2013-14 BIOENGINEERING CURRICULUM CHART

● AMS 3 or Math 3 or math placement
MATH 19A
Calculus

MATH 19B
Calculus

● Math 19A
(Co-requisite)
PHYS 5A/L or 6A/L
Intro to Physics I Mechanics

● Math 19B
PHYS 5C/N or 6C/N
Intro to Physics III Electricity & Magnetism

Advanced Math

● Ams 3 or Math 3 or MPE
AMS 10
AND
● Math 19B and Ams 10 or Math 21
AMS 20
Math. Methods Engineers I & II

OR

● Math 19A or 20A
MATH 21
Linear Algebra
AND
● Math 19B or 20B
MATH 23A
Multivariable Calculus
AND
● MATH 23A
MATH 24
Ordinary Differential Equations

CHEM 1A
General Chemistry

CHEM 1B/M
General Chemistry

● CHEM 1A
CHEM 1C/N
General Chemistry

● MATH 19A and PHYS 5A/L or 6A/L and AMS 10 or MATH 21
CMPE 9
Statics and Dynamics

BME 80G
Bioethics in the 21st Century: Science, Business, and Society

● CHEM 1A & 1B
BIOL 20A
Cell and Molecular Biology

● BIOL 20A
BIOE 20B
Development and Physiology

● CHEM 1B & 1C
CHEM 108A/L
Organic Chemistry

● BIOL 20A and 20B and 108A or 112A
BIOL 100
Biochemistry

- OR -

● CHEM 108B or 112C and BIOL 20A. Concurrent enrollment in BIOL 100K
BMB 100 A-B
Biochemistry and Molecular Biology

Two of the following:
*(Rehabilitation concentration requires **three**:*
CMPE 12/L, CMPE 13/L or CMPS 12A/L, & CMPS 12B/M)

● BIOL 20A
BME 160/L
Programming for Biologists and Biochemists

● Math 3 or Math 19A
†CMPS 12A/L
Intro to Programming

● CMPS 11 or 12A or CMPE 13
CMPS 12B/M
Intro to Data Structures

● One of the following: CMPE 3, 8 or CMPS 5C, 5J, 5P, 10, 12A
CMPE 12/L
Computer Systems & Assembly Language
(not recommended without CMPE13/L)

● CMPE 12/L
CMPE 13/L
Computer Systems & C

● MATH 24 or AMS 20 and Phys 5C/N or 6C/N
EE 101/L
Electronic Circuits
or
● MATH 19B or Math 20B and Phys 5C/N or Phys 6C/N
BME 101/L**
Applied Circuits for Bioengineers

● CMPS 12B or CMPE 12 or BME 160
#CMPE 185
Technical Writing for Computer Engineers

● Biol 20A and Bio 20B or 105 and Biol 100 or Bioc 100A and Phys 5C or Phys 6C
BME 150/L
Molecular Biomechanics

● MATH 3 or MATH 19A
AMS 7/L
Statistical Methods
OR
● AMS 11B or MATH 11B or MATH 19B
AMS 131%
Probability Theory
OR
● CMPE 16 or 16H and MATH 22 or 23A
CMPE 107%
Probability & Statistics for Engineers

CONCENTRATION (choose 1)

BIOELECTRONICS

● EE 101/L and AMS 20 or 20A
EE 103
Signals and Systems

● EE 103
EE 104
Bio-electronics and Bio-instrumentations
OR
● EE 101/L
EE 171/L
Analog Electronics

BIOMOLECULAR

BME 5§
Introduction to Biotechnology

● BIOL 20A
BIOL 105
Genetics

REHABILITATION

CMPE 80A§
Assistive Technology and Universal Access

● CMPS 12B
CMPE 131
Human-Computer Interaction

§BME 5 & CMPE80A should be taken in first or second year.

● = Course prerequisites

-Physics 5B/6B is recommended
****For biomolecular or rehab concentration**
Satisfies the DC requirement
† May substitute with CMPS 5J AND CMPS 11

% Must complete BME 110 as an elective

Four Electives (pertinent to track) required
(more information on back of this chart)

Faculty Approval _____

Design Elective	UD BSOE Elective or CMPS12B in Rehab Conc.	UD BSOE Elective	BSOE or PBSci Elective

Senior Design Project:

BME/CE/EE 123A Engineering Design Project I
- and -
BME/CE/EE 123B Engineering Design Project II

- OR -

BME/CE/EE 195 Senior Thesis
(Must enroll in 3 quarters of BME 195)
- and -
BME 123T Senior Thesis Presentation
(Must concurrently enroll during last quarter of Thesis work)

Students completing a thesis must seek department approval of their project one year before graduation

Prior to graduation (see beng.soe.ucsc.edu) you must:

1. Submit a Portfolio 2. Complete an Exit Survey 3. Attend an Exit Interview

BIOENGINEERING BS
DEGREE CURRICULUM

Fall _____	Winter _____	Spring _____	Summer _____

Fall _____	Winter _____	Spring _____	Summer _____

Fall _____	Winter _____	Spring _____	Summer _____

Fall _____	Winter _____	Spring _____	Summer _____

Approved List of Upper Division Electives – *Courses used to satisfy a concentration cannot be used to also satisfy electives*

AMS 147-Computational Methods and Applications

BIOC 100C -Biochemistry

BIOL 105-Genetics
BIOL 110-Cell Biology
BIOL 114-Cancer Cell Biology
BIOL 115-Eukaryotic Molecular Biology
METX 119-Microbiology
BIOL 125-Introduction To Neuroscience
BIOL 130/L-Human Physiology/Lab

BIOE 131/L-Animal Physiology/Lab

BME 110-Computational Biology Tools ♦
BME 128-Protein Engineering **$** ♦
BME 130-Genomes ♦
BME 140-Bioinstrumentation ♦
BME 155-Biotechnology & Drug Develop. ♦
BME 170-Frontiers in Drug Action and Discovery
BME 177-Engineering Stem Cells **$**
BME 178-Stem Cell Biology ♦
BME 205-Bioinformatics Models and Algorithms **$** ♦
BME 211-Computational Systems Biology
BME 215-Applied Gene Technology
BME 230/L-Computational Genomics

CHEM 108B/M-Organic Chemistry/Lab

CMPE 100/L-Logic Design/Lab **$** ♪
CMPE 110-Computer Architecture
CMPE 118/L-Mechatronics/Lab♪
CMPE 121/L-Microprocessor System Design/Lab
CMPE 131-Human-Computer Interaction
CMPE 167/L-Sensing and Sensor Technology/Lab ♪
CMPE 202-Computer Architecture
CMPE 215-Models of Robotic Manipulation
CMPE 233-Human Factors ♪
CMPE 235-User Evaluation of Technology

CMPS 101-Algorithms and Abstract Data Types
CMPS 109-Advanced Programming ♪
CMPS 115-Software Methodology
CMPS 116-Software Design Project
CMPS 180-Database Systems I
CMPS 181-Database Systems II
CMPS 182-Introduction to Database Management Syst....

EE 103-Signals and Systems
EE 104-Bio-electronics and Bio-instrumentations ♣
EE 115-Intro. to MEMS Design ♣
EE 130/L-Intro. to Optoelectronics and Photonics/Lab ♣
EE 145/L-Properties of Materials/Lab ♣
EE 154-Feedback Control Systems ♣
EE 171/L-Analog Electronics/Lab ♣
EE 172-Advanced Analog Circuits **$** ♣
EE 212-Introduction to BioMEMS ♣
EE 216-Nanomaterials and Nanometer-scale Device ♣
EE 230-Optical Fiber Communication ♣
EE 270-Neural Implant Engineering ♣
EE 293-Advanced Topics in Electrical Engineering ♣

$-Counts towards Design Elective
♦-Recommended for Biomolecular
♣-Recommended for Bioelectronics
♪-Recommended for Rehabilitation

Student Name _____ Student ID _____
Faculty Advisor: _____ Date: _____
Staff Advisor: _____ Date: _____