Electrical and Computer Engineering (EECE)

Chairperson: Edwin E. Yaz, Ph.D., P.E.
Electrical and Computer Engineering Graduate Programs website (http://www.marquette.edu/engineering/electrical_computer/grad.shtml)

Degrees Offered
Master of Science; Doctor of Philosophy

Mission Statement
The Department of Electrical and Computer Engineering embraces the missions of Marquette University and its College of Engineering. The mission of the Department of Electrical and Computer Engineering is to offer its students high quality, up-to-date, nationally-recognized programs in electrical and computer engineering that prepare them for successful careers. This success is marked by a commitment to lifelong learning and a deep concern for the impact of their work on others, research that advances the frontiers of technical and scientific knowledge and service to professional and civic communities.

Program Description
The master of science and doctor of philosophy degree programs are designed to provide graduate students with both broad fundamental knowledge and up-to-date information on current and emerging technologies. Students may enroll on either a full-time or part-time basis (with the exception of the one-year residency requirement for doctoral students). Doctoral students and research-oriented master’s students engage in research activities under the close supervision of their advisers, gradually learning to become independent researchers. Their projects often are supported by government and industry grants. Courses and research activities make significant use of the department’s extensive laboratory and computer facilities. Graduates find employment in industry, research facilities, government and academia.

Prerequisites for Admission
Graduates of accredited colleges or universities with bachelor's degree in electrical engineering, computer engineering or equivalent are eligible for admission. Only those applicants whose undergraduate records show promise of success in graduate study are admitted. To qualify for admission, applicants must have, as a minimum, approximately a B average in their total post-secondary school education.

A master of science degree or equivalent in an appropriate field of study is required for admission to the doctoral program. Applicants with bachelor's degrees must first be admitted to and successfully complete the master of science degree program and may then continue into the doctoral program.

Application Requirements
Applicants must submit, directly to the Graduate School:

1. A completed application form and fee online (http://marquette.edu/grad/future_apply.shtml).
2. Copies of all college/university transcripts except Marquette.
3. Three letters of recommendation.
5. GRE test scores (General Test only).
6. (For international applicants only) a TOEFL score or other acceptable proof of English proficiency.

Upon admission, final official transcripts from all previously attended colleges/universities, with certified English translations if original language is not English, must be submitted to the Graduate School within the first five weeks of the term of admission or a hold preventing registration for future terms will be placed on the student’s record.

General Information
All admitted students are required to obtain and read the department’s Graduate Student Handbook (http://www.marquette.edu/engineering/electrical_computer/documents/gradhandbook2010.pdf), which contains complete details about the electrical and computer engineering programs and additional departmental degrees. This handbook is available through the Electrical and Computer Engineering Office, (414) 288-6820 and on the department’s graduate programs website (http://www.marquette.edu/engineering/electrical_computer/grad.shtml).

Electrical and Computer Engineering Master’s Requirements
The EECE department offers two options for earning a master's degree: a thesis option (Plan A) and a non-thesis/course work option (Plan B). By the end of the first term of full-time studies, all master's students must meet with the academic adviser and together complete a Master's Program Planning Form. This planning form will identify the chosen option (Plan A or B) as well as the proposed set of courses for their program of study. Full details of...
the master's degree programs can be found in the EECE Graduate Student Handbook (http://www.marquette.edu/engineering/electrical_computer/documents/gradhandbook2010.pdf).

Students must choose one or more from the list of the EECE Department focus areas:

- Control Systems and System Integration
- Computing Systems Hardware and Software
- Electromagnetics and Remote Sensing
- Micro- and Nano-Systems and Sensors
- Power Electronics and Energy Systems
- Signal Processing and Computer Vision

**Thesis Option (Plan A)**

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 6010</td>
<td>Advanced Engineering Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>EECE 6020</td>
<td>Probability and Random Processes in Engineering</td>
<td>3</td>
</tr>
<tr>
<td>Additional courses determined in consultation with adviser.</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>EECE 6952</td>
<td>Department Colloquium</td>
<td>0</td>
</tr>
<tr>
<td>EECE 6999</td>
<td>Master's Thesis</td>
<td>6</td>
</tr>
</tbody>
</table>

Total Credit Hours: **30**

- At least 12 of the 18 credits hours of course work must be taken in EECE.
- At least 12 credit hours (exclusive of thesis) must be taken strictly at the graduate level (6000 or 8000-level).
- Students must work with their adviser to choose the 18 course credits.
- Students must successfully complete and defend a research thesis under the guidance of their faculty advisers and thesis committee members.

**Non-Thesis/Course Work Option (Plan B)**

**Required Courses**

<table>
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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>EECE 6010</td>
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<td>EECE 6020</td>
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<td>3</td>
</tr>
<tr>
<td>Additional courses determined in consultation with adviser.</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>EECE 6952</td>
<td>Department Colloquium</td>
<td>0</td>
</tr>
</tbody>
</table>

Total Credit Hours: **30**

- At least 21 credit hours must be in EECE.
- At least 18 credits of the total program course work and at least 12 credits of the EECE course work must be taken strictly at the graduate level (6000 or 8000-level).
- Students must successfully pass the master of science comprehensive written examination, given in fall and spring term, prior to graduation. The exam covers material from the two required core courses EECE 6010 Advanced Engineering Mathematics and EECE 6020 Probability and Random Processes in Engineering and a selected focus area from the list provided above.
- Students together with the director of graduate studies (DGS) must select their focus area(s) from the EECE Department list provided above.

**Accelerated Bachelor’s–Master’s Degree Program**

The EECE Department offers an accelerated degree program where eligible students may obtain both a bachelor's degree and a master of science degree in electrical and computer engineering in five years.

- Students with a GPA of 3.500 or better in their mathematics, science and engineering courses are eligible to apply to this program in their junior year.
• This program is available to undergraduate students in electrical and computer engineering or in physics.

• Students wishing to participate in the five-year program must apply and be admitted to the program before their senior year.

### Electrical and Computer Engineering Doctoral Requirements

The EECE doctoral program requires a total of 36 credit hours for post-master’s students: 24 credit hours of course work, plus 12 additional credits in EECE 8999 Doctoral Dissertation. (A master’s degree is considered to be the equivalent of 24 course work credits.) The EECE doctoral program requires a total of 60 credits hours for post-baccalaureate students: 48 credit hours of course work, plus 12 additional credits in EECE 8999 Doctoral Dissertation.

Students must choose one or more from the list of the EECE Department focus areas:

- Control Systems and System Integration
- Computing Systems Hardware and Software
- Electromagnetics and Remote Sensing
- Micro-and Nano-Systems and Sensors
- Power Electronics and Energy Systems
- Signal Processing and Computer Vision

### Program Requirements

Courses are typically taken in the first two years of study and must form a cohesive overall plan of study as determined mutually by each student and their adviser.

**Post-master’s program requirements:**

<table>
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<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>EECE 6010</td>
<td>Advanced Engineering Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>EECE 6020</td>
<td>Probability and Random Processes in Engineering</td>
<td>3</td>
</tr>
<tr>
<td>Additional courses as approved by adviser.</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>EECE 6952</td>
<td>Department Colloquium (taken by all full-time students every academic term)</td>
<td>0</td>
</tr>
<tr>
<td>EECE 8999</td>
<td>Doctoral Dissertation (taken over several terms)</td>
<td>12</td>
</tr>
<tr>
<td><strong>Total Credit Hours</strong></td>
<td><strong>36</strong></td>
<td></td>
</tr>
</tbody>
</table>

- The written qualifying examination (WQE) is required to be taken by the beginning of the fourth term of study, after taking EECE 6010 Advanced Engineering Mathematics and EECE 6020 Probability and Random Processes in Engineering.
- The WQE is administered twice per year. Following successful completion of the WQE, students become doctoral candidates and move forward to pursue their dissertation research.
- The doctoral dissertation process requires declaration of a faculty dissertation committee, presentation of an oral proposal to the committee, submission of a dissertation outline to the Graduate School, and finally a public dissertation defense of the research work.

Full details of the requirements of the doctoral program can be found in the EECE Graduate Student Handbook (http://www.marquette.edu/engineering/electrical_computer/documents/gradhandbook2010.pdf).