State University of New York at Binghamton
Thomas J. Watson School of Engineering and Applied Science
BS in Biomedical Engineering Four-Year-Program
Application Code: 274
(If undecided use: 0229)

FALL 2015

Engineering Design Division

(The freshman year is common to all engineering majors)

Year 1

Fall

MATH 224/225	Calculus I (M)
CHEM 111	Chemical Principles (L)
WTSN 111	Introduction to Engineering Design
WTSN 103	Engineering Communications I
General Education Elective (A, G, N, P)	
Body/Wellness	

Spring

MATH 226/227	Calculus II (MATH 225)
PHYS 131	General Physics I Calculus-based (MATH 225)
WTSN 112	Introduction to Engineering Analysis (J) (WTSN 111)
WTSN 104	Engineering Communications II (WTSN 103)
General Education Elective (A, G, N, P)	
Body/Wellness	

Year 2

Fall

BME 201	Introduction to Biomedical Engineering (MATH 225, PHYS 131, WTSN 112) (Co-req: BIOL 118)
MATH 324	Ordinary Differential Equations (MATH 227)
CHEM 231	Organic Chemistry I (CHEM 111)
BIOL 118	Cell & Molecular Biology

Spring

BME 203	Biomedical Modeling & Numerical Methods (MATH 227, BME 201)
BME 213	Biomolecule Engineering (BIOL 118, BME 201, CHEM 111, MATH 324)
MATH 323	Calculus III (MATH 227)
PHYS 132	General Physics II Calculus-based (PHYS 131)
General Education Elective (A, G, N, P)	

Year 3

Fall

BME 313	Biomaterials (CHEM 231, BME 213, BIOL 118)
BME 318	Biomechanics (PHYS 131, MATH 227)
BME 324	Biomedical Instrumentations (L) (BME 201, BME 203, BME 213)
ME 331	Thermodynamics (MATH 323, MATH 324, PHYS 131)
BME Depth or Science Elective*	

Spring

BME 303	Bio-Fluid Mechanics (BME 318, PHYS 131, MATH 227)
BME 340	Bioinformatics and Biostatistics (BIOL 118, BME 203)
BME 351	Biomedical Engineering Lab (BME 213, BME 324, BME 318) (Co-req: BME 303)
BIOL 311	Cell Biology (BIOL 118, CHEM 111)
or	
BIOL 301	Molecular Genetics (BIOL 118, CHEM 111, CHEM 231) (Co-req: CHEM 332)
General Education Elective (A, G, N, P)	

Year 4

Fall

BME 413	Biomedical Transport Phenomena (ME 331, BME 318, BME 303)
BME 432	Ethics in Engineering (H) (Co-req: BME 450)
BME 433	Human Physiology (CHEM 231, BIOL 118)
BME 450	Biomedical Engineering Design I (BME 318, BME 351) (Co-req: BME 413)
BME Depth elective*	

Spring

BME 451	Biomedical Engineering Design II (J) (BME 450)
Science Elective	CHEM 332 (CHEM 231) ***or*** CHEM 341(CHEM 111) ***or*** BCHM 302 (BIOL 118, CHEM 111, CHEM 231, CHEM 332)
BME Depth or Science Elective*	
BME Depth Elective*	

* Depth Electives are chosen from your concentration. Science electives include: PSYC 111, BCHM 302, any CHEM 300 level and above, any BIOL 300 level and above. ANTH 243 & ANTH 240 may be combined as a science elective.

06/03/15

Biomedical Engineering with MCAT Preparation

FALL 2015

Year 1

Engineering Design Division

(The freshman year is common to all engineering majors)

Fall

MATH 224/225	Calculus I (M)
CHEM 111	Chemical Principles (L)
WTSN 111	Introduction to Engineering Design
WTSN 103	Engineering Communications I
General Education Elective (A, G, N, P)	
Body/Wellness	

Spring

MATH 226/227	Calculus II (MATH 225)
PHYS 131	General Physics I Calculus-based (MATH 225)
WTSN 112	Introduction to Engineering Analysis (J) (WTSN 111)
WTSN 104	Engineering Communications II (WTSN 103)
General Education Elective (A, G, N, P)	
Body/Wellness	

Year 2

Fall

BME 201	Introduction to Biomedical Engineering (MATH 225, PHYS 131, WTSN 112) (Co-req: BIOL 118)
MATH 324	Ordinary Differential Equations (MATH 227)
CHEM 231	Organic Chemistry I (CHEM 111)
BIOL 118	Cell & Molecular Biology

Spring

BME 203	Biomedical Modeling & Numerical Methods (MATH 227, BME 201)
BME 213	Biomolecule Engineering (BIOL 118, BME 201, CHEM 111, MATH 324)
MATH 323	Calculus III (MATH 227)
PHYS 132	General Physics II Calculus-based (PHYS 131)
Pre-Med Elective*	

- ANTH 243 OR ANTH 240 offered online in summer and winter only (**2 credits**)

Year 3

Fall

BME 318	Biomechanics (PHYS 131, MATH 227)
BME 324	Biomedical Instrumentations (L) (BME 201, BME 203, BME 213)
ME 331	Thermodynamics (MATH 323, MATH 324, PHYS 131)
CHEM 341	Intermediate Inorganic Chemistry (CHEM 111)
Pre-Med Elective*	

Spring

BME 303	Bio-Fluid Mechanics (BME 318, PHYS 131, MATH 227)
BME 340	Bioinformatics and Biostatistics (BIOL 118, BME 203)
BME 351	Biomedical Engineering Lab (BME 213, BME 324, BME 318) (Co-req: BME 303)
Pre-Med Elective*	
Pre-Med Elective*	

MCAT typically taken after Junior Year Before MCAT, you should take: BIOL 117, BIOL 118, CHEM 111, CHEM 341, CHEM 231, CHEM 332 and 335, PHYS 131, PHYS 132, PSYC 111, BCHM 302, BME 340 Biostatistics, & ANTH 240/243.

Year 4

Fall

BME 313	Biomaterials (CHEM 231, BME 213, BIOL 118)
BME 413	Biomedical Transport Phenomena (ME 331, BME 318, BME 303)
BME 432	Ethics in Engineering (H) (Co-req: BME 450)
BME 433	Human Physiology (CHEM 231, BIOL 118)
BME 450	Biomedical Engineering Design I (BME318, BME 351) (Co-req: BME 413)
BME Depth elective**	

Spring

BME 451	Biomedical Engineering Design II (J) (BME 450)
BIOL 311	Cell Biology (BIOL 118, CHEM 111)
or	
BIOL 301	Molecular Genetics (BIOL 118, CHEM 111, CHEM 231) (Co-req: CHEM 332)
BME Depth Elective**	
General Education Elective (A, G, N, P)	
General Education Elective (A, G, N, P)	

* Pre-Med Electives: BIOL 117, CHEM 332, CHEM 335 (L), PSYC 111, BCHM 302, ANTH 240 or 243

** Students who are planning on taking the MCAT, must choose two additional depth electives from any of the other BME concentrations, except pre-health to meet the ABET 48 engineering credit hour requirement.

06/03/15

BME Major Concentrations:

Students are required to select an area of emphasis to gain more in-depth knowledge and specialty training in biomedical engineering. Students must take any two courses from the list of courses prescribed in each concentration to declare their concentration. Courses chosen from a concentration fulfill the BME Depth Electives.

Biomaterials and Bio-pharmaceutical Technology Concentration (Choose two courses to declare this concentration)

- BME 483 Tissue Engineering (BME 313,BME 201, BIOL 118) (Co-req: BME 433)
- BME 473 Advanced biomaterials and biocompatibility (BME 313)
- BME 463 Bioprocess engineering (BME 213, CHEM 231)
- BME 442 Nanotechnology and drug delivery (BME 213)

Computational Biosystems Concentration (Choose two courses to declare this concentration)

- BME 302 Adaptive Systems
- BME 472 Multivariate Statistics (MATH 323, BME 203)
- BME 410 Complexity in Biological Systems (MATH 324)
- BME 453 Modeling Complex Biological Systems
- BME 423 Dynamics of Complex Networks

Biomedical Devices and Instrumentations Concentration (Choose two courses to declare this concentration)

- BME 424 Bioimaging (BME 324)
- EECE 260 Circuits (PHYS 132)
- BME 420 Biomedical Devices and Diagnostics
- BME 443 Bio-MEMS (BME 303)
- EECE 301 Signals and Systems (EECE 260, MATH 324)

Pre-Health Concentration (Students who wish to complete the pre-health concentration, but are not planning on taking the MCAT, must complete two courses from the pre-health concentration below, in addition to any two engineering depth electives from the other three BME concentrations. The two additional engineering depth electives are required to meet the ABET 48 engineering credit hour requirement.)

- BIOL 117 Organismal & Population Biology
- CHEM 332 Organic Chemistry II (CHEM 231)
- CHEM 335 Organic Chemistry Lab (CHEM 231)
- CHEM 341 Intermediate Inorganic Chemistry (CHEM 111)
- PSYC 111 Psychology
- BCHM 302 Biochemistry (BIOL 118, CHEM 111, CHEM 231, CHEM 332)
- ANTH 243 OR ANTH 240

Students who plan on taking the MCAT should follow the BME MCAT Preparation Guidesheet to complete the suggested courses prior to taking the MCAT Exam.

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