

ELECTRICAL ENGINEERING DEPARTMENT

**California Polytechnic State University
San Luis Obispo, California**



**BSEE / MSEE
BSCPE / MSEE
HONORS PROGRAM
HANDBOOK**

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Introduction

This is a “blended” program that provides a means for academically excellent upper-division students to complete MSEE graduate studies concurrently with completion of the BS degree.

Some features of the program are:

- It provides a seamless process whereby students can progress from undergraduate status to graduate status without having to go through the formal application process through the Admissions Office (thereby eliminating the need to pay the Cal State Apply application fee, provide letters of recommendation or take GRE or other entrance exams).
- It allows concurrent enrollment in courses that will apply to the BS degree, along with courses that will apply to the MS degree.
- The time to MSEE graduation is typically reduced compared to students who complete the two degrees as separate programs.

All students should become familiar with the Cal Poly Catalog which gives information pertinent to undergraduate and graduate studies in the EE Department. Cal Poly Graduate Education Handbook is an additional important source of information, and is available at <http://www.grad.calpoly.edu> under Policies. **This handbook supplements the catalog and the Cal Poly Graduate Education Handbook and should not be interpreted as replacing or superseding information therein.**

Eligibility

EE and CPE students who are in their junior year of EE coursework and have a cumulative Cal Poly GPA of 3.2 or better are eligible to apply for the program. For applicants whose GPA is between 3.2 and 3.5, up to three letters of recommendation from faculty are required.

Students with a GPA below 3.2 may still be considered for the Honors Program if their application is accompanied by multiple, strong faculty recommendations, or if special circumstances warrant such consideration.

The appropriate time to apply to the program is between the end of junior year and the enrollment in the EE 460 or CPE 461 Senior Project course. Starting Fall 2017, BMS students are required to complete Senior Project as a separate requirement. Completion of Senior Project is a pre-requisite for MS Thesis.

Students may not apply to the Honors program after they have accumulated 205 degree-applicable units that fulfill requirements of either the B.S. or M.S. degrees.

Application

Application forms for the BS/MSEE Honors Program are available from the EE Department Office. They can also be found <http://www.ee.calpoly.edu/honors/>. You do not need to take the

GRE exam, submit transcripts, or pay any fee for application to this program. Submit the application directly to the EE Department Office.

Admission and Status

Admission Decisions

Admission to the program will be determined by the Graduate Coordinator in consultation with the Graduate Committee and Department Chair.

Admission of students who do not meet the 3.2 GPA minimum requirements will only be granted after review and concurrence of the Graduate Committee.

Graduate Status

Upon admission, your undergraduate status will not officially change until you have completed a minimum of 180 units of coursework applicable to the two degrees (BS or MS). At this time you are eligible to apply for a *Postbaccalaureate Change of Objective*, which will change your degree objective from BS to BMS, and your registration status to Postbaccalaureate Graduate. The change in status must occur before you reach a total of 205 units applicable to the two degrees. Note, once a student transitions from undergraduate to graduate status, they will lose access to their progress-to-degree information on their Cal Poly portal.

The earliest that the change in status will take effect is in the quarter following the one in which the request is received by the Academic Records Office. The completed and signed *Change of Objective* form must generally be received by Academic Records no later than the end of the 4th week of the quarter prior to when it is to take effect. (Keep in mind that this form requires the signature of the CENG Associate Dean of Graduate Programs prior to submission to Academic Records, and so time for this approval must be taken into consideration when planning to meet the submission deadline.) You are permitted to apply for a *Change of Objective* before completing the minimum number of units required, provided that you will reach the minimum number before the quarter in which the change is to take effect (specified on the form). If you are requesting a Change of Objective for a future quarter, and meet the filing deadline (4th week of the quarter prior to when it is to take effect), your change to “Postbaccalaureate Graduate” status should be executed in time for you to gain graduate priority for course registrations for the quarter that the Objective change takes effect. If you wish to apply ahead of time for Graduate status, you must provide the Graduate Coordinator with a draft of your *Formal Study Plan*, along with information on the undergraduate degree courses that you plan to complete before the *Change of Objective* is to take effect, to confirm that the required units should be completed in time.

Students must be matriculated for at least two academic quarters in BMS Graduate status before receiving their MS degree. Therefore, the *Postbaccalaureate Change of Objective* should be completed as soon as the minimum number of units is achieved.

There are certain advantages in obtaining BMS graduate status as soon as possible such as:

- Priority registration
- University employment pay scale based on graduate status

- Eligibility for graduate student financial support.

The major disadvantage of the change from BS to BMS is the increased tuition for graduate program and the loss of some financial supports that are only available to undergraduate students.

General Academic Guidelines

Academic Advising

The EE Department has a faculty member designated as the department's Graduate Coordinator. Although you are encouraged to seek advice and consultation from any faculty member, the Graduate Coordinator is your official program advisor and he/she must approve and sign off all the required forms.

Once you begin work on thesis research, your Thesis Advisor can also provide advice on appropriate coursework to prepare for the thesis research or for your particular field of interest. Therefore, it is helpful to engage a Thesis Advisor as soon as possible in your MS degree program.

Registration and Continuous Enrollment

It is expected that you will be registered at Cal Poly each quarter until you complete all requirements for your degrees (Summer quarter excepted). If you have some special circumstance which requires a break in your studies, contact the Graduate Coordinator about this matter. For example, students on approved university leaves of absence as defined in the University catalog (Medical Leave; Planned Educational Leave) will not be required to enroll during the leave period. Except for these special cases, if you do not register continuously (except Summer), or register but fail to take coursework applicable to your degree objective, you may be dropped from the Graduate Program and will need to reapply for admission.

Effective Fall quarter 2009, graduate students will be required to maintain continuous enrollment from the time of first enrollment in a graduate program until completion of the degree. Students will maintain continuous enrollment either by being enrolled as a regular student (enrolling in coursework or thesis units), or by registering in a special course designated for this purpose during terms in which they are not otherwise regularly enrolled. Continuous enrollment will be defined as being enrolled during at least three quarters each academic year (usually Fall, Winter, and Spring quarters).

The special course, *GS 597 Continued Graduate Study*, is listed in the University catalog but taken through Cal Poly Continuing Education (Open University) to minimize the cost. It is a one-unit course, graded on a credit/no-credit (CR/NC) basis. Units earned in GS 597 will **not** count toward meeting any degree requirements.

Students who fail to fulfill this continuous enrollment requirement will not be permitted to graduate – even if all other degree requirements have been completed - until payment has been made for all quarters of non-enrollment. In such cases, the student must register in *GS 597*

through Continuing Education for a number of units equal to the number of non-enrolled quarters.

All students must be enrolled during the quarter in which they graduate, either through regular course enrollments or by registering in *GS 597* for that quarter.

The Formal Study Plan

The major element of the *Formal Study Plan* (*Working Formal Study Plan* and *Final Formal Study Plan*) is a display of your intended courses to satisfy the MSEE degree requirements. The *Formal Study Plan* will henceforth be referred to as the “Plan”. You are advised to review the Cal Poly catalog and this handbook, as well as consulting the proposed annual schedule of course offerings posted by the EE Department and any other department offering courses included in your Plan, before attempting to construct a comprehensive Study Plan. You may also wish to consult with faculty and the Graduate Coordinator while formulating your Plan. The forms are available on the GradEd website <http://www.grad.calpoly.edu/checklist-forms/form.html> to assist you with developing your Study Plan.

The *Working Formal Study Plan* should be submitted to the Graduate Coordinator before the twelfth unit of graduate study is completed. The *Final Formal Study Plan* should be submitted within the first three weeks of the beginning of the quarter in which you plan to graduate. The Graduate Coordinator must approve the Plan before forwarding it for further approval by the College of Engineering and the University GradEd Office.

The *Formal Study Plan* must meet the following requirements:

- The Plan must have a total of at least 45 quarter units.
- The only “required courses” in the Plan are 3 units of EE 563 Graduate Seminar (one unit for each of three quarters), 4 units of EE 525 Stochastic Processes for Engineers or EE 513 Control Systems Theory, and 9 units of EE 599 Thesis.
- At least 28 units in the Plan must be from graduate-level 500 series courses, and the remainder must be no lower than 400 level (advanced undergraduate) courses. Therefore, students will need at least 12 additional units in 500-level courses beyond the required MSEE courses and Thesis (EE 525/513, 563, 599).
- Inclusion of courses in the Plan from related technical support areas such as Computer Science, other Engineering disciplines, Mathematics, or Physics is encouraged but should not constitute more than 17 units of the 45 unit Plan. Computer Engineering courses (carrying a “CPE” prefix in the course number) are considered equivalent to Electrical Engineering (“EE” prefix) courses, and are not included in this 17 unit limitation.
- At least 32 units of the Plan must be completed in residence. This means that up to 13 quarter units ($8\frac{2}{3}$ semester units) from another university could be accepted as part of the Plan, provided that they were not used to fulfill part of another completed degree program.
- Courses taken for credit/no credit (except for EE 563 Grad. Seminar) cannot be used in the Formal Study Plan, but may be taken as prerequisites or as supplemental coursework.

- Cooperative Education courses (EE 594, 595) may be taken during a student's graduate program. These courses can be used to fulfill the continuous enrollment requirement for a student while temporarily employed. However, credits earned in such courses can not be used to fulfill the 45 course unit requirements for the MS degree.
- The most important criterion is that the Plan as a whole must "make sense." Chosen electives should support some technical objective by providing sufficient breadth and depth within an area of specialization.

Academic Performance

You are required to maintain an overall GPA of 3.00 or higher in all coursework appearing on your *Formal Study Plan*. Failure to maintain this minimum cumulative GPA for your MSEE studies will prevent you from advancing to Candidacy, and may result in placement on Academic Probation. Continued failure to meet this minimum requirement for a second consecutive quarter while on Probation may further result in Academic Disqualification and dismissal from the graduate program.

Courses with grades of D+ or lower are not acceptable in fulfillment of the *Formal Study Plan* and may be retaken. However, while an improved grade (C- or better) in the second attempt at a course will fulfill this portion of the student's program of study (as defined by the Formal Study Plan), the grades from both course attempts are included in the calculation of the cumulative GPA for the MS degree.

Application for Graduation

You must file a *Application for Graduation* (E-form) one quarter prior to the quarter that you plan to graduate.

All requirements for the MS degree must be completed within seven years from the first quarter in which coursework listed in the *Final Formal Study Plan* was undertaken.

Supervised Courses

Supervisory courses EE 599 Thesis and EE 500 Individual Study are offered as required. You must have a supervising faculty member for these courses, and the topic for study must be approved by the supervising faculty advisor before enrolling in either of these courses. Contact the EE Department Office for supervisory course approval forms and registration permissions for these courses. The University recommends that no more than 30% of the Study Plan units for a graduate degree program should come from independent study courses (including the Thesis). Therefore no more than 4 total units of EE 500 Individual Study will generally be approved on a Formal Study Plan. Graduate students working on independent study projects for credit should enroll in EE 500, not the undergraduate equivalent course EE 400.

Thesis

Selection of Thesis Project

The successful completion of a thesis is the culminating experience for the granting of a graduate degree to BMS Honors Program participants. The general guidelines for a thesis are:

- A thesis is the written product of a systematic study of a significant problem.
- It identifies the problem, states the major assumptions, explains the significance of the undertaking, sets forth the sources for and methods of gathering information, analyzes the data, and offers a conclusion or recommendation.
- The finished product evidences originality, critical and independent thinking, appropriate organization and format, and thorough documentation.
- Normally, an oral defense of the thesis is required.

Note, completion of Senior Project is a pre-requisite for MS Thesis.

Thesis Advisor

Your thesis adviser must be a permanent full-time faculty member of the electrical engineering department or the computer engineering program. You should consult the Faculty Interest List published by the electrical engineering department (available on-line) to find potential thesis advisors who have expertise in the specialization that you would like to work in for your thesis project. You must obtain an advisor's approval and signature on a *Supervisory Course Approval* form, before registering for EE 599 Design Project-Thesis.

The responsibilities of the Thesis Advisor include:

- Assist with the definition of the thesis project, including clarification of objectives and deliverables.
- Suggest appropriate preparation for the thesis research including relevant coursework to consider, as well as guiding and reviewing the search of relevant literature for background preparation.
- Provide technical advice and consultation for dealing with the challenges, roadblocks and dead-ends inherent in research projects.
- Review the thesis document draft(s) and provide feedback on needed changes and revisions.
- Determine the appropriate timing and units for EE 599 registrations.
- Recommend other faculty members with proper technical expertise to potentially serve on the Thesis Committee.
- Certify readiness for the Oral Defense of the thesis and assist with preparations (review of presentation materials, *etc.*)

It is recommended that you begin seeking a Thesis Advisor during your first quarter of studies in the MSEE program, so that you can gain the benefit of their advice on coursework to include in your Study Plan and so that you have time to define a suitable project well enough to launch into your thesis research as soon as possible.

Thesis Committee

You will need to assemble a Thesis Committee of at least three faculty members before thesis defense. One of these members is your primary Thesis Advisor, who will also be the Chair of your Thesis Committee. Selection of the other two members should be done in consultation with your Thesis Advisor.

At least two of the Thesis Committee members must be from the Electrical Engineering department. One member of the committee is frequently from a support department outside the EE Department (such as Math, CSC, *etc.*), depending on the thesis topic. If your Thesis Advisor is a CPE faculty member from the Computer Science Department, then both additional Thesis Committee members should be from the EE Department faculty.

The responsibilities of the Thesis Committee members are to:

- Participate in the Thesis Proposal Presentation and provide feedback
- Review the Thesis document before the Oral Defense
- Formulate questions to ask during the Oral Defense
- Provide feedback and suggestions for improving the Thesis document, including needed clarifications, technical inaccuracies, sufficiency of exposition, and formatting issues.
- Assess the Thesis document, Oral Defense Presentation, answers to subsequent questions and merit of the thesis research to determine if the Thesis should be approved, approved following adequate revision (as spelled out by the committee), or rejected.

It is expected that any Thesis Committee member with serious reservations about the content of the Thesis document or the research undertaken will notify the Thesis Advisor of their concerns prior to the Oral Defense, so that remedies can be made or the Defense rescheduled to a time when it is more likely to be successful.

Thesis Proposal Presentation

The MS thesis student, at the discretion of thesis adviser, will present his/her thesis proposal at the time of committee selection, at the latest one quarter before the thesis defense. Thesis committee members can condition their participation based on the thesis proposal presentation.

Thesis Proposal Presentation Guidelines (if required)

Purpose

The purpose of the Thesis Proposal presentation is for the student to demonstrate the quality, feasibility, and academic merit of the proposed research and to receive constructive feedback from the committee. It is also an opportunity for the thesis committee members to confirm that the proposed research falls sufficiently within their areas of expertise and interest for them to be an effective member of the Thesis Committee.

Procedure

The MS thesis student will present his/her thesis proposal at the time of committee selection, at the latest one quarter before the thesis defense when filing the “Advancement to Candidacy Form”. It is the responsibility of the student to schedule a time acceptable to the committee. The committee should attend and provide feedback.

The thesis presentation will be scheduled for 50 minutes with a 15 minute overview of the proposed research addressing the following:

- Significance of the proposed study

- Scope and objectives of the proposed research
- A review of the major findings of previous research in the related field
- Relevant work completed/preliminary observations
- List of research questions to be investigated
- A schedule outlining the anticipated dates of completion of each task
- List of references reviewed

The oral presentation is followed by questions and suggestions from the committee.

Although it is expected that all thesis research will include a Thesis Proposal presentation, your individual Thesis Advisor may choose not to require it as part of your particular project. Thesis Committee members, however, can condition their agreement to participate further based on whether or not the Thesis Proposal presentation is completed, or on the information conveyed at the presentation.

Thesis Oral Defense

An oral presentation in defense of your thesis must be scheduled prior to submission of the thesis document for final approval. The presentation must have all the members of your Thesis Committee present. The policy of the EE Department is to also make the initial presentation open to other interested faculty and students.

You should work out the scheduling (time and room) and announcement of the Thesis Oral Defense with the EE Department Office staff. Announcement of the presentation should be made by e-mail and posted flyers at least one week in advance.

The Thesis Oral Defense is usually scheduled for two hours, and typically consists of:

1. Thesis Oral Presentation (presented by the Thesis student, open to all interested faculty and students) [40-50 minutes]
2. Questions on the Presentation (from attending faculty, students, and committee members) [10 – 15 minutes]
3. Closed Session Questioning (Thesis Committee, Thesis student only) [20 – 45 minutes]
4. Thesis Committee Deliberation (Thesis Committee only) [10 – 30 minutes]

Thesis Document

General instructions for Master's Thesis Formatting Guidelines should be carefully followed in order to minimize the time and number of revisions that will be required during the approval process of the final thesis document. Master's Thesis Templates can be found at <http://www.grad.calpoly.edu/thesis/templates.html>. You should apply the appropriate formats to the earliest drafts of your Thesis document to prevent wasting a lot of time reformatting and correcting the document later, when it is far more unwieldy.

It is suggested that you develop your thesis document in stages while conducting your project, rather than waiting until the very end of the project to write this extensive document. Your Thesis Advisor may ask you to provide report section drafts as part of the grade determination for early quarters of EE 599 registration.

A draft of your complete thesis document should be provided to your Thesis Advisor **at least four weeks** before you intend to defend your Thesis. This is needed to provide them with sufficient time to thoroughly review your Thesis and suggest needed revisions that can be completed before the document is supplied to the other members of the Thesis Committee.

A revised and complete hardcopy version of your thesis document should be provided to each member of your Thesis Committee **at least two weeks** before you plan to hold your Thesis Oral Defense. This version must have been previously reviewed and approved by your Thesis Advisor.

Thesis Document Approval

Final approval of your thesis report involves two steps:

- (1) Thesis Committee approval for content, and
- (2) Office of Graduate Education approval for format.

As a result of your thesis committee's review of your thesis document and oral defense presentation, you will likely be asked to make revisions to the content of your thesis document, to add required information, clarify explanations, expand upon critical topics, or resolve typographic or grammatical errors. The committee may request additional reviews of the revised document, or may choose to delegate the task of final review to your thesis advisor.

Once the thesis document is approved by your Thesis Committee, you should obtain their signatures verifying this approval using the *Master's Thesis Approval Form*, by the last day of the quarter in which you intend to graduate. Refer to Master's Thesis Submission Process (<http://www.grad.calpoly.edu/thesis/thesis.html>) for detailed instructions.

Process to Award Both Degrees

When all requirements have been met for both degrees, Records re-opens undergraduate matriculation (secondary), posts the undergraduate degree, then completes graduate matriculation (primary). Both degrees are awarded at the same time and recognized at a graduation ceremony.

If student fails to complete MS requirements, but completes all their undergraduate requirements, the undergraduate matriculation can be re-opened in order to grant the BS degree. The student must submit a PBCO form and change their degree objective back to their undergraduate program.

Department Facilities Available to BS/MSEE Honors Students

Students who are working on a thesis and/or special projects may be assigned workspace in one of the EE Department labs. Students who are working on sponsored projects will typically work in the area assigned for that project – in some cases this could be in the ATL research facility or Bonderson Building. All Honors Program students may have access to the EE Graduate lab (20-121) with priority given to Teaching Associates for office hours and lab preparation (key can be requested through EE Office).

Financial Assistance Available to Graduate Students

Teaching Associates

The EE Department typically has a number of paid Teaching Associate (TA) positions for graduate students capable of serving as an instructor for selected undergraduate laboratories. Typically, non-major introductory circuits and electronics labs are staffed using graduate student TAs. Only qualified students who are maintaining satisfactory academic performance and sufficient progress toward completion of their degrees will be appointed to these positions. Student TAs are only permitted to teach a maximum of one laboratory course section per quarter. Applications for these positions should be submitted to the EE Department Office.

In order to be considered for a Teaching Associate position, a student must meet the following minimum academic qualifications:

- 1) Student instructors must have earned a minimum B average in their undergraduate circuits lecture courses, and also in their undergraduate electronics lecture courses.
- 2) Student instructors must have earned a minimum B+ average in their undergraduate circuits laboratory courses, and also in their undergraduate electronics laboratory courses.

Once appointed to a Teaching Associate position, a student must meet the following requirements in order to be reappointed to an additional teaching position in a subsequent quarter:

- 1) Students must maintain a minimum 3.3 GPA in the quarter in which they are teaching.
- 2) Students must receive a signature from their thesis advisor indicating that adequate progress has been made on their Master's thesis.

Note that tuition waivers are NOT automatically awarded to students receiving teaching associate positions (as more typically occurs at PhD-granting universities).

Research Assistants

Sponsored research by departmental faculty frequently employs students in the conduct of the research as Research Assistants (RA). On occasion, individual faculty members have sponsored projects that provide a stipend to the students participating in the project (usually thesis students). Check with the EE Department Office and individual faculty members on the availability of these appointments.

Again, note that tuition waivers are also NOT automatically awarded to students receiving research assistantships (as more typically occurs at PhD-granting universities).

Graders and Laboratory Assistants

Hourly wage jobs assisting faculty as laboratory assistants or graders are also generally available each quarter (except Summer). Available positions are posted by the EE department at the beginning of each quarter. Selection to these positions is made by the individual faculty course instructors. These positions are staffed by both graduate students and advanced undergraduates, and so employment in these positions each quarter is not guaranteed. The number of hours per

week required may be different for each specific position, and subject to confirmation and approval by the hiring faculty member.

Fellowships and Scholarships

Both current and prospective graduate students may apply for Student Financial Aid or Cal Poly scholarships through Cal Poly's Financial Aid Office

http://financialaid.calpoly.edu/_finaid/types_aid/scholarships.htm

The Graduate Education Office manages several other financial support opportunities such as TA/GA programs, Resident and Non-resident Tuition Waiver, Graduate Equity Fellowship Program. Please visit <http://grad.calpoly.edu/> under financial resources for descriptions of each program and instructions of application.

Checklist

Students are responsible for initiation, completion and submission of all necessary forms. Failure to complete and submit forms at the appropriate times may delay the completion of your program(s) and the granting of your degree(s).

(All forms required can be downloaded from <http://grad.calpoly.edu/checklist-forms/form.html>.)

- Accept to BMS program by submitting *Blended Programs Application Approval* Form (E-form).

- When you complete 180 units —fill out *Postbaccalaureate Change of Objective* Form and submit to the EE Department Office.

- First quarter—fill out *Working Formal Study Plan & Advancement to Candidacy* Form and submit to the EE Department Office.

- Present thesis proposal to the thesis committee (at the latest) one quarter before the thesis defense.

- One Quarter prior to graduation— submit *Application for Graduation* (E-Form).

- Final quarter — submit *Final Formal Study Plan* Form within the first 3 weeks. Submit *Master's Thesis Approval Form* once the thesis is completed.