The Biomedical Engineering Curriculum – Version F15

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<u>BiomedE Undergraduate Core Curriculum</u>

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Subjects required by all programs   Cr. Hrs
Math 115, 116, 215, 216   16
Engineering 100, Intro to Engineering   4
Engineering 101, Intro to Computing   4
Chemistry 130   3
Physics 140/141, 240/241   10
Intellectual Breadth   16
          53

Advanced Science and Engineering Math
Biology 172 or 174, Intro to Biology (F,W)   4
(If using AP Bio credit (195), then Biology 173 (2) is required)
BiomedE 241, Biomedical Engineering Undergraduate Laboratory (F, W)   4

Chemistry 210/211, Structure & Reactivity I (F, W, Sp)   5
MCDB 310, Intro Biochemistry (F,W,Sp) **or** BiolChem 415, Intro Bio-
chemistry (F,W) or Chem 351, Fundamentals Of Biochemistry (F,W)   3-4
          16-17

Required Program Subjects
BiomedE 211, Circuits & Systems for Biomedical Engineering (F)
(If you are planning on the Bioelectrical concentration, it is recommended that you take
EECS 215 in place of BiomedE 211)   4

BiomedE 221, Biophysical Chemistry and Thermodynamics (F,W)   4
BiomedE 231, Intro to Biomechanics (W)   4
BiomedE 350, Intro to BiomedE Design (W)   3
BiomedE 418, Quantitative Cell Biology (F,W)   3
BiomedE 419, Quantitative Physiology (F)   4
BiomedE 450, Biomedical Design (4) (W) **OR**
 BiomedE 451, Biomedical Design (2) (F) **AND** BiomedE 452, Biomedical Design (3) (W)

4-5

BiomedE 458, Biomedical Instrumentation & Design (F,W)   4
MSE 250, Principles of Engineering Materials (F, W)   4
          34-35

BSE Concentration Requirements and Electives*   **14**

* Must include at least 12 cr. of engineering courses

Table 3.3 BiomedE Biochemical Concentration

Concentration Requirements (7 credits)

BiomedE 321, Bioreaction Engineering & Design (W)	3 cr. hrs.
BiomedE 331, Intro to Biofluid Mechanics (F)	4

Lab Requirement (1 class)

MatScie 360, Experimental Meth in MSE Lab I (F)	3
MCDB 429, Laboratory in Cell & Molecular Biology (W)*	3
Biology 226, Animal Physiology Lab (F,W)	2
Physiology 404, Human Physiology Lab (F,W)	2

Choose one (1 class)

BiomedE 410, Biomedical Materials (F)	3
BiomedE 479, Biotransport (W)	4

Concentration Electives, if needed

BiomedE 332, Intro to Biosolid Mechanics (W)	4
BiomedE 410, Biomedical Materials (F)	3
BiomedE 474, Tissue Engineering (F)	3
BiomedE 476, Advanced Biofluid Mechanics (W)	4
BiomedE 479, Biotransport (W)	4
ChE 519, Pharmaceutical Engineering (W)	3
MatScie 350, Principles of Engineering Materials II (F)	4
MatScie 412, Polymer Materials (F)	3
MatScie 420, Mech Behavior of Materials (F)	3
MatScie 440, Ceramic Materials (W)	3
MatScie 512, Polymer Physics (W)	3

*MCDB 429, Biology 226, and Physiology 404, are not considered engineering courses for ABET requirement purposes: students must have a minimum of 48 credit hours of Engineering course work in their bachelor's program.

BiomedE Bioelectrical Concentration

Concentration Requirements (8 credits)

BiomedE 311, Biosystems and Signals (W) or EECS 216, Intro to Signals and Systems (F,W)	4 cr. hrs.
BiomedE 417, Electrical Biophysics (W)	4

At least one of the following (3-4 credits):

BiomedE 552, Biomedical Optics (F)	3
EECS 320, Intro to Semiconductor Devices (F,W)	4
EECS 414, Intro to MEMS (F)	4
EECS 351, Digital Signal Processing (F,W)	4

Concentration Electives:

BiomedE 331, Intro to Biofluid Mechanics (F)	4
BiomedE 522, Biomembranes (W)	3
BiomedE 552, Biomedical Optics (F)	3
EECS 280, Programming for Engineers (F, W)	4
EECS 301, Probabilistic Methods in Engineering (F, W)	4
EECS 311, Analog Electronics (W)	4
EECS 312, Digital Integrated Circuits (F, W)	4
EECS 320, Intro to Semiconductor Devices (F, W)	4
EECS 334, Principles of Optics (W)	4
EECS 414, Intro to MEMS (F)	4
EECS 423, Solid State Device Lab (F)	4
EECS 434, Photonics (F)	4
EECS 435, Fourier Optics (W odd years)	3
EECS 438, Adv. Lasers & Optics Lab (W)	4
EECS 352, DSP Lab (F, W)	4
EECS 460, Fund Control Sys (F)	3
Math 354, Fourier Analysis & its Applications ("sporadically")	3
Math/BiomedE 464, Inverse Problems (W)	3
MechEng/BiomedE 424, Engineering Acoustics (F)	3
NERS/BiomedE 481, Radiation Imaging (W)	2

BiomedE Biomechanical Concentration

Concentration Requirements (8 credits)

BiomedE 331, Intro to Biofluid Mechanics (F)	4 cr. hrs.
BiomedE 332, Intro to Biosolid Mechanics (W)	4

At least one of the following (3-4 credits)

BiomedE 456, Biomechanics (F)	3
BiomedE 476, Advanced Biofluid Mechanics (W)	4
BiomedE 479, Biotransport (W)	4
IOE 333, Ergonomics (F,W)	3
IOE 463, Work Measurement & Prediction (F)	3
IOE 491, Applied Physical Ergonomics (F)	3
IOE/BiomedE 534, Occupational Biomechanics (W)	3

Concentration Electives:

ANAT 403, Human Body* (F,W)	5
BiomedE 456, Biomechanics (F)	3
BiomedE 476, Advanced Biofluid Mechanics (W)	4
BiomedE 479, Biotransport (W)	4
IOE 333, Ergonomics (F,W)	3
IOE 436, Human Factors in Computer Systems (W)	3
IOE 438, Occupational Safety Management (W)	2
IOE 463, Work Measurement & Prediction (F)	3
IOE 491, Applied Physical Ergonomics (F,W)	3
IOE/BiomedE 534, Occupational Biomechanics (W)	3
MechEng 250, Design and Manufacturing I (F,W)	4
MechEng 360, Modeling of Dynamic Systems (F,W)	4
MechEng 406, Biomechanics for Engineers (W)	3
MoveSci 230, Musculoskeletal Anatomy (F,W)	3
MoveSci 231, Musculoskeletal Anatomy Lab (F,W)	1
MoveSci 435, Biomechanics of Human Locomotion (F every other even year)	3

*ANAT (was BiomedE) 403 is not considered an engineering course for the ABET requirement: all students have a minimum of 48 credit hours of Engineering in their bachelors program.