# **B.S.** in Biomedical Engineering

# **BME Tracks:**

# **Medical Device and Imaging Track**

(120 credits)

First Year		
1st Semester		Credits
PHYS 111	Physics I	3
PHYS 111A	Physics I Lab	1
ENGL 101	English Composition: Introduction to Academic Writing	3
CHEM 125	General Chemistry I	3
CHEM 125A	General Chemistry Lab I	1
MATH 111	Calculus I	4
FED 101	Fundamentals of Engineering Design	2
FYS SEM	First-Year Student Seminar	0
	Term Credits	17
2nd Semester		
BME 101	Introduction to Biomedical Engineering	0
MATH 112	Calculus II	4
CHEM 126	General Chemistry II	3
PHYS 121	Physics II	3
PHYS 121A	Physics II Lab	1
ENGL 102	English Composition: Introduction to Writing for Research	3
	Term Credits	14
Second Year		
1st Semester		
History and Huma	anities GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-	3
requirements/ger-	200-level/)	
BME 111	Introduction to Physiology	3
BME 301	Electrical Fundamentals of Biomedical Engineering	3
BME 303	Biological and Chemical Foundations of Biomedical Engineering	3
MATH 211	Calculus III A <sup>1</sup>	3
MATH 279	Statistics and Probability for Engineers <sup>2</sup>	2
	Term Credits	17
2nd Semester		
History and Huma requirements/ger-	anities GER 300+ level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education- 300-level/)	3
BME 210	Processing Fund for Biol Signa	3
BME 302	Mechanical Fundamentals of Biomedical Engineering	3
BME 304	Material Fundamentals of Biomedical Engineering	3
MATH 222	Differential Equations	4
	Term Credits	16
Third Year		
1st Semester		
History and Huma	anities GER 300+ level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-	3
requirements/ger-		
BME 382	Engineering Models of Physiological Systems	3
MATH 337	Linear Algebra	3
BME 386	Biosensor and Data Acquisition Lab	3

BME 333	Biomedical Signals and Systems	3
	Term Credits	15
2nd Semester		
Engineering Elec	ctive <sup>3</sup>	3
BME 383	Measurement Lab for Physiological Systems and Tissue	3
BME 372	Electronics of Medical Devices	3
IE 492	Engineering Management	3
Engineering Elec	ctive <sup>3</sup>	3
	Term Credits	15
Fourth Year		
1st Semester		
BME 495	Capstone Design I	2
Engineering Elec	ctive <sup>3</sup>	3
Science or Engir	neering Elective 3,4	3
Science or Engir	neering Elective <sup>3,4</sup>	3
BME 471	Principles of Medical Imaging	3
	Term Credits	14
2nd Semester		
BME 496	Capstone Design 2	3
Capstone HSS 4	4xx	3
BME 472	FDA Regulation of Medical Devices	3
Science or Engir	neering Elective 3,4	3
	Term Credits	12
	Total Credits	120

Students can take MATH 213 (http://catalog.njit.edu/search/?P=MATH%20213) (Calculus III B) instead of MATH 211 (http://catalog.njit.edu/search/?P=MATH%20211).

#### The curriculum for B.S. in Biomedical Engineering – MEDICAL DEVICE & IMAGING CO-OP TRACK – CYCLE A

1st Semester		Credits
PHYS 111	Physics I	3
PHYS 111A	Physics I Lab	1
ENGL 101	English Composition: Introduction to Academic Writing	3
CHEM 125	General Chemistry I	3
CHEM 125A	General Chemistry Lab I	1
MATH 111	Calculus I	4
FED 101	Fundamentals of Engineering Design	2
FYS SEM	First-Year Student Seminar	0
	Term Credits	17
2nd Semester		
BME 101	Introduction to Biomedical Engineering	0
MATH 112	Calculus II	4
CHEM 126	General Chemistry II	3
PHYS 121	Physics II	3
PHYS 121A	Physics II Lab	1

Students can take MATH 333 (https://catalog.njit.edu/search/?P=MATH%20333) (Probability and Statistics) instead of MATH 279 (https://catalog.njit.edu/search/?P=MATH%20279).

Engineering Electives choices: BME 385, BME 420, BME 422, BME 427, BME 430, BME 321, BME 351, BME 352, BME451, BME452, MECH 236 and BME 601, ENGR 3xx4xx, BME 491, BME 492, BME 651, BME 670, BME 671, BME 673, BME 674, BME 676, BME 678, BME 688, BME 698, OPSE 301, OPSE 310, OPSE 402, MET 304, MTEN 201.

Science Elective Choices are: CHEM 243, CHEM 244, CHEM 473, MATH 3xx/4xx, PHYS 350, PHYS 451, IE 335, IE 355, IE 449, IE 439, IE 455, MATH 661, CS 350, IE 334, IE 335, IE 447, IE 455, IE 460, IE 463.

ENGL 102	English Composition: Introduction to Writing for Research	3
	Term Credits	14
Second Year		
1st Semester		
History and Huma requirements/ger	anities GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education200-level/)	3
BME 111	Introduction to Physiology	3
BME 301	Electrical Fundamentals of Biomedical Engineering	3
BME 303	Biological and Chemical Foundations of Biomedical Engineering	3
MATH 211	Calculus III A <sup>1</sup>	3
MATH 279	Statistics and Probability for Engineers <sup>2</sup>	2
	Term Credits	17
2nd Semester		
History and Huma requirements/ger	anities GER 300+ level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education300-level/)	3
BME 210	Processing Fund for Biol Signa	3
BME 302	Mechanical Fundamentals of Biomedical Engineering	3
BME 304	Material Fundamentals of Biomedical Engineering	3
MATH 222	Differential Equations	4
ENGR 210	Career Planning Seminar for En	1
	Term Credits	17
Third Year		
1st Semester		
ENGR 310	Co-op Work Experience I	12
	Term Credits	12
2nd Semester		
MATH 337	Linear Algebra	3
BME 372	Electronics of Medical Devices	3
BME 382	Engineering Models of Physiological Systems	3
BME 386	Biosensor and Data Acquisition Lab	3
History and Huma requirements/ger	anities GER 300 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education- -300-level/)	3
	Term Credits	15
Fourth Year		
1st Semester		
ENGR 410	Co-op Work Experience II	12
	Term Credits	12
2nd Semester		
BME 333	Biomedical Signals and Systems	3
BME 383	Measurement Lab for Physiological Systems and Tissue	3
Engineering Elec		3
Engineering Elec	tive <sup>3</sup>	3
IE 492	Engineering Management	3
	Term Credits	15
Fifth Year		
1st Semester		
BME 495	Capstone Design I	2
	eering Elective 3,4	3
	eering Elective <sup>3,4</sup>	3
Engineering Elec		3
BME 471	Principles of Medical Imaging	3
	Term Credits	14

#### B.S. in Biomedical Engineering

#### 2nd Semester

BME 496	Capstone Design 2	3
Capstone HSS	S 4xx	3
BME 472	FDA Regulation of Medical Devices	3
Science and E	Engineering Elective 3,4	3
	Term Credits	12
	Total Credits	145

- Students can take MATH 213 (http://catalog.njit.edu/search/?P=MATH%20213) (Calculus III B) instead of MATH 211 (http://catalog.njit.edu/search/?P=MATH%20211).
- Students can take MATH 333 (https://catalog.njit.edu/search/?P=MATH%20333) (Probability and Statistics) instead of MATH 279 (https://catalog.njit.edu/search/?P=MATH%20333) (Probability and Statistics) instead of MATH 279 (https://catalog.njit.edu/search/?P=MATH%20279).
- Engineering Electives choices: BME 385, BME 420, BME 422, BME 427, BME 430, BME 321, BME 351, BME 352, BME451, BME452, MECH 236 and BME 601, ENGR 3xx4xx, BME 491, BME 492, BME 651, BME 670, BME 671, BME 673, BME 674, BME 676, BME 678, BME 688, BME 698, OPSE 301, OPSE 310, OPSE 402, MET 304, MTEN 201.
- Science Elective Choices are: CHEM 243, CHEM 244, CHEM 473, MATH 3xx/4xx, PHYS 350, PHYS 451, IE 335, IE 355, IE 449, IE 439, IE 455, MATH 661, CS 350, IE 334, IE 335, IE 447, IE 455, IE 460, IE 463.

#### The curriculum for B.S. in Biomedical Engineering – MEDICAL DEVICE & IMAGING CO-OP TRACK – CYCLE B

1st Semester		Credits
PHYS 111	Physics I	3
PHYS 111A	Physics I Lab	1
ENGL 101	English Composition: Introduction to Academic Writing	3
CHEM 125	General Chemistry I	3
CHEM 125A	General Chemistry Lab I	1
MATH 111	Calculus I	4
FED 101	Fundamentals of Engineering Design	2
FYS SEM	First-Year Student Seminar	0
	Term Credits	17
2nd Semester		
BME 101	Introduction to Biomedical Engineering	0
MATH 112	Calculus II	4
CHEM 126	General Chemistry II	3
PHYS 121	Physics II	3
PHYS 121A	Physics II Lab	1
ENGL 102	English Composition: Introduction to Writing for Research	3
	Term Credits	14
Second Year		
1st Semester		
History and Huma requirements/ger-	nities GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education- 200-level/)	3
BME 111	Introduction to Physiology	3
BME 301	Electrical Fundamentals of Biomedical Engineering	3
BME 303	Biological and Chemical Foundations of Biomedical Engineering	3
MATH 211	Calculus III A <sup>1</sup>	3
MATH 279	Statistics and Probability for Engineers <sup>2</sup>	2
	Term Credits	17
2nd Semester		
History and Huma requirements/ger-	inities GER 300+ level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education- 300-level/)	3
BME 210	Processing Fund for Biol Signa	3
BME 302	Mechanical Fundamentals of Biomedical Engineering	3

BME 304	Material Fundamentals of Biomedical Engineering	(
MATH 222	Differential Equations	4
	Term Credits	16
Third Year		
1st Semester		
History and Huma	nities GER 300+ level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-	;
requirements/ger-		
BME 382	Engineering Models of Physiological Systems	(
MATH 337	Linear Algebra	
BME 372	Electronics of Medical Devices	3
BME 386	Biosensor and Data Acquisition Lab	:
ENGR 210	Career Planning Seminar for En	•
	Term Credits	16
2nd Semester		
ENGR 310	Co-op Work Experience I	12
	Term Credits	12
Fourth Year		
1st Semester		
Engineering Electi	ve <sup>3</sup>	(
Engineering Electi	ve <sup>3</sup>	3
BME 333	Biomedical Signals and Systems	;
BME 383	Measurement Lab for Physiological Systems and Tissue	;
IE 492	Engineering Management	;
	Term Credits	1
2nd Semester		
ENGR 410	Co-op Work Experience II	12
	Term Credits	12
Fifth Year		
1st Semester		
BME 495	Capstone Design I	2
BME 471	Principles of Medical Imaging	3
Science or Engine	ering Elective <sup>3,4</sup>	:
Science or Engine		3
Engineering Electi		;
	Term Credits	14
2nd Semester		
BME 496	Capstone Design 2	(
Science or Engine		:
Capstone HSS 4x		;
BME 472	FDA Regulation of Medical Devices	;
	Term Credits	12

Students can take MATH 213 (http://catalog.njit.edu/search/?P=MATH%20213) (Calculus III B) instead of MATH 211 (http://catalog.njit.edu/search/?P=MATH%20211).

Students can take MATH 333 (https://catalog.njit.edu/search/?P=MATH%20333) (Probability and Statistics) instead of MATH 279 (https://catalog.njit.edu/search/?P=MATH%20279).

<sup>&</sup>lt;sup>3</sup> Engineering Electives choices: BME 385, BME 420, BME 422, BME 427, BME 430, BME 321, BME 351, BME 352, BME451, BME452, MECH 236 and BME 601, ENGR 3xx4xx, BME 491, BME 492, BME 651, BME 670, BME 671, BME 673, BME 674, BME 676, BME 678, BME 688, BME 698, OPSE 301, OPSE 310, OPSE 402, MET 304, MTEN 201.

Science Elective Choices are: CHEM 243, CHEM 244, CHEM 473, MATH 3xx/4xx, PHYS 350, PHYS 451, IE 335, IE 355, IE 449, IE 439, IE 455, MATH 661, CS 350, IE 334, IE 335, IE 447, IE 455, IE 460, IE 463.

### **Biomaterials Track**

(120 credits)

MTEN 201

**BME 385** 

**BME 383** 

**BME 422** 

**BME 420** 

**2nd Semester** IE 492

Introductory Principles of Materials Engineering

Measurement Lab for Physiological Systems and Tissue

Cell and Biomaterial Engineering Laborarory

**Term Credits** 

**Engineering Management** 

Biomaterials Characterization

Advanced Biomaterials Science

(120 credits)		
First Year		
1st Semester		Credits
PHYS 111	Physics I	3
PHYS 111A	Physics I Lab	1
ENGL 101	English Composition: Introduction to Academic Writing	3
CHEM 125	General Chemistry I	3
CHEM 125A	General Chemistry Lab I	1
MATH 111	Calculus I	4
FED 101	Fundamentals of Engineering Design	2
FYS SEM	First-Year Student Seminar	0
	Term Credits	17
2nd Semester		
ENGL 102	English Composition: Introduction to Writing for Research	3
PHYS 121	Physics II	3
PHYS 121A	Physics II Lab	1
CHEM 126	General Chemistry II	3
MATH 112	Calculus II	4
BME 101	Introduction to Biomedical Engineering	0
	Term Credits	14
Second Year		
1st Semester		
BME 303	Biological and Chemical Foundations of Biomedical Engineering	3
BME 304	Material Fundamentals of Biomedical Engineering	3
BME 111	Introduction to Physiology	3
MATH 211	Calculus III A <sup>1</sup>	3
MATH 279	Statistics and Probability for Engineers <sup>2</sup>	2
	Term Credits	14
2nd Semester		
History and Huma requirements/ger-	inities GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education- 200-level/)	3
BME 210	Processing Fund for Biol Signa	3
BME 302	Mechanical Fundamentals of Biomedical Engineering	3
MATH 222	Differential Equations	4
BME 301	Electrical Fundamentals of Biomedical Engineering	3
	Term Credits	16
Third Year		
1st Semester		
History and Huma requirements/ger-	inities GER 300+ level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-300-level/)	3
CHEM 243	Organic Chemistry I	3
BME 352	Thermal Science for Biomedical Engineering	3

3

3

15

3

3

3

3

History and Humanities GER 300 (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-

3 requirements/ger-300-level/) **Term Credits** 15 Fourth Year 1st Semester **BME 430** 3 Fundamentals of Tissue Engineering **BME 382** Engineering Models of Physiological Systems 3 Science or Engineering Elective 3,4 3 Science or Engineering Elective 3,4 3 Capstone Design I **BME 495** 2 **Term Credits** 14 2nd Semester **BME 427** 3 Biotransport Engineering Elective <sup>3</sup> 3 Engineering Elective 3 3 **BME 496** 3 Capstone Design 2 Humanities and Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/ 3 general-education-requirements/hss-capstone/) **Term Credits** 15 **Total Credits** 120

#### The curriculum for B.S. in Biomedical Engineering - BIOMATERIALS CO-OP TRACK - CYCLE A

1st Semester		Credits
PHYS 111	Physics I	3
PHYS 111A	Physics I Lab	1
ENGL 101	English Composition: Introduction to Academic Writing	3
CHEM 125	General Chemistry I	3
CHEM 125A	General Chemistry Lab I	1
MATH 111	Calculus I	4
FED 101	Fundamentals of Engineering Design	2
FYS SEM	First-Year Student Seminar	0
	Term Credits	17
2nd Semester		
ENGL 102	English Composition: Introduction to Writing for Research	3
PHYS 121	Physics II	3
PHYS 121A	Physics II Lab	1
CHEM 126	General Chemistry II	3
MATH 112	Calculus II	4
BME 101	Introduction to Biomedical Engineering	0
	Term Credits	14

Students can take MATH 213 (http://catalog.njit.edu/search/?P=MATH%20213) (Calculus III B) instead of MATH 211 (http://catalog.njit.edu/ search/?P=MATH%20211).

Students can take MATH 333 (https://catalog.njit.edu/search/?P=MATH%20333) (Probability and Statistics) instead of MATH 279 (https:// catalog.njit.edu/search/?P=MATH%20279).

Engineering Electives choices: BME 372, BME 333, BME 386, BME 471, BME 472, BME 321, BME 351, BME 352, BME451, BME 452, MECH 236 and BME 601, ENGR 3xx4xx, BME 491, BME 492, BME 651, BME 670, BME 671, BME 673, BME 674, BME 676, BME 678, BME 688, BME 698, OPSE 301, OPSE 310, OPSE 402, MET 304.

Science Elective Choices are: CHEM 244, CHEM 473, MATH 3xx/4xx, PHYS 350, PHYS 451, IE 335, IE 355, IE 449, IE 439, IE 455, MATH 661, CS 350, IE 334, IE 335, IE 447, IE 455, IE 460, IE 463.

#### Second Year 1st Semester **BME 303** Biological and Chemical Foundations of Biomedical Engineering 3 **BME 304** Material Fundamentals of Biomedical Engineering 3 Introduction to Physiology 3 **BME 111 MATH 211** Calculus III A 1 3 Statistics and Probability for Engineers <sup>2</sup> **MATH 279** 2 **Term Credits** 14 2nd Semester History and Humanities GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-3 requirements/ger-200-level/) **BME 210** Processing Fund for Biol Signa 3 **BME 302** Mechanical Fundamentals of Biomedical Engineering 3 4 **MATH 222** Differential Equations **BME 301** Electrical Fundamentals of Biomedical Engineering 3 **ENGR 210** 1 Career Planning Seminar for En **Term Credits** 17 **Third Year** 1st Semester **ENGR 310** Co-op Work Experience I 12 **Term Credits** 12 2nd Semester History and Humanities GER 300 (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-3 requirements/ger-300-level/) **BME 352** Thermal Science for Biomedical Engineering 3 **MTEN 201** Introductory Principles of Materials Engineering 3 **CHEM 243** Organic Chemistry I 3 Cell and Biomaterial Engineering Laborarory **BME 385** 3 Term Credits 15 Fourth Year 1st Semester **ENGR 410** Co-op Work Experience II 12 **Term Credits** 12 2nd Semester 3 Humanities and Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/ general-education-requirements/hss-capstone/) Engineering Models of Physiological Systems 3 **BME 382** IE 492 **Engineering Management** 3 **BME 420** Advanced Biomaterials Science 3 **BME 422** Biomaterials Characterization 3 **Term Credits** 15 Fifth Year 1st Semester **BME 495** Capstone Design I 2 **BME 383** Measurement Lab for Physiological Systems and Tissue 3 **BME 430** Fundamentals of Tissue Engineering 3 Science or Engineering Elective 3,4 3 Science or Engineering Elective 3,4 3 **Term Credits** 14 2nd Semester **BME 496** Capstone Design 2 3 **BME 427** Biotransport 3

Total Credits	145
Term Credits	15
Humanities and Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/)	3
Engineering Elective <sup>3</sup>	3
Engineering Elective <sup>3</sup>	3

- Students can take MATH 213 (http://catalog.njit.edu/search/?P=MATH%20213) (Calculus III B) instead of MATH 211 (http://catalog.njit.edu/search/?P=MATH%20211).
- Students can take MATH 333 (https://catalog.njit.edu/search/?P=MATH%20333) (Probability and Statistics) instead of MATH 279 (https://catalog.njit.edu/search/?P=MATH%20279).
- Engineering Electives choices: BME 372, BME 333, BME 386, BME 471, BME 472, BME 321, BME 351, BME 352, BME451, BME 452, MECH 236 and BME 601, ENGR 3xx4xx, BME 491, BME 492, BME 651, BME 670, BME 671, BME 673, BME 674, BME 676, BME 678, BME 688, BME 698, OPSE 301, OPSE 310, OPSE 402, MET 304.
- Science Elective Choices are: CHEM 244, CHEM 473, MATH 3xx/4xx, PHYS 350, PHYS 451, IE 335, IE 355, IE 449, IE 439, IE 455, MATH 661, CS 350, IE 334, IE 335, IE 447, IE 455, IE 460, IE 463.

#### The curriculum for B.S. in Biomedical Engineering – BIOMATERIALS CO-OP TRACK – CYCLE B

First Year		
1st Semester		Credits
PHYS 111	Physics I	3
PHYS 111A	Physics I Lab	1
ENGL 101	English Composition: Introduction to Academic Writing	3
CHEM 125	General Chemistry I	3
CHEM 125A	General Chemistry Lab I	1
MATH 111	Calculus I	4
FED 101	Fundamentals of Engineering Design	2
FYS SEM	First-Year Student Seminar	0
	Term Credits	17
2nd Semester		
ENGL 102	English Composition: Introduction to Writing for Research	3
PHYS 121	Physics II	3
PHYS 121A	Physics II Lab	1
CHEM 126	General Chemistry II	3
MATH 112	Calculus II	4
BME 101	Introduction to Biomedical Engineering	0
	Term Credits	14
Second Year		
1st Semester		
BME 303	Biological and Chemical Foundations of Biomedical Engineering	3
BME 304	Material Fundamentals of Biomedical Engineering	3
BME 111	Introduction to Physiology	3
MATH 211	Calculus III A <sup>1</sup>	3
MATH 279	Statistics and Probability for Engineers <sup>2</sup>	2
	Term Credits	14
2nd Semester		
History and Humar requirements/ger-2	nities GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-lo0-level/)	3
BME 210	Processing Fund for Biol Signa	3
BME 302	Mechanical Fundamentals of Biomedical Engineering	3
MATH 222	Differential Equations	4
BME 301	Electrical Fundamentals of Biomedical Engineering	3

ENGR 210	Career Planning Seminar for En	
	Term Credits	17
Third Year		
1st Semester		
History and Hum requirements/ge	anities GER 300+ level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education- -300-level/)	;
CHEM 243	Organic Chemistry I	;
BME 352	Thermal Science for Biomedical Engineering	3
MTEN 201	Introductory Principles of Materials Engineering	;
BME 385	Cell and Biomaterial Engineering Laborarory	;
	Term Credits	15
2nd Semester		
ENGR 310	Co-op Work Experience I	12
	Term Credits	12
Fourth Year		
1st Semester		
BME 382	Engineering Models of Physiological Systems	(
IE 492	Engineering Management	(
BME 420	Advanced Biomaterials Science	(
BME 422	Biomaterials Characterization	;
History and Hum requirements/ge	anities GER 300 (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education300-level/)	;
	Term Credits	15
2nd Semester		
ENGR 410	Co-op Work Experience II	12
	Term Credits	12
Fifth Year		
1st Semester		
BME 495	Capstone Design I	2
BME 383	Measurement Lab for Physiological Systems and Tissue	3
BME 430	Fundamentals of Tissue Engineering	(
Science or Engir	eering Elective <sup>3,4</sup>	;
Science or Engir	eering Elective <sup>3,4</sup>	;
	Term Credits	14
2nd Semester		
BME 496	Capstone Design 2	(
BME 427	Biotransport	;
Engineering Elec		;
Engineering Elec		(
	Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/	(
	n-requirements/hss-capstone/)	
	Term Credits	1:
	Total Credits	145

Students can take MATH 213 (http://catalog.njit.edu/search/?P=MATH%20213) (Calculus III B) instead of MATH 211 (http://catalog.njit.edu/search/?P=MATH%20211).

Students can take MATH 333 (https://catalog.njit.edu/search/?P=MATH%20333) (Probability and Statistics) instead of MATH 279 (https://catalog.njit.edu/search/?P=MATH%20279).

Engineering Electives choices: BME 372, BME 333, BME 386, BME 471, BME 472, BME 321, BME 351, BME 352, BME451, BME 452, MECH 236 and BME 601, ENGR 3xx4xx, BME 491, BME 492, BME 651, BME 670, BME 671, BME 673, BME 674, BME 676, BME 678, BME 688, BME 698, OPSE 301, OPSE 310, OPSE 402, MET 304.

Science Elective Choices are: CHEM 244, CHEM 473, MATH 3xx/4xx, PHYS 350, PHYS 451, IE 335, IE 355, IE 449, IE 439, IE 455, MATH 661, CS 350, IE 334, IE 335, IE 447, IE 455, IE 460, IE 463.

# **Biomechanics Track**

(120 credits)

(120 credits)		
First Year		
1st Semester		Credits
ENGL 101	English Composition: Introduction to Academic Writing	3
PHYS 111	Physics I	3
PHYS 111A	Physics I Lab	1
CHEM 125	General Chemistry I	3
CHEM 125A	General Chemistry Lab I	1
MATH 111	Calculus I	4
FED 101	Fundamentals of Engineering Design	2
FYS SEM	First-Year Student Seminar	0
	Term Credits	17
2nd Semester		
ENGL 102	English Composition: Introduction to Writing for Research	3
PHYS 121	Physics II	3
PHYS 121A	Physics II Lab	1
CHEM 126	General Chemistry II	3
MATH 112	Calculus II	4
BME 101	Introduction to Biomedical Engineering	0
	Term Credits	14
Second Year		
1st Semester		
History and Human	nities GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-	3
requirements/ger-2	200-level/)	
BME 111	Introduction to Physiology	3
MATH 211	Calculus III A <sup>1</sup>	3
BME 210	Processing Fund for Biol Signa	3
BME 302	Mechanical Fundamentals of Biomedical Engineering	3
MATH 279	Statistics and Probability for Engineers <sup>2</sup>	2
	Term Credits	17
2nd Semester		
History and Human requirements/ger-3	nities GER 300+ level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-300-level/)	3
BME 304	Material Fundamentals of Biomedical Engineering	3
BME 301	Electrical Fundamentals of Biomedical Engineering	3
BME 303	Biological and Chemical Foundations of Biomedical Engineering	3
MATH 222	Differential Equations	4
	Term Credits	16
Third Year		
1st Semester		
History and Human requirements/ger-3	nities GER 300+ level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-300-level/)	3
BME 382	Engineering Models of Physiological Systems	3
BME 321	Adv Mechanics for Biomed Engr	3
MATH 337	Linear Algebra	3
MECH 236	Dynamics	2
	Term Credits	14
2nd Semester		
BME 351	Introduction to Biofluid Mechanics	3
BME 384	Biomechanics Laboratory	3

BME 478	Introduction to CAD for Biomechanics	4
IE 492	Engineering Management	3
Science or Engi	neering Elective <sup>3,4</sup>	3
	Term Credits	16
Fourth Year		
1st Semester		
Science or Engi	neering Elective <sup>3,4</sup>	3
BME 451	Biomechanics I	3
BME 495	Capstone Design I	2
BME 383	Measurement Lab for Physiological Systems and Tissue	3
Engineering Ele	octive <sup>3</sup>	3
	Term Credits	14
2nd Semester		
BME 452	Mechanical Behavior and Performance of Biomaterials	3
BME 496	Capstone Design 2	3
Engineering Ele	octive <sup>3</sup>	3
	Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/on-requirements/hss-capstone/)	3
	Term Credits	12
	Total Credits	120

- Students can take MATH 213 (http://catalog.njit.edu/search/?P=MATH%20213) (Calculus III B) instead of MATH 211 (http://catalog.njit.edu/search/?P=MATH%20211).
- Students can take MATH 333 (https://catalog.njit.edu/search/?P=MATH%20333) (Probability and Statistics) instead of MATH 279 (https://catalog.njit.edu/search/?P=MATH%20279).
- Engineering Electives Choices: BME 372, BME 333, BME 386, BME 471, BME 472, BME 385, BME 420, BME 422, BME 427, BME 430, ENGR 3xx4xx, BME 491, BME 492, BME 651, BME 670, BME 671, BME 673, BME 674, BME 676, BME 678, BME 688, BME 698, OPSE 301, OPSE 310, OPSE 402, MET 304, MTEN 201.
- Science Elective Choices are: CHEM 243, CHEM 244, CHEM 473, MATH 3xx/4xx, PHYS 350, PHYS 451, IE 335, IE 355, IE 449, IE 439, IE 455, MATH 661, CS 350, IE 334, IE 335, IE 447, IE 455, IE 460, IE 463.

#### The curriculum for B.S. in Biomedical Engineering – BIOMECHANICS CO-OP TRACK– CYCLE A

1st Semester		Credits
ENGL 101	English Composition: Introduction to Academic Writing	3
PHYS 111	Physics I	3
PHYS 111A	Physics I Lab	1
CHEM 125	General Chemistry I	3
CHEM 125A	General Chemistry Lab I	1
MATH 111	Calculus I	4
FED 101	Fundamentals of Engineering Design	2
FYS SEM	First-Year Student Seminar	0
	Term Credits	17
2nd Semester		
ENGL 102	English Composition: Introduction to Writing for Research	3
PHYS 121	Physics II	3
PHYS 121A	Physics II Lab	1
CHEM 126	General Chemistry II	3
MATH 112	Calculus II	4
BME 101	Introduction to Biomedical Engineering	0
	Term Credits	14

3

Second Year		
1st Semester		
History and Human requirements/ger-2	ities GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education- 00-level/)	3
BME 111	Introduction to Physiology	3
BME 301	Electrical Fundamentals of Biomedical Engineering	3
BME 303	Biological and Chemical Foundations of Biomedical Engineering	3
MATH 211	Calculus III A <sup>1</sup>	3
MATH 279	Statistics and Probability for Engineers <sup>2</sup>	2
	Term Credits	17
2nd Semester		
History and Human requirements/ger-3	ities GER 300+ level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education- 00-level/)	3
BME 210	Processing Fund for Biol Signa	3
BME 302	Mechanical Fundamentals of Biomedical Engineering	3
BME 304	Material Fundamentals of Biomedical Engineering	3
MATH 222	Differential Equations	4
ENGR 210	Career Planning Seminar for En	1
	Term Credits	17
Third Year		
1st Semester		
ENGR 310	Co-op Work Experience I	12
	Term Credits	12
2nd Semester		
MATH 337	Linear Algebra	3
MECH 236	Dynamics	2
BME 321	Adv Mechanics for Biomed Engr	3
Science or Enginee	ering Electives <sup>3,4</sup>	3
History and Human requirements/ger-3	ities GER 300+ level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education- 00-level/)	3
	Term Credits	14
Fourth Year		
1st Semester		
ENGR 410	Co-op Work Experience II	12
	Term Credits	12
2nd Semester		
BME 351	Introduction to Biofluid Mechanics	3
BME 382	Engineering Models of Physiological Systems	3
BME 384	Biomechanics Laboratory	3
BME 478	Introduction to CAD for Biomechanics	4
IE 492	Engineering Management	3
	Term Credits	16
Fifth Year		
1st Semester		
BME 383	Measurement Lab for Physiological Systems and Tissue	3
BME 451	Biomechanics I	3
BME 495	Capstone Design I	2
Science or Enginee	ering Elective <sup>3,4</sup>	3
Engineering Electiv		3
	Term Credits	14
2nd Semester		
D. 15 100		_

BME 496

Capstone Design 2

	Total Credits	145
	Term Credits	12
	d Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/tion-requirements/hss-capstone/)	3
Engineering Elective <sup>3</sup>		
BME 452	Mechanical Behavior and Performance of Biomaterials	3

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- Students can take MATH 333 (https://catalog.njit.edu/search/?P=MATH%20333) (Probability and Statistics) instead of MATH 279 (https://catalog.njit.edu/search/?P=MATH%20333) (Probability and Statistics) instead of MATH 279 (https://catalog.njit.edu/search/?P=MATH%20279).
- Engineering Electives Choices: BME 372, BME 333, BME 386, BME 471, BME 472, BME 385, BME 420, BME 422, BME 427, BME 430, ENGR 3xx4xx, BME 491, BME 492, BME 651, BME 670, BME 671, BME 673, BME 674, BME 676, BME 678, BME 688, BME 698, OPSE 301, OPSE 310, OPSE 402, MET 304, MTEN 201.
- Science Elective Choices are: CHEM 243, CHEM 244, CHEM 473, MATH 3xx/4xx, PHYS 350, PHYS 451, IE 335, IE 355, IE 449, IE 439, IE 455, MATH 661, CS 350, IE 334, IE 335, IE 447, IE 455, IE 460, IE 463.

#### The curriculum for B.S. in Biomedical Engineering – BIOMECHANICS CO-OP TRACK – CYCLE B

First Year		
1st Semester		Credits
ENGL 101	English Composition: Introduction to Academic Writing	
PHYS 111	Physics I	3
PHYS 111A	Physics I Lab	1
CHEM 125	General Chemistry I	3
CHEM 125A	General Chemistry Lab I	1
MATH 111	Calculus I	4
FED 101	Fundamentals of Engineering Design	2
FYS SEM	First-Year Student Seminar	0
	Term Credits	17
2nd Semester		
ENGL 102	English Composition: Introduction to Writing for Research	3
PHYS 121	Physics II	3
PHYS 121A	Physics II Lab	1
CHEM 126	General Chemistry II	3
MATH 112	Calculus II	4
BME 101	Introduction to Biomedical Engineering	0
	Term Credits	14
Second Year		
1st Semester		
History and Humani requirements/ger-20	ties GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education- 00-level/)	3
BME 111	Introduction to Physiology	3
BME 301	Electrical Fundamentals of Biomedical Engineering	3
BME 303	Biological and Chemical Foundations of Biomedical Engineering	3
MATH 211	Calculus III A <sup>1</sup>	3
MATH 279	Statistics and Probability for Engineers <sup>2</sup>	2
	Term Credits	17
2nd Semester		
History and Humani requirements/ger-30	ties GER 300+ level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education- 00-level/)	3
BME 210	Processing Fund for Biol Signa	3
BME 302	Mechanical Fundamentals of Biomedical Engineering	3
BME 304	Material Fundamentals of Biomedical Engineering	3

	Total Credits	146
	Term Credits	12
	n-requirements/hss-capstone/)	J
	Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/	3
Engineering Elect		3
BME 452	Mechanical Behavior and Performance of Biomaterials	3
2nd Semester BME 496	Capstone Design 2	3
2nd Composter	Term Credits	14
Engineering Elect		3
Engineering Elect		
	Capstone Design I  eering Electibe <sup>3,4</sup>	3
BME 495		
BME 451	Biomechanics I	3
BME 383	Measurement Lab for Physiological Systems and Tissue	2
1st Semester		
Fifth Year	Term Orealis	12
LINGIN 410	Term Credits	12
ENGR 410	Co-op Work Experience II	12
2nd Semester	Term Oreans	10
12 702	Term Credits	16
IE 492	Engineering Management	3
BME 478	Introduction to CAD for Biomechanics	4
BME 384	Biomechanics Laboratory	3
BME 382	Engineering Models of Physiological Systems	3
BME 351	Introduction to Biofluid Mechanics	3
1st Semester		
Fourth Year	Term Oreans	12
LINGICOTO	Term Credits	12
ENGR 310	Co-op Work Experience I	12
2nd Semester	Tom Ordano	13
. Squii omorito, gor	Term Credits	15
History and Huma requirements/ger-	anities GER 300+ level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-	3
Science or Engine		3
BME 321	Adv Mechanics for Biomed Engr	3
MECH 236	Dynamics	2
MATH 337	Linear Algebra	3
ENGR 210	Career Planning Seminar for En	1
1st Semester		
Third Year		
	Term Credits	17
ENGR 210	Career Planning Seminar for En	1
MATH 222	Differential Equations	4

Students can take MATH 213 (http://catalog.njit.edu/search/?P=MATH%20213) (Calculus III B) instead of MATH 211 (http://catalog.njit.edu/search/?P=MATH%20211).

Students can take MATH 333 (https://catalog.njit.edu/search/?P=MATH%20333) (Probability and Statistics) instead of MATH 279 (https://catalog.njit.edu/search/?P=MATH%20279).

<sup>&</sup>lt;sup>3</sup> Engineering Electives Choices: BME 372, BME 333, BME 386, BME 471, BME 472, BME 385, BME 420, BME 422, BME 427, BME 430, ENGR 3xx4xx, BME 491, BME 492, BME 651, BME 670, BME 671, BME 673, BME 674, BME 676, BME 678, BME 688, BME 698, OPSE 301, OPSE 310, OPSE 402, MET 304, MTEN 201.

Science Elective Choices are: CHEM 243, CHEM 244, CHEM 473, MATH 3xx/4xx, PHYS 350, PHYS 451, IE 335, IE 355, IE 449, IE 439, IE 455, MATH 661, CS 350, IE 334, IE 335, IE 447, IE 455, IE 460, IE 463.

# **Pre-Health Option**

Students planning to apply to Medical and Dental schools will follow one of the above tracks with specific selections and substitutions to fulfill Medical School admissions guidelines.

The following should be taken as Advanced Science Electives:

Code	Title	Credits
CHEM 473	Biochemistry	3
CHEM 244	Organic Chemistry II	3
CHEM 244A	Organic Chemistry I Laboratory	2

The following should be taken as History and Humanities GER courses:

Code	Title	Credits
STS 221	Introduction to Sociology	3
PSY 359	Foundations of Cyberpsychology	3

The following will substitute for BME 303:

Code	Title	Credits
BIOL 201	Found of Biol: Cell & Molecula (Lecture)	3
or R120 201	Foundations Of Biology	
BIOL 202	Found of Biol: Cell & Molecula (Lab)	1
or R120 202	Foundations Of Biology Lab	

General Education Requirements "Refer to the General Education Requirements for specific information for GER courses"