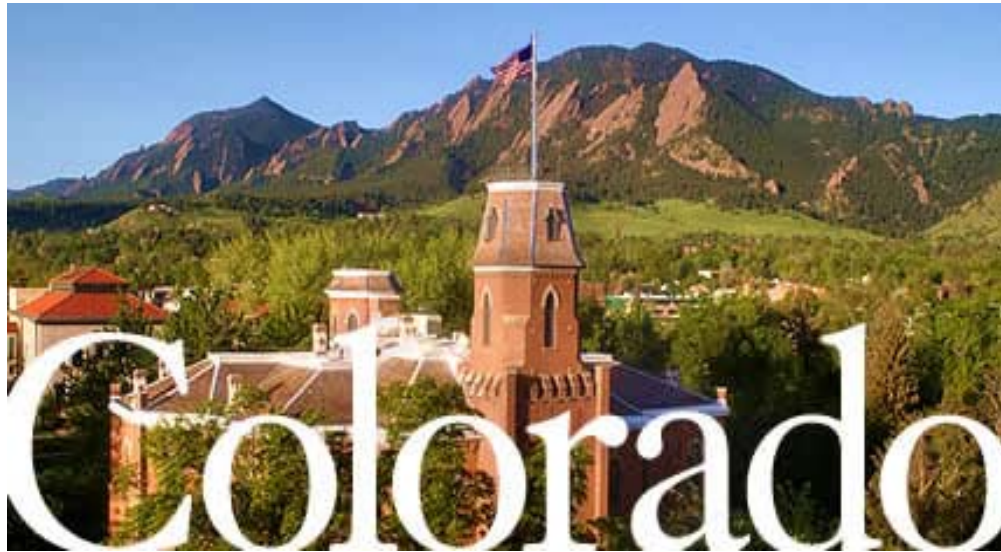


ELECTRICAL, COMPUTER, & ENERGY ENGINEERING



GRADUATE STUDY GUIDE FALL 2011 – SPRING 2012



University of Colorado at Boulder
Department of Electrical, Computer & Energy Engineering
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1. GENERAL INFORMATION

The Graduate School of the University of Colorado offers advanced instruction leading to the following degrees in the Department of Electrical, Computer, & Energy Engineering:

Doctor of Philosophy (Ph.D.)
Master of Science (M.S.)
Master of Engineering (M.E./MENG)

Students who wish to pursue studies toward any of these degrees are accepted into the Graduate School as graduate students. Students who wish to take graduate courses for information only can be accepted into the University as special students. For details about the special student category, see Section 7.7.

Graduate programs are available on the Boulder, Denver, and Colorado Springs campuses. The Colorado Springs M.S. and Ph.D. programs are administered through the Colorado Springs campus. The Denver M.S. program is administered on the Denver campus. Graduate credits earned in any of the three locations are **not** necessarily interchangeable. Students should check with appropriate departmental representatives.

An M.S. degree is not required for entrance into the Ph.D. program. Exceptional students are encouraged to apply directly for admission into the Ph.D. program.

2. ADMISSION

2.1. General Admission Procedures

Requests for admission to the Graduate School for graduate work in the Department of Electrical, Computer, & Energy Engineering should be addressed to:

Director of Graduate Studies
Electrical, Computer, & Energy Engineering Department
Campus Box 425
University of Colorado
Boulder, CO 80309-0425 USA

All applicants for admission must present complete credentials including a completed application form (Parts I and II), general Graduate Record Exam (GRE), four letters of recommendation, and a nonrefundable check or money order in the amount of \$50 for U.S. citizens and permanent residents (\$70 for foreign applicants). This can be paid via credit card if applying online. To apply online, fill out the form at <http://www.colorado.edu/prospective/graduate/apply/process.html>. At least two letters of recommendation should be from former professors. Recommendations from persons with a particularly good knowledge of the applicant should be encouraged to attach a short letter attesting to the applicant's ability to do research and pursue an advanced degree.

The Graduate Record Examination (general GRE) is **required** of all M.S. and Ph.D. applicants. Applicants desiring financial aid should take the exam as early as possible in order for the scores to be reported in time for consideration for aid (Fall: by January 15 for U.S. citizens, permanent residents and refugees—by Dec. 1st if an overseas/visa applicant; Spring: Oct 1st for *all* applicants). Information about the GRE testing program is available in the Testing Office, Willard 29, (303) 492-5854. Further information is available at <http://www.ets.org/gre#cbdates>. The application credentials must be in the office of the Department of Electrical, Computer, & Energy Engineering by the application deadline (stated in the application material) for the term in which the student expects to register. Students who submit credentials after that date may be denied admission for that semester. GRE scores are mailed by the testing service to our university with the following: **Institution code: 4841**; Department Code: 1203. Please note that ETS (Educational Testing Service) sends only to the former code.

In addition to the above, applicants from foreign countries must show proof of proficiency in the English language, both written and spoken, and proof of financial independence. A minimum score of 600 (250 computerized; 100 Internet-based) on the TOEFL exam is required. **Students from India or having studied 1+ yrs in an English-speaking country need NOT submit a TOEFL score. TOEFL scores: Code 66.** IELTS scores of 7+ may be accepted on a case-by-case basis.

A *University of Colorado Catalog* describing all course offerings will be sent to each applicant by the Office of Admissions upon receipt of the application fee. They may also be viewed at: <http://www.colorado.edu/catalog/>.

A graduate of an electrical engineering curriculum is expected to have expertise in several basic areas of electrical engineering. Students wishing to work toward a graduate degree in electrical engineering without first obtaining an undergraduate degree in electrical engineering will need to take some background course work. This course work will be chosen in consultation with the student's advisor. Undergraduate courses in electrical engineering cannot be counted toward a graduate degree in electrical engineering.

2.2. Specific Master of Science Admission Requirements

The specific criteria for admission to the Master of Science program are:

- (a) A baccalaureate degree from an accredited college or university of recognized standing, equivalent to the degree given at this University, or college work equivalent to that required for such a degree, at least 96 semester hours of which must be acceptable toward a baccalaureate degree at this University. A minimum undergraduate GPA of 3.0 out of 4.0 is expected.
- (b) Promise of ability to pursue advanced study and research as judged by previous scholastic record or work experience.
- (c) Adequate preparation to enter graduate study in the chosen field. For some students with backgrounds other than electrical engineering, it may be appropriate to apply for admission to the Master of Engineering program with an emphasis in their chosen areas rather than the Master of Science in electrical engineering. This program will, in general, require fewer deficiency courses (see Section 5). If you have questions regarding your preparation, please contact the Graduate Director.
- (d) Although there are no hard limits, students admitted to our program in recent years averaged 87% verbal, 91% Quantitative and 90% Analytical (on the old 800-scale) (4.4 / 6.0 on the new scale).

2.3. Specific Doctor of Philosophy Admission Requirements

The specific criteria for admission to the Doctor of Philosophy program are described below.

- (a) The applicant usually will have received the Master of Science degree from an accredited college or university and will rank high in his or her class academically. An exceptional student without a Masters degree may be accepted directly into the Ph.D. program and is strongly encouraged to do so. A minimum GPA of 3.5 out of 4.0 for the most recent academic degree is expected.
- (b) The student must show the ability to perform independent research. A student who has not written a thesis or an equivalent research paper may be admitted upon the recommendations of at least two graduate faculty members who can attest to the student's potential research abilities.
- (c) The applicant must indicate a field of specialization and be acceptable as a thesis advisee to a member of the Electrical, Computer, & Energy Engineering graduate faculty.
- (d) Applicants who have received their Masters degree from the University of Colorado *must* reapply for admission to the Ph.D. program and fulfill requirements outlined in Section 6.1. It is not necessary to resubmit transcripts and references. However, the application must be accompanied by a positive written recommendation from the student's thesis advisor. The application should be submitted at least one month prior to the beginning of the term in which the student expects to register.
- (e) The GRE expectations for Ph.D. students are similar to those for M.S. students (see Section 2.2.(d)).
- (f) All Ph.D. students will be considered provisional within the Department of Electrical, Computer, & Energy Engineering until their successful completion of the Preliminary Examination.

2.4. Classification of Students

Depending on the degree to which the applicant satisfies the preceding requirements, the applicant may be admitted as either a regular degree student or as a provisional degree student.

2.4.1. Regular Degree Student

A student can be admitted as a regular degree student if, in addition to fulfilling the above mentioned requirements, the student has an overall undergraduate grade point average of at least a 3.0 for the M.S. program and a 3.5 for the Ph.D. program. If the student has completed at least 24 semester hours of graduate work with a 3.25 average or above at a graduate school of recognized standing, even if the undergraduate grade-point average is below 3.0, the student may be admitted as a regular degree student upon recommendation of the Department of Electrical, Computer, & Energy Engineering.

Privileges. Regular degree students may take courses for which they have the appropriate specific prerequisites, on any of the four campuses of the University of Colorado. However, only a limited number of courses can be transferred to the Boulder campus. The typical limit is 9 credit hours for an M.S. degree and up to 21 credit hours for a Ph.D. degree.

Restrictions. Regular degree students must maintain a 3.0 grade point average for all work taken, whether it is to be applied toward the advanced degree or not. Failure to maintain this standard of performance may cause the student to be dropped from the academic program after receiving warning from the Graduate School.

2.4.2. Provisional Degree Student

If the student does not satisfy the requirements for a regular degree student, but, in the opinion of the department, merits a trial in graduate work despite either a low undergraduate grade-point average or deficiencies in preparation, the student may be admitted as a provisional degree student. Usually, the undergraduate grade point average falls between 2.85 and 3.0. All students admitted in this category must submit credentials showing academic potential.

In many cases the students will be advised to take graduate Electrical, Computer, & Energy Engineering courses as a non-degreed/special student before being considered for admission.

Ordinarily, students admitted as provisional will not be eligible for a change of status to a "regular degree student" until they have completed their first 12 semester hours of graduate level coursework in Electrical, Computer, & Energy Engineering within the first two semesters of attendance maintaining a grade-point average of 3.25 or above. At the time of admission to provisional degree status, the students will be informed by the department, in writing, of the performance expected of them before the department will recommend their admission as regular degree students. Normally a student may not retain provisional degree status for more than 18 semester hours. By that time, the department must decide whether to recommend admission to regular degree status or to drop the student from the department's program.

Privileges. Provisional degree students have all the privileges of regular degree students in terms of taking courses and working toward an advanced degree.

Restrictions. Provisional degree students are required to maintain a 3.25 grade-point average on all work taken whether or not it is to be applied toward the advanced degree sought. If students fail to maintain such a standard of performance, they may be dropped from the academic program without warning from the Graduate School or the department. Provisional degree students are not eligible for fellowship or scholarship support from the Graduate School and usually are not considered for teaching or research assistantships by the department.

3. GRADUATE STUDENT ADVISING

3.1. General Requirement

The responsibility for coordination of graduate student advising and program monitoring lies with the **Director of Graduate Studies** of the Department of Electrical, Computer, & Energy Engineering. Detailed academic advising will normally be done by the student's academic advisor who may also be the thesis advisor. Certain coordinating rules and policies, however, are imposed by the Director of Graduate Studies. *The responsibility for compliance with these rules rests with the student.* The student's contact with the Director of Graduate Studies in the fulfillment of the following requirements will be through their advisors and the Electrical, Computer, & Energy Engineering Graduate Office, Engineering Center, Room ECEE 1B63. *All petitions to the Director of Graduate Studies must bear the endorsement of the academic advisor.*

In cooperation with the student's academic advisor, the Director of Graduate Studies shall have full jurisdiction concerning any matters that go beyond the minimum requirements for all Electrical, Computer, &

Energy Engineering graduate degree students, but are still appropriate for the field of specialization of the student at the Masters level. This shall specifically include the following matters:

- (a) the amount and type of credit hours earned outside of the student's specialty;
- (b) additional credit hour requirements beyond the Department of Electrical, Computer, & Energy Engineering minimum;
- (c) the requirement of evidence of research ability as a prerequisite for a Ph.D.

Decisions on these matters shall be recorded in the student's general plan of study.

3.2. Master of Science Advising

The Director of Graduate Studies will assign a faculty member to act as the academic advisor for each incoming graduate student. This academic advisor may be changed later, upon request by the student and approval by the Director of Graduate Studies, to another faculty member who may also serve as thesis advisor. The Director of Graduate Studies will cooperate with the student's academic advisor in discharging the following responsibilities:

- (a) advising the students on how best to achieve their own study objectives;
- (b) ascertaining that the student's work satisfied the academic standards that are appropriate for their field of specialization at the Masters level;
- (c) with respect to item (a) the student shall submit to the Director of Graduate Studies an overall degree plan which has been worked out with the academic advisor. One copy, signed by the academic advisor, is to be submitted to the Graduate Office of the Electrical, Computer, & Energy Engineering Department by the end of the first month of the student's first semester. *Students who have not complied with the provisions of this section may not be recommended for graduation upon completion of the normal 30 semester hours of graduate-level courses.*

3.3. Doctor of Philosophy Advising

Each incoming student will have a faculty member assigned to act as the student's academic advisor. The student's academic advisor may be changed upon request by the student and the agreement of the faculty member requested as advisor.

An overall degree plan must be endorsed by the student's advisor and submitted to the Director of Graduate Studies in the Electrical, Computer, & Energy Engineering Graduate Office for approval during the first month of work toward the Ph.D. degree. The degree plan may be altered with approval of the advisor and of the Director of Graduate Studies. There is no assurance that courses not included in the degree plan will be counted toward the degree.

Each student is required to work out with the academic advisor a semester course plan at the beginning of each semester. Any deviations from the previously prepared degree plan must be recorded in the Electrical, Computer, & Energy Engineering Graduate Office, ECEE 1B63.

The advisor should:

- (a) endorse the degree plan;
- (b) assure that the student's work satisfies the academic standards for the Ph.D.
- (c) establish the Thesis Committee in accordance with the Rules of the Graduate School.

However, ultimate responsibility for knowledge of and compliance with specific rules lies with the student.

3.4. Written Records

A signed written record concerning all important decisions involving the student's academic program shall be entered into the student's permanent file in the ECEE Graduate Office. This shall include the following:

- (a) application materials;
- (b) a record of the original appointment of the academic advisor and of the student's general plan of study, signed by the student and by the advisor.
- (c) unofficial transcripts;
- (d) all other matters concerning the program.

3.5. Students' Responsibilities

Students are responsible for seeing their advisors at least once a semester, prior to registration for the next semester, or as often as has been agreed between the students and their advisors. If the student fails to do so, the advisor may decline to count toward a degree any credit hours on which the advisor had not been consulted prior to registration.

4. MASTER OF SCIENCE (E.E.) DEGREE

4.1. General Requirements

4.1.1. Academic Advisor

An academic advisor will be appointed for each student during their first semester in the program according to the provisions of Section 3.2. The academic advisor is assigned on the basis of the student's specialty interests as noted in their application and may be changed upon request by the student and approval by the Director of Graduate Studies and the requested advisor. The academic advisor is not necessarily the thesis advisor.

4.1.2. Quality of Work

An M.S. student must maintain a cumulative GPA of 3.0 on all course work taken regardless of the level of course work or the reason it was taken. Courses in which grades below "C" are received are not accepted for Master's degree programs or for the removal of academic deficiencies. Courses in which a grade of "C" is received can be used towards the Master of Science degree requirements if the cumulative GPA remains 3.0 or above. Grades earned in transfer courses or courses taken as a special student are not calculated into the GPA [with one exception. See Sec. 4.1.6 below]. Courses taken may not count towards the Master of Science degree, but grades from those courses are calculated into the cumulative GPA. A student cannot be admitted to candidacy nor graduate with a cumulative GPA below 3.0.

4.1.3. Application for Candidacy

Admission to the Graduate School is not equivalent to approval of candidacy for an advanced degree. A student who wishes to become a candidate for a degree must make special application at the time and in the manner prescribed for the degree sought.

Application for admission to candidacy must be made by each student on forms obtained from the Electrical Engineering Graduate Office (ECEE 1B63) not later than 10 weeks prior to completion of the requirements for the degree.

A student admitted to the Graduate School with 'regular' status and later accepted as a candidate for the Master of Science degree will be recommended for the degree only after the requirements have been met under either Plan I (thesis) or Plan II (non-thesis). See Sections 4.2 and 4.3.

4.1.4. Residence Requirement

In general, the residence requirement may be met only by residence at this university for at least two regular semesters, or by three ten-week summer terms. For full residence a student must be registered within the time designated at the beginning of the semester and must carry the equivalent of (1) not fewer than 5 semester hours of work in courses numbered 5000 or above, (2) at least 8 semester hours of combined graduate and undergraduate coursework, (3) at least 1.0 pre-Comprehensive exam thesis hour (4) no fewer than 5 post-Comprehensive exam thesis hours, or (5) registration as Masters Candidate for Degree (ECEN 6940).

Students in off-campus locations may earn part or all of the credit required for the Master of Science degree through the CAETE (Center for **Advanced Engineering and Technology Education**) distance learning program. **CAETE courses will satisfy residence requirements if you are in a remote location and the courses are taught on the Boulder Campus.**

The usual time required for a student to complete the requirements for the M.S. degree is two calendar years. However, a student who is deficient in general training cannot expect to obtain a degree in two years.

4.1.5. Time Limit

All work must be completed within four years. Work done earlier will not be accepted for the degree unless validated by a special examination. A student is expected to complete the work with reasonable continuity.

4.1.6. Credit by Transfer

Resident graduate work of high quality done in a recognized graduate school elsewhere or at the University of Colorado before being admitted to the graduate program and *coming within the four-year limit* may be accepted up to a maximum of 9 semester hours, provided it is recommended by the Electrical, Computer, & Energy Engineering Department and approved by the Dean of the Graduate School. Such credits will be transferred to the Graduate School only after the student has established a satisfactory record in residence here for at least one semester (must complete at least six credit hours). Provisional students must be transferred to regular degree status before transfer credits can be approved.

Work completed at CU as a special student or at another CU campus falls under the 9-hour rule. Work already applied toward another degree cannot be accepted, nor can extension work completed at another institution, nor can correspondence work, except to make up deficiencies. Transfer courses must have a grade of "B" or better but transfer course grades are not calculated into the GPA [One exception is made: Grades from courses taken in the Continuing Education / ACCESS program, *after* (NOT before) a student has been admitted to the MENG, M.S. or Ph.D. program *are* calculated into the GPA. Embedded Systems is one such course.] Once a student is admitted to the program, courses taken through CAETE do not count as transfer credit, but can be used to partially fulfill the course requirements for the degree.

No graduate credit will be accepted that was earned and applied toward an undergraduate degree elsewhere, even though the courses may be of graduate standing and may exceed the work required for a bachelor's degree. Courses used toward one Masters degree can NOT be transferred in for credit toward another Masters degree at CU.

Transferred credit will not reduce the residence requirement at this University but may reduce the amount of work to be done in formal courses. Request for transfer of credit must be initiated by the student after one semester of residency but prior to the beginning of the semester in which the student expects to receive the degree.

4.1.7. Withdrawing from School

M.S. students may participate in the Time Off Program (details available from the Office of Registrations or via <http://registrar.colorado.edu/students/timeoffprogram.html>). Any semester/s on Time Off are included in the time limit to complete the degree. Students who are not on Time Off and do not register during a given fall or spring semester will be automatically withdrawn from the University and must fill out an application for re-admission in order to return. **Note that this occurs even if you transfer from on-campus to CAETE or visa versa, for one semester—if you don't notify the Grad Program Advisor of the change and fill out a simple ("CAETE transfer") form, then the University registration software will automatically drop you, and you must re-apply.** Students who withdraw from school permanently must do so formally with the Admissions office and by e-mailing withdraw@colorado.edu and also by e-mailing sadoff@colorado.edu. For questions or more information about the withdrawal process, visit or call the Office of the Registrar, Regent 105, 303-492-8673 or e-mail withdraw@colorado.edu. Please see <http://registrar.colorado.edu/students/withdraw.html> for more details.

4.2. Plan I Degree Requirements

4.2.1. Course Requirements

- 1) A minimum of 30 credit hours.
- 2) At least 18 credit hours in ECEN 5000+ level courses (These courses must be "technical" courses. While most graduate courses offered by the dept are technical, there are exceptions. Always consult, **before** taking a course, with your faculty advisor and/or the Graduate Director, as to whether it will count toward this requirement).
- 3) The remaining courses (in excess of the 18 hours specified above, in #2) used to fulfill the 30-credit hour requirement, must satisfy the following constraints:
 - a) Must be ECEN courses or technical math, science or engineering courses (tech writing courses do not fulfill this, nor do business courses)
 - b) All TLEN, EMEN and ECEN courses must be at the 5000+ level or above.
 - c) A maximum of 6 credit hours may be at the 4000 level. The others must be at the 5000+ level.

- 4) A maximum of 6 credit hours of independent study can be used towards the 30 credit hour requirement. Independent study taken with ECEE Faculty may count toward the 18 hours in #2, above.
- 5) At least 6 hours must be in 5000+ level courses in technical and scientific disciplines outside the student's core specialization area. This requirement may be fulfilled using courses either outside or inside the ECEE Department. Courses meeting this requirement must be approved by the student's advisor and the director of graduate studies—prior to submission of graduation paperwork.
- 6) 4 to 6 credit hours of Master's Thesis. These thesis hours may count toward the 18 hour requirement in #2 above. The total number of combined credit hours of independent study and thesis research shall not exceed 9 credit hours.

Students must maintain a 3.0 or better grade point average. Because the MSEE degree is scientifically and technically based, **courses having course content in communication skills, humanities, writing, social sciences, fine arts, business, law, or education cannot be used towards the degree. Technical writing courses offered by the Physics dept do NOT count toward a graduate degree in the ECEE Dept, nor do English improvement courses.** In cases of any doubt about a particular course, the students should contact their advisors and the Director of Graduate Studies for approval prior to taking the course.

All graduate level courses must be taught by members of the graduate faculty. It is the responsibility of the *student* to ensure that the instructors are members of the graduate faculty. Please contact sadoff@colorado.edu if in doubt.

Two technical ITP (Interdisciplinary Telecommunications Program) courses at the 5000 level or above can be used toward the 30 credit hour course work requirement for the MS degree with the exclusion of TLEN 5300 and TLEN 5310. In addition, one Engineering Management, or one non-technical ITP course, (excluding TLEN 5300 and TLEN 5310) or ECEN 5007 can be used toward the 30-credit course work requirement. All of the above is subject to approval of the student's advisor by submitting a new degree plan.

4.2.2. Thesis

The Masters thesis should be written on a subject of substantial import in the student's field of interest and will be under the supervision of a graduate faculty member in the Department of Electrical, Computer, & Energy Engineering. It must conform to the format specifications as set forth by the Graduate School (see: http://www.colorado.edu/GraduateSchool/academics/thesis_sub.html). The student should find a faculty member who is willing to supervise the thesis as early as possible in the program. One bound copy of each thesis is required in the Electrical, Computer, & Energy Engineering Department Office for the permanent file in addition to the two unbound copies required by the Graduate School.

4.2.3. Thesis Defense

A final examination for a student enrolled under Plan I will consist of a defense of the student's thesis before the Final Examination Committee at least three weeks before commencement. The examining committee will consist of three members of the graduate faculty, including the student's thesis advisor and a second reader, both of whom shall have been appointed at least one month prior to the examination date. Appointment of this committee (one of which may be from outside the ECEE Department) and the setting of the examination time will be done by the student and the thesis advisor. This information must be reported to the departmental Graduate Office (ECEE 1B63) at least two weeks before the examination.

Students must be registered during the semester of the final examination. If they have completed all their course work and all their thesis work, then they must e-mail The ECEE Grad Program Advisor to enroll them in 3.0 default hours of ecen 6940—Masters Candidacy hours—for which there is a tuition fee.

4.3. Plan II Degree Requirements

4.3.1. Course Requirements

- 1) A minimum of 30 credit hours.
- 2) At least 18 credit hours in ECEN 5000+ level courses (These courses must be "technical" courses. While most graduate courses offered by the dept are technical, there are exceptions. Always consult, *before* taking a course, with your faculty advisor and/or the Graduate Director, as to whether it will count toward this requirement).

3) The remaining courses (in excess of the 18 hours specified above, in #2) used to fulfill the 30-credit hour requirement, must satisfy the following constraints:

- a) Must be ECEN courses or technical math, science or engineering courses (tech writing courses do not fulfill this, nor do business courses)
 - b) All TLEN, EMEN and ECEN courses must be at the 5000+ level or above.
 - c) A maximum of 6 credit hours may be at the 4000 level. The others must be at the 5000+ level.
- 4) A maximum of 6 credit hours of independent study can be used towards the 30 credit hour requirement. Ind study taken with ECEE Faculty may count toward the 18 hours in #2, above.

Students must maintain a 3.0 grade point average. Because the MSEE degree is scientifically and technically based, **courses having course content in communication skills, humanities, writing, social sciences, fine arts, business, law, or education cannot be used for credit towards the degree. Technical writing courses offered by the Physics dept do NOT count toward a graduate degree in the ECEE Dept, nor do English improvement courses.** In cases of any doubt about a particular course, the students should contact their advisors and the Director of Graduate Studies for approval prior to taking the course.

All graduate level courses must be taught by members of the graduate faculty. It is the responsibility of the *student* to ensure that the instructors are members of the graduate faculty. Please contact sadoff@colorado.edu if in doubt.

Two technical ITP (Interdisciplinary Telecommunications Program) courses at the 5000 level or above can be used toward the 30 credit hour course work requirement for the MS degree with the exclusion of TLEN 5300 and TLEN 5310. In addition, one Engineering Management or non-technical ITP course (excluding TLEN 5300 and TLEN 5310) can be used toward the 30-credit course work requirement. All of the above is subject to approval by the student's advisor by submitting a new degree plan.

4.3.2. Comprehensive Examination

For many years, our department has been one of several on campus which no longer require passing a Comprehensive exam to graduate with an M.S. degree (if continuing on to a Ph.D., then you must still pass a Ph.D. Comprehensive exam, but there is none required to earn an M.S. degree). Your course work is considered sufficient—that, plus filling out a form to remind the campus Graduate School of this fact (see The ECEE Grad Program Advisor in ECEE 1B63 for the form, very early in the semester during which you plan to graduate).

4.4. Distance Learning / Webstreaming Programs / CAETE

4.4.1. CAETE Courses taken by degree-seeking students admitted via the CAETE program:

Under the rules of the Electrical, Computer, & Energy Engineering department, it is possible for a duly admitted graduate student **in a remote geographical area in the U.S.** to complete some or all of the requirements for the Master of Science degree through participation in the CAETE (Center for Advanced Engineering and Technology Education) distance learning program. The mechanics of this program are handled by the CAETE office. More details are available at <http://cuengineeringonline.colorado.edu/registration/academic> .

4.4.2. CAETE Courses Taken by On-Campus Students

(Note: CAETE office is located on first floor of the Office Tower, quite near the elevators).:

4.4.2.1. Requirements for **all** on-campus students:

- 1) Switching exclusively to CAETE courses is **impossible** for F- and J-visa students and rather problematic for U.S. citizens and permanent residents. For the latter, you **must** be decisive about your first semester and **not** switch between programs

until completion of your first semester. Such a process is quite time-consuming and you may not see the changes you want, in time for the semester start—so choose wisely.

- 2) In later semesters, you can NOT take CAETE courses simply to save tuition money.
- 3) Each semester that you either switch ALL your course work from on-campus to exclusively via CAETE (or vice versa), you must fill out a “CAETE transfer form” available from the Graduate Program Advisor. ***Failing to do so could lead to the university registration software dropping you from the system, and the need to re-apply from the beginning! [Note: Under software implemented in fall 2010, this may no longer be the case; please check with the CAETE office to be certain]***

4.4.2.2. Additional requirements for **F- and J-visa students**:

- 1) If you take a CAETE course, you MUST also be enrolled in a minimum of 2.0 on-campus course credits to maintain your visa status per U.S. Immigration and Naturalization Services (INS) regulations. A course offered via Continuing Education (ACCESS program), such as Embedded Systems, qualifies as an “on-campus” course, as long as you have already been admitted to the MENG, M.S. or Ph.D. degree program. In fact, although at least one Embedded Systems course is administered via CAETE, it is NOT actually a ‘distance-learning’ course, and requires physical attendance in the lab and classroom.

4.5 Continuing Education / ACCESS

Occasionally, some popular courses are available only via the Continuing Education / ACCESS program (303-492-8252 or <http://conted.colorado.edu/programs/access/>, located at 15th and University. Tuition is paid separately to Continuing Education, not to the Bursar’s Office. Embedded Systems is sometimes offered via Continuing Education in this manner. Grades from courses taken via Continuing Education, **after** a student has been admitted into the MENG, M.S. or Ph.D. degreed programs, will be calculated into the cumulative GPA. If the course is taken **before** the student is admitted to the degreed program, then only the credit—not the grade—can be transferred in to apply toward the degree.

Continuing Education courses are considered ‘on-campus’ courses for purposes of visa status. CAETE courses are not.

CAETE and Continuing Education courses are considered non-degreed courses when taken *prior to* admission to a degree-seeking program. *After* admission to your BS/MS, MS, MENG or Ph.D. degree-seeking program, CAETE and Cont. Ed. Courses are considered “degreed” and need not be transferred in.

Visa students must ALWAYS be registered in a minimum of 2 on-campus credit hours (including Continuing Education courses). In their final semester, if they are either in an internship, and/or working out of state, they can request a form from the ISSS office, to be signed by their faculty advisor, giving them permission to take only a single course, but they must never be registered solely through CAETE.

Tuition for CAETE courses is *never* covered by tuition remission for TA or RA work. There are *never* any exceptions for this. On-campus course work is covered, however: Up to five course credit hours for a 25% TA or RA appointment and up to 10 course credit hours for a 50% TA or RA appointment.

4.6. M.S. Degree Flowchart

The Master of Science flowchart, Figure 1, graphically describes the sequence of events leading up to the conferring of the M.S. degree. Students are responsible for making certain that each step in their program is completed within the required time:

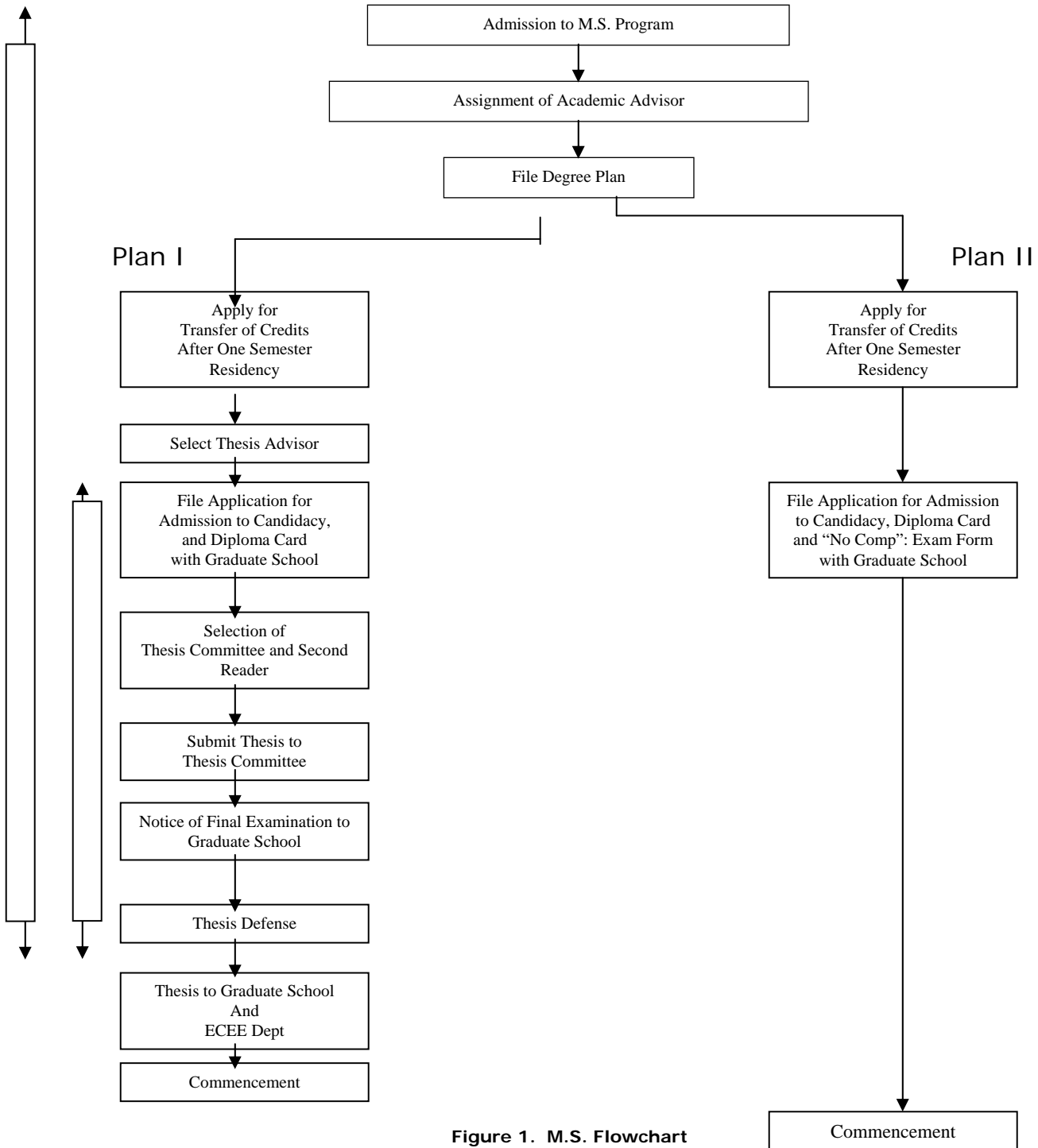


Figure 1. M.S. Flowchart

5. THE MASTER OF ENGINEERING PROGRAM

A qualified student may enroll in the graduate program of the Department of Electrical, Computer, & Energy Engineering to pursue the degree of Master of Engineering (M.E./MENG). This program is broad-based and is designed especially for students who want to further their education in more than just electrical engineering. An example might be in technical administration where course work in the business and management area would logically supplement advanced scientific study.

5.1. Admission Procedure

The student who wishes to enter the Master of Engineering program with an emphasis on Electrical, Computer, & Energy Engineering should apply to the Electrical, Computer, & Energy Engineering Department in the same manner as a Master of Science applicant. The Graduate Record Exam (GRE) is **not required** for admission into the Master of Engineering program. The application will be reviewed by the departmental admissions committee, which in turn will forward its recommendation for acceptance through the normal channels to the Dean of the Graduate School. Qualifications for admission are essentially the same as those for the Master of Science degree (see Section 2.2). For the students who have been out of school for an extended period of time, work experience and the recommendations of supervisory personnel will be weighed to a somewhat greater extent, since academic transcripts may no longer reflect their true ability.

5.2. Records

Records for the MENG student majoring in Electrical, Computer, & Energy Engineering will be handled through the Graduate Office of the Electrical, Computer, & Energy Engineering Department, Room ECEE 1B22 (see Section 3.4).

5.3. Academic Advising

Academic advisors for MENG students majoring in Electrical, Computer, & Energy Engineering will be appointed by the Director of Graduate Studies. The academic advisor will be a member of the Electrical, Computer, & Energy Engineering Department graduate faculty.

5.4. Course of Study

A minimum of 30 semester hours of academic work acceptable to the student's advisory committee (see Section 5.7) and within the rules established by the College of Engineering and Applied Science and the Graduate School will be required for the Master of Engineering degree. At least 15 of these credit hours must be at the 5000 level or above in Electrical, Computer, & Energy Engineering courses. (These courses must be "technical" courses. While most graduate courses offered by the dept are technical, there are exceptions. Always consult, *before* taking a course, with your faculty advisor and/or the Graduate Director, as to whether it will count toward this requirement).

All ECEN, TLEN and EMEN courses must be at the 5000 level or above. As many as 15 credit hours may be taken outside of electrical engineering. All courses outside Electrical, Computer, & Energy Engineering must be at the 5000 level or above, except for a maximum of six credit hours that can be at the 4000 level and above in Science, Mathematics, or Engineering (but not in EMEN, TLEN, or ECEN). All courses must have the advisor's pre-approval.

All courses applied toward the degree must be taught by members of the graduate faculty.

It is the responsibility of the student to ensure that the instructors are members of the graduate faculty.

Please contact sadoff@colorado.edu if in doubt.

5.5. Residence Requirements

Students completing the Master of Engineering degree on the Boulder Campus must fulfill the residence requirements for the Master of Science degree. See section 4.1.4.

Students in off-campus locations may earn part or all of the credit required for the Master of Engineering degree through the CAETE (Center for **A**dvanced **E**ngineering and **T**echnology **E**ducation) distance learning program. **CAETE courses will satisfy residence requirements if you are in a remote location and the courses are taught on the Boulder Campus.**

5.6. Credit by Transfer

A maximum of 9 semester hours of acceptable course work may be transferred from another accredited institution. Work completed at CU as a special student or at another CU campus falls under the 9-hour rule. Work already applied toward another degree cannot be accepted, nor can extension work completed at another institution, nor can correspondence work, except to make up deficiencies. Transfer courses must have a grade of "B" or better but are not calculated into the GPA. [One exception is made: Grades from courses taken in the Continuing Education / ACCESS program, after a student has been admitted

to the MENG, M.S. or Ph.D. program **are** calculated into the GPA. Embedded Systems is one such course.] Once a student is admitted to the program, courses taken through CAETE do not count as transfer credit but can be used towards the course requirements for the degree.

5.7. Quality of Work

An M.E./MENG student must maintain a cumulative GPA of 3.0 on all course work taken regardless of the level of course work or the reason it was taken. Courses in which grades below “C” are received are not accepted for Master’s degree programs or for the removal of academic deficiencies. Courses in which a grade of “C” is received can be used toward the Master of Engineering degree requirements if the cumulative GPA remains 3.0 or above. Grades earned in transfer courses or courses taken as a special student are not calculated into the GPA. Courses taken may not count towards the Master of Engineering degree, but grades from those courses are calculated into the GPA. A student cannot be admitted to candidacy or graduate with a cumulative GPA below 3.0.

5.8. Comprehensive Examination

For the past several years, our department has been one of several on campus which no longer requires passing a Comprehensive exam to graduate with an M.E./MENG degree (if continuing on to a Ph.D., then you must still pass a Ph.D. Comprehensive exam, but there is none required to earn an M.E./MENG degree). Your course work is considered sufficient—that, plus filling out a form to remind the campus Graduate School of this fact (see the Grad Program Advisor in ECEE 1B63 for the form, very early in the semester during which you plan to graduate).

5.9. Time Limit

All work, including the comprehensive examination, must be completed within four years. Work done earlier will not be accepted for the degree unless validated by a special examination. A student is expected to complete the work with reasonable continuity.

If you are earning your degree exclusively through the CAETE program, all of the requirements for the degree of Master of Engineering must be completed within a six-year period.

5.10. Withdrawing from School

MENG students may participate in the Time Out Program (details available from the Office of Registrations or via <http://registrar.colorado.edu/students/timeoffprogram.html>). Any semester/s on Time Off are included in the time limit to complete the degree. Students who are not on Time Off and do not register during a given fall or spring semester will be automatically withdrawn from the University and must fill out an application for re-admission in order to return. **Note that this occurs even if you transfer from on-campus to CAETE or visa versa, for one semester—if you don’t notify the Grad Program Advisor of the change and fill out a simple (“CAETE transfer”) form, then the registration software will likely drop you, and you must re-apply.** Students who withdraw from school permanently must do so formally with the Admissions office and by e-mailing withdraw@colorado.edu and also by e-mailing sadoff@colorado.edu. For questions or more information about the withdrawal process, visit or call the Office of the Registrar, Regent 105, 303-492-8673 or e-mail withdraw@colorado.edu. <http://registrar.colorado.edu/students/withdraw.html> provides more details.

5.11. Moving from MENG to M.S.

Students who intend to switch from the M.E. (MENG) program to the M.S. program and who opted for the M.E. program because they could not take the GRE exam in time, must take the GRE as early as possible, and, in any case, no later than prior to final exams in their first semester. For their MENG>M.S. request to be accepted, their scores, letters of recommendation, transcripts, personal statement, etc. must be strong enough to warrant admission directly into the M.S. program.

6. DOCTOR OF PHILOSOPHY DEGREE

The Doctor of Philosophy degree is the highest academic degree conferred by the University. The student who receives it must have demonstrated proficiency in some broad subject of learning and the ability to critically evaluate work in this field. Furthermore, the student must have shown ability to work independently in this chosen field and must have made an original contribution to the advancement of knowledge.

6.1. General Requirements

6.1.1. Admission Requirements

The general admission requirements for the doctoral program are outlined in Section 2.3. Admission does not follow automatically with the conferring of the M.S. Degree or successful completion of the preliminary examination by an M.S. degree student. The student must reapply and must be recommended *strongly* by his or her advisor.

6.1.2. Residence Requirements

The minimum residence requirement shall be six semesters of scholarly work beyond the attainment of an acceptable bachelor's degree. Not fewer than four semesters of residence credit, at least two of which must be consecutive in one academic year, must be earned at the University of Colorado. The last two semesters of the residence requirement must be earned here, except in unusual circumstances subject to the approval of the Dean of the Graduate School. Residence credit may be earned for course work completed with distinction, for participation in seminars, or for scholarly research performed here or elsewhere under the auspices of the University of Colorado. Not more than two semesters of residence credit may be allowed for an acceptable Masters degree. For further residence information, see the *University of Colorado Catalog*. <http://www.colorado.edu/catalog/>.

6.1.3. Academic Requirements

A *minimum* of 60 semester hours of course work and thesis credit combined beyond the bachelor's degree will be required for all doctoral degrees within the department. Of that minimum, students must complete at least 30 hours of course work at or above the 5000 level and 30 hours of doctoral thesis credit.

Of the 60 hours (30 hours course work and 30 hours thesis) necessary for the minimum fulfillment of the academic requirement for the Ph.D. degree, at least 18 credit hours of course work must be in ECEN. (These courses must be "technical" courses. While most graduate courses offered by the dept are technical, there are exceptions. Always consult, *before* taking a course, with your faculty advisor and/or the Graduate Director, as to whether it will count toward this requirement.) Additional hours may be at the 5000 level and above in fields mathematical, scientific or engineering, outside of Electrical, Computer, & Energy Engineering.

Of the 60 hours necessary for the minimum fulfillment of the academic requirement for the Ph.D. degree, at least 9 hours must be in 5000+ level courses in technical and scientific disciplines outside the student's core specialization area. This requirement may be fulfilled using courses either outside or inside the ECEE Department. However, neither EMEN nor TLEN course work fulfills this requirement, as these are considered not technical. Nor do any technical writing nor business courses fulfill this. Courses meeting this requirement must be approved by the student's advisor and the director of graduate studies prior to submission of graduation paperwork.

A maximum of 10 of the dissertation hours accrued prior to the semester of passing the comprehensive exam may be counted toward the required 30. Up to 10 hours taken during the semester of passing the comprehensive exam may be counted toward the required 30 hours. At no time shall a doctoral student register for more than 15 hours of 5000-level and above courses—nor for more than 10 thesis hours in a single semester. Normally a student must have earned at least three and not more than six semesters of residence credit before admission to candidacy.

Following the semester in which the comprehensive exam is taken and passed, the student must be continuously registered each fall and spring for dissertation hours until the student successfully defends his or her dissertation or formally withdraws from the program. Students admitted to "candidacy for degree" will register for and be charged for 5 hours of credit for each full term of doctoral work. Students who are off-campus and using no university facilities may register for 3 dissertation hours. However, off-campus status (3 credit hours of dissertation) is considered part time enrollment. Continuous registration during the academic year will be required until all requirements for the degree are completed. It is expected that the student and advisor will consult each semester as to the number of hours for which the student will register, consistent with the classification identified above. Students who are admitted to the Graduate School with deficiencies may expect to receive little or no residence credit until these deficiencies have been removed. (The Graduate School rules require that at least 30 semester hours of 5000+ level course work appear in the Application for Candidacy.) Summer enrollment is required only if 1) summer is your first semester as a Ph.D. 2) you are doing a Ph.D. Comprehensive exam, MS final defense or Ph.D. final defense during the summer term; 3) you are a visa student graduating in summer.

For further residence information see the *University of Colorado Catalog*.

All graduate level courses must be taught by members of the graduate faculty. It is the responsibility of the *student* to ensure that the instructors are members of the graduate faculty. Please contact sadoff@colorado.edu if in doubt.

6.1.4. Preliminary Examination

A preliminary examination is required of all Ph.D. candidates to test their fitness for the program and to determine areas of weakness. The examination is given once each year in January and the content and form of the exam will be determined by the faculty members of the respective area.

There is no general exam—only an exam for each respective research area (see list below).

Occasionally a research area offers both a “core” exam and a more specific exam. **Registration must be made in advance to take the exam and is due by the end of November (give to the Grad Program Advisor in ECEE 1B63).**

Atmospheric Remote Sensing	Electromagnetic Theory
Biomedical Engineering	Power Electronics & Systems
Computer Engineering	Optoelectronics
Control Theory	Nanotechnology/Solid State
Digital Signal Processing/Communications	VLSI/CAD

Once registered, you are obliged to take the exam, else receive a failing grade. Students who fail the exam will usually be given one more opportunity to repeat the part(s) that they failed the next time the exam is given. The Optics and Nano prelims are given in May; nearly all others are given in January. Anyone—even someone not registered as a student—can take this exam, but is only given two, consecutive attempts to pass it.

6.1.5. Degree Plan

Early in their Ph.D. program, students must work out an informal degree plan with the aid of their academic advisor. A satisfactory program will be determined in consultation with the academic advisor and/or in consultation with the faculty member with whom the student wishes to do research for the Ph.D. thesis. This faculty member normally becomes the chair of the student's Thesis Committee (Section 6.5). This program will be tailored to the area of academic interest and should represent a coordinated approach to the attainment of the student's ultimate goals. The degree plan may include the courses previously applied toward the Masters degree, which should be so indicated, and should total at least 30 semester hours of 5000- and 6000-level courses, but more hours will usually be required at the discretion of the Thesis Committee. Of the 60 hours (M.S. plus Ph.D.) necessary for the minimum fulfillment of the academic requirement for the Ph.D. degree, at least **9 hours** must be in 5000- and 6000-level courses in technical math, science or engineering fields outside of the student's core specialization area. This requirement may be fulfilled using courses either outside or inside the ECEE Department. Courses meeting this requirement must be approved by the student's advisor and the director of graduate studies. A student entering the University of Colorado with an M.S. degree from another institution, who has at least 6 hours of credit for non-electrical engineering graduate courses, shall be required to take not more than 3 hours of 5000- or 6000-level non-electrical engineering courses at the University of Colorado to fulfill the non-electrical engineering course requirement.

6.1.6. Quality of Work

Students are expected to complete with distinction all work in the formal courses that apply toward the degree. A course grade below "B-" will not be counted toward the minimum requirements for the degree but will be considered in the overall grade-point average with the exception of a foreign language course used to fulfill the language requirement (see section 6.3). In general, a course may **not** be repeated for the purpose of raising the grade.

Telecommunications (TLEN) and Engineering Management (EMEN) courses can **not** be used toward the Ph.D. degree.

6.1.7. Credit by Transfer

Graduate work of high quality done in a recognized graduate school elsewhere may be accepted up to a maximum of 21 semester hours, provided it is recommended by the Electrical, Computer, & Energy Engineering Department and approved by the Dean of the Graduate School. Such credits will be transferred only after the student has passed the preliminary examination.

A student who has received an M.S. degree from the University of Colorado may apply those coursework credits towards the Ph.D. degree provided that they meet the requirements of the Ph.D. degree.

No graduate credit will be accepted that was earned as an undergraduate student elsewhere, even though the courses may be of graduate standing and may exceed the work required for a bachelor's degree.

Transfer courses must have a grade of "B" or better but grades from those courses are not calculated into the GPA [One exception is made: Grades from courses taken in the Continuing Education / ACCESS

program, after a student has been admitted to the MENG, M.S. or Ph.D. program *are* calculated into the GPA. Embedded Systems is one such course.]

6.2. Research Advisor

A student who is ready to begin research work for the Ph.D. thesis will request the faculty member with whom he or she wishes to work to act as chair of the student's Thesis Committee. (Students should place their major effort on their research problem after they have passed the comprehensive examination for the Ph.D. degree but may begin their research before then if the Chair approves.)

If the research advisor is different from the student's initial advisor, the appropriate changes in the Thesis Committee must be initiated by the student.

Important: The ability to perform significant and independent research is a prime requisite for the Ph.D. degree. This research must be under the supervision of a graduate faculty member, and it is the student's responsibility to choose a topic and find a faculty member who will act as research advisor. This is an important step and should be done early in the program to ensure the probability of completion. It is advised that the student select a thesis topic and find a research advisor before embarking upon a Ph.D. program.

6.3. Foreign Language Requirement

Ph.D. students whose native language is English must demonstrate first-year proficiency in one foreign language suitable to their Thesis Committee by completion of one of the following:

- (a) presenting a transcript with a grade of "C" or better in at least three semester hours of a second semester, college-level language course;
- (b) presenting a transcript showing a grade of "C" or better in two years of high school language;
- (c) registering for any second semester, college-level course in the foreign language and passing it with a grade of "C" or better; or
- (d) attaining advanced placement credit for one year of college-level foreign language in their undergraduate work.

The language requirement must be met before the Ph.D. comprehensive examination may be scheduled.

A student whose native language is not English will, by passing courses and by completing graduate work at the University, demonstrate sufficient ability in English to meet the spirit of the language requirement.

Any exception to these rules must be made in a formal petition to the Director of Graduate Studies with written approval of the student's advisor.

6.4. Admission to Candidacy and Comprehensive Examination

At least two weeks before the comprehensive examination is attempted, the student must apply for admission to candidacy for the Ph.D. degree (on forms obtained in the Electrical, Computer, & Energy Engineering Department Graduate Office, ECEE 1B63).

Upon completion of the formal course work and fulfillment of the language requirement, the student must pass a written and/or oral comprehensive examination which examines mastery of graduate course work and capabilities of performing the proposed research. This examination will be taken by arrangement with the members of the Thesis Committee appointed by the Director of Graduate Studies upon the recommendation of the thesis advisor and having a minimum of five members of whom at least one must be from outside the department. Three of the five members must be Boulder Campus resident Graduate Faculty members. The student must be registered the semester of the examination.

The comprehensive examination must be taken not later than three calendar years after acceptance into the doctoral program. In case of failure, the examination may be attempted once more after a period of time determined by the examining board.

A student shall have earned at least four semesters of residence credit, shall have passed the language requirement, and shall have passed the comprehensive examination before he or she may be admitted to candidacy for the degree. The student must be registered at the University for the fall and spring semesters each year between the passing of the comprehensive examination and the completion of the dissertation defense. After passing their comprehensive exams, doctoral students are **not** allowed to go on the Time Out Program.

Students should consult the *University of Colorado Catalog* regarding additional rules relative to the comprehensive examination, particularly regarding time limitation.

6.5. Thesis and Final Examination

A dissertation proposal must be submitted by the student to the Thesis Committee, preferably at the time of the comprehensive examination, but in no case later than the end of the semester in which the comprehensive examination is completed. The dissertation proposal should outline the area of study and describe the problem in sufficient detail to indicate clearly the contribution of the proposed work.

6.5.1 Formatting:

A thesis based upon the research work done with consulting advice from the student's Thesis Committee should be finished in typewritten form (in accordance with rules furnished by the Graduate School Office) at least 30 days before the date of the final examination, and should be made available to the Final Examination Committee at least two weeks before the student takes the final examination. The thesis must conform to the format requirements as set forth by the Graduate School:

http://www.colorado.edu/GraduateSchool/academics/thesis_sub.html. One bound copy of each thesis is required for the Electrical, Computer, & Energy Engineering Department Office files in addition to the unbound (electronic) copy required by the graduate school. A signature page (hard copy on regular, white paper (does *not* need to be on thesis-bond paper), signed, minimally, by the thesis advisor and one other reader, is also due in Regent Hall Rm# 1B53 (Graduate School) at this time.

The student must register for a minimum of 30 hours of doctoral dissertation credit in accordance with the provisions of Section 6.1.3. Dissertation credit is also discussed in Section 10 of the Graduate School Rules: http://www.colorado.edu/GraduateSchool/policies/_docs/GraduateSchoolRules.pdf. This credit will not be included in calculating the student's grade-point average.

After the thesis has been accepted, a final examination time will be arranged by the student with the members of the Final Examination Committee, which usually consists of the members of the student's Thesis Committee. The student is responsible for notifying the Graduate School as well as the Electrical, Computer, & Energy Engineering Graduate Office of the final examination two weeks before the test date and supplying them with a thesis title and abstract. The student must be registered at the time the final examination is taken.

6.5.2 Defenses between semesters (valid for both MS and Ph.D. defenses):

Summer

For a defense to count toward summer, the student performing the defense must be enrolled for the summer term. S/he may perform the defense any time *following* the conclusion of the university spring graduation ceremony, but *prior to* the official start of fall semester courses—yes, even during the couple of weeks between semesters.

Fall

The same holds true for fall semester: The student must be enrolled for the fall semester, and the defense may be performed any time *following* the official university summer graduation date (no ceremonies held in summer, but there is an official date, approx. end of the first week of August), but must *precede* the official start of the spring semester courses.

Spring

Again, the same rules for a spring defense hold true: The student must be enrolled for spring semester and the defense may be performed any time *following* the official university fall graduation ceremony, but must *precede* the official start of summer "A"-session courses.

Note: Most students perform these defenses *during* the respective semester—not between semesters—and must do so, maximally, several weeks prior to the graduation ceremony, in order to graduate in the same semester as the defense.

A student who fails the final examination may attempt it again upon recommendation of the Thesis Committee.

6.6. Time Limit

All work, including the final examination, should be completed within six years from the time of admission. Work done earlier will not be accepted for the degree unless validated by a special examination. A student is expected to complete the work with reasonable continuity.

6.7. Doctor of Philosophy Flowchart

The Doctor of Philosophy Flowchart, Figure 2, graphically illustrates the sequence of events leading up to this degree. The students should familiarize themselves with this sequence, the time schedules, and the rules of the Graduate School as outlined in the *University of Colorado Catalog*, since students are responsible for their own programs.

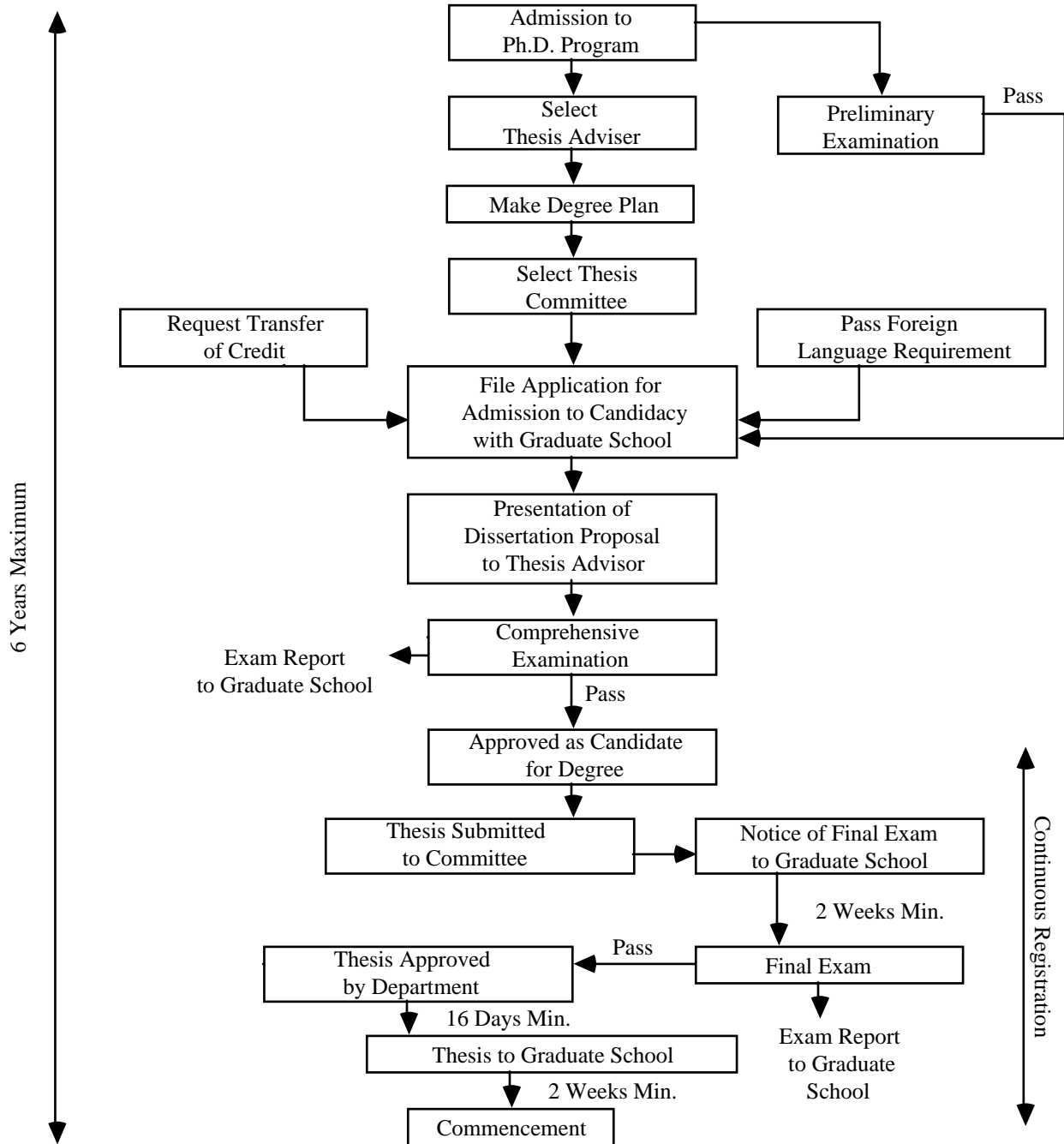


Figure 2. Ph.D. Flowchart

7. RULES COMMON ACROSS MULTIPLE DEGREES

7.10.1. Only a maximum of six ECEN 5000+ level course credit hours can count toward both BS and MS credit—and ONLY for those students who are specifically BS/MS degree-seeking status.

7.10.2. No class can *ever* count as triple credit (in other words, courses taken in 7.10.1., above, count only toward the BS/MS degree. They may *never* be applied toward a Ph.D. degree.

7.10.2 To transfer from one degree program to another requires an application. See the Grad Advisor for details.

8 ADDITIONAL INFORMATION

8.1. Financial Assistance

Most of the fellowships and scholarships are awarded by a Graduate School committee on the basis of a University-wide competition. The Electrical, Computer, & Energy Engineering Department recommends first-, second-, and third-year graduate students to this competition on the basis of past academic performance and future promise. All new-student applications accepted by January 15 are reviewed and those showing the greatest potential are submitted to the competition automatically. Students already on campus must apply to the Electrical, Computer, & Energy Engineering Department to be considered for second- or third-year awards.

Teaching assistantships are awarded by the Department of Electrical, Computer, & Energy Engineering on the basis of expected teaching ability. Usually they are not made available to overseas students until communication and technical proficiency have been established through classroom work on this campus.

Research assistantships are awarded by individual faculty members who have sponsored research funds at their disposal. Such awards are made on the basis of mutual interests between student and professor.

Only those who have been accepted as regular degree students and who maintain an acceptable performance level are eligible for financial assistance.

8.2. Research and Teaching Appointments

In order to be appointed as either a Research or Teaching Assistant, a graduate student must be enrolled on a full-time basis, and for at least 12 consecutive weeks of the semester during which they work as TA or RA. Full-time status for a Masters student is defined as being enrolled in either (a) 5 hours of graduate level work or 8 hours of mixed graduate and undergraduate level work; (b) registration for any number of Master's thesis hours; or (c) registration for Master's Candidate for Degree (ECEN 6940).

Full-time status for doctoral students who have not passed the comprehensive examination is defined as enrollment in either (a) 5 hours of graduate level course work or 8 hours of mixed graduate and undergraduate level course work or (b) registration for any number of doctoral thesis hours. Full-time status for doctoral students who have passed the comprehensive examination is defined as registration for at least 5 hours of doctoral thesis.

8.2.1. Teaching Assistantships

These are usually awarded to first-year students based on their academic record, recommendations, and motivation for graduate study. Teaching assistantships for continuing students are awarded after demonstration of their abilities to the Electrical, Computer, & Energy Engineering faculty. The purpose of teaching assistantships is to give serious graduate students the opportunity to teach, and they should not be considered just as a form of financial aid. For this reason, appointments will be made for one semester at a time with reappointment dependent upon a performance evaluation by the teaching assistant's supervisor.

Each teaching assistant will be supervised by a full-time faculty member who has the basic responsibility for the course. The students taking the course have every reason to expect their instructor to be well prepared and helpful.

A limited number of tuition waivers are available for teaching assistants. The amount of the waiver is graduated and based upon the percentage of teaching time. For further information contact the Electrical, Computer, & Energy Engineering Department Graduate Office.

Teaching assistants will observe the academic calendar in the same manner as other faculty members.

8.2.2. Research Assistantships

These are awarded to students by individual faculty members on the basis of research needs and mutual interests. Current research activities in the Electrical, Computer, & Energy Engineering Department are available at <http://ecee.colorado.edu>. Interested students should contact appropriate faculty members directly.

Research assistants on appointment will observe the same calendar as the University staff with respect to vacation periods. Deviation from this schedule must be authorized by the research supervisor.

8.3. Denver and Colorado Springs Campuses

The University of Colorado maintains campuses in Denver and Colorado Springs as well as in Boulder. It is possible for a student to enroll and complete the course work necessary for an advanced degree in electrical engineering at either of these campuses, although most of the classes are scheduled in the evenings and are arranged for the convenience of the working student. Any courses taken by Boulder campus students at another CU campus are subject to the 9 hour (for M.S.) or 21 hour (for Ph.D.) maximum transfer rule (see Sections 4.1.6 and 6.1.7).

The campus at Denver is a geographic extension of the Electrical, Computer, & Energy Engineering Department in Boulder. A separate M.S. program exists at the Denver Campus and admissions for this program are handled by the Denver Campus. Full-time faculty are available for counseling and advising and have responsibility for the academic programs.

For further detailed information, write:

Electrical Engineering Department
University of Colorado at Denver
Campus Box 104
P.O. Box 173364
Denver, Colorado 80217-3364

The campus at Colorado Springs has established a separate M.S. and Ph.D. program. Please write for information to:

Electrical Engineering Department
University of Colorado at Colorado Springs
P.O. Box 7150
Colorado Springs, Colorado 80933-7150

As part of its Biomedical Engineering program, the Department of Electrical, Computer, & Energy Engineering has affiliation with many departments at the Health Sciences Center. For further information contact Prof. Howard Wachtel, 303-492-7713, or email wachtel@colorado.edu or hwachtel@comcast.net.

8.4. Petitions

Deviations from the general rules and procedures listed in this booklet or in the *University of Colorado Catalog* may be made only through the use of a properly executed petition. Petition forms are available in the Electrical, Computer, & Energy Engineering Graduate Office. They must be filled out by the student, endorsed by his or her academic advisor, and submitted to the department Graduate Office for final approval by the Director of Graduate Studies.

8.5. Department Committees

(a) *Graduate Admissions Committee*. This committee is responsible for all of the activities associated with the recommendation of students for admission to the departmental graduate program. Included in these activities are the review of transcripts, status determination, recommendations for appointments and financial assistance, and admissions policy determinations.

(b) *Graduate Examinations Committee*. This committee is responsible for the determination of examination policy with respect to the Masters final and the Ph.D. preliminary examinations. It administers the latter examination and is responsible for the interpretation of the results and the establishment of passing criteria for recommendation to the graduate faculty.

(c) *Graduate Program Committee*. This committee is responsible for following the academic performance of graduate students throughout their programs and for dropping from the program those students who do not meet a minimum academic performance as established by the committee and approved by the faculty. It continually reviews the regulations governing graduate work in the department and recommends changes as the need arises. It also accepts and rules upon all petitions from graduate students pertinent to graduate policy.

8.6. Housing

The Off-Campus Housing Office in Hallett Hall maintains lists of rooms and apartments available off campus. This office can also provide application blanks for buffet apartments in Crosman Hall for graduate women or Reed Hall for graduate men, graduate women, or couples without children. Information concerning married student housing on or off campus can be obtained from the Family Housing Office at 1350 20th Street, Boulder, CO 80302, (303) 492-6384.

Here are three more resources available to you (the first two also require that you have paid your enrollment deposit and registered for classes):

- Housing Services – they provide family housing (does not require the couple to be married) and a limited number of units for single graduate students. Their web site is: <http://housing.colorado.edu/residences/graduate-family> . See also:
- Off Campus Student Services – for a small fee, you get access to their listings. They're also handy to know if you have problems once you move in. Their web site is: <http://ocss.colorado.edu/>.
- Housing Helpers – though not associated with the university, they are close enough to campus to be worth talking to. Their web site is: <http://www.housinghelpers.com/>

8.7. Special Students

The special student category is open to all persons who wish to take courses at the University of Colorado for information only. Consent of the instructor is required for such registration, and credit received may *not* be applied toward any graduate degree except through subsequent "Transfer of Credit". The special student is a student-at-large and is not attached to a particular department nor is he or she enrolled in the Graduate School. The student need not submit a formal application, but rather a letter of intent should be sent to the Office of Admissions and Records.

Further information about this category may be obtained by writing or calling the Department of Continuing Education, Campus Box 178, (303) 492-5148.

8.8. Further Information

See the *University of Colorado Catalog* (<http://www.colorado.edu/catalog/>) or contact the Electrical, Computer, & Energy Engineering Graduate Office, ECEE 1B63, (303) 735-0490.

8.9. Academic Probation

Each semester, roughly 6-12 graduate students in our ECEE department drop below a 3.0 cumulative grade point average. If you know you are one of these students, then you will need to write a letter (on a blank sheet of paper—no special form for this), to Attn: Dean of the Graduate School.

In the letter, you must specify which specific course titles and associated course numbers you will take during the next two semesters, plus the minimal, respective grades you intend to earn, in each one.

You then need to show, mathematically, how these grades will bring your cumulative gpa above a 3.0.

Please note that in worst case, you can be kicked out of our program, but that faculty, in general, wish to see you improve your grades and graduate (you can not graduate with any gpa less than 3.0). That said, it is important to write this petition letter, obtain signatures on it, and submit it in a very timely way, as soon as you are able, after learning of your sub-3.0 cumulative gpa.

Three people need to sign and date your letter of petition:

- 1) You
- 2) your faculty academic advisor
- 3) the ECEE departmental Graduate Director

Please then give the Grad Program Advisor a photocopy of the letter, and bring the original to Carrie Simon in the Graduate School (Regent Hall, Rm# 1B53).

8.10. ESSENTIAL: All the rules preceding this are equally important, and you should refer to them for specifics. Nonetheless, in our experience, some rules create more problems than others, for students. Below is a list of specifics that requires your special attention.

In the past, some individuals' graduations have been delayed—or, more seriously, students were dropped from our program—due to failure to comply with one or more of the following.

8.10.1. Seek help as early as possible for any concerns or questions that affect your academic life.

Please speak with the course instructor and with your faculty academic advisor for concerns about a course. For academic or any other problems, please contact the ECEE Graduate Program Advisor, the ECEE Graduate Program Director, the Ombuds' office <http://ombuds.colorado.edu/> or Counseling and Psychological Services <http://studentlife.colorado.edu/resources/counseling-and-psychological-services/>, as appropriate. Early advice is much more effective.

8.10.2. Getting graduation paperwork submitted on time is the responsibility of the student. If you miss the deadline to submit *all* the required paperwork, by the deadline (usually e-mailed several times, beginning 5 or 6 weeks prior to the deadline), then you do not graduate in that semester.

8.10.3. THESIS STUDENTS:

You need to seek approval for your **six (MS) or nine (Ph.D.)**, out-of-specialization course credit hours sufficiently in advance (ideally, prior to taking the course) so that you can make alternate plans in case any of the courses you plan to use to fulfill the requirement do not get approved.

8.10.4. You can not drop a class in which you got a bad grade. You can not drop a class, after the drop deadline, just because you fear you will get a bad grade. Plan accordingly.

8.10.5. Only courses with a minimum of "B" can be transferred into a grad-level degree seeking program. Courses with lower grades can *never* be transferred.

8.10.6. Failure to comply with the provisions of academic probation is the leading cause of being dropped from our program. **Please talk with your advisor as soon as you become aware that your cumulative GPA may drop /has dropped below 3.0. Meet the deadlines and the provisions of probation status.**

8.10.7. You can only graduate after completing 30 course credit hours. If you are transferring course credit hours, these sometimes translate as fractional hours (from quarter systems or other terms at overseas universities). There is no "rounding up" to 30—no matter how small the difference.

RULES COMMON ACROSS MULTIPLE DEGREES

8.10.8. Only a maximum of six ECEN 5000+ level course credit hours can count toward both BS and MS credit—and ONLY for those students who are specifically BS/MS degree-seeking status.

8.10.9. No class can *ever* count as triple credit (in other words, courses taken in 8.10.8., above, count only toward the BS/MS degree. They may *never* be applied toward a Ph.D. degree.

8.10.10 To transfer from one degree program to another requires an application. See the Grad Advisor for details. (Masters students do *not* become Ph.D. students simply by simply taking the Ph.D. preliminary exam, nor by virtue of their faculty advisors stating that they are a Ph.D. student. Rather, changing from Masters to Ph.D. status involves a lot of serious paperwork and deadlines. There is a process required in order to apply. Please see the Graduate Program Advisor for details.) Notice that you can not register for Ph.D. thesis hours until you are formally admitted to the Ph.D. program.

8.10.11. You must be a full-time enrolled, degree-seeking student to work as a salaried TA or RA, and must work at least 12 weeks of a semester in order to receive the tuition remission and insurance coverage.

8.10.12. Please register as early as possible for the courses you plan to take. Timely registration helps prevent course cancellation due to under-enrollment.