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

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

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**Program Description**

Computer Engineering is a field, which in some sense, resides between the long-established fields of Computer Science and Electrical Engineering. It is concerned with topics such as analog and digital circuit design, embedded controllers, computer hardware, system software, computer system design, data communication, signal processing, computer networks, robotics, computer vision, graphics and image processing, and other topics in computing where hardware plays an important role. Computer engineers often work with other engineers, physical scientists, and software engineers.

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

**Total Units Required to Graduate 180-186 units**

**Major Requirements 139 units**

 ECE/CMPS Courses 81

 Cognates 58

**Minor Requirement 0 units**

**Other University Requirements 40-47 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 3-5

 GWAR (Exam) or Class 0-5

**Additional Units 0-1 units**

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

\*\*Computer Engineering General Education ABET Reductions (see Notes).

**Requirements for the Major in Computer Engineering**

1. **Lower Division** (24 units):

ECE 160, CMPS 150, 221, 223, 224, 295

2. **Upper Division required** (42 units):

 ECE 304, 307, 320, 321, 322, 360, 420, 490A, 490B

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

 Choose one course from each of the three areas:

 **Communications, Signal Processing, Networking:**

 ECE 422, 423, 425, 426

 **Embedded Systems, Computer Control, Robotics:**

 ECE 457, 432

 **Computer Vision and Image Processing:**

ECE 446, 447

4. **Cognate Requirements** (53 units):

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

**General Education Courses and Notes:**

 ECE 490A or 490B satisfies Theme 1.

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

 For Computer Engineering majors, A3 is waived.

 PHYS 221 will satisfy Areas B1 and B3.

 Area B2 is waived for Computer Engineering majors.

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

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

**Requirements for the Bachelor of Science Degree in Computer Engineering with a Concentration in Electrical Engineering (This concentration has been elevated to a Degree Program. Please see Electrical Engineering).**