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

FALL 2024
Engineering Design Division
(The freshman year is common to all engineering majors)

Fall

MATH 224/225	Diff Calc/Int Calc(M)
CHEM 111	Chemical Principles (L)
EDD 111	Introduction to Engineering Design
EDD 103	Engineering Communications I

General Education Elective (A, D, G, N)

Body/Wellness

Spring

MATH 226/227	Int Tech&App/Inf S. (MATH 225)
PHYS 131	General Physics I Calculus-based (MATH 225)
EDD 112	Introduction to Engineering Analysis (J) (EDD 111)
EDD 104	Engineering Communications II (EDD 103)
BIOL 113	Intro to Cell & Molecular Biol, or General Education Elective (A, D, G, N)

Body/Wellness

Year 2

Fall

BME 201	Introduction to Biomedical Engineering (MATH 225, PHYS 131, EDD 112) (Co-req: BIOL 113)
MATH 324	Ordinary Differential Equations (MATH 227)
CHEM 231	Organic Chemistry I (CHEM 111)

General Education Elective (A, D, G, N)

Spring

BME 203	Biomedical Modeling & Numerical Methods (MATH 324 or 371, BME 201)
BME 213	Biomolecule Engineering (BIOL 113, 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, D, G, N)

Year 3

Fall

BME 313	Biomaterials (CHEM 231, BME 213, BIOL 113)
BME 318	Biomechanics (PHYS 131, MATH 227)
BME 324	Biomedical Instrumentations (L) (BME 201, BME 203, BME 213, PHYS 132)
BME 330	Biothermodynamics (MATH 323, MATH 324, PHYS 131)

BME Depth or Science Elective*

Spring

BME 303	Bio-Fluid Mechanics (BME 318, PHYS 131, MATH 226)
BME 340	Bioinformatics and Biostatistics (BIOL 113, BME 203)
BME 351	Biomedical Engineering Lab (BME 213, BME 324, BME 318) (Co-req: BME 303)
BIOL 311 or	Cell Biology (BIOL 113, CHEM 111)
BIOL 401	Molecular Genetics (BIOL 113, CHEM 111, CHEM 231) (Co-req: CHEM 332)

General Education Elective (A, D, G, N)

Year 4

Fall

BME 413	Biomedical Transport Phenomena (BME 330, BME 318, BME 303)
BME 432	Ethics in Engineering (H) (Co-req: BME 450)
BME 433	Human Physiology (CHEM 231, BIOL 113)
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 (must be 4 credit hours) Refer to **

BME Depth or Science Elective*

BME Depth Elective*

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* BME depth Electives are chosen from your concentration.
** Science electives include: PSYC 111, PSYC 220, ANTH 243, ANTH 240 (summer and winter online courses), any BCHM 300 level and above, any CHEM 300 level and above, any BIOL 300 level and above.
4/12/2024

Biomedical Engineering with MCAT Preparation
FALL 2024
Year 1
Engineering Design Division
(The freshman year is common to all engineering majors)

Fall		**Spring**	
MATH 224/225	Calculus I (M)	MATH 226/227	Calculus II (MATH 225)
CHEM 111	Chemical Principles (L)	PHYS 131	General Physics I Calculus-based (MATH 225)
EDD 111	Introduction to Engineering Design	EDD 112	Introduction to Engineering Analysis (J) (EDD 111)
EDD 103	Engineering Communications I	EDD 104	Engineering Communications II (EDD 103)
General Education Elective (A, D, G, N)		BIOL 113	Intro to Cell & Molecular Biol, or General Education Elective (A, D, G, N)
Body/Wellness		Body/Wellness	

Year 2

Fall		**Spring**	
BME 201	Introduction to Biomedical Engineering (MATH 225, PHYS 131, EDD 112) (Co-req: BIOL 113)	BME 203	Biomedical Modeling & Numerical Methods (MATH 227, BME 201)
MATH 324	Ordinary Differential Equations (MATH 227)	BME 213	Biomolecule Engineering (BIOL 113, BME 201, CHEM 111, MATH 324)
CHEM 231	Organic Chemistry I (CHEM 111)	MATH 323	Calculus III (MATH 227)
		PHYS 132	General Physics II Calculus-based (PHYS 131)
		Pre-Med Elective*	

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

Year 3

Fall		**Spring**	
BME 318	Biomechanics (PHYS 131, MATH 227)	BME 303	Bio-Fluid Mechanics (BME 318, PHYS 131, MATH 227)
BME 324	Biomedical Instrumentations (L) (BME 201, BME 203, BME 213)	BME 340	Bioinformatics and Biostatistics (BIOL 113, BME 203)
BME 330	Biothermodynamics (MATH 323, MATH 324, PHYS 131)	BME 351	Biomedical Engineering Lab (BME 213, BME 324, BME 318) (Co-req: BME 303)
CHEM 341	Intermediate Inorganic Chemistry (CHEM 111)	Pre-Med Elective*	
Pre-Med Elective*		Pre-Med Elective*	

MCAT typically taken after Junior Year Before MCAT, courses suggested to take: BIOL 113, BIOL 114, CHEM 111, CHEM 341, CHEM 231, CHEM 332 and 335, PHYS 131, PHYS 132, PSYC 111, BCHM 403, BME 340 Biostatistics, & ANTH 240, ANTH 243 (summer and winter online courses).

Year 4

Fall		**Spring**	
BME 313	Biomaterials (CHEM 231, BME 213, BIOL 113)	BME 451	Biomedical Engineering Design II (J) (BME 450)
BME 413	Biomedical Transport Phenomena (BME 330, BME 318, BME 303)	BIOL 311 or	Cell Biology (BIOL 113, CHEM 111)
BME 432	Ethics in Engineering (H) (Co-req: BME 450)	BIOL 401	Molecular Genetics (BIOL 113, CHEM 111, CHEM 231) (Co-req: CHEM 332)
BME 433	Human Physiology (CHEM 231, BIOL 113)	BME Depth Elective**	
BME 450	Biomedical Engineering Design I (BME318, BME 351) (Co-req: BME 413)	General Education Elective (A, D, G, N)	
BME Depth elective**		General Education Elective (A, D, G, N)	

* Pre-Med Electives: BIOL 114, CHEM 332, CHEM 335 (L), PSYC 111, BIOL 403, ANTH 240/243, any BCHM 300 level and above, any CHEM 300 level and above, any BIOL 300 level and above.

** Students who are planning on taking the MCAT, must choose two additional BME depth electives from any of the other BME concentration.

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 486 Neuroengineering (Spring) (BME 201)
- BME 483 Tissue Engineering (Fall) (BME 313, BME 201, BIOL 113) (Co-req: BME 433)
- BME 473 Advanced Biomaterials and Biocompatibility (Spring) (BME 313)
- BME 463 Bioprocess Engineering (Spring) (BME 213, CHEM 231)
- BME 442 Nanotechnology and Drug Delivery (Fall) (BME 313)

Biomedical Devices and Instrumentations Concentration (Choose two courses to declare this concentration)
- BME 424 Bioimaging (Spring) (BME 324)
- BME 420 Biomedical Devices and Diagnostics (Fall) (BME 324, BME 351)
- BME 428 Biophotonics and Image Processing
- BME 443 Quantitative Instrumental Bioanalysis (Spring) (BME 324, BME 351)
- EECE 260 Circuits (Spring) (PHYS 132)
- EECE 301 Signals and Systems (Fall) (EECE 260, MATH 324)

Computational Biosystems Concentration (Choose two courses to declare this concentration)
- BME 470 Advanced Bioinformatics (Fall) (BME 340)
- BME 453 Biomedical Data Management and Regulatory Sciences (Spring) (BME 340)
- BME 472 Experimental Design and Statistical Analysis (Fall) (BME 203, MATH 323)
- BME 484 AI in Biomedical Engineering
- BME 485 Quantum Biology (Spring) (MATH 227)
- BME 401 Python for Biomedical Analysis (Summer)
- ISE 314 Computer Programming for Engineers (Fall)

Pre-Med 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.)
- BIOL 114 Intro to Organisms & Pops Biol
- 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 403 Biochemistry (BIOL 113, CHEM 111, CHEM 231, CHEM 332)

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