

NEW PROGRAM PROPOSALCollege: [**Engineering and Computer Science**] Department: [**ECE**]1. **Title of Proposed Program:** (e.g. B.S. in ..., Option in) [**Master of Science Degree in Computer Engineering**]2. **Type of Proposed Program:**

- ☐ New Undergraduate Major
☐ New Option in Undergraduate Major
☐ New Minor
☒ New Master's Degree Program
☐ New Option in Master's Degree Program
☐ Other []

3. **Date of Proposal Implementation: (Semester / Year):** [**Fall**] / [**2013**] *Comments*4. **Unit Requirements** (if proposing a **NEW UNDERGRADUATE MAJOR**):

Lower Division Requirements: [] units
 Upper Division Requirements: [] units
 Total Units Required in Major: [] units
 GE Requirements (not overlapping with major) [] units
 Electives Outside of Major: [] units
 Total Units to Degree: [] units

5. **Unit Requirements** (if proposing a **NEW MINOR or UNDERGRADUATE OPTION**):

Lower Division Requirements: [] units
 Upper Division Requirements: [] units
 Total Units Required in Minor or Option: [] units

6. **Unit Requirements** (if proposing a **NEW MASTERS or OTHER PROGRAM** not covered by #4 or #5 above) :

Lower Division Requirements: [] units
 Upper Division Requirements: [] units
 Graduate Course Requirements: [**30**] units
 Total Units Required in PROGRAM: [**30**] units
 GE Requirements (not overlapping with major) [] units
 Electives Outside of Major/Program: [] units
 Total Units to Degree: [**30**] units

- 7. Catalog Entry:** *(Attach proposed catalog copy. This should include a complete description of the proposed program.)*
- 8. Justification of Request:** *(Attach)*
- 9. Estimate of Impact on Resources within the Department, for other Departments and for the University:** *(Attach)*

([Hyperlink to Resource List](#))

10. Goals and Measurable Student Learning Outcomes for the New Program: *(Attach)*

11. Methods of Assessment for Measurable Student Learning Outcomes: *(Attach)*

A. Assessment Tools

B. Describe the procedure the dept/program will use to ensure the faculty will be involved in the assessment process. (Refer to the University's policy on assessment).

12. Record of Consultation: *(Normally all consultation should be with a department chair or program coordinator. If more space is needed attach statement and supporting memoranda.)*

Date:	Dept/College:	Department Chair/Program Coordinator	Concur (Y/N)
[2/23/2012]	[ECE/CECS]	[Dept. Vote: Ali Amini]	[Y]
[3/16/2012]	[ME/CECS]	[Hamid Johari]	[Y]
[4/17/2012]	[CS/CECS]	[Steven Stepanek]	[Y]
[3/16/12]	[MSEM/CECS]	[Ileana Costea]	[Y]
[3/16/12]	[CEAM/CECS]	[Nazaret Dermendjian]	[Y]
[]	[]	[]	[IP]

13. Approvals:

Department Chair/Program Coordinator:	Date: [4/20/2012]
College (Dean or Associate Dean):	Date: []
Educational Policies Committee:	Date: []
Graduate Studies Committee:	Date: []
Provost:	Date: []

Consultation with Oviatt Library is needed to ensure the availability of appropriate resources to support proposed program.

Collection Development Coordinator, Mary Woodley	Date
Please send an email to: collection.development@csun.edu	4/20/12

7. Catalog Entry

Requirements for the Master of Science Degree in Computer Engineering

A. Requirements for Admission to the Program

1. A bachelors' degree in a technical field (i.e. Engineering, Computer Science, Physics, Mathematics) from an accredited university or college with an overall GPA of at least 2.75.
2. Have at least a 2.7 undergraduate grade point average in the last sixty semester unit or ninety quarter units attempted.

B. Admission Procedure

Application forms can be accessed on line (www.csumentor.edu) and are submitted on-line. Applications may be requested from the university and should be returned to the university Office of Admissions and Records. Application deadlines for admission are set by the university Office of Admission and Records.

All applicants, regardless of citizenship, whose preparatory education was principally in a language other than English must receive a minimum score of 550 on the Paper Based, 213 on the Computer Based, or 79/80 on the Internet Based Test of English as a Foreign Language (TOEFL) or a score of 6 or higher on International English Language Testing System (IELTS).

Continuing students in either Post baccalaureate or Graduate status may change their objective and seek admission to MS in Computer Engineering by filling out a change of objective form that can be obtained from the Office of Admissions and Records. Such students must still satisfy all admission requirements for the MS in Computer Engineering program.

It is the student's responsibility to be aware of all university regulations and restrictions such as:

1. No more than 9 units of transfer or extension work.
2. No more than a total of 9 units of ECE 400-level Digital courses and/or Comp 400-level courses taken in residence can be counted toward Master in Computer Engineering.
3. 12-unit rule for classification.
4. Probation and Disqualification.
5. Repeat of courses rules.
6. Advancement to Candidacy.
7. Academic leave.
8. A 7-year time limit for the completion of the degree.
9. Graduation with Distinction.

For details on the above, students are advised to meet with the ECE Graduate Coordinator. Prior to the formation of their Graduate Committee, graduate students are advised by the Graduate Coordinator. After the formation of their Graduate Committee, graduate students are advised by their Committee Chair. All courses taken toward M.S. degree must be approved by the Committee Chair and the Graduate Coordinator.

C. Classified Graduate Status

1. Fulfill University and Department requirements for classified status.
2. Completion of prerequisite courses with 3.0 GPA or higher.
3. Submit tentative program of study to the ECE graduate coordinator.
4. Complete all 3 sections of GRE aptitude Exam. The quantitative score must be above the 50th percentile.

D. For the Degree

1. Completion of 30 units under either the Thesis Plan or the Project Plan or 33 units under the Comprehensive Exam Plan.
Note: Students may not take a course (counting toward M.S. in Computer Engineering degree) which is the same or equivalent to a course taken towards ones undergraduate program.
2. Formal approval of granting of the degree by the Engineering faculty.

Thesis Plan

- a) 24 units of course work applicable to the M.S. degree, of which at least 15 units must be Engineering and Computer Science courses at the 500/600-level or above. All course work in the student's graduate program must be completed with a "C" or better while maintain an overall GPA of 3.0 or higher.
- b) 6 units of ECE 698C (Thesis), and successful defense of Thesis before the thesis committee.

Project Plan

- a) 27 units of course work applicable to the M.S. degree, of which at least 18 units must be Engineering and Computer Science courses at the 500/600-level or above. All course work in the student's graduate program must be completed with a "C" or better while maintain an overall GPA of 3.0 or higher.
- b) 3 units of ECE 698C (Graduate Project) culminating in a comprehensive report.

Comprehensive Exam Plan

- a) 30 units of coursework applicable to the M.S. degree, of which at least 21 units must be 500/600-level Engineering and Computer Science courses. All course work in the student's graduate program must be completed with a "C" or better while maintain an overall GPA of 3.0 or higher.
- b) 3 units of ECE 697 comprehensive study preparatory to the exam and completion of the comprehensive exam with a grade of "B" or better.

E. Graduate Program

The 30-33 units of coursework in the graduate program must form a cohesive plan of graduate study and must be approved by the faculty advisor and the Graduate Coordinator. The Thesis Plan must not include ECE 699C (Independent Study) and the Project Plan may include at most 3 units of ECE 699C (Independent study). Inclusion of a course not in the Computer Engineering suggested or elective course list must have the written approval of the graduate advisor prior to enrollment in the course.

F. Special Requirements

Students with a B.S. in a field other than Computer Engineering must complete all course requirements (prerequisite courses) of the Computer Engineering undergraduate program as specified by the graduate coordinator prior to their advancement to classified status.

1. PREREQUISITE COURSES

Some or all of these prerequisite courses may be required depending on applicant's prior background. The graduate coordinator will determine the specific prerequisite courses on a case by case basis.

MATH150A	Mathematical Analysis I	5
MATH150B	Mathematical Analysis II	5
MATH250	Mathematical Analysis III	3
MATH280	Applied Differential Equations	3
PHYS 220A/AL	Mechanics	3
PHYS 220B/BL	Electricity and Magnetism	3
COMP 110/L	Introduction to Algorithms and Programming and Laboratory	3/1
COMP 182/L	Data Structures and Program Design	3/1
COMP 282	Advanced Data Structures and lab	3
ECE 240/L	Electrical Engineering Fundamentals	3/1
ECE 309	Numerical Methods in Electrical Engineering	2
ECE 320/L	Theory of Digital Systems	3/1
ECE 340/L	Electronics I	3/1
ECE 350	Linear Systems I	3
ECE 351	Linear System II	3
ECE 420	Digital Systems Design with programmable Logic	3
ECE 422	Design of Digital Computers	3
ECE 425/L	Microprocessor Systems & Laboratory	3/1
ECE 442/L	Digital Electronics & Laboratory	3/1
ECE 450	Probabilistic Systems in Electrical Engineering Design & Analysis	3

2. REQUIRED COURSES (30-33 Units)

The Department of Electrical and Computer Engineering offers the Master of Science degree in Computer Engineering. For this degree, the student must define a program that conforms to the general M.S. in Computer Engineering degree requirements as established by the Department. Students are advised to meet with an advisor as soon as possible to plan their program. No more than a total of 9 units of 400-level courses (ECE digital courses and/or Computer Science courses) taken in residence can be counted toward the Master in Computer Engineering. Students may not take a course (counting toward MSCompE degree) which is the same or equivalent to a course taken toward one's undergraduate program. All graduate programs in the Department of Electrical and Computer Engineering must be approved by the faculty advisor and the Graduate Coordinator.

Students must select a minimum of 12 units of Electrical and Computer Engineering courses and a minimum of 6 units of Computer Science courses. Students must select their coursework from the following list of courses:

Electrical and Computer Engineering Courses:

ECE 420	Digital Systems Design w/Programmable Logic	3
ECE 422	Design of Digital Computers	3
ECE 425/L	Microprocessor Systems and Lab	3/1
ECE 442/L	Digital Electronics and Lab	3/1
ECE 443/L	Pulse and Waveshaping Circuit Design and Laboratory	3/1
ECE 520/L	System On Chip Design and Lab	3/1
ECE 524/L	FPGA/ASIC Design and Optimization Using VHDL and Lab	3/1
ECE 526/L	Verilog HDL for Digital Integrated Circuit Design and Lab	3/1
ECE 527/L	Application Specific Integrated Circuit Development and Lab	3/1
ECE 546	Very Large Scale Integrated Circuit Design	3
ECE 620	Advanced Switching Theory	3
ECE 621	Computer Arithmetic Design	3
ECE 622	Digital Systems Structure	3
ECE 623	Diagnosis and Reliable Design of Digital Systems	3
ECE 624	Digital Systems Design Automation and VHDL Modeling	3
ECE 625	Microprocessor Interfacing and Applications	3
ECE 629C	Seminar in Digital Systems and Components	3
ECE 635	Error Detection and Correction Systems Design	3
ECE 639	Robotic Sensing and Computer Vision	3
ECE 697	Directed Comprehensive Study	3
ECE 698C	Thesis or Graduate Project	3
ECE 699C	Independent Study	3

Computer Science Courses:

Comp 420	Advanced Operating System Concepts	3
Comp 424	Computer System Security	3
Comp 426	Fault-Tolerant Software and Computing	3
Comp 429	Computer Network Software	3
Comp 432	Object-Oriented Programming	3
Comp 440	Database Design	3
Comp 469	Introduction to Artificial Intelligence	3
Comp 484/L	Web Engineering I and Lab	2/1
Comp 485	Human-Computer Interaction	3
Comp 529	Advanced Network Topics	3
Comp 541	Data Mining	3
Comp 560	Expert Systems	3
Comp 565/L	Advanced Computer Graphics and Lab	2/1
Comp 587	Software Verification and Validation	3
Comp 686	Software Engineering Management	3

Total Units Required for the M.S. CompE Degree**30-33.**

8. Justification of Requests

With the large computer industry in our local area, we expect the need for Computer Engineers with master degree to be particularly high and the demand for our graduates to be significant. This is evident from the information obtained from companies in our community that have expressed increased demand for employees in the Computer Engineering field with higher degrees. They have expressed concern over the lack of graduates in this field. Most of these companies have deep involvement with our college. They serve as members of our Professional Advisory Board, have helped establish and maintain our laboratories with donations of equipment and software, participate in our Co-op and internship programs, hire our undergraduate and graduate students, and interact with our faculty through research clinics and summer consulting.

Over the past few years our current undergraduate students in computer engineering as well as electrical engineering have expressed interest in a Computer Engineering Master degree program. At the present the department has a Digital and Computer Engineering concentration under the Master of Science in Electrical Engineering. The Master in Computer Engineering will combine this concentration with Computer Science courses, under an appropriate name to assist our students with matching positions in industry.

9. Estimate of Impact on Resources within the Department, for other Departments and for the University

The courses selected for the proposed program are combination of courses currently offered by the ECE and Computer Science departments. These courses have already existing allocated facilities and laboratories, and no changes in allocation and/or use of facilities are proposed or required.

10. Goals and Measureable Student Learning Outcomes for the New Program

- a) Ability to apply knowledge of advanced principles to the analysis of electrical and computer engineering problems.
- b) Ability to apply knowledge of advanced techniques to the design of electrical and computer engineering systems.
- c) Ability to apply the appropriate industry practices, emerging technologies, state-of-the-art design techniques, software tools, and research methods for solving electrical and computer engineering problems.
- d) Ability to use the appropriate state-of-the-art engineering references and resources, including IEEE research journals and industry publications, needed to find the best solutions to electrical and computer engineering problems.

- e) Ability to communicate clearly and use the appropriate medium, including written, oral, and electronic methods.
- f) Ability to maintain life-long learning and continue to be motivated to learn new subjects.
- g) Ability to learn new subjects that are required to solve problems in the industry without being dependent on a classroom environment.
- h) Ability to be competitive in the engineering job market and/ or be admitted to an excellent Ph.D. program

11. Method of Assessment for Measureable Student Learning Outcomes

ECE 420	a, b, c, e, f, h
ECE 422	a, b, c, e, f, h
ECE 425/L	a, b, c, e, f, h
ECE 442/L	a, b, c, e, f, h
ECE 443/L	a, b, c, e, f, h
ECE 520/L	a, b, c, f, g
ECE 524/L	a, b, c, d, e, f, g, h
ECE 526/L	a, b, c, e, h
ECE 527/L	a, b, c, e, h
ECE 546	a, b, c, d, f, g, h
ECE 620	a, b, c, d, f, g
ECE 621	a, b, c, d, f, g, h
ECE 622	a, b, c, d, h
ECE 623	a, b, c, d, f, g, h
ECE 624	a, b, c, d, f, g, h
ECE 625	a, b, c, d, f, g, h
ECE 629C	a, b, c, d, f, g, h
ECE 635	a, b, c, d, f, g, h
ECE 639	a, b, c, d, h
ECE 697	a, b, c
ECE 698C	a, b, c, d, e, f, g, h
ECE 699C	a, b, c, d, e, f, g, h

In addition:

- 1) Applied Course Project Assessments.
- 2) Examination Questions.
- 3) Student Evaluations.
- 4) Course Grade Distribution.
- 5) Graduate Students Open Forum (organized by the department every Fall).
- 6) Alumni Survey.
- 7) Master Projects/Thesis.
- 8) Independent Study Reports.