**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.

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

**Total Units Required to Graduate 180 units**

**Major Requirements 133 units**

 CMPS/ECE Courses 70

 Cognates (includes PHIL 316) 63

**Other University Requirements 42-47 units**

 CSUB 101 2

 American Institutions 5

 Area A 10\*

 Area B 0\*

 Area C 10

 Area D 10\*\*

 Theme 1 0\*

 Theme 2 0\*

 Theme 3 0\*\*

 GRE 5

 GWAR (Exam) or Class 0-5

**Additional Units** **0-5 units**

\*A3, B1, B2, B3, B4, Theme 1, Theme 2 satisfied in major or cognate

\*\*Electrical Engineering General Education ABET Reductions (see Notes)

**Requirements for the Major in Electrical Engineering**

1. **Lower Division** (14 units):

ECE 160, CMPS 150, 221, 224

2. **Upper Division required** (41 units):

 ECE 304, 307, 320, 330, 332, 337, 423, 490A, 490B

3. **Upper Division Electives** (3 courses) (15 units):

 Select three courses from: ECE 322, 336, 420, 422, 424, 432, 433, 434, 446, 447, 457, 464

4. **Cognate Requirements** (58 units):

 MATH 201 or 231, MATH 202 or 232, MATH 203 or 233, MATH 204 or 234, MATH 230 or 330, and MATH 340, CHEM 211, PHYS 221, 222, 223, PHYS/ENGR 207

**General Education Courses and Notes:**

 ECE 490A, 490B satisfies Theme 1.

 PHIL 316 must be taken and will satisfy Theme 2 and the Electrical Engineering Ethics requirement.

 For Electrical Engineering majors, A3 is substituted by PHYS/ENGR 207.

 PHYS 221 will satisfy Areas B1 and B3.

 Area B2 is waived for Electrical Engineering majors.

 For Electrical Engineering majors, HIST 231 or 232 will (double) count for both 5 units of Area C as well as for American Institutions.

 The Electrical Engineering ABET 3c. and 3h. Student Outcomes waive 5 units in Area D and waive 5 units of Theme 3.

**COURSE DESCRIPTIONS**

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