following Astronomy electives: 3

ASTR courses numbered 500 and above

| | | |
|----------|------------------------------------------------|--|
| MATH 581 | Numerical Methods | |
| MATH 611 | Time Series Analysis | |
| PHSX 615 | Numerical and Computational Methods in Physics | |

Biology Concentration

In addition to the core courses above, students in the biology concentration take the following courses:

| Code | Title | Hours |
|----------------------------------------------|---------------------------------------------------------------------|-------|
| Natural Science and Other Disciplines | | |
| BIOL 150 | Principles of Molecular and Cellular Biology | 3 |
| BIOL 152 | Principles of Organismal Biology | 3 |
| BIOL 154 | Introductory Biology Lab for STEM Majors | 2 |
| BIOL 350 | Principles of Genetics | 4 |
| BIOL 412 | Evolutionary Biology | 4 |
| Biology Elective 3 | | |
| BIOL 400 | Fundamentals of Microbiology | |
| BIOL 413 | The Tree of Life | |
| BIOL 414 | Principles of Ecology | |
| BIOL 416 | Cell Structure and Function | |
| BIOL 428 | Introduction to Systematics | |
| BIOL 544 | Comparative Animal Physiology | |
| BIOL 680 | Genomics | |
| CHEM 130 | General Chemistry I (Core 34: Natural Science (SGE)) ⁰⁴⁰ | 5 |
| or CHEM 150 | Chemistry for Engineers | |
| or CHEM 170 | Chemistry for the Chemical Sciences I | |
| or CHEM 190 | Foundations of Chemistry I, Honors | |
| CHEM 135 | General Chemistry II | 5 |
| or CHEM 175 | Chemistry for the Chemical Sciences II | |
| or CHEM 195 | Foundations of Chemistry II, Honors | |

Chemistry Concentration

In addition to the core courses above, students in the chemistry concentration take the following courses:

| Code | Title | Hours |
|--------------------------------------------------------------------------------|---------------------------------------------------------------------|-------|
| Natural Science and Other Disciplines | | |
| MATH 220 | Applied Differential Equations | 3 |
| or MATH 221 | Applied Differential Equations, Honors | |
| or MATH 320 | Elementary Differential Equations | |
| EPHX 210 | General Physics I for Engineers | 3 |
| or PHSX 211 | General Physics I | |
| PHSX 216 | General Physics I Laboratory | 1 |
| or PHSX 114 | College Physics I | |
| Above two classes can also be satisfied with PHSX 213 or (PHSX 114 + PHSX 201) | | |
| PHSX 212 | General Physics II | 3 |
| PHSX 236 | General Physics II Laboratory | 1 |
| Above two classes can also be satisfied with PHSX 214 | | |
| CHEM 201 | Laboratory Safety in the Chemical Sciences | 1 |
| CHEM 130 | General Chemistry I (Core 34: Natural Science (SGE)) ⁰⁴⁰ | 5 |
| or CHEM 150 | Chemistry for Engineers | |
| or CHEM 170 | Chemistry for the Chemical Sciences I | |
| or CHEM 190 | Foundations of Chemistry I, Honors | |
| CHEM 135 | General Chemistry II | 5 |
| or CHEM 175 | Chemistry for the Chemical Sciences II | |
| or CHEM 195 | Foundations of Chemistry II, Honors | |
| CHEM 330 | Organic Chemistry I | 3 |
| CHEM 498 | Undergraduate Research | 1 |
| CHEM 530 | Physical Chemistry I | 4 |
| CHEM 535 | Physical Chemistry II | 3 |

Economics Concentration

In addition to the core courses above, students in the economics concentration take the following courses:

| Code | Title | Hours |
|------------------------------------------------------|------------------------------------------------------------------------------------------|-------|
| ECON 142 | Principles of Microeconomics (Core 34: Social and Behavior Science (SGE)) ⁰⁵⁰ | 3 |
| or ECON 143 | Principles of Microeconomics, Honors | |
| ECON 144 | Principles of Macroeconomics | 3 |
| or ECON 145 | Principles of Macroeconomics, Honors | |
| ECON 520 | Microeconomics | 3 |
| ECON 522 | Macroeconomics | 3 |
| ECON 526 | Introduction to Econometrics | 3 |
| Satisfy Economics 500 and above elective requirement | | 6 |
| Satisfy Economics 600 and above elective requirement | | 6 |

Journalism Concentration

In addition to the core courses above, students in the journalism concentration take the following courses:

| Code | Title | Hours |
|---------|---------------------------------------------------------------------|-------|
| JMC 101 | Media and Society (Core 34: Arts/Humanities (SGE)) ^{060 A} | 3 |
| JMC 104 | Words at Work: Writing Essentials | 3 |
| JMC 300 | Visual Storytelling | 2 |

| | | |
|--------------------------------------------------------------------------------------------|-----------------------------|---|
| Select one of the following Tech Tool courses: JMC 211, JMC 212, JMC 213, JMC 214, JMC 215 | | 1 |
| JMC 302 | Information Exploration | 3 |
| JMC 304 | Media Writing for Audiences | 3 |
| JMC 309 | Data Storytelling | 3 |
| JMC 408 | Media Law and Ethics | 3 |

Journalism Electives (9 credit hours - Choose 3 of the following)

| Code | Title | Hours |
|---------|-----------------------------------------------------------------------------------------------------|-------|
| JMC 201 | Current Issues in Journalism | 3 |
| JMC 260 | Agency: Introduction | 3 |
| JMC 315 | Health and Science Communication | 3 |
| JMC 320 | Introduction to Digital Marketing Communications, Advertising and Public Relations | 3 |
| JMC 330 | Sports Media in the 21st Century | 3 |
| JMC 340 | Creative Concepting ¹ | 3 |
| JMC 345 | Audience Experience ¹ | 3 |
| JMC 408 | Media Law and Ethics | 3 |
| JMC 410 | Media Photography | 3 |
| JMC 415 | Multimedia Reporting | 3 |
| JMC 419 | Multimedia Editing | 3 |
| JMC 420 | Advanced Digital Marketing Communications, Advertising and Public Relations ¹ | 3 |
| JMC 430 | Communicating Sports Information ¹ | 3 |
| JMC 460 | Research Methods in Digital Marketing Communications, Advertising and Public Relations ¹ | 3 |
| JMC 503 | History of Journalism and Mass Communication | 3 |
| JMC 534 | Diversity in Media | 3 |
| JMC 545 | Magazine Publishing | 3 |
| JMC 590 | International Journalism | 3 |
| JMC 610 | Advanced Visual Media ¹ | 3 |
| JMC 611 | Sales Strategies | 3 |
| JMC 612 | Visual Design and Production | 3 |
| JMC 613 | Global Communications | 3 |

¹ Pre-requisites beyond JMC Foundation

Physics Concentration

In addition to the core courses above, students in the physics concentration take the following courses:

| Code | Title | Hours |
|----------------------------------------------|--------------------------------------------------------------------------------------------|-------|
| Natural Science and Other Disciplines | | |
| MATH 220 | Applied Differential Equations | 3 |
| or MATH 221 | Applied Differential Equations, Honors | |
| or MATH 320 | Elementary Differential Equations | |
| EPHX 210 | General Physics I for Engineers (Core 34: Natural & Physical Science (SGE)) ⁰⁴⁰ | 3 |
| or PHSX 211 | General Physics I | |
| PHSX 216 | General Physics I Laboratory (Core 34: Natural & Physical Science (SGE)) ⁰⁴⁰ | 1 |
| or PHSX 114 | College Physics I | |

Above two classes can also be satisfied with PHSX 213 or (PHSX 114 + PHSX 201)

| | | |
|----------|-------------------------------|---|
| PHSX 212 | General Physics II | 3 |
| PHSX 236 | General Physics II Laboratory | 1 |

Above two classes can also be satisfied with PHSX 214

| | | |
|----------|-----------------------------------|---|
| PHSX 313 | General Physics III | 3 |
| PHSX 316 | Intermediate Physics Laboratory I | 1 |
| PHSX 503 | Undergraduate Research | 2 |
| PHSX 521 | Mechanics I | 3 |
| PHSX 531 | Electricity and Magnetism | 3 |
| PHSX 611 | Introductory Quantum Mechanics | 3 |

Physics electives (chosen from PHSX 516 and PHSX 536 and PHSX courses numbered 600 and above) 6

Total Hours **32**

Sample 4-year plans for the Bachelor of Science in Applied Computing with the following concentrations can be found here: concentration in Astronomy (<https://catalog.ku.edu/engineering/electrical-engineering-computer-science/bs-applied-computing/astronomy-conc/>); concentration in Biology (<https://catalog.ku.edu/engineering/electrical-engineering-computer-science/bs-applied-computing/biology-conc/>); concentration in Chemistry (<https://catalog.ku.edu/engineering/electrical-engineering-computer-science/bs-applied-computing/chemistry-conc/>); concentration in Economics (<https://catalog.ku.edu/engineering/electrical-engineering-computer-science/bs-applied-computing/economics-conc/>); concentration in Journalism (<https://catalog.ku.edu/engineering/electrical-engineering-computer-science/bs-applied-computing/journalism-conc/>); concentration in Physics (<https://catalog.ku.edu/engineering/electrical-engineering-computer-science/bs-applied-computing/physics-conc/>) or by using the left-side navigation.

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.