MASTER OF SCIENCE IN THE FIELD
OF COMPUTER ENGINEERING

Students in the computer engineering master’s program learn sophisticated computer architecture and integrated circuit design techniques using industry-standard computer-aided design tools. The master’s program offers a flexible schedule that includes late afternoon and evening classes as well as the ability to choose a thesis or non-thesis degree option.

Students acquire up-to-date knowledge and skills in the advances of computer systems architecture and networking, and in the rapidly growing use of superscalar microprocessors, real-time embedded systems, VLSI and ASIC design modules, digital signal processors, and networked computing platforms.

More information is available on the departmental website (https://www.ece.seas.gwu.edu/master-science-computer-engineering/).

ADMISSIONS

Admission deadlines:

- Fall - January 15
- Spring - September 1
- Summer - March 1 (non-F1 visa seeking applicants)

Standardized test scores: The Graduate Record Examination (GRE) is required of all applicants. (Institution code 5246). Average scores for our Fall 2014 incoming class were: 161 (Q), 148 (V), and 3 (W).

The Test of English as a Foreign Language (TOEFL), the academic International English Language Testing System (IELTS), or the PTE Academic is required of all applicants except those who hold a bachelor’s, master’s, or doctoral degree from a college or university in the United States or from an institution located in a country in which English is the official language, provided English was the language of instruction. Minimum scores:

- Academic IELTS: an overall band score of 6.0 with no individual score below 5.0; applicants requesting funding consideration must have an overall band score of 7.0 with no individual score below 6.0; or
- TOEFL: 550 on paper-based or 80 on Internet-based; applicants requesting funding consideration must have 600 on paper-based; or 100 on Internet-based; or
- PTE Academic: 53; applicants requesting funding consideration must have 68.

Recommendations required: Two (2) recommendations required. If possible, one recommendation should be from your advisor at the institution from which you earned your highest degree.

Prior academic records: Transcripts are required from all colleges and universities attended, whether or not credit was earned, the program was completed, or the credit appears as transfer credit on another transcript. Unofficial transcripts from all colleges and universities attended must be uploaded to your online application. Official transcripts are required only of applicants who are offered admission.

If academic records are in a language other than English, a copy in the original language and an English language translation must be uploaded. Transcript evaluations should not be uploaded. Applicants who have earned a degree from an Indian university are required to submit individual semester marksheets.

Statement of purpose: In an essay of 250 to 500 words, state your purpose in undertaking graduate study at The George Washington University; describe your academic objectives, research interests, and career plans; and discuss your related qualifications, including collegiate, professional, and community activities, and any other substantial accomplishments not already mentioned.

Additional requirements: Applicant must possess a B.S. in biomedical engineering, electrical engineering, computer engineering, or computer science with a grade point average of at least 3.0 (on a scale of 4.0) for the last 60 credits of undergraduate work. Students with a B.S. in another field may be admitted with a set of deficiency courses to be determined by the department.

All applicants must choose an area of focus that most closely matches their interests and note this on the online application. All applicants must submit a résumé or CV.

International applicants only: Please follow this link - https://graduate.admissions.gwu.edu/international-student-application-requirements (https://graduate.admissions.gwu.edu/international-student-application-requirements/) - to review the International Applicant Information carefully for details on required documents, earlier deadlines for applicants requiring an I-20 or DS-2019 from GW, and English language requirements.

For more information on the admission process, please visit the SEAS Frequently Asked Questions page. (http://graduate.seas.gwu.edu/apply/faq/)

Contact for questions: engineering@gwu.edu - 202-994-1802 (phone) - 202-994-1651 (fax)
9:00 – 5:00 pm, Monday through Friday

REQUIREMENTS

The following requirements must be fulfilled:
Thesis option—30 credits, including all requirements in one focus area and 6 credits in thesis. Non-thesis option—30 credits taken in one focus area.

Colloquium requirement: In addition to required coursework, students must attend five non-credit bearing colloquia as part of their program of study. Each colloquium attended is verified by a faculty member also in attendance. After attending five colloquia and prior to applying for graduation, a student must submit a colloquium attendance form, signed by the faculty advisor, to the department.

Focus areas

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<th>Code</th>
<th>Title</th>
<th>Credits</th>
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**Computer architecture and high-performance computing focus area**

Required

ECE 6005 Computer Architecture and Design

At least five courses selected from the following:

ECE 6105 Introduction to High-Performance Computing

ECE 6120 Advanced Microarchitecture

ECE 6125 Parallel Computer Architecture

ECE 6130 Big Data and Cloud Computing

ECE 6140 Embedded Systems

ECE 6150 Design of Interconnection Networks for Parallel Computer Architectures

ECE 6160 Secure Computing Systems

For thesis option

ECE 6998 Thesis Research I

ECE 6999 Thesis Research II

Electives*

Non-thesis option—6 credits in elective courses, 3 of which must come from outside of the area of focus list; thesis option—0 credits in elective courses.

**MEMS, electronics, and photonics focus area**

Required

ECE 6030 Device Electronics

Four courses selected from the following:

ECE 6020 Applied Electromagnetics

ECE 6210 Machine Intelligence

ECE 6213 Design of VLSI Circuits

ECE 6214 High-Level VLSI Design Methodology

ECE 6215 Microsystems Design, Simulation, and Fabrication for Sensor Applications

ECE 6216 RF/VLSI Circuit Design

ECE 6217 Neural Networks and Hardware Implementations

ECE 6218 Advanced Analog VLSI Circuit Design

ECE 6221 Introduction to Physical Electronics

Non-thesis option—12 credits in elective courses, 3 of which must come from outside of the area of focus list. For either option, at least 3 credits must come from outside of the area of focus list.
ECE 6240  VLSI Design and Simulation
ECE 6245  Microfabrication and Nanofabrication Technology
ECE 6250  ASIC Design and Testing of VLSI Circuits
ECE 6255  Sensors, Networks, and Applications
ECE 6260  Introduction to Nanoelectronics
ECE 6710  Microwave Engineering
ECE 6715  Antennas
ECE 6745  Analysis of Nonlinear and Multivalued Devices
ECE 6761  Light and Information
ECE 6765  Photonics and Fiber Optics
ECE 6770  Applied Magnetism

For thesis option
ECE 6998  Thesis Research I
ECE 6999  Thesis Research II

Electives *

Non-thesis option—15 credits in elective courses; thesis option—9 credits in elective courses. For either option, at least 3 credits must come from outside of the area of focus list.

*Normally, no more than two courses taken outside the Department of Electrical and Computer Engineering may be counted toward the requirements for the degree. Courses taken outside the department must have prior approval from the faculty advisor. In addition, no more than three 3000- or 4000-level ECE courses eligible for graduate credit may be counted toward requirements for the degree.

**Required for students who have not taken a course in probability and random processes at the undergraduate level or above.

Educational Planner

In consultation with an academic advisor, each student must develop an Educational Planner through DegreeMAP that governs the student’s plan of study. The Educational Planner should be established soon after matriculation and must be completed before the end of the student’s first semester. The Educational Planner must be approved by the advisor.

Visit the program website (https://www.ece.seas.gwu.edu/graduate-programs/) for additional information.