PhD in Electrical and Computer Engineering

Admission Contact Information
349 Engineering Building West
Columbia, MO 65211
(573) 882-4436
Email: umcengrecegradoff@missouri.edu

The ECE department offers the Doctor of Philosophy in Electrical and Computer Engineering.

Admission Criteria for the PhD Electrical or Computer Engineering

Deadline for Fall entrance: February 15
Deadline for Spring entrance: September 1

• Minimum GPA: 3.5 (with A = 4.0) in the last 60 hours of the MS graded coursework
• Minimum GRE scores:

When did you take the GRE?

<table>
<thead>
<tr>
<th>Verbal</th>
<th>Quantitative</th>
<th>Analytical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior to August 1, 2011</td>
<td>90th percentile</td>
<td>will be considered</td>
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<tr>
<td>On or After August 1, 2011</td>
<td>90th percentile</td>
<td>will be considered</td>
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</tbody>
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International applicants only:

• Minimum TOEFL scores:

<table>
<thead>
<tr>
<th>Internet-based test (iBT)</th>
<th>Paper-based test (PBT)</th>
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<tbody>
<tr>
<td>80</td>
<td>550</td>
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• Minimum Academic IELTS scores:

<table>
<thead>
<tr>
<th>Item</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listening</td>
<td>5.5</td>
</tr>
<tr>
<td>Reading</td>
<td>5.5</td>
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<tr>
<td>Writing</td>
<td>5.5</td>
</tr>
<tr>
<td>Speaking</td>
<td>5.5</td>
</tr>
</tbody>
</table>

• Holds the equivalent of a BS degree in electrical or computer engineering with an outstanding record, or holds the equivalent of an MS degree in electrical or computer engineering

Consideration in doctoral program admissions is given to the applicant’s grade trends, experience and maturity, and to the availability of expertise in areas of the applicant’s technical interest.

Required Application Materials

• Statement of Purpose (upload to the Supplemental information section of the application)
• Copies of your official transcripts (upload to the Educational History section of the application)
• Copies of your GRE scores (upload to the Test Information section of the application)
• Copies of your TOEFL or IELTS Scores (for non-native English speakers only) (upload to the Test Information section of the application)
• 3 letters of Recommendation (the department accepts electronic recommendations – in the recommendation section of the online application, enter the information for three recommenders. Each recommender will receive an email with instructions on how to complete the recommendation). The department does also accept hard copy letters of recommendation. The letters may be mailed to: Graduate School, 210 Jesse Hall, Columbia, MO 65211.

To the Office of Graduate Studies:
Official Transcripts. The mailing address is: Office of Graduate Studies, 210 Jesse Hall, Columbia, MO 65211.

Note: when registering for GRE or TOEFL exams, be sure to designate your program of interest at the University of Missouri-Columbia. MU’s Institutional Code is 6875 (no departmental code is necessary).

To be accepted outright by the director of graduate studies (DGS), the student needs to have an MS degree in either Electrical Engineering or Computer Engineering.

Students who meet the academic requirements but have degrees in other engineering or science disciplines can be accepted into the PhD program by the Graduate Program Committee (GPC).

Students who don’t meet the above requirements may still be admitted by the GPC if there are mitigating factors. Consideration in doctoral program admissions is given to the applicant’s grade trends, experience and maturity, and to the availability of expertise in areas of the applicant’s technical interest.

Outstanding BS students who meet the following requirements may be accepted directly for advisement in the department’s doctoral program:

• Holds the equivalent of a BS degree in electrical or computer engineering
• GRE quantitative score of at least the 90th percentile
• TOEFL score of at least 550 paper-based. IELTS score: 5.5
• A 3.5 or better grad point average (A=4.0) in their undergraduate studies
• Submission of three letters of recommendation from persons familiar with the applicant’s engineering or related work
• Submission of a statement of research interests

Additional information can be obtained from the Graduate Division of the Department of Electrical and Computer Engineering, 349 Engineering Building West, Columbia, MO 65211, or via email: umcengrecegradoff@missouri.edu

Appeal Process

All students have the right to a timely formal appeal to the GPC. Upon receipt of an admission decision or disciplinary action, the student has 10 working days in which to request a formal appeal. The DGS will convene a meeting of the GPC, the student, and the student’s advocate (if appropriate) within 10 working days of receiving the request. The decision of the GPC at the hearing is final.

Transfer of Credit

The doctoral committee may recommend up to 30 hours of post-baccalaureate graduate credit from an accredited university be transferred toward the total hours required for the doctoral degree.
It is the responsibility of the doctoral committee to determine the appropriateness of coursework for transfer credit. All requests for exceptions to this policy must be approved by the Office of Graduate Studies. This policy applies to students who begin their enrollment during the Fall Term 2006 and subsequent semesters.

(Note: The preceding represents a change in policy and becomes effective for graduate students beginning their doctoral programs during the Fall semester 2006. For students who began their doctoral programs prior to the fall 2006 semester, consult the appropriate catalog or the Office of Graduate Studies for policies pertaining to transfer of credit.)

The committee may recommend that courses taken through MU's Extension division be counted toward the credit hour requirement. Extension or correspondence course work from institutions other than MU may not be used to meet the total hours required for the doctoral degree.

Time Limits on Transfer Credits

All courses to be applied to the plan of study must be completed within 8 years of filing the plan.

Requirements to obtain the PhD degree in Electrical Engineering and Computer Engineering

1. The student must be qualified to be a PhD candidate. Students admitted with an MS degree must prove competency in a written qualifying examination conducted by a PhD qualifying committee within 3 semesters of admission.

   Students admitted directly from a BS degree program must complete the 24 hours of graded coursework requirements of the MS degree during the first two years of their program. This will prepare them for the PhD qualifying examination process, to be passed within 4 semesters after this requirement is satisfied, and will allow them to obtain an MS degree if a thesis or project report is completed and defended, consistent with MS requirements, or to obtain an ME degree once the course work requirement has been satisfied. A student may petition the faculty for an extension of the two year requirement.

2. A minimum of 72 semester hours beyond the BS are required by the Graduate School; the student's doctoral program committee sets the total number of credit hours and specific courses to be completed as part of his/her PhD program. However, the Graduate School requires a minimum of 15 hours of 8000/9000 level classes to be taken at MU exclusive of research, problems, and supervised study.

3. The candidate must pass a written and oral comprehensive examination.

4. The student must complete a doctoral dissertation on a topic approved by his or her Doctoral Advisory Committee and defend the dissertation in an oral final examination.

Selection of an Advisor

The student selects an advisor or co-advisors, by mutual consent, from doctoral faculty members who are dissertation supervisors in the department or area program in which the major work is planned. In the event that an advisor retires or leaves MU, he/she may continue to serve as a student’s advisor unless there is written academic program policy prohibiting such an arrangement. If an advisor is unable or unwilling to continue to serve, the academic program, with the leadership of the director of graduate studies, will assist to ensure that a replacement is found.

Doctoral Degree Forms

By the end of the second semester of study at MU, a student should begin submitting degree program forms which will aid the academic program and the Graduate School in tracking the student’s progress toward degree completion. These forms include the following:

- D1 Qualifying Exam Results & Doctoral Committee Approval (http://gradstudies.missouri.edu/forms-downloads/repository/d1.pdf) Submitted after passing qualifying exams
- D2 Plan of Study Form (http://gradstudies.missouri.edu/forms-downloads/repository/d2.pdf) Submitted no later than the end of the student’s third semester.
- D3 Result of the Comprehensive Examination (http://gradstudies.missouri.edu/forms-downloads/repository/d3.pdf) Submitted to the Graduate School within one month of exam completion
- Change of Committee (http://gradstudies.missouri.edu/forms-downloads/repository/cocform.pdf)
- Plan of Study Course Substitution Form (http://gradstudies.missouri.edu/forms-downloads/repository/subform.pdf)

More information is available at: http://gradstudies.missouri.edu/academics/graduation-requirements/doctoral-grad-requirements.php

Qualifying Examination/Process

To be officially admitted to the PhD program, the student must pass a qualifying examination/process. The student is given two opportunities to pass the Qualifying Examination with a score of 70% or above.

Qualifying Exam Rules

1. To be eligible to take the Qualifying Examination, graduate students must be accepted for advisement in the Ph.D. program. The examination must be passed before the end of his or her second year of advisement as a Ph.D. student. Each student may take the exam twice. Students who have been accepted into the PhD program with a BS degree must complete the 24 hours of graded coursework requirements of the MS degree during the first two years of their program. This will prepare them for the PhD qualifying examination process, to be passed within two years after the requirement is satisfied, and will allow them to obtain an MS degree if a thesis or project report is completed and defended, consistent with the MS requirements, or to obtain an ME degree once the course work

These PhD requirements apply to ECE graduate students first enrolled in MU ECE in the Fall semester 2007 or later. UM ECE graduate students enrolled prior to Fall semester 2007 may choose to follow the MU ECE PhD requirements that were in effect for their MU ECE graduate admission semester.
A student may petition the faculty for an extension of the two year requirement.

2. All eligible students who intend to take the exam must complete the REQUEST FOR QUALIFYING EXAMINATION form and submit it to the ECE Graduate Office within four weeks after the start of the semester. At this time the student will be asked to select two of the seven topic areas over which he or she wishes to be examined. Only students on the approved lists will be allowed to take the exam. When a student submits the REQUEST FOR QUALIFYING EXAMINATION form, the Graduate Office will provide:
   a. The date, time and place of the examination;
   b. A reminder to bring their ID card to the exam.
   c. A copy of the Qualifying Examination Rules.
   d. A copy of the Guidelines For Qualifying Exam Committee.

3. The examination shall be prepared and administered during the 12th week of both the fall and winter semesters by the Qualifying Examination (QE) Committee. The ECE Graduate Committee currently serves as the QE Committee since it contains a representative from each of the 6 focus areas in the department. The Graduate Director will select the specific date, time and place of the exam at the beginning of each semester.

4. It shall be a written examination taken by all students desiring to qualify during the given semester.

5. The exam will contain five questions from each of the two areas selected by the student. Each student must select and answer five questions from this set, with no more than three questions from one area. The exam will be closed book, with two standard pages of notes, front and back, allowed. A book of mathematical tables will be provided by the department. The exam will last four hours.

6. The QE committee shall administer the examination and identify passing candidates. The ECE faculty as a whole have the responsibility to approve that action.

Qualifying Examination Guidelines

These guidelines have been prepared to help maintain consistency in the form and difficulty of the Department’s qualifying examination.

1. The QE Committee shall consist of one faculty representative from each of the following topic areas, except Foundations:
   a. Communications and Signal Processing Area;
   b. Intelligent Systems Area;
   c. Physical and Power Electronics Area;
   d. System Modeling and Control;
   e. Micro/Nano Electronics;
   f. Digital/Computer Systems; and
   g. Applied Physics
   h. Foundations

2. The ECE graduate Committee serves as the QE Committee since it contains a representative from each research area. The ECE department chair appoints the Graduate Committee with input from the Graduate Director.

3. The faculty from each topic area will be responsible for maintaining a list of topics which constitute the core material an MS graduate should be expected to have mastered. The members of each group will be responsible for preparing questions for the exam covering topics from the list. For the major core focus area, questions will come from 4000/7000 – 8000 level courses. Questions for the topics in the Foundation area will be from a set of required 3000 level courses.

4. The QE Committee will solicit questions from the faculty group, but the Committee will have the responsibility of combining these questions into a fair, comprehensive exam. The QE Committee member for each group will be responsible for coordinating his or her group. The representatives of each topic group shall call a meeting of all faculty from that group for the purpose of reviewing the exam questions to be submitted to the Qualifying Exam Committee. The group’s submission must be approved by a majority vote of those present.

5. Solutions will be graded by faculty members who prepared the questions. The grading must be completed within two weeks after the exam. A guideline is that each question should be doable by a strong MS graduate in 40 to 45 minutes.

6. Solutions will be graded on a 100 point scale with 70 points as a minimum passing grade.

7. Each student’s performance will be reviewed by the QE Committee and a majority vote of the QE Committee is required for passing.

8. The QE Committee must report the results of the exam to the ECE Faculty within four weeks of the exam.