MASTER OF SCIENCE IN THE FIELD OF COMPUTER ENGINEERING

The master of science in computer engineering provides students with the latest knowledge and skills training to address contemporary advances in computer architecture and systems. It addresses the rapidly growing trends in high-performance computing, cloud and edge computing, data analytics, secured architectures and hardware, heterogeneous and multi-core processors, real-time embedded systems, energy efficient computing, scalable network-on-chip, 3-D stacking, approximate computing, and post-Moore’s law processors such as neuromorphic and nano-photonic processor architectures. The program also provides knowledge about VLSI, ASIC design, and digital signal processors. Students will learn sophisticated computer systems and integrated circuit design techniques using industry-standard computer-aided design tools and field programmable gate arrays (FPGAs). Students in the program will be able to choose one of two areas of focus: (a) Computer Architecture and High Performance Computing; or (b) MEMS, Electronics, and Photonics.

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

REQUIREMENTS

The following requirements must be fulfilled:

30 credits are required for the degree. Non-thesis and thesis options are available. For the thesis option, 6 of these credits are taken in ECE 6998 and ECE 6999. For either option, the student must select one focus area from the chart below and complete the specified number of credits for that 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, the student must submit to the department prior to applying for graduation a colloquium attendance form signed by the faculty advisor.

### Computer Architecture and High-Performance Computing

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ECE 6005</td>
<td>Computer Architecture and Design</td>
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At least five of the following courses:

- 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 8150 Advanced Topics in Computer Architecture

For thesis option

- ECE 6998 Thesis Research
- ECE 6999 Thesis Research

### MEMS, Electronics, and Photonics

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ECE 6030</td>
<td>Device Electronics</td>
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4 of the following:

- ECE 6213 Design of VLSI Circuits
- ECE 6214 High-Level VLSI Design Methodology
- ECE 6215 Introduction to MEMS
- ECE 6216 RF/VLSI Circuit Design
- ECE 6218 Advanced Analog VLSI Circuit Design
- ECE 6221 Introduction to Physical Electronics
- ECE 6240 VLSI Design and Simulation
- ECE 6245 Micro- and Nanofabrication Technology
- ECE 6250 ASIC Design and Testing of VLSI Circuits
- ECE 6260 Introduction to Nanoelectronics

For thesis option

- ECE 6998 Thesis Research
<table>
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<tr>
<th>Electives*</th>
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<tr>
<td>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.</td>
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</tbody>
</table>

*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 student's faculty advisor. In addition, no more than three 3000- or 4000-level ECE courses that have been approved for graduate credit may be counted toward the requirements for the degree.

**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.

Additional program requirements can be found on the Department of Electrical and Computer Engineering Master's Degree requirements (https://www.ece.seas.gwu.edu/graduate-programs/) webpage.