

California State University, Chico

**Department of
Electrical and Computer Engineering**

**Graduate Student
Handbook**

Fall 2011

Foreword

The Department of Electrical and Computer Engineering (ECE) at California State University, Chico (CSUC) offers a graduate program leading to the **Master of Science in Electrical and Computer Engineering (MSECE)**, with focus on Electronics or Computer Engineering in the following technical areas:

High Frequency Design, Software Engineering, Computer Networking, Digital Signal Processing, Electromagnetics, Embedded and Real-Time Systems, Controls

This handbook describes the MS program in the Department, outlines a number of procedures for graduate students and states various departmental regulations.

Information provided in this handbook is intended as a supplement to, and not a substitute for, the Guide to Graduate Studies of CSUC. The Guide to Graduate Studies contains general rules and regulations governing the University's graduate programs.

Table of Contents

INTRODUCTION	4
1. ADMISSIONS.....	5
2. ADMISSION STATUS.....	5
3. FINANCIAL ASSISTANCE	6
3.1 TEACHING ASSISTANTSHIP (TA).....	6
3.2 RESEARCH ASSISTANTSHIP (RA)	7
3.4 FINANCIAL AID.....	7
3.4 TUITION WAIVER (TW)	7
4. ADVISING.....	7
4.1 INITIAL ADVISING	7
4.2 FACULTY ADVISOR	7
4.3 RESPONSIBILITIES OF GRADUATE STUDENT	8
5. REGISTRATION	8
5.1 FULL-TIME STATUS.....	8
5.2 PART-TIME STATUS.....	8
5.4 RESEARCH COURSES	9
6. GENERAL INFORMATION.....	9
6.1 COMPLETION OF STUDENT RESEARCH	9
6.2 GRADE REQUIREMENTS FOR GRADUATION	9
6.3 CONTINUATION AND DISMISSAL	9
6.4 FACILITIES.....	10
7. MASTER OF SCIENCE DEGREE REQUIREMENTS	10
7.1 BASIC REQUIREMENTS	10
7.2 PLAN OF STUDY	12
7.3 TIME LIMIT	12
7.4 FORMATION OF THESIS COMMITTEE	12
7.5 THESIS PROPOSAL	12
7.6 THESIS SUBMISSION, DEFENSE, AND ACCEPTANCE	12
7.7 THE COMPREHENSIVE EXAMINATION.....	13
7.8 GRADUATION	14
7.9 PART-TIME GRADUATE STUDIES.....	14
8. DEPARTMENT FACULTY	14

INTRODUCTION

Welcome! If you are already a graduate student, beginning your program of study, or a prospective graduate student, this handbook is a valuable resource for you. It is intended to provide a single source for most of the administrative policies and details that you'll need to know during the course of your Master's study in the Department of Electrical and Computer Engineering at CSU Chico. You also need to know what resources exist (other than this document) to help you through the process. Here's a summary:

Graduate Coordinator: The Graduate Coordinator is your primary contact for administrative and advising issues. The Graduate Coordinator is the department Chair, Dr. Adel A. Ghandakly:

Office: OCNL 313

Phone: 530-898-5343

Email: aghandakly@csuchico.edu

Guide to Graduate Studies: This is a very helpful document, provided by the School of Graduate Studies, that describes the general university policies relating to graduate programs at CSU Chico. It also contains outlines and formatting instructions for Thesis/Project documents. It is available from the School of Graduate Studies Office, THMA 209 (for a nominal fee) or online at: http://www.csuchico.edu/graduatestudies/documents/fall_grad_guide.pdf

Department Office: Located in OCNL 313, and department website <http://www.ecst.csuchico.edu/ece/>, where you can get the department level forms, and get most of your general questions answered.

Student file: In the department office, a file is maintained for every active graduate student, that contains all of the relevant paperwork documenting that student's career at CSU Chico, from admission to graduation. The Graduate Coordinator can retrieve your file for you, and review it with you, to ensure that it is complete and accurate.

Admission letter: The admission letter that was sent to you announcing your acceptance into the master's program, may contain significant information about things like prerequisite courses you may be required to complete, fee waivers you may have been awarded, etc. If you need a copy of the letter that was sent to you, see the Graduate Coordinator.

If you have questions or problems, these resources are intended to help you resolve them. Use them to ensure that you are on track and satisfying all of the degree program requirements.

1. ADMISSIONS

The graduate program in the ECE Department is open to all qualified individuals with B.S. degrees in Electrical Engineering or Computer Engineering. Applicants must have a grade point average of at least 2.5 on a 4.0 scale in previous undergraduate work.

Applicants with a bachelor's or master's degree in another field may also be eligible to pursue graduate study in the ECE Department after completing all required remedial preparation at the undergraduate level. The set of remedial courses required will be based on each applicant's previous academic work, and will be specified by the Graduate Coordinator.

International students who have completed a Bachelor's Degree program that does not include the necessary background course material may also be required to complete some remedial course work after admission to the program. This list of remedial courses will be identified in each applicant's admission letter.

An applicant for admission must complete the following steps:

- Submit a completed Application for Admission to the School of Graduate Studies of CSUC <http://www.csumentor.edu/admissionapp/> .
- Pay the university application fee.
- Submit official transcripts of all previous college level work.
- Submit Graduate Record Examination (GRE) scores (not required for CSUC graduates).

International applicants are also required to:

- Submit two letters of recommendation assessing the applicant's academic potential.
- Submit a Statement of Purpose.
- Submit Test of English as a Foreign Language (TOEFL) scores.

The above documents should be sent directly to the School of Graduate Studies, CSUC.

2. ADMISSION STATUS

Provisional admission may be granted to applicants who lack undergraduate or graduate work considered essential for graduate study in the ECE Department. Additional course work, without graduate credit, will be required to make up such deficiencies before promotion to classified status can be granted. Remedial course work required will be determined by the Graduate Program Coordinator and approved by the Department Chair.

Each graduate student receives an acceptance letter which states the level at which the department recommends admission and stipulates any specific conditions of the admission. A graduate student's status falls into one of four categories:

1. Unclassified. An unclassified student is not admitted to a master's degree program but is enrolled for a variety of objectives. These may include completing remedial course work to qualify for a master's degree program, earning a second baccalaureate or second major, or taking class work for professional development.

2. Conditionally classified. A conditionally classified student has been admitted to the desired master's degree program, but has not been formally approved for master's degree study and is taking steps to meet specific requirements outlined by the university and the department to qualify for "classified" status.

3. Classified. A classified master's degree student has been formally approved by the department and the Office of Graduate Programs to pursue master's degree study.

4. Candidate. A student is advanced to candidate status (candidacy) only after demonstrating a significant ability and aptitude for the discipline.

Advancement within the levels occurs once the necessary university and departmental requirements have been met.

3. FINANCIAL ASSISTANCE

Full-time graduate students in the ECE Department may apply for the following forms of financial assistance.

- Teaching Assistantship (TA)
- Research Assistantship (RA)
- Financial Aid
- Tuition Waiver (TW)

For all the above types of financial assistance, additional tuition and fees as required by the university are the responsibility of the student.

3.1 TEACHING ASSISTANTSHIP (TA)

Teaching assistantships may be available to a selected number of qualified full-time graduate students of the ECE Department, upon completion of at least one semester of study in the program. Graduate students with a GPA over 3.0/4.0 may be considered for a teaching or research assistantship. The teaching assistants are required to devote up to 20 hours per week of effort in teaching, research, or appropriate service. These assistantships are usually for one semester period, and most commonly involve grading or lab course work in support of lower

division undergraduate courses. Appointments are made by recommendations of the Graduate Coordinator and approval of the Department Chair on the basis of department needs.

TA positions are awarded for a fixed, stated period of time and continuation of the position beyond that time is not implied.

3.2 RESEARCH ASSISTANTSHIP (RA)

Research assistantships may be available as a result of grants and contracts of the faculty doing sponsored research. These assistantships are normally made available for a 9-month period with the possibility of additional compensation during the summer. RA awards are made directly by the faculty in charge of the sponsored research. The research assistant is required to devote up to 20 hours per week on an assigned research project. Continuation or termination of the appointment is decided by the faculty advisor (principal investigator) on the basis of the availability of funds and the student's progress in research and academic standing.

3.4 FINANCIAL AID

Financial Aid is applied for and awarded by the Financial Aid and Scholarship Office, and is independent of ECE department assistance. Information about their programs can be found at <http://fa.csuchico.edu/fa/index.aspx>

3.4 TUITION WAIVER (TW)

A TW provides full-time or partial tuition waiver for the recipient. TW awards are available to qualified full-time graduate students on a competitive basis. A TW recipient may be required to perform departmental services as assigned by the ECE Department Chair.

4. ADVISING

4.1 INITIAL ADVISING

The Graduate Program Coordinator will serve as temporary faculty advisor for all students until an advisor is selected.

4.2 FACULTY ADVISOR

During the first semester, all full-time students should meet with ECE faculty members to discuss potential focus area for their MS program. Such meetings give both the faculty member and the student an opportunity to evaluate their respective abilities to collaborate and work with one another.

By the end of the tenth week of the first semester of enrollment, all new full-time graduate students should submit the name(s) of ECE faculty whom they would like to have as their permanent advisor. The Graduate Program Coordinator will help to match students and faculty advisors based upon first choices wherever feasible. Students should meet with the faculty advisor assigned to initiate planning of the research topic as soon as possible after receipt of notification. The faculty member becomes the student's permanent faculty advisor.

Primary responsibilities of the faculty advisor are as follows:

- Approve the student's plan of study. Such a program of study must also be approved by the Graduate Program Coordinator.
- Monitor the student's progress.
- Approve any revision(s) to the plan of study.
- Assist and guide the student in his/her program.
- Transmit results to the Graduate Program Coordinator using appropriate forms.
- Oversee the student's thesis or project defense (Thesis/Project option).

A student may change faculty advisors by completing the appropriate forms through the department office.

4.3 RESPONSIBILITIES OF GRADUATE STUDENT

- Maintain 3.0 GPA, and *no more than two courses with C grade*.
- Comply with University, College, and Department regulations.
- Complete and submit appropriate forms.
- Keep the ECE department office updated regarding current address, email address and phone number.

5. REGISTRATION

The registration procedure begins in the ECE Department. The Graduate Program Coordinator will serve as the student's temporary faculty advisor until a permanent advisor is chosen. A Plan of Study should be prepared and submitted as soon as possible after selection of the permanent advisor.

Changes in the student's program of study may be requested by submitting a Plan of Study Course Substitution Form. It is the responsibility of the student to insure that required courses in the program are taken.

5.1 FULL-TIME STATUS

Full-time graduate students supported by the Department must register for a minimum of 8 graduate units each semester including projects, independent study, research and thesis. Courses taken on an audit basis are excluded from this number.

5.2 PART-TIME STATUS

To maintain an active degree program status, a student must be continuously enrolled at CSU Chico. This can be done by registering for at least one credit each term, or by maintaining

adjunct enrollment status through the Center for Regional and Continuing Education. Adjunct enrollment maintains a student's active status when no current course work is being done, for a nominal administrative fee. However, it is expected that every part-time student will take at least one course per term or register for thesis work so as to complete the degree program within a reasonable time. Exceptions may be granted for such reasons as illness, maternity leave or travel requirements imposed by employers.

5.4. RESEARCH COURSES

- EECE 699T – Thesis

When pursuing the graduation with Thesis option, a student must enroll in this course during their final year of study. This course is counted as 6 semester units towards satisfying the overall 30 unit graduation requirement.

- EECE 697 Independent Study

Independent study is defined as individualized study under the direction of an ECE faculty member, and is distinct from thesis research. A maximum of 9 credits of independent study may be counted toward the M.S. degree course work requirements (includes Thesis/Project units). This course number is not to be used for thesis.

- EECE 699P – Project

When pursuing the graduation with Project option, a student must enroll in this course during their final year of study. This course is counted as 3 semester units towards satisfying the overall 30 unit graduation requirement.

6. GENERAL INFORMATION

6.1 COMPLETION OF STUDENT RESEARCH

The student and the advisor must agree on a time table to complete the degree.

6.2 GRADE REQUIREMENTS FOR GRADUATION

In order to be awarded the Masters Degree, the student must have a grade point average (GPA) of at least 3.00/4.00 (B average) for all credits (course work and thesis research) in his or her program of study. Grades earned in courses which are repeated are included in the computation of the GPA. In addition *no more than two courses with C grade* are allowed.

If a grade of incomplete (I) or in progress (IP) is received, the student must remove the I or the IP grade from the record as soon as possible. After one academic year, the I grade automatically changes to an F (failure). No student may graduate with an I or PR grades on the record.

6.3 CONTINUATION AND DISMISSAL

A student may continue in the ECE Department as long as reasonable progress is being made toward the degree. From an academic viewpoint, this means that the student's record in graduate course work, exclusive of thesis research, continues to exhibit an average of B or better with an

appropriate distribution of A, B, and C grades, and that I and PR grades appear only infrequently and for a good cause.

6.4 FACILITIES

The department has an excellent set of laboratory facilities, and after hours access is granted to graduate students pursuing research activities (Thesis, Project or Independent Study) on a case by case basis. Approval by the Graduate Coordinator and Department Chair is required.

Keys or cards for access to departmental areas are assigned on a discretionary, as-needed basis. All keys must be returned to the key shop at the end of each academic year and prior to leaving the University. Computer disks, laser printing, copying, and similar items are the students' responsibility and cannot be furnished by the department.

7. MASTER OF SCIENCE DEGREE REQUIREMENTS

7.1 BASIC REQUIREMENTS

Completion of an approved program consisting of 30 units as follows (*no more than two courses with C grade* are allowed towards the 30 unit requirement):

(a) Completion of the 12-unit core:

EECE 615 High Frequency Design Techs	4
EECE 643 Computer-Aided Circuit Eng	4
EECE 682 Computer Control of Dynamic Systems	4

(b) 10 units selected from any approved senior or graduate-level courses not otherwise required for the degree.

(c) Plus 8 units according to the following degree options:

OPTION IN COMPUTER ENGINEERING:

Undergraduate background: Programming in C++ & assembly language, Data structures, Operating systems, Signals and transforms, Analog electronics, Digital systems and state machine design, Computer interface circuits, Microprocessor system design. The 8 units in this option are selected from:

EECE 631 Process Improvement	4
EECE 655 Topics Computer Networking	4
EECE 685 Adaptive Control	4
EECE 669 Topics in Signal Processing	4

OPTION IN ELECTRONICS ENGINEERING:

Undergraduate background: Programming in C++ and assembly language, Signals and transforms, Advanced analog electronics, Digital systems design, Computer interface circuits, Control systems, Digital Signal Processing, Communication Systems. The 8 units in this option are selected from:

EECE 675 Electromagnetic Compatibility	4
EECE 655 Topics Computer Networking	4
EECE 685 Adaptive Control	4
EECE 669 Topics in Signal Processing	4

(d) At least 18 units, including a thesis or project if chosen, must be in electrical and computer engineering (EECE); remaining units may be selected from electrical or computer engineering or in related areas with the approval of the Graduate Coordinator.

(e) At least 18 of the units required for the degree must be 600-level courses.

(f) Not more than 9 semester units of transfer and/or extension credit (correspondence courses and U.C. extension course work are not acceptable); Open University course work is included in this 9 unit total.

The Master of Science Degree is offered with the following Thesis or Non-Thesis options:

- 1. Master of Science Degree with Thesis Option:** A minimum of 30 semester units of approved graduate study including 6 semester units of Master of Science Thesis under the supervision of a faculty is required. Students are required to submit a written thesis and successfully complete the oral defense of the thesis work.
- 2. Master of Science Degree with Non-Thesis Options:** The degree requirements for Master of Science with Non-Thesis option are available with the approval of the Department Chair or the Department Graduate Program Coordinator:
 - a. Master of Science Degree with Project Option:** Students are required to complete 30 units of approved graduate study including 3 semester units of Master of Science Project as specified by individual department guidelines and requirements. Students are required to submit a written Project Report to the department.
 - b. Master of Science Degree with Coursework only Option:** Students are required to complete 30 semester units of approved graduate-level course work plus a Comprehensive Examination.

With all options above, the students must complete the following additional requirements:

- An approved Plan of Study.
- Satisfactory academic performance (minimum 3.00 GPA)
- At least a B average (GPA of 3.0/4.0) for all graduate course credits in his or her program of study as well as for his/her entire Chico State graduate transcript.

Courses taken on an audit basis do not count toward the degree. Courses outside the Department of Electrical and Computer Engineering require prior approval.

7.2 PLAN OF STUDY

The student must, in conjunction with his/her faculty advisor, prepare a coherent Plan of Study related to courses in at least one of the departmental focus areas. The Plan of Study must be approved by the faculty advisor and the ECE Graduate Program Coordinator. Courses will be selected by the student in consultation with the faculty advisor. Any changes in the student's Plan of Study must be approved in writing by the faculty advisor, the ECE Graduate Program Coordinator, and the School of Graduate Studies. (Plan of Study form can be found at the back of this document)

7.3 TIME LIMIT

The M.S. degree may be pursued on a full or part-time basis. However, each student must complete all requirements for the M.S. degree within 5 years from the date of the end of the semester of enrollment in the oldest course applied toward the degree, unless a petition for extension has been approved by the faculty advisor, ECE Graduate Coordinator, and the School of Graduate Studies.

7.4 FORMATION OF THESIS/PROJECT COMMITTEE

Once a student has chosen to pursue the thesis or project option, a thesis or project committee is formed and approved by the ECE Graduate Program Coordinator in consultation with the thesis/project advisor and the student. The M.S. thesis/project committee shall be composed of a *minimum of two* members of ECE faculty. The thesis/project chairperson and/or the thesis/project advisor must be a full time member of the CSUC Graduate Faculty.

7.5 THESIS PROPOSAL

The student must prepare a thesis proposal prior to the formation of his or her thesis/project committee, which is then reviewed and eventually approved by the committee members. It is the responsibility of the student to circulate or give copies of the proposal to the committee members. Then, using a form available from the ECE Graduate Coordinator, the thesis advisor notifies the Graduate Coordinator of the final approval of the thesis/project proposal. This must be done before registering for EECE 699.

7.6 THESIS SUBMISSION, DEFENSE, AND ACCEPTANCE

A final draft of the M.S. thesis is prepared by the student when the research is completed to the satisfaction of the faculty advisor. The student should obtain directions regarding thesis preparation from the Guide to Graduate Studies, available from the School of Graduate Studies, and should follow the department acceptable [FORMAT](#) . It is highly recommended that students use a professional typist for the final document preparation (see the Graduate Coordinator for recommendations). The draft thesis should be submitted to the advisor for critical review and evaluation. This should be done in a timely manner, giving the advisor

sufficient time to review the final draft. After the thesis advisor has reviewed the thesis draft, recommended changes, and approved the final text and form of the document, the student should submit copies to the thesis committee for evaluation. The thesis committee members should have at least one week for review of the document before the defense. All members of the thesis committee are expected to be present at the thesis defense.

The student, in consultation with the thesis advisor and committee, schedules the thesis defense. The thesis advisor will counsel the student regarding specific topics to be addressed at the defense. The defense is presented in an open, announced meeting presided over by the thesis advisor. The student is allowed about 35 minutes for a formal oral presentation. Following the oral presentation, the thesis committee, other faculty, students, and guests are allowed to ask questions concerning the student's thesis work. After the question and discussion period is concluded, all those present, other than the faculty members constituting the committee, will be excused.

The thesis committee holds a private discussion of the student's thesis and makes a final decision by a majority vote whether the student's defense has been successful. If the student does not pass the thesis defense, then the thesis committee, in consultation with the Graduate Program Coordinator, will decide a course of action to correct deficiencies, weaknesses, or other problems.

Even if the student passes the thesis defense, there are usually changes or additions/deletions required as a result of the defense. These are made by the student in consultation with the faculty advisor and any concerned committee members. The student should also be aware that the School of Graduate Studies requires final corrected copies to be submitted by a specified date (usually the 12th or 13th week of the semester), if a student is to graduate that semester.

At least two permanently bound copies of the thesis must be prepared in accordance with the University regulations. One copy is to be provided to the faculty advisor and the other will be retained in the files of the ECE Department. Additional copies (as specified in the Guide to graduate Studies) are submitted to the School of Graduate Studies for archival storage in the University library. It is the student's responsibility to pay costs associated with copying and binding of the thesis.

7.7 THE COMPREHENSIVE EXAMINATION

Students opting for the course only option, have to successfully complete a Comprehensive Examination (CE) in order to complete their degree requirements. The CE is offered toward the end of each semester, and is based on technical material as outlined below. Students wishing to take the exam need to register with the department office in the first 2 weeks of the semester they are planning to take the exam.

CE Objective: The intent of the CE is to assess a student's comprehensive competence his/her MS core and specialization area of expertise.

CE Format:

- i. In consultation with his/her advisor and approval of the graduate coordinator, the student will identify three (3) courses to provide the student with guidelines for the CE coverage.

- ii. The Three guideline courses will consist of two (2) of the MS program Core Courses and one course from the student's focus area.
- iii. The Comprehensive Examination is a three hour exam, and the student will be tested for breadth and depth of knowledge in the technical areas covered by the guideline courses.
- iv. Examination results are distributed within two weeks of the exam date.
- v. Those students failing to pass the examination may register to take the exam for a second time the following semester.

7.8 GRADUATION

Students must apply for graduation on the Application for Degree form which is filed with the School of Graduate Studies before a specified date in the semester during which degree requirements are expected to be completed. This date usually falls during the 3rd or 4th week of the semester. Specific dates for the current academic year can be found at <http://www.csuchico.edu/gisp/gs/deadlines/index.html>

7.9 PART-TIME GRADUATE STUDIES

Admission to the program and requirements for the M.S. degree on a part time basis are identical to that for admission to the regular full-time program.

8. DEPARTMENT FACULTY

Uma Balaji, Ph.D	EM, Microwave, Antennas, Wireless Communications
Adel Ghandakly, Ph.D	Intelligent and adaptive Control, Energy Systems
Hede Ma, Ph.D.	Digital System Design, Microprocessor Systems
Albert O. Richardson, Ph.D.	Microprocessor Applications, Microelectronics, VLSI
Ben-Dau Tseng, Ph.D.	Electronics, Digital Signal Processing
Dale Word, M.S.	Embedded and Real-Time Systems
John J. Zenor, Ph.D.	Real-Time Simulation, Operating Systems, Networking

Graduate Program 2-Year Plan Timeline

1st Semester:

- Attend Orientation Meeting
- Get to Know Faculty
- Use Graduate Coordinator for Advice
- Choose Faculty Advisor (week 10)
- Complete and File the Master's Degree Plan of Study (week 11)

2nd Semester:

- Apply for TA/RA Positions (prior to start of semester)
- Begin Thesis/Project Background Research

3rd Semester:

- File for Graduation
- Submit Thesis/Project Proposal
- Form Thesis/Project Committee
- Start Actively Working on Thesis/Project

4th Semester:

- Complete Thesis/Project Work
- Submit Project/Thesis to Graduate School