Computer Engineering M.S.

The plan in Computer Engineering leads to the master of science (M.S.) degree. Graduate study in this plan prepares students to occupy leading roles in the development and use of computers and computing systems. The plan in Computer Engineering addresses the evaluation, design and implementation of computer systems for various applications. The curriculum and faculty research emphasize the integration of systems design, software applications and hardware design. Current specializations within the computer engineering degree plan include robotics, embedded system design, digital signal and image processing, integrated circuits and systems, communication and networks and high performance computing. The plan consists of formal courses, laboratory work and research in one of the specialty areas conducted under the guidance of a faculty adviser. Students have two degree completion options: thesis option (33 credit hours) or extended course work option (36 credit hours).

Degree Requirements

Computer Engineering Basic Preparation

Candidates should have a bachelor’s degree in Computer Engineering or related areas. Students should consult an academic adviser to determine if they have sufficient background to satisfy the required foundation courses. At a minimum, the following foundation courses, or their equivalents, are required and should be completed prior to enrolling in certain graduate courses:

### Core Requirements (15 hours)

**Computer Engineering Core Requirements (15 hours)**

The following courses or their approved substitutions are required for both the thesis and the extended course work options.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>CENG 5131</td>
<td>Engineering Applications</td>
</tr>
<tr>
<td>CENG 5133</td>
<td>Computer Architecture Design</td>
</tr>
</tbody>
</table>

Students will select two more core courses from the following list:

<table>
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<tbody>
<tr>
<td>CENG 5334</td>
<td>Fault Tolerant Computing</td>
</tr>
<tr>
<td>CENG 5431</td>
<td>Digital Signal Processing</td>
</tr>
<tr>
<td>CENG 5433</td>
<td>Principles of Digital Communications Systems</td>
</tr>
<tr>
<td>CENG 5434</td>
<td>Microcomputer Systems Design</td>
</tr>
<tr>
<td>CENG 5534</td>
<td>Advanced Digital System Design</td>
</tr>
<tr>
<td>CENG 6533</td>
<td>Robotics</td>
</tr>
</tbody>
</table>
Elective Requirements for Thesis Option (18 hours)

Computer Engineering Elective Requirements (18 hours thesis option, 21 hours non-thesis)

The following courses or their approved substitutions are required for both the thesis and the extended course work options. 6 hours of CENG courses 5100-6000 level, 3 hours of CENG/CSCI/SWEN/SENG courses 5100-6000 level, 3 hours of CENG/CSCI/SWEN 4000-6000 level: 3 hours thesis option, 6 hours non-thesis, 6 hours of Master’s thesis.

Extended Course Work Option (21 hours)

Extended Course Work Option (21 hours)

12 hours of CENG courses 5100-6000 level, 3 hours of CENG/CSCI/SWEN/SENG courses 5100-6000 level, 3 hours of CENG/CSCI/SWEN courses 4000-6000 level, 3 hours of Research Project and Seminar.

CENG 6838: Research Project and Seminar

Additional Information

Prior approval of non-CENG electives is required from the faculty adviser. CENG 6838 must be taken in the semester in which the student applies to graduate. Up to 3 hours of combined internship and co-op can be used as an elective with approval of the faculty adviser.

Robotics Specialization

Robotics

Students interested in a Robotics Specialization should take the following courses:

CENG 5435: Robotics and ROS Credit Hours: 3
CENG 5436: Computer Vision and Applications Credit Hours: 3
CENG 5531: Machine Learning and Applications
CENG 6533: Robotics

Communication and Networks Specialization

Communication and Networks

Students interested in a Communication and Networks Specialization should take the following courses:

CENG 5331: Theory of Information & Coding
CENG 5332: Wireless Communications & Networks
CENG 5433: Principles of Digital Communications Systems
CENG 5532: Tele-Medicine Credit Hours: 3
CENG 5535: Wireless Sensor Networks Credit Hours: 3

Digital Signal and Image Processing Specialization

Digital Signal and Image Processing

Students interested in a Digital Signal and Image Processing Specialization should take the following courses:

CENG 5431: Digital Signal Processing
CENG 5436: Computer Vision and Applications Credit Hours: 3
CENG 5631: Digital Image Processing Credit Hours: 3
CENG 6431: DSP Implementations
CENG 6432: Bio-Medical Signal Processing Credit Hours: 3

Integrated Circuits and Systems Specialization

Integrated Circuits and Systems

Students interested in an Integrated Circuits and Systems Specialization should take the following courses:

CENG 5335: Digital Systems Testing
Embedded System Design Specialization

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<td>CENG 5434</td>
<td>Microcomputer Systems Design</td>
</tr>
<tr>
<td>CENG 5534</td>
<td>Advanced Digital System Design</td>
</tr>
<tr>
<td>CENG 6534</td>
<td>Digital Systems Synthesis and Optimization</td>
</tr>
</tbody>
</table>