Master of Engineering in Electrical Engineering and Computer Science

Electrical Engineering and Computer Science

The technological advances that have made our society what it is today are due largely to the efforts of electrical engineers, computer engineers, and computer scientists. Among these advances are radio, television, telephones, wireless and mobile communications, personal computers, workstations, mainframe computers, aircraft avionics, satellite electronics, automobile electronics, office machinery, medical electronic equipment, video games, electric power generation and distribution systems, telecommunications, computer networks (including the Internet), personal entertainment products, radar, defense electronics, artificial intelligence, and a variety of computer software.

Vision and Mission

The vision of the EECS department is to provide a stimulating and challenging intellectual environment.

- To have classes populated by outstanding students.
- To be world class in an increasing number of selected areas of research.
- To have faculty members with high visibility among their peers.

The mission of the EECS department is

- To educate the next generation of electrical engineers, computer engineers, and computer scientists.
- To discover, apply, and disseminate knowledge.
- To be an asset to the community and to society.

Graduate Admission to the Department of Electrical Engineering and Computer Science

Applicants for the Master's of Engineering in EECS (ME in EECS) degree program typically possess a degree in Computer Science, Computer Engineering, or Electrical Engineering. However, a student with good preparation in a related field may qualify by taking appropriate additional undergraduate courses. Such courses normally do not count toward the graduate degree. A list of specific prerequisite courses (https://eecs.ku.edu/deficiency-courses/)for the ME in EECS degree is available in the graduate office or on the department's website.

Applicants must demonstrate evidence of aptitude for graduate work, as shown by suitable performance in undergraduate and any graduate course work, by aptitude test scores on the Graduate Record Examination, and by academic letters of reference.

Unless the applicant's native language is English or the applicant has received a baccalaureate degree or higher from an accredited U.S. institution of higher education, he or she must meet the department's standard for the Test of English as a Foreign Language (TOEFL), which is higher than the general KU requirement. Applicants for graduate teaching assistantships must earn satisfactory scores on the Test of Spoken English.

Application Information & Deadlines

Fall Priority Deadline: December 15

Spring Priority Deadline: September 30

Applications accepted after the priority deadlines listed above may not be considered for fellowships and assistantships. All application materials must be submitted by March 1 (Fall semester admission) and October 1 (Spring semester admission). Visit the Graduate Studies website (http://www.graduate.ku.edu/) for the application procedure and fees.

International students and students who indicated English as a second language, are required to show proof of English proficiency for admission purposes and may need to check-in at the Applied English Center (https://aec.ku.edu/) (AEC) upon arrival on campus for orientation. This process serves to confirm each student's level of English proficiency and determine whether English courses will be included as a requirement of the student's academic program. Note: Students who demonstrate English proficiency **at the waiver level** or who have earned a degree from one of the specified English-speaking countries listed in the policy (http://policy.ku.edu/graduate-studies/english-proficiency-international-students/) are not required to check in at the AEC (see eligibility requirements on the Graduate Studies website (https://graduate.ku.edu/english-proficiency-requirements/)).

Application Materials

- Online Application (https://graduate.ku.edu/ku-graduate-application/)
- GRE scores (school code 6871)
- Statement of objectives and resume
- Official transcript
- Letters of recommendation
- TOEFL scores (international students)
- Financial statement (international students only)

Submit all supporting documents and your graduate application online (http://www.graduate.ku.edu/).

Visiting Us

The graduate program staff is happy to work with all prospective students in determining the fit between the student and the program. In order to determine this, we feel that visiting our campus in Lawrence is a very important step. In order to facilitate your visit to KU, there are two main options:

The first, and most preferred, option entails simply applying for admission to the program. All prospective students are welcome to attend our Graduate Open House in mid-October or mid-March, Eligible admitted students may be invited to participate in Campus Visit Days in February (prior to the fall semester of your intended matriculation). These organized campus visit opportunities will allow you to gather a great deal of first-hand information which we hope will help you in making a final decision about whether to attend KU.

The second option is making arrangements to visit us on your own, outside of organized events. With early notification, we will do our best to work with you to provide information and schedule appointments with faculty when possible. Please contact us if you feel that this is the best option for you.

Students will complete a Plan of Study (https://gradplan.engr.ku.edu/accounts/login/?next=/) during their first semester that outlines a comprehensive plan to complete their degree. Every student should select a faculty advisor in the first semester and work together to develop a formal Plan of Study that includes courses that are consistent with the student's academic background and goals. Every Plan of Study will consist of 30 hours of coursework and 1 credit hour of EECS 802 Electrical Engineering and Computer Science Colloquium and Seminar on Professional Issues, which is to be completed during the first semester of the program.

All plans must include:

- EECS 802
- Minimum of 7 EECS courses numbered 700 or higher, excluding Directed Graduate Reading (EECS 801), Graduate Problems (EECS 891), Master's Thesis (EECS 899) and Post-Master's Research (EECS 998).
- Maximum of 2 courses numbered between 500-699 may be counted toward the hours required for the degree.
- 4 courses from the "Foundational" course list
- 5 courses from the "Elective" course list

Courses numbered below 500 will not count toward the degree.

M.Eng. plans of study will follow the "*predefined course lists*" (similar to those used by our current M.S. degree programs). The program will have one *predefined course list* for each focus area: Computer Science (https://eecs.ku.edu/computer-science-course-list/), Computer Engineering (https://eecs.ku.edu/computer-engineering-course-list/), or Electrical Engineering (https://eecs.ku.edu/electrical-engineering-course-list/). A M.Eng. Plan of Study not following a predefined course list will be required to have the EECS graduate committee assess the submitted plan of study, goals and justification.

The degree requirements for the M.Eng. in EECS program mirror those for our (coursework-only) M.S. degree programs.

Some more specifics of the degree requirement include:

(a) Every student can select or is assigned a faculty advisor in their first semester. The student will work with their faculty advisor to develop a formal plan of study that includes courses that are consistent with the student's academic background and identified degree and goals.

(b) Every plan of study will consist of 30 coursework credits and 1 credit of EECS 802.

(c) M.Eng. plans of study that follow the "*predefined course lists*" (similar to those used by our current M.S. degree programs) will be automatically approved by the EECS graduate committee. A predefined plan of study includes: (i) 4 courses from the "Foundational" course list, (ii) 5 courses from the "Elective" course list, (iii) one open elective course related to the student's professional goals, (iv) at least one semester of EECS Colloquium (EECS 802), (v) a maximum of 2 courses numbered between 500-699 may be counted toward the hours required for the degree. The program will have one *predefined course list* for each focus area (Computer Science, Computer Engineering, or Electrical Engineering). The predefined course lists for each our focus areas are listed below.

(d) M.Eng. plans of study not following a predefined course list will be required to have the EECS graduate committee assess the submitted plan of study, goals and justification.

(e) Every M.Eng. in EECS plan of study must adhere to the following rules: (i) a total of 30 hours of coursework, (ii) include at least one semester of EECS Colloquium (EECS 802 (https://catalog.ku.edu/archives/2024-25/search/?P=EECS%20802)) to be taken the first semester of the program, (iii) minimum of 7 EECS courses numbered 700 or higher, (iv) maximum of 2 courses numbered between 500-699, (v) maximum of 3 hours outside the EECS department (any elective course outside of other Engineering departments at KU, Physics or Math, will need to be petitioned to count towards the degree).

Predefined course lists:

The predefined course list for each focus area (Computer Science, Computer Engineering, or Electrical Engineering) are divided into the *foundational* and *elective* set of classes.

The predefined course list for M.Eng. students with a "Computer Science (CS)" focus is:

Foundation course list for CS focus (12 credit hours):

Code	Title	Hours
EECS 639	Introduction to Scientific Computing	3
EECS 730	Introduction to Bioinformatics	3
EECS 835	Advanced Data Science	3
EECS 836	Machine Learning	3
EECS 743	Advanced Computer Architecture	3
EECS 750	Advanced Operating Systems	3
EECS 762	Programming Language Foundation I	3
EECS 765	Introduction to Cryptography and Computer Security	3
EECS 780	Communication Networks	3

Elective course list for CS focus (15 credit hours):

Code	Title	Hours
EECS 649	Introduction to Artificial Intelligence	3
EECS 630	Advanced Data Structures and Algorithms	3
EECS 690	Special Topics: _____	1-3
EECS 700	Special Topics: _____	1-5
EECS 739	Parallel Scientific Computing	3
EECS 841	Computer Vision	3
EECS 742	Static Analysis	3
EECS 746	Database Systems	
EECS 753	Embedded and Real Time Computer Systems	3
EECS 755	Software Modeling and Analysis	3
EECS 764	Analysis of Algorithms	3
EECS 767	Information Retrieval	3
EECS 768	Virtual Machines	3
EECS 776	Functional Programming and Domain Specific Languages	3
EECS 781	Numerical Analysis I	3
EECS 782	Numerical Analysis II	3
EECS 837	Data Mining	3
EECS 843	Programming Language Foundation II	3
EECS 866	Network Security	3

The predefined course list for M.Eng. students with a "Computer Engineering (CoE)" focus is:

Foundation course list for CoE focus (12 credit hours):

Code	Title	Hours
EECS 630	Advanced Data Structures and Algorithms	3
EECS 644	Introduction to Digital Signal Processing	3
EECS 665	Compiler Construction	4
EECS 739	Parallel Scientific Computing	3
EECS 743	Advanced Computer Architecture	3
EECS 750	Advanced Operating Systems	3
EECS 762	Programming Language Foundation I	3
EECS 780	Communication Networks	3
EECS 786	Digital Very-Large-Scale-Integration	3

Elective course list for CoE focus (15 credit hours):

Code	Title	Hours
EECS 611	Electromagnetic Compatibility	3
EECS 628	Fiber Optic Communication Systems	3
EECS 649	Introduction to Artificial Intelligence	3
EECS 664	Introduction to Digital Communication Systems	3
EECS 690	Special Topics: _____	1-3
EECS 700	Special Topics: _____	1-5
EECS 730	Introduction to Bioinformatics	3
EECS 835	Advanced Data Science	3
EECS 836	Machine Learning	3
EECS 739	Parallel Scientific Computing	3
EECS 740	Digital Image Processing	3
EECS 742	Static Analysis	3
EECS 744	Digital Signal Processing Implementation in Programmable Logic Devices	3
EECS 753	Embedded and Real Time Computer Systems	3
EECS 759	Estimation and Control of Unmanned Autonomous Systems	3
EECS 764	Analysis of Algorithms	3
EECS 765	Introduction to Cryptography and Computer Security	3
EECS 767	Information Retrieval	3
EECS 768	Virtual Machines	3
EECS 769	Information Theory	3
EECS 776	Functional Programming and Domain Specific Languages	3
EECS 781	Numerical Analysis I	3
EECS 782	Numerical Analysis II	3

The predefined course list for M.Eng. students with a "Electrical Engineering (EE)" focus is:

Foundation course list for EE focus (12 credit hours):

Code	Title	Hours
EECS 628	Fiber Optic Communication Systems	3
EECS 713	High-Speed Digital Circuit Design	3
EECS 723	Microwave Engineering	3
EECS 728	Fiber-optic Measurement and Sensors	3
EECS 744	Digital Signal Processing Implementation in Programmable Logic Devices	3
EECS 780	Communication Networks	3

Code	Title	Hours
EECS 786	Digital Very-Large-Scale-Integration	3
EECS 820	Advanced Electromagnetics	3
EECS 861	Random Signals and Noise	3
EECS 862	Principles of Digital Communication Systems	3
EECS 863	Network Analysis, Simulation, and Measurements	3

Elective course list for EE focus (15 credit hours):

Code	Title	Hours
EECS 611	Electromagnetic Compatibility	3
EECS 622	Microwave and Radio Transmission Systems	3
EECS 649	Introduction to Artificial Intelligence	3
EECS 664	Introduction to Digital Communication Systems	3
EECS 670	Introduction to Semiconductor Processing	3
EECS 690	Special Topics: _____	1-3
EECS 700	Special Topics: _____	1-5
EECS 721	Antennas	3
EECS 725	Introduction to Radar Systems	3
EECS 836	Machine Learning	3
EECS 740	Digital Image Processing	3
EECS 743	Advanced Computer Architecture	3
EECS 769	Information Theory	3
EECS 780	Communication Networks	3
EECS 781	Numerical Analysis I	3
EECS 782	Numerical Analysis II	3
EECS 784	Science of Communication Networks	3
EECS 823	Microwave Remote Sensing	3
EECS 828	Advanced Fiber-Optic Communications	3
EECS 844	Adaptive Signal Processing	3
EECS 865	Wireless Communication Systems	3
EECS 868	Mathematical Optimization with Applications	3
EECS 869	Error Control Coding	3
EECS 881	High-Performance Networking	3
EECS 965	Detection and Estimation Theory	3