

MS IN ELECTRICAL AND ELECTRONIC ENGINEERING



SACRAMENTO STATE
Redefine the Possible

In Workflow

1. EEE Committee Chair (pheedley@csus.edu)
2. EEE Chair (mahyar.zarghami@csus.edu)
3. ECS College Committee Chair (figgess@csus.edu)
4. ECS Dean (arad@csus.edu)
5. Academic Services (catalog@csus.edu)
6. Senate Curriculum Subcommittee Chair (curriculum@csus.edu)
7. Dean of Undergraduate (james.german@csus.edu; celena.showers@csus.edu; renee.leonard@csus.edu)
8. Dean of Graduate (cnewsome@skymail.csus.edu)
9. Catalog Editor (catalog@csus.edu)
10. Graduate Studies (jdsmall@csus.edu; mxiong@csus.edu)

Approval Path

1. Fri, 09 Apr 2021 22:28:37 GMT
Perry Heedley (pheedley): Approved for EEE Committee Chair
2. Fri, 16 Apr 2021 22:25:43 GMT
Mahyar Zarghami (mahyar.zarghami): Approved for EEE Chair
3. Fri, 03 Sep 2021 17:56:21 GMT
Gareth Figgess (figgess): Rollback to Initiator
4. Fri, 22 Oct 2021 22:16:22 GMT
Perry Heedley (pheedley): Approved for EEE Committee Chair
5. Sat, 30 Oct 2021 18:05:10 GMT
Mahyar Zarghami (mahyar.zarghami): Approved for EEE Chair
6. Fri, 03 Dec 2021 18:04:04 GMT
Mohammed Eltayeb (mohammed.eltayeb): Approved for ECS College Committee Chair
7. Fri, 03 Dec 2021 18:42:35 GMT
Behnam Arad (arad): Approved for ECS Dean

History

1. May 2, 2018 by clmig-jwehrheim

Date Submitted: Mon, 04 Oct 2021 20:32:07 GMT

Viewing: MS in Electrical and Electronic Engineering

Last approved: Wed, 02 May 2018 13:43:45 GMT

Last edit: Fri, 04 Mar 2022 22:37:52 GMT

Changes proposed by: Preetham Kumar (101070303)

Academic Group: (College)

Engineering & Computer Science

Academic Organization: (Department)

Electrical and Electronic Engineering

Catalog Year Effective:

2022-2023 Catalog

Individual(s) primarily responsible for drafting the proposed degree major program:

| Name (First Last) | Email | Phone 999-999-9999 |
|-------------------|-------------------|--------------------|
| Perry Heedley | pheedley@csus.edu | 916-278-7936 |

Type of Program Proposal:

Major

Program Change Type:

Non-Substantive

Title of the Program:

MS in Electrical and Electronic Engineering

Designation: (degree terminology)

Master of Science

Briefly describe the program proposal (new or change) and provide a justification:

This is a change to update the number of units for EEE 201 from 1 to 2.

Objectives of the degree program:

The Master of Science degree program in Electrical and Electronic Engineering is designed to provide students with advanced study in a variety of Electrical and Electronic Engineering topics, and opportunities to conduct independent research to broaden their professional scope.

University Learning Goals

Graduate (Masters) Learning Goals:

Critical thinking/analysis
Communication
Information literacy
Disciplinary knowledge
Professionalism

Will this program be required as part of a teaching credential program, a single subject, or multiple subject waiver program (e.g., Liberal Studies, Biology) or other school personnel preparation program (e.g., School of Nursing)?

No

Catalog Description:

Total units required for MS: 30

Program Description

The Master of Science degree program in Electrical and Electronic Engineering is designed to provide students with advanced study in a variety of Electrical and Electronic Engineering topics, and opportunities to conduct independent research to broaden their professional scope.

The scheduling of courses and the Culminating Experience options in the program are designed to provide flexibility for working professionals. All students complete a one-unit research methodology course, three-unit computational methods course, and at least two of the designated elective area core courses. This requirement is designed to provide a strong academic foundation. In consultation with the Graduate Coordinator and faculty advisors, students then focus their studies in one or more of the following areas, adapting to the needs and interests of the practicing engineer or post-graduate candidate:

- Control Systems
- Communication Systems
- Power Systems
- Microelectronic Design
- Computer Architecture & Digital Design

Coordinated courses are offered in advanced microprocessors, electromagnetic theory and microwaves, lasers and fiber optics, semiconductor devices, robotics and intelligent machines, systems and control, networks, and communication systems. Other coordinated courses facilitate the study of estimation and stochastic control, advanced communications and signal processing, large interconnected power systems, power systems reliability, and planning, advanced design and organization of digital computer systems, and advanced integrated circuit design. The program is also sufficiently flexible to allow special independent studies of problems of current interest.

The Department has a strong relationship with the local engineering community. Students of the program have access to Department laboratories and facilities and to University computer services.

Admission Requirements: Course prerequisites and other criteria for admission of students to the degree major program, and for their continuation in it.

Admission Requirements

Admission as a classified graduate student in Electrical and Electronic Engineering requires:

- a BS in Electrical and Electronic Engineering or equivalent;
- at least a 3.0 GPA in the BS in Electrical Engineering or equivalent; or
- at least a 3.25 GPA in the last 60 units of the BS in Electrical and Electronic Engineering or equivalent.

Under special circumstances, a student who does not satisfy the Admission Requirements may be admitted as a conditionally classified graduate student. Deficiencies will be specified in the acceptance letter to the student and must be removed by the student before the student can become a classified graduate student.

A student registered as an unclassified graduate student should carefully note that graduate courses taken as an unclassified graduate or as an open university student cannot be used to improve the student's grade point average for admittance to the Electrical and Electronic Engineering graduate program. Only undergraduate Electrical and Electronic Engineering courses can be taken or retaken to improve the GPA of the student for admittance to the graduate program.

Admission Procedures

Applications are accepted as long as room for new students exists. However, students are strongly urged to apply by April 1 for the following fall or October 1 for the following spring. All prospective graduate students, including Sacramento State graduates, must file the following with the Office of Graduate Studies, River Front Center 215, (916) 278-6470:

- an online application for admission; and
- two sets of official transcripts from all colleges and universities attended, *other than Sacramento State*.

At the same time, students not meeting the above admission requirements should submit to the Electrical and Electronic Engineering Graduate Coordinator two letters of recommendation, Graduate Record Examination scores, and/or other evidence of their potential for successful graduate study in this program.

Approximately six weeks after receipt of all items listed above, a decision regarding admission will be mailed to the applicant.

Minimum Units and Grade Requirement for the Degree

Units Required for the MS: 30

Minimum Cumulative GPA: 3.0. No more than three (3) courses in the program of study may have a grade below "B" and no course may have a grade below "C+".

Advancement to Candidacy

By the end of the first semester, after admission to the program, each student in the EEE Department is required to have a program of study approved by an elective area core faculty advisor and the Graduate Coordinator. Students will fill out a form (contract) outlining what courses they plan to take to complete the MS degree. This contract will be signed by the student and the faculty advisor, and filed in the EEE Department Office.

In addition, each student must file an application for Advancement to Candidacy with the Office of Graduate Studies indicating a proposed program of graduate study for the completion of the MS EEE. This procedure should begin as soon as the *classified* graduate student has:

- removed any deficiencies in Admission Requirements;
- completed a minimum of 12 units in the graduate program with a minimum 3.0 GPA; at least nine units of the 12 units must be EEE 200 level courses; and
- taken the Writing Placement for Graduate Students (WPG) or taken a Graduate Writing Intensive (GWI) course in their discipline within the first two semesters of coursework at California State University, Sacramento or secured approval for a WPG waiver.


Each student must be advanced to candidacy prior to registering for EEE 500.

Advancement to Candidacy forms are available in the Office of Graduate Studies and in the Electrical and Electronic Engineering Department Office.

As defined by policy <http://www.csus.edu/umannual/acadaff/fsm00010.htm>, a change in units constitutes a substantive change to the program. If your changes constitute a substantive change, please refer back to the "Program Change Type" field above to ensure that "Substantive" is selected.

Program Requirements: (If new courses are being created as part of a new program, it will be useful to propose courses first.)

Program Requirements

| Code | Title | Units |
|---|--|-------|
| Required Core Courses (11 Units) | | |
| EEE 201 | Research Methodology  | 2 |
| EEE 244 | Electrical Engineering Computational Methods and Applications | 3 |
| Select two of the following: | | |
| EEE 211 | Microwave Engineering ¹ | 6 |

| | |
|---------|---|
| EEE 230 | Analog and Mixed Signal Integrated Circuit Design |
| EEE 241 | Linear Systems Analysis |
| EEE 250 | Modern Power Transmission Systems |
| EEE 260 | Statistical Theory of Communication ¹ |
| EEE 285 | Micro-Computer System Design I |

Electives

Select from the following and other areas so that the overall program totals at least 30 units: ²

Communication Systems

| | |
|---------|--|
| EEE 211 | Microwave Engineering |
| EEE 212 | Modern Antenna Design |
| EEE 213 | Microwave Devices and Circuits |
| EEE 214 | Computer Aided Design for Microwave Circuits |
| EEE 215 | Lasers |
| EEE 245 | Advanced Digital Signal Processing |
| EEE 260 | Statistical Theory of Communication |
| EEE 261 | Information Theory, Coding, and Detection |
| EEE 262 | Wireless Communications Systems |
| EEE 264 | Advanced Topics in Wireless Communications |
| EEE 265 | Optoelectronic Engineering |
| EEE 267 | Fiber Optic Communications |
| EEE 272 | High Speed Digital System Design |

Control Systems

| | |
|---------|--|
| EEE 221 | Machine Vision |
| EEE 222 | Electronic Neural Networks |
| EEE 225 | Advanced Robot Control |
| EEE 241 | Linear Systems Analysis |
| EEE 242 | Statistical Signal Processing |
| EEE 243 | Applied Stochastic Processes |
| EEE 246 | Advanced Digital Control |
| EEE 249 | Advanced Topics in Control and Systems |

Power Systems

| | |
|---------|---|
| EEE 250 | Modern Power Transmission Systems |
| EEE 251 | Power System Economics and Dispatch |
| EEE 252 | Power System Reliability and Planning |
| EEE 253 | Control and Stability of Power Systems |
| EEE 254 | Large Interconnected Power Systems |
| EEE 255 | Future Power Systems and Smart Grids |
| EEE 256 | Advanced Power Systems Protection |
| EEE 257 | Wind Energy Electrical Conversion Systems |
| EEE 259 | Advanced Topics in Power Systems |

Microelectronic Design

| | |
|---------|--|
| EEE 230 | Analog and Mixed Signal Integrated Circuit Design |
| EEE 231 | Advanced Analog and Mixed Signal Integrated Circuit Design |
| EEE 232 | Key Mixed-Signal Integrated Circuit Building Blocks |
| EEE 234 | Digital Integrated Circuit Design |
| EEE 235 | Mixed-Signal IC Design Laboratory |
| EEE 236 | Advanced Semiconductor Devices |
| EEE 238 | Advanced VLSI Design-For-Test I |
| EEE 239 | Advanced VLSI Design-For-Test II |

Computer Architecture & Digital Design

| | |
|-------------|---|
| EEE 270 | Advanced Topics in Logic Design |
| EEE 272 | High Speed Digital System Design |
| EEE/CSC 273 | Hierarchical Digital Design Methodology |
| EEE 274 | Advanced Timing Analysis |
| EEE/CSC 280 | Advanced Computer Architecture |
| EEE 285 | Micro-Computer System Design I |
| EEE 286 | Microcomputer System Design II |

Culminating Requirement (0-5 Units)

| | | |
|-------------------------------------|------------------------|-------|
| EEE 500 | Culminating Experience | 0 - 5 |
| Plan A Thesis (5 units) | | |
| Plan B Project (2 units) | | |
| Plan C Comprehensive Exam (0 units) | | |

Total Units**30**

- ¹ Only one of these two courses will be counted as a core requirement. The other may be taken as an elective.
- ² Select at least 14 units if completing a 5 unit Plan A thesis, or select at least 17 units if completing a 2 unit Plan B project, and select at least 19 units if completing a Plan C exam. This selection must be done in consultation with the elective area faculty advisor and the Graduate Coordinator, and may include approved courses from other areas. A maximum of 7 units of undergraduate technical electives in electrical and electronic engineering or computer engineering may be applied to this requirement if approved by the Graduate Coordinator and if they have not been used to satisfy the BS program requirements or MS EEE admission requirements.

Notes:

- **The student cannot register for the Culminating Experience until the student passes the Writing Placement for Graduate Students (WPG), and advances to candidacy.** In subsequent semesters, students will enroll in Continuous Enrollment through the College of Continuing Education after qualifications for enrollment are verified.
- **Before registering for EEE 500**, students choosing Plan A, Master Thesis (5 units), or Plan B, Master Project (2 units), must submit an approved Topic Form to the Graduate Coordinator.
- **Students opting for Plan C, Comprehensive Exam**, must have that option approved by their elective area advisor. They will not receive degree credit for EEE 500. They must complete a total of 30 units of approved coursework, including core, elective core, and elective courses. They must advance to candidacy for the degree, and take a written comprehensive exam that will cover all of the material in their MS Program of Study. After a student's first failed attempt at the Plan C examination, the student shall receive advising from the graduate coordinator designed to prepare the student for a second attempt at the examination. Such advising may include a recommendation for the student to take additional course(s) to improve preparation for the next attempt. According to the Office of Graduate Studies policy, students are allowed no more than two attempts at the examination; however, if the EEE Department determines that there are extreme extenuating circumstances, the student may be recommended to the Office of Graduate Studies for a third attempt at the examination. Students are advised that a change from the exam option to project or thesis option is **not allowed** after the first attempt at the exam. Additionally, after two unsuccessful attempts at the exam, the student is subject to discontinuation from the graduate program. **Note:** It should be recognized that industry puts a high value on project and thesis problem-solving experience, and the demonstration of technical writing skill that these options require. Graduating under Plan C option will not provide that experience. Students taking this option should consider, with their elective area advisors, other ways of gaining that valuable experience, such as through an EEE 299 Special Problems course.
- **As soon as possible after the student has registered for EEE 500**, it is expected that the student will select a committee appropriate to the chosen plan of study. The Thesis Committee is to consist of the student's Thesis Advisor, who is the Chairperson of the student's Thesis Committee, and two other faculty members. The Project Committee is to consist of the student's Project Advisor, who is the Chairperson of the student's Project Committee, and one other faculty member. The committee members selected by the student must be approved by the Electrical and Electronic Engineering Department's Graduate Coordinator.
- **The Thesis (Plan A)** must be orally presented and defended, approved by the student's Thesis Committee, and approved by the Electrical and Electronic Engineering Graduate Coordinator prior to submittal of the Thesis to the Office of Graduate Studies.
- **The Project (Plan B)** is to culminate in a report and a device or simulation, which is to be demonstrated to the student's Project Committee. The Project Report must be approved by the student's Project Committee and approved by the Electrical and Electronic Engineering Graduate Coordinator prior to its submittal to the Office of Graduate Studies.

For graduate programs, the number of declared undergraduate major and the degree production over the preceding years of the corresponding baccalaureate program:

40

Fiscal Impact to Change an Existing Program

Indicate programmatic or fiscal impact which this change will have on other academic units' programs, and describe the consultation that has occurred with affected units:

None

Provide a fiscal analysis of the proposed changes:

None

How will the above changes be accommodated within the department/College existing fiscal resources?

N/A

Will the proposed changes require additional resources?

No

What additional space, equipment, operating expenses, library, computer, or media resources, clerical/technical support, or other resources will be needed?

None

Reviewer Comments:

Gareth Figgess (figgess) (Fri, 03 Sep 2021 17:56:21 GMT): Rollback: Clarify Culminating Experience Units 1-unit & 6-unit options-reference MS in Computer Engineering

Key: 168