

**MEMORANDUM TO GRADUATE STUDENTS
IN
ELECTRICAL ENGINEERING
(New: Effective for Spring 2018 and Future Enrollees)**

Subject: School of Electrical and Computer Engineering Policies
With Regard to Graduate Studies

This memorandum supplements the information and instructions given in the most recent edition of the OSU University Catalog. It is the responsibility of every graduate student to be familiar with the general requirements associated his/her degree program as listed in the Catalog. Specific requirements and options relevant to graduate studies in the School of Electrical and Computer Engineering (ECE) are described herein.

Essential information for all graduate students in the School of Electrical and Computer Engineering is as follows:

New Students:

Prior to or shortly after enrolling in the Graduate College, students who are pursuing a graduate degree in the School of Electrical and Computer Engineering should contact the Graduate Coordinator in the departmental office (Room 202, Engineering South) for initial advisement. The Graduate Coordinator will assist all incoming graduate students with the selection of first semester courses.

By the middle of the first semester, every graduate student should have contacted and identified an academic advisor to oversee their graduate work.

All Students:

Students are directed to the Graduate College for information regarding the sequence of requirements and milestones. Specifically, note that

- **The application for degree (diploma application) must be submitted to the Graduate College at the BEGINNING of the term in which the degree is to be conferred.**
- **A student MUST be enrolled in a minimum of two (2) credit hours during the semester in which degree requirements are completed.**

MASTER OF ENGINEERING DEGREE:

The Master of Engineering in Electrical Engineering (MEngEE) is a professional degree offered under the OSU Graduate College Professional Path (Plan II). It is intended for students who wish to enhance their professional qualifications for an enhanced engineering career in the workforce. The degree requires 33 graduate credit hours.

Students in the MEngEE program **are required** to take courses in at least four areas of ECEN at the 5000 level (designated by second digit of the course number) or above. The degree program requirements are summarized in the following table:

MEngEE (33 hrs.)	
TECHNICAL ELECTIVE (Outside Dept., 4000 level or above)	3 hours
ECEN GRADUATE LEVEL COURSES (ECEN 5000 level or above. May include up to three (3) hours of ECEN 5070 with approval of the student's graduate advisory committee.)	21 hours
ECEN COURSE APPROVED FOR FOR GRADUATE CREDIT (Approved ECEN 4000 level or above)	3 hours
ADDITIONAL COURSES (Must be approved for graduate credit. May include non-ECEN graduate level courses with approval of the student's graduate advisory committee)	6 hours
ECEN 5010 MEng Assessment	0 hours
Note: ENGL4893 RESEARCH WRITING FOR INTL GRAD (3 credit hours) <u>cannot</u> be used toward the degree.	

Additional MEngEE Degree Requirements:

- A.** Students **MUST** take any remedial courses at the first enrollment opportunity after entrance into the MEngEE program.
- B.** Up to three (3) 4000 level ECEN courses that have been **approved for graduate credit** within the ECEN program may be included on the MEngEE Plan of Study. The list of approved courses is included at the end of this memorandum.

- C. The minimum requirement of 21 hours of graduate-level courses in ECEN MAY NOT include the following courses: ECEN 5000, 5030 and 6050.
- D. Graduate College regulations **REQUIRE** a minimum of 21 hours of 5000-level courses on all MEngEE Plans of Study.
- E. Students who do not have a BSEE or BSCpE degree **MAY** include **only one** “outside” ECEN course on their MEngEE Plan of Study. **All** students **MUST** have at least one “outside” ECEN course.
- F. For the technical elective (3 hours), courses that are cross-listed with ECEN must be approved by the student’s advisor.
- G. Students must enroll in ECEN 5010 MEng Assessment in the semester in which they complete their degree requirements. Students will prepare a poster presentation documenting a major design project performed in coursework during the MEng program. The presentation will be given to the ECE Graduate Assessment Committee during the last week of the semester.

Entrance Requirements:

- A. 3.0 GPA in an accredited BSEE or BSCpE program is the standard for admission to the MEngEE program. However, applicants with lower GPA **may be granted** probationary admission. Students who have bachelor’s degrees in other engineering fields **may be admitted** to the MEngEE program, **subject to** the same GPA requirements. These candidates will be expected to take enough prerequisite courses (from undergraduate ECEN courses, and perhaps some courses in Mathematics, Computer Science and/or Physics) to accomplish two ends: (a) to assure a reasonable basis for success in the graduate courses associated with the MEngEE degree; and, (b) to assure that when the candidate enters the workforce with the MEngEE degree, there will be no potential deficiencies in the candidate’s technical background. This may require some prerequisite courses in areas of study in which the student has little interest and in which he/she has no intention of practicing after graduation. Students are sometimes admitted to an MEngEE program with a grade of “C” in one or two junior- or senior-level courses. Students **may be required**, as a condition of admission to the MEngEE, program to repeat such courses, or take another undergraduate-level course in the same or closely related area of study. A grade of “B” **MUST** be attained for such prescribed prerequisite courses.
- B. Students admitted unconditionally to the program are assumed competent to take the required MEngEE courses. If the student feels unprepared for one of the required classes, he/she may enroll in the appropriate prerequisite courses.
- C. Students admitted conditionally should enroll in the necessary undergraduate prerequisite courses as a first priority. Graduate courses may be taken concurrently with prerequisite courses in other areas. Students need not necessarily complete all prerequisite courses before taking the first 5000-level courses.
- D. Note: The aforementioned prerequisite courses do not count towards the degree requirements of the MEngEE degree. That is, these prerequisite courses are not listed in the Plan of Study.
- E. The School of Electrical and Computer Engineering **waives** the foreign-language requirement for MEngEE degree.

Graduate record examination:

Scores for the Graduate Record Examination (GRE) general exam must be submitted with the application. Applicants scoring 153 and higher on the verbal section and 155 and higher on the quantitative section of the GRE have proven to be competitive within the ECE graduate program.

Retention standards:

The Graduate College bulletin sets forth certain minimum grade standards for retention: **The School of Electrical and Computer Engineering expects all candidates to attain grades of “B” or better in all courses taken as graduate students, whether prerequisite courses or courses listed as part of the Plan of Study. A grade below “B” in a prerequisite course is cause for suspension. A grade below “C”, or more than two (2) “C’s” in graduate courses will result in suspension. A GPA of 3.0 or above in graduate courses must be maintained.**

A preliminary **Plan of Study** for the MEngEE degree should be worked out by the student and with his/her advisor. This plan should include a listing of course work and an estimate of the time schedule. **The initiative for proposing a Plan of Study lies with the student.** The Graduate College requires that a MEngEE Plan of Study be filed **BEFORE** the student registers for his/her 17th hour of graduate credit. The approval of the student’s advisor and two other faculty members as well as that of the Dean of the Graduate College is required for all MEngEE Plans of Study.

Plans of Study may be revised from time to time; the revision is accomplished by submitting a new plan as outlined above. **The Graduate College REQUIRES that the final plan be filed before registration for the semester in which the necessary work for the degree will be completed.**

“4+1” Accelerated Master of Engineering

Students admitted to the ECE “4+1” accelerated Master of Engineering program may apply up to nine (9) credit hours that have been applied to an OSU BSEE or BSCpE degree plan of study to the MEng plan of study. Such students will require an additional 24 hours of graduate course work. Students may apply to the accelerated Master’s program at any time after the completion of 90 credit hours toward the BS degree. The dual-credit hours must be ECE courses approved for graduate ECE credit as designated at the end of this memorandum and the student must have earned an “A” or “B” in each dual-credit course. All other admission and degree requirements must be met..

MASTER OF SCIENCE DEGREE:

The Master of Science in Electrical Engineering (MSEE) degree is an academic, research-based degree offered under the OSU Graduate College Traditional Path (Plan I) including a thesis. It is intended for students who wish to make fundamental contributions to the understanding and practice of engineering science and techniques. It is also intended to prepare students for the Ph.D. program. The degree requires 30 hours of graduate-level credit, including 6 hours of Thesis credit.

Students in the MSEE degree program **are required** to take courses in at least two areas of ECEN at the 5000 level (designated by the second digit of course number) or above. A summary of the degree requirements is given in the following table:

MSEE (30 hrs.)	
TECHNICAL ELECTIVE (Outside Dept., 4000 level or above)	3 hours
ECEN GRADUATE LEVEL COURSES (ECEN 5xxx or above. May not include ECEN 5000, ECEN 5030, or ECEN 5070.)	18 hours
THESIS	6 hours
ECEN 5070 or ECEN Grad. Level Course	3 hours
Note: ENGL4893 RESEARCH WRITING FOR INTL GRAD (3 credit hours) <u>cannot</u> be used toward the degree.	

Additional MSEE Degree Requirements:

- A.** Students **MUST** take any remedial courses at the first enrollment opportunity after entrance into the MSEE program.
- B.** Up to two (2) 4000 level ECEN courses that have been **approved for graduate credit** within the ECEN program may be included on the MSEE Plan of Study. The list of approved courses is included at the end of this memorandum.
- C.** No course required for the BSEE or BSCpE degree at OSU may appear on the MSEE Plan of Study.
- D.** No OSU course equivalent to a course applied to a Bachelor's degree at OSU or another institution may be included on the MSEE Plan of Study.
- E.** The minimum requirement of 18 hours of graduate-level courses in ECEN **MAY NOT** include the following courses: ECEN 5000, 5030 and 6050.
- F.** Graduate College regulations **REQUIRE** a minimum of 21 hours of 5000-level courses on all MSEE Plans of Study.

- G. Students who do not have a BSEE or BSCpE degree **CAN** include **only one** “outside” ECEN course on their MSEE Plan of Study. **All** students **MUST** have at least one “outside” ECEN course.
- H. For the technical elective (3 hours), courses that are cross-listed with ECEN must be approved by the student’s advisor.

Entrance Requirements:

- A. 3.0 GPA in an accredited BSEE or BSCpE program is the standard for admission to the MSEE program. However, applicants with lower GPA **may be granted** probationary admission. Students who have BS degrees in other engineering fields **may be admitted** to the MSEE program, **subject to** the same GPA requirements. These candidates will be expected to take enough prerequisite courses (from undergraduate ECEN courses, and perhaps some courses in Mathematics, Computer Science and/or Physics) to accomplish two ends: (a) to assure a reasonable basis for success in the graduate courses associated with the MSEE degree; and, (b) to assure that when the candidate enters the workforce with the MSEE degree, there will be no potential deficiencies in the candidate’s technical background. This may well require some prerequisite courses in areas of study in which the student has little interest and in which he/she has no intention of practicing after graduation. Students are sometimes admitted to an MSEE program with a grade of “C” in one or two junior- or senior-level courses. Students **may be required**, as a condition of admission to the MSEE program to repeat such courses, or take another undergraduate-level course in the same or closely related area of study. A grade of “B” or better **MUST** be attained for such prescribed prerequisite courses.
- B. Students admitted unconditionally to the program are assumed competent to take the required MSEE courses. If the student feels unprepared for one of the required classes, he/she may enroll in the appropriate prerequisite courses.
- C. Students admitted conditionally should enroll in the necessary undergraduate prerequisite courses as a first priority. Graduate courses may be taken concurrently with prerequisite courses in other areas. Students need not necessarily complete all prerequisite courses before taking the first 5000-level courses.
- D. Note: The aforementioned prerequisite courses do not count towards the degree requirements of the MSEE degree. That is, these prerequisite courses are not listed in the Plan of Study.
- E. The School of Electrical and Computer Engineering **waives** the foreign-language requirement for MSEE degree.

Graduate Record Examination:

Scores for the Graduate Record Examination (GRE) general exam must be submitted with the application. Applicants scoring 153 and higher on the verbal section and 155 and higher on the quantitative section of the GRE have proven to be competitive within the ECE graduate program.

Retention Standards:

The Graduate College bulletin sets forth certain minimum grade standards for retention: **The School of Electrical and Computer Engineering expects all candidates to attain grades of “B” or better in all courses taken as graduate students, whether prerequisite courses or courses listed as part of the Plan of Study. A grade below “B” in a prerequisite course is cause for suspension. A grade below “C”, or more than two (2) “C’s” in graduate courses will result in suspension. A GPA of 3.0 or above in graduate courses must be maintained.**

A preliminary **Plan of Study** for the MSEE degree should be worked out by the student and with his/her advisor. This plan should include a listing of course work and an estimate of the time schedule. **The initiative for proposing a Plan of Study lies with the student.** The Graduate College requires that a MSEE Plan of Study be filed **BEFORE** the student registers for his/her 17th hour of graduate credit. The approval of the student’s advisor and two other faculty members as well as that of the Dean of the Graduate College is required for all MSEE Plans of Study.

Plans of Study may be revised from time to time; the revision is accomplished by submitting a new plan as outlined above. **The Graduate College REQUIRES that the final plan be filed before registration for the semester in which the necessary work for the degree will be completed.**

THESIS DEFENSE:

A candidate for the Master of Science degree is required to give an oral defense covering his/her thesis. The thesis and defense will be evaluated by the student’s advisory committee consisting of the thesis advisor and two other ECE faculty members.

DOCTOR OF PHILOSOPHY DEGREE:

The Doctor of Philosophy Degree in Electrical Engineering is an academic, research-based degree for students who wish to advance the state-of-the-art in engineering science and technology through fundamental research. The Ph.D. degree prepares students for careers in academic, government, and industrial research.

Students who have filed notice with the Graduate College of intention to become a candidate for the Ph.D. Degree in Electrical Engineering will need an advisory committee. This committee will be chaired by a member of the Faculty of the School of Electrical and Computer Engineering and will include at least two additional ECE faculty, and should have representation of at least one other department in which the student contemplates taking course(s).

If a student already enrolled as a candidate for the MSEE degree wishes to file notice to become a candidate for the Ph.D. degree, he/she should petition the Graduate College to designate his/her advisor for the Master's program as his/her temporary Ph.D. advisor in order to preserve continuity in his/her program.

The minimum requirement for the Doctoral Degree is 73 credit-hours beyond a Bachelor's Degree, or 43 hours beyond the Master's Degree. This includes credit for the dissertation. This requirement may, however, be increased at the discretion of the student's advisory committee. The degree requirements beyond the Bachelor's degree are summarized in the table below:

		PhD (73 hrs.)
LECTURE COURSES	33 hours	
(May include up to six (6) credit hours of ECEN 5070 Directed Studies or equivalent with approval of the student's graduate advisory committee.)		
ECEN 6050 Prelim. PhD Research & Proposal	3 hours	
ECEN 6001 PhD Seminar Series	1 hours	
ECEN 6000 Dissertation Research	30 hours	
ADDITIONAL COURSES	6 hours	
(May include additional lecture course, Masters thesis (ECEN 5000 or equivalent), and/or dissertation research hours as approved by the student's graduate advisory committee.)		
Note: ENGL4893 RESEARCH WRITING FOR INTL GRAD (3 credit hours) <u>cannot</u> be used toward the degree.		

Additional PhDEE Degree Requirements:

- A. A maximum of 36 ECEN 6000 Dissertation Research hours may be applied to the PhD plan of study.
- B. A maximum of six (6) Master's thesis hours (ECEN 5000 or equivalent) may be applied to the PhD plan of study.
- C. A maximum of 30 credit hours applied to a Master's plan of study may be applied to the PhD plan of study.
- D. Students must enroll in ECEN 6050 Preliminary PhD Research and Proposal in the first semester in which they begin their PhD study.
- E. Students must enroll in ECEN 6001 PhD Seminar Series at the first opportunity after beginning their PhD study.
- F. The advisory committee may add additional credit hour requirements as appropriate.

The contents of an approved Plan of Study will be determined by the student and his/her advisory committee. Normally, the student will take all of the courses offered in at least the sequence of specialized graduate work embracing the field of interest in which he/she proposes to conduct research. A maximum of three (3) 4000-level ECEN courses approved for graduate credit may be included toward the Ph.D. 73 credit hour requirement (including any courses that were included on a MSEE Plan of Study). The list of approved courses is included at the end of this memorandum.

A sufficient concentration of subjects offered by one of the other departments of the Graduate College may be accepted as a minor if the faculty of the department involved is represented on the student's advisory committee.

The School of Electrical and Computer Engineering waives the foreign-language requirement for the Ph.D. Degree.

A student may apply for candidacy for the Ph.D. degree upon completing 30 credit-hours beyond the Master's degree or 60 credit-hours beyond the Bachelor's degree.

Milestones:

Initial Assessment Examination (ECEN 6050): ECEN 6050, Preliminary Research and Proposal, will be used to evaluate the student's ability to perform independent research on an advanced topic. Note that the research should be *independent*, but it is not necessarily *original* research. The student will provide his/her Ph.D. committee with a document that details his/her research (two weeks before the presentation). In the presentation, the student will summarize his/her research in an oral presentation to the advisory committee and make a recommendation on how the current state-of-the-art might be extended through novel research. Students will receive minimal guidance from the advisor during the preparation of the 6050 document. The submitted document and oral presentation must primarily reflect the student's own work. Enrollment in ECEN 6050 in the first semester after admission to the Ph.D. program is **required**. The oral

examination must be taken prior to beginning the second semester after enrollment. The advisory committee has the option of assigning an incomplete grade in ECEN 6050 to students who do not successfully pass the examination on the initial attempt. In this case, the student must repeat and pass the examination prior to the completion of the second semester of study. Students who are admitted directly into the Ph.D. program upon completion of the BS degree will be considered to have entered the Ph.D. program upon completion of 30 hours of graduate credit and must complete the Initial Assessment Examination within two semesters of that time.

Plan of Study: An initial Plan of Study must be submitted to the Graduate College prior the completion of the third semester of enrollment. The procedure for submitting the Plan of Study is outlined at <http://gradcollege.okstate.edu/planofstudy>.

Candidacy for Degree: A student should apply for candidacy for the Ph.D. degree per OSU Graduate College requirements upon completing 30 credit-hours after the MSEE Degree or 60 credit-hours after the Bachelor's degree. The School of Electrical and Computer Engineering requirements for candidacy consist of an initial dissertation proposal in the form of a written outline that has been approved by the Doctoral Committee.

Final Dissertation Proposal Defense: The School of Electrical and Computer Engineering requires that a final written dissertation proposal be submitted to the student's advisory committee and defended orally before the committee. It will be evaluated by the advisory committee to judge the candidate's progress toward the dissertation degree requirement and to assess the student's ability to present and defend the results of original research. The proposal and defense will not be used to explore the candidate's comprehension of course work not related to his or her research investigation. The Ph.D. candidate is expected to participate in published scholarship. At the time of the proposal defense the student must have (at least) submitted a paper on his/her research for publication in a peer-reviewed conference or journal. Any deficiencies that may have been uncovered in this report **MUST** have been rectified before a candidate can be permitted to defend the final dissertation. The Final Dissertation Proposal Defense must be successfully completed at least six months prior to the final dissertation defense.

Dissertation Defense: The final thesis examination will be conducted to judge the candidate's ability to present and defend the results of original research. Although referred to in the Graduate Catalog as the "final" examination, this examination will not be used to explore the candidate's comprehension of course work not related to his research investigation. At the time of this final examination, the student must have (at least) submitted a journal paper on his/her research. Any deficiencies that may have been uncovered in previous examinations **MUST** have been rectified before a candidate can be permitted to take his/her thesis examination.

**4000 LEVEL ECEN COURSES APPROVED FOR GRADUATE
CREDIT WITHIN THE ECEN PROGRAM**

ECEN 4133	Power Electronics
ECEN 4153	Power System Analysis and Design
ECEN 4213	Embedded Computer Systems Design
ECEN 4233	High Speed Computer Arithmetic
ECEN 4243	Computer Architecture
ECEN 4283	Computer Networks
ECEN 4303	Digital Electronics Circuit Design
ECEN 4413	Automatic Control Systems
ECEN 4523	Communication Theory
ECEN 4533	Data Communications
ECEN 4613	Microwave Engineering
ECEN 4763	Introduction to Digital Signal Processing
ECEN 4773	Real Time Digital Signal Processing
ECEN 4823	Design of Optical Systems
ECEN 4843	Design of Lasers and Systems