**Department of Computer and Electrical Engineering and Computer Science**

**School of Natural Sciences, Mathematics, and Engineering**

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**Program Description**

Electrical Engineering is a large and expanding field which is concerned with the following fundamental areas: digital signal processing, semiconductor electronics, microprocessors and embedded systems, VSLI design, cyber-physical systems, data communications, energy systems and power electronics, transmission and distribution, RF and microwave, robotics and control system design, electromechanics and mechatronics, computer networks, digital design, image processing and computer vision. If computer science can be regarded to be on the information processing side of computer engineering, then electrical engineering can be regarded to be on the side which builds upon the fundamental physical properties of electricity and magnetism. Electrical engineers often work with other engineers, physical scientists, and computer scientists.

The Computer and Electrical Engineering and Computer Science Department moved into a new building in Fall 2008. The department administers its own local area network which includes multiple Unix/Linux servers, two software programming labs, a walkin lab/tutoring center, one advanced workstation lab, an isolated network lab, an AI/visualization lab, a DSP/communications lab, one digital electronics hardware lab, a power systems/electronics lab, and a robotics/control systems lab. There is also a study room/library with computers available to students.

An important goal of the department is to enable students to work much more closely with faculty than they would be able to at larger universities. A detailed description of student learning goals and objectives can be found at <http://www.cs.csub.edu/all_abet.pdf>.

**Requirements for the Bachelor of Science Degree in Electrical Engineering**

**Total Units Required to Graduate 120 units**

**Major Requirements 92 units**

CMPS/ECE Courses 56

Cognate Courses 36

**General Education Requirements 24 units \*\*\***

First-year Seminar 0\*

Foundational Skills 6\*

LD Area B 3\*

LD Area C 6

LD Area D 6

AI-Hist/Gov6

JYDR3

UD Thematic Areas (C&D) 3\*

Capstone 0\*

SELF 0\*\*

GWAR 0\*\*

**Additional Units** **4 units**

\* The following required major courses also meet general education requirements: ECE/ENGR 1618 meets First-year Seminar, MATH 2310 or 2510 meets Foundational Skill B4, PHYS 2210 meets LD Area B1/B3, PHIL 3318 meets UD Thematic Area C, and CMPS 4908 meets Capstone. Additionally, ENGR/ECE/PHYS 2070 currently satisfies the requirements of Foundational Skill A3 for engineering majors. Total reduction: 15 units (required)

\*\* The SELF requirement may be met by selecting another General Education course with a SELF overlay or by taking a stand-alone course. The GWAR requirement can be met by taking an exam, taking another General Education course with a GWAR overlay, or by taking a stand-alone course.

\*\*\* Computer Engineering is guaranteed 6-9 units of General Education modifications outside of LD Area B by the Academic Senate documentation. The department does not, as of this submission, know exactly what those modifications are. The total unit count has been reduced by 9 units until such time as the modifications are approved by GECCo.

**SB1440 Units Required 58 units\***

\* Units required for graduation after completion of the Engineering (Electrical Engineering focus) model curriculum and lower-division general education at a California community college. Total assumes 3 units of upper division general education modifications.

**Requirements for the Major in Electrical Engineering**

1. **Lower division required courses** (12 units):

ECE 1618, 1620, ENGR/ECE/PHYS 207, CMPS 2010

2. **Upper division required courses** (32 units):

ECE 3040, 3070, 3200, 3230, 3320, 3370, 3340, 4902, 4908

3. **Upper division elective courses** (12 units):

Select 12 units of elective courses from the following. At least one course must be at the 4000-level:

**Digital Design and Embedded Systems**

ECE 3220, 3250, 4240

**Digital Communication and Digital Signal Processing**

ECE 4220, 4250, 4260

**Control Systems and Robotics**

ECE 4320, 4570

**Power Systems and Power Electronics**

ECE 3380, 4330, 4370

**Image Processing and Computer Vision**

ECE 4460, 4470

**Special Topics and Independent Study**

ECE 3770, 3771, 4770, 4771, 4800, 4860, 4870, 4890

*Only a combined total of 4 units of ECE 377x, 477x, 48xx may be used for elective credit.*

4. **Required cognate courses** (36 units):

MATH 2510 or 2310, MATH 2520 or 2320, MATH 2530, 2610, 3220, CHEM 1000, PHYS 2210, 2220, PHIL 3318

5. **General Education Courses and Notes:**

 ECE 4908 satisfies the Capstone requirement.

 PHIL 3318 satisfies UD Thematic Area C and the Computer Engineering Ethics requirement.

 PHYS 2210 satisfies LD Areas B1 and B3.

 MATH 2510 or 2310 satisfies Foundational Skill B4.

 ENGR/ECE/PHYS 2070 satisfies Foundational Skill A3.

 Remaining modifications will be documented after decision from GECCo.

**COURSE DESCRIPTIONS**

**Note:** All Computer Engineering and Electrical Engineering courses descriptions are listed under the Computer Engineering Degree Program and carry the ECE prefix.