

B.S./M.S. FIVE-YEAR PROGRAM IN BIOMEDICAL ENGINEERING

Overview

The Department of Biomedical Engineering offers a dual-degree program that culminates with students receiving both Bachelor of Science and Master of Science (BS/MS) in Biomedical Engineering concurrently. This program is available only to qualified students enrolled in the undergraduate program in Biomedical Engineering at the University of Miami. This program is intended to give qualified Biomedical Engineering students the opportunity to acquire both a baccalaureate degree (BSBE) and a Master of Science (MSBE) degree in five years rather than the 4 plus 2 years (approximately) that is traditionally expected. The two degrees are awarded simultaneously when the combined requirements have been met for both degrees.

- Juniors from any of the four BME Concentrations who have maintained at least a 3.0 CGPA have the option to apply for admission to the combined BS-MS in Biomedical Engineering program.
- Those who are accepted into this accelerated program must maintain at least a 3.0 CGPA and a minimum of a 3.0 GPA for the final 30 credit hours to meet the requirements of the Graduate School.
- Up to 6 credit hours of Technical electives earned during the fourth year can be counted toward the 30 credit hours required for the MS degree. If their schedule allows, students may be able to complete an additional 6 credits of graduate classes during their fourth year.
- Students must be registered for a minimum of 12 undergraduate credit hours per semester in their fourth year.
- Students can register for a maximum of 6 graduate credit hours in each semester of their fourth year.
- If a student needs to withdraw from the BS/MS BME program then all the requirements for the specific BS BME Concentration must be completed for graduation with the BS BME degree.

Admission Requirements

The dual BS/MS program is available only to qualified undergraduate students enrolled in the Department of Biomedical Engineering, in any of the four Concentrations (Electrical, Mechanical, Biomaterials and Tissue, PreMed). Typically, students must have undergraduate student status and a cumulative G.P.A. of at least 3.0 at the time of application.

Qualified students must apply prior to the beginning of final exams in the second semester of their junior year. Students are strongly advised to apply to the BS/MS program as early as possible in their junior year to facilitate academic advising and course selection in the second semester of their junior year. Before submitting an application, interested students should discuss the program and the possibility of entering the program with an academic advisor.

Curriculum Guidelines

In the dual-degree BS/MS program in the Department of Biomedical Engineering, the first four years of the curriculum are altered as follows:

- In the senior year, up to two 3-credit Undergraduate Technical Electives can be replaced with 3-credit Graduate Technical Electives
- If their schedule allows, students may be able to register for an additional 6 credits of Graduate Technical Electives in the senior year.

In the fifth year, BS/MS students complete their graduate course requirements, including completion of the MS Project (BME 706). Students in the BS/MS program must also complete exactly two physiology courses chosen from BME 601, BME 602, BME 603 BME 601, BME 602, BME 603 as part of their graduate requirements.

Graduate Technical Electives taken in the senior year must be chosen from the BME graduate course offerings, with the approval of their academic advisor. The credits of Graduate Technical Electives completed in the fourth year are counted toward the 30 credits required for the MS degree.

Students admitted in the dual degree BS/MS program can take a maximum of six (6) graduate credits per semester in their senior year, for a maximum of twelve (12) graduate credits per year, without incurring additional costs if they are full-time undergraduate students during this period. Students should register for courses towards their graduate degree as "G" credits and not as "U" credits. These registrations must be completed prior to taking courses. Retroactive add/drops will not be processed.

To register for graduate credits during their senior year, students must be in senior status and must complete and submit the Graduate School's Application for Undergraduates to Take Graduate Coursework (<https://www.grad.miami.edu/policies-and-forms/forms/>) form. This form must accompany the Add/Drop and/or Course Request form to ensure that students are registered with the correct registration status.

In the Senior year, students must be registered for a minimum of 12 undergraduate credits each semester to maintain full-time status as an undergraduate student. After completing the senior year, students must register as graduate students.

Graduation Requirements

Students accepted into the dual degree program must maintain at least a 3.0 Cumulative GPA, and meet all other pertinent Graduate School requirements, including a minimum of 3.0 GPA in the credits applied toward the MS degree.

Curriculum Requirements

BSBE/MSBE (Biomaterials and Tissue Concentration)

Students in the BSBE Biomaterials and Tissue concentration are required to complete the following courses for the dual degree:

Code	Title	Credit Hours
BSBE REQUIREMENTS		
Engineering Courses		
BME 111	Introduction to Engineering I	3
BME 112	Introduction to Biomedical Engineering	2
BME 211	Introduction to Programming for Biomedical Engineers	3
BME 266	Human Physiology Laboratory	1
BME 302	Cellular Engineering	3
BME 303	Cell Engineering Lab	1
BME 310	Mathematical Analysis in Biomedical Engineering	3
BME 330	Foundations of Medical Imaging	3
BME 335	Biomaterials	3
BME 375	Fundamentals of Biomechanics	3
BME 401	Biomedical Design	3
BME 402	Senior Design I	2
BME 403	Senior Design II	1
BME 440	Biomedical Measurements	4
BME 450	Biomedical Transport Phenomena	3
BME 470	Biomedical Signal Analysis	3
BME 480	Biomedical Instrumentation	3
BME 512	Regulatory Control of Biomedical Devices	3
BME 535	Advanced Biomaterials	3
BME 565	Principles of Cellular and Tissue Engineering	3
BME 567	Tissue Engineering Lab	1
ECE 201	Electrical Circuit Theory	3
Math and Science Courses		
BIL 150	General Biology	4
BIL 151	General Biology Laboratory	1
BME 265	Medical Systems Physiology	3
BME 312	Biomedical Statistics and Data Analysis	3
CHM 121	Principles of Chemistry	4
CHM 113	Chemistry Laboratory I	1
CHM 205	Chemical Dynamics Laboratory	1
CHM 221	Introduction to Structure and Dynamics	4
MTH 151	Calculus I for Engineers	5
MTH 162	Calculus II	4
MTH 311	Introduction to Ordinary Differential Equations	3
PHY 221	University Physics I	3
PHY 222	University Physics II	3
PHY 223	University Physics III	3
PHY 224	University Physics II Lab	1
PHY 225	University Physics III Lab	1
Additional Requirements		
ENG 105	English Composition I	3

ENG 107	English Composition II: Science and Technology	3
Arts and Humanities Cognate		9
People and Society Cognate		9
MSBE REQUIREMENTS		
Technical electives taken as graduate courses		6
Two physiology courses chosen from BME 601, BME 602, BME 603		6
BME 706	Master's Project	3
Five additional graduate courses		15
Total Credit Hours		155

Curriculum Requirements

BSBE/MSBE (Electrical Concentration)

Students in the BSBE Electrical concentration are required to complete the following courses for the dual degree:

Code	Title	Credit Hours
BSBE REQUIREMENTS		
Engineering Courses		
BME 111	Introduction to Engineering I	3
BME 112	Introduction to Biomedical Engineering	2
BME 211	Introduction to Programming for Biomedical Engineers	3
BME 266	Human Physiology Laboratory	1
BME 310	Mathematical Analysis in Biomedical Engineering	3
BME 330	Foundations of Medical Imaging	3
BME 335	Biomaterials	3
BME 375	Fundamentals of Biomechanics	3
BME 401	Biomedical Design	3
BME 402	Senior Design I	2
BME 403	Senior Design II	1
BME 440	Biomedical Measurements	4
BME 450	Biomedical Transport Phenomena	3
BME 470	Biomedical Signal Analysis	3
BME 480	Biomedical Instrumentation	3
BME 507	LabView Applications for Biomedical Engineering	1
BME 512	Regulatory Control of Biomedical Devices	3
BME 540	Microcomputer-Based Medical Instrumentation	3
BME 541	Medical Electronic Systems Laboratory	2
ECE 201	Electrical Circuit Theory	3
ECE 202	Electronics I	3
ECE 203	Electrical Circuits Laboratory	1
ECE 211	Logic Design	3
ECE 315	Digital Design Laboratory	1
Technical Elective Lab		1
Math and Science Courses		
BIL 150	General Biology	4
BIL 151	General Biology Laboratory	1
BME 265	Medical Systems Physiology	3
BME 312	Biomedical Statistics and Data Analysis	3
CHM 121	Principles of Chemistry	4
CHM 113	Chemistry Laboratory I	1
MTH 151	Calculus I for Engineers	5
MTH 162	Calculus II	4
MTH 311	Introduction to Ordinary Differential Equations	3

PHY 221	University Physics I	3
PHY 222	University Physics II	3
PHY 223	University Physics III	3
PHY 224	University Physics II Lab	1
PHY 225	University Physics III Lab	1
Additional Requirements		
ENG 105	English Composition I	3
ENG 107	English Composition II: Science and Technology	3
Arts and Humanities Cognate		9
People and Society Cognate		9
MSBE REQUIREMENTS		
Technical electives taken as graduate courses		6
Two physiology courses chosen from BME 601, BME 602, BME 603		6
BME 706	Master's Project	3
Five additional graduate courses		15
Total Credit Hours		154

Curriculum Requirements

BSBE/MSBE (Mechanical Concentration)

Students in the BSBE Mechanical concentration are required to complete the following courses for the dual degree:

Code	Title	Credit Hours
BSBE REQUIREMENTS		
Engineering Courses		
BME 111	Introduction to Engineering I	3
BME 112	Introduction to Biomedical Engineering	2
BME 211	Introduction to Programming for Biomedical Engineers	3
BME 266	Human Physiology Laboratory	1
BME 303 or ECE 303	Cell Engineering Lab Electronics Laboratory	1
BME 310	Mathematical Analysis in Biomedical Engineering	3
BME 330	Foundations of Medical Imaging	3
BME 335	Biomaterials	3
BME 375	Fundamentals of Biomechanics	3
BME 401	Biomedical Design	3
BME 402	Senior Design I	2
BME 403	Senior Design II	1
BME 440	Biomedical Measurements	4
BME 450	Biomedical Transport Phenomena	3
BME 460	Introduction to Physiological Fluid Mechanics	3
BME 470	Biomedical Signal Analysis	3
BME 480	Biomedical Instrumentation	3
BME 506	Computer Aided Design in Biomedical Engineering	1
BME 512	Regulatory Control of Biomedical Devices	3
BME 575	Tissue Mechanics	3
ECE 201	Electrical Circuit Theory	3
CAE 210	Mechanics of Solids I	3
MAE 202	Dynamics	3
Technical Elective Lab		1
Math and Science Courses		
BIL 150	General Biology	4
BIL 151	General Biology Laboratory	1

BME 265	Medical Systems Physiology	3
BME 312	Biomedical Statistics and Data Analysis	3
CHM 121	Principles of Chemistry	4
CHM 113	Chemistry Laboratory I	1
MTH 151	Calculus I for Engineers	5
MTH 162	Calculus II	4
MTH 311	Introduction to Ordinary Differential Equations	3
PHY 221	University Physics I	3
PHY 222	University Physics II	3
PHY 223	University Physics III	3
PHY 224	University Physics II Lab	1
PHY 225	University Physics III Lab	1
Additional Requirements		
ENG 105	English Composition I	3
ENG 107	English Composition II: Science and Technology	3
Arts and Humanities Cognate		9
People and Society Cognate		9
MSBE REQUIREMENTS		
Technical electives taken as graduate courses		6
Two physiology courses chosen from BME 601, BME 602, BME 603		6
BME 706	Master's Project	3
Five additional graduate courses		15
Total Credit Hours		154

Curriculum Requirements

BSBE/MSBE (Pre-Med Concentration)

Students in the BSBE Pre-Med concentration are required to complete the following courses for the dual degree:

Code	Title	Credit Hours
BSBE REQUIREMENTS		
Engineering Courses		
BME 111	Introduction to Engineering I	3
BME 112	Introduction to Biomedical Engineering	2
BME 211	Introduction to Programming for Biomedical Engineers	3
BME 266	Human Physiology Laboratory	1
BME 303	Cell Engineering Lab	1
BME 310	Mathematical Analysis in Biomedical Engineering	3
BME 330	Foundations of Medical Imaging	3
BME 335	Biomaterials	3
BME 375	Fundamentals of Biomechanics	3
BME 401	Biomedical Design	3
BME 402	Senior Design I	2
BME 403	Senior Design II	1
BME 440	Biomedical Measurements	4
BME 450	Biomedical Transport Phenomena	3
BME 470	Biomedical Signal Analysis	3
BME 480	Biomedical Instrumentation	3
BME 512	Regulatory Control of Biomedical Devices	3
ECE 201	Electrical Circuit Theory	3
Advanced Bioscience Elective		6
Technical Elective Lab		1
Technical or Science Lab Elective		1

Math and Science Courses		
BIL 150	General Biology	4
BIL 151	General Biology Laboratory	1
BIL 160	Evolution and Biodiversity	4
BIL 161	Evolution and Biodiversity Laboratory	1
BME 265	Medical Systems Physiology	3
BME 312	Biomedical Statistics and Data Analysis	3
CHM 113	Chemistry Laboratory I	1
CHM 121	Principles of Chemistry	4
CHM 205	Chemical Dynamics Laboratory	1
CHM 221	Introduction to Structure and Dynamics	4
MTH 151	Calculus I for Engineers	5
MTH 162	Calculus II	4
MTH 311	Introduction to Ordinary Differential Equations	3
PHY 221	University Physics I	3
PHY 222	University Physics II	3
PHY 223	University Physics III	3
PHY 224	University Physics II Lab	1
PHY 225	University Physics III Lab	1
Additional Requirements		
ENG 105	English Composition I	3
ENG 107	English Composition II: Science and Technology	3
Arts and Humanities Cognate		9
People and Society Cognate		9
MSBE REQUIREMENTS		
Technical electives taken as graduate courses		3
Two physiology courses chosen from BME 601, BME 602, BME 603		6
BME 706	Master's Project	3
Six additional graduate courses		18
Total Credit Hours		158

Suggested Plan of Study

Biomaterials and Tissue Concentration

Freshman Year		
Fall		Credit Hours
BME 111	Introduction to Engineering I	3
ENG 105	English Composition I	3
MTH 151	Calculus I for Engineers	5
PHY 221	University Physics I	3
PS Cognate ¹		3
Credit Hours		17
Spring		
BME 112	Introduction to Biomedical Engineering	2
CHM 121	Principles of Chemistry	4
CHM 113	Chemistry Laboratory I	1
ENG 107	English Composition II: Science and Technology	3
MTH 162	Calculus II	4
PHY 222	University Physics II	3
PHY 224	University Physics II Lab	1
Credit Hours		18

Sophomore Year		
Fall		
BIL 150	General Biology	4
BIL 151	General Biology Laboratory	1
BME 302	Cellular Engineering	3
BME 303	Cell Engineering Lab	1
ECE 201	Electrical Circuit Theory	3
MTH 311	Introduction to Ordinary Differential Equations	3
PHY 223	University Physics III	3
Credit Hours		18
Spring		
BME 211	Introduction to Programming for Biomedical Engineers	3
BME 265	Medical Systems Physiology	3
BME 266	Human Physiology Laboratory	1
CHM 221	Introduction to Structure and Dynamics	4
CHM 205	Chemical Dynamics Laboratory	1
BME 310	Mathematical Analysis in Biomedical Engineering	3
PHY 225	University Physics III Lab	1
Credit Hours		16
Junior Year		
Fall		
BME 312	Biomedical Statistics and Data Analysis	3
BME 330	Foundations of Medical Imaging	3
BME 335	Biomaterials	3
BME 375	Fundamentals of Biomechanics	3
HA Cognate ¹		3
PS Cognate ¹		3
Credit Hours		18
Spring		
BME 401	Biomedical Design	3
BME 450	Biomedical Transport Phenomena	3
BME 470	Biomedical Signal Analysis	3
HA Cognate ¹		3
PS Cognate ¹		3
Credit Hours		15
Senior Year		
Fall		
BME 402	Senior Design I	2
BME 440	Biomedical Measurements	4
BME 565	Principles of Cellular and Tissue Engineering	3
BME 567	Tissue Engineering Lab	1
Graduate Technical Elective ⁴		3
Graduate Course ³		3
Undergraduate Technical Elective ²		2-3
Credit Hours		18-19
Spring		
BME 403	Senior Design II	1
BME 480	Biomedical Instrumentation	3
BME 512	Regulatory Control of Biomedical Devices	3
BME 535	Advanced Biomaterials	3
Graduate Technical Elective ⁴		3
HA Cognate ¹		3

Graduate Course ³		3
Credit Hours		19
Fifth Year (Graduate)		
Fall		
BME 706	Master's Project	3
Graduate Course ³		3
Graduate Course ³		3
Credit Hours		9
Spring		
Graduate Course ³		3
Graduate Course ³		3
Graduate Course ³		3
Credit Hours		9
Total Credit Hours		157-158

- ¹ PS/HA Cognate: Students must complete a minimum of 1 People & Society (PS) cognate and 1 Humanities & Arts (HA) cognate, to be selected from the list of available cognates (<https://cognates.miami.edu/>). Each cognate should be a minimum of 3 courses (minimum of 9 credits). Students in Premed Concentration are highly encouraged to choose cognates that include PSY 110 and SOC 101.
- ² Technical Electives are chosen from BME course offerings (300 level & above) with the approval of the advisor. Any other course selected needs to be approved by the advisor and the department chairperson.
- ³ Graduate courses are 600 or 700 level courses chosen from the BME course offerings with the approval of the advisor. Up to 6 credits of graduate courses can be taken in other engineering disciplines.
- ⁴ Technical Electives must be selected from 600-level BME course offerings. BME 601, BME 602, and BME 603 cannot be counted as graduate technical electives.

Suggested Plan of Study

Electrical Concentration

Freshman Year		
Fall		Credit Hours
BME 111	Introduction to Engineering I	3
ENG 105	English Composition I	3
MTH 151	Calculus I for Engineers	5
PHY 221	University Physics I	3
PS Cognate ¹		3
Credit Hours		17
Spring		
BME 112	Introduction to Biomedical Engineering	2
CHM 121	Principles of Chemistry	4
CHM 113	Chemistry Laboratory I	1
ENG 107	English Composition II: Science and Technology	3
MTH 162	Calculus II	4
PHY 222	University Physics II	3
PHY 224	University Physics II Lab	1
Credit Hours		18
Sophomore Year		
Fall		
BIL 150	General Biology	4
BIL 151	General Biology Laboratory	1
ECE 201	Electrical Circuit Theory	3
MTH 311	Introduction to Ordinary Differential Equations	3
PHY 223	University Physics III	3
PS Cognate ¹		3
Credit Hours		17

Spring		
BME 211	Introduction to Programming for Biomedical Engineers	3
BME 265	Medical Systems Physiology	3
BME 266	Human Physiology Laboratory	1
BME 310	Mathematical Analysis in Biomedical Engineering	3
ECE 203	Electrical Circuits Laboratory	1
PHY 225	University Physics III Lab	1
HA Cognate ¹		3
Credit Hours		15
Junior Year		
Fall		
BME 312	Biomedical Statistics and Data Analysis	3
BME 375	Fundamentals of Biomechanics	3
BME 450	Biomedical Transport Phenomena	3
ECE 202	Electronics I	3
ECE 211	Logic Design	3
Credit Hours		15
Spring		
BME 330	Foundations of Medical Imaging	3
BME 335	Biomaterials	3
BME 401	Biomedical Design	3
BME 440	Biomedical Measurements	4
ECE 315	Digital Design Laboratory	1
HA Cognate ¹		3
Credit Hours		17
Senior Year		
Fall		
BME 402	Senior Design I	2
BME 470	Biomedical Signal Analysis	3
BME 507	LabView Applications for Biomedical Engineering	1
BME 512	Regulatory Control of Biomedical Devices	3
Graduate Technical Elective ⁵		3
HA Cognate ¹		3
Graduate Course ⁴		3
Credit Hours		18
Spring		
BME 403	Senior Design II	1
BME 480	Biomedical Instrumentation	3
BME 540	Microcomputer-Based Medical Instrumentation	3
BME 541	Medical Electronic Systems Laboratory	2
Graduate Technical Elective ⁵		3
Technical Elective Lab ³		1
PS Cognate ¹		3
Graduate Course ⁴		3
Credit Hours		19
Fifth Year (Graduate)		
Fall		
BME 706	Master's Project	3
Graduate Course ⁴		3
Graduate Course ⁴		3
Credit Hours		9

Spring	
Graduate Course ⁴	3
Graduate Course ⁴	3
Graduate Course ⁴	3
Credit Hours	9
Total Credit Hours	154

- ¹ PS/HA Cognate: Students must complete a minimum of 1 People & Society (PS) cognate and 1 Humanities & Arts (HA) cognate, to be selected from the list of available cognates (<https://cognates.miami.edu/>). Each cognate should be a minimum of 3 courses (minimum of 9 credits). Students in Premed Concentration are highly encouraged to choose cognates that include PSY 110 and SOC 101.
- ² Technical Electives are chosen from BME course offerings (300 level & above) with the approval of the advisor. Any other course selected needs to be approved by the advisor and the department chairperson.
- ³ Technical Elective Lab is selected from BME 303, BME 495, BME 506, BME 507 or BME 567.
- ⁴ Graduate courses are 600 or 700 level courses chosen from the BME course offerings with the approval of the advisor. Up to 6 credits of graduate courses can be taken in other engineering disciplines.
- ⁵ Technical Electives must be selected from 600-level BME course offerings. BME 601, BME 602, and BME 603 cannot be counted as graduate technical electives.

Suggested Plan of Study

Mechanical Concentration

Freshman Year		Credit Hours
Fall		
BME 111	Introduction to Engineering I	3
ENG 105	English Composition I	3
MTH 151	Calculus I for Engineers	5
PHY 221	University Physics I	3
PS Cognate ¹		3
Credit Hours		17
Spring		
BME 112	Introduction to Biomedical Engineering	2
CHM 121	Principles of Chemistry	4
CHM 113	Chemistry Laboratory I	1
ENG 107	English Composition II: Science and Technology	3
MTH 162	Calculus II	4
PHY 222	University Physics II	3
PHY 224	University Physics II Lab	1
Credit Hours		18
Sophomore Year		
Fall		
BIL 150	General Biology	4
BIL 151	General Biology Laboratory	1
BME 211	Introduction to Programming for Biomedical Engineers	3
ECE 201	Electrical Circuit Theory	3
MTH 311	Introduction to Ordinary Differential Equations	3
PS Cognate ¹		3
Credit Hours		17
Spring		
BME 265	Medical Systems Physiology	3
BME 266	Human Physiology Laboratory	1
CAE 210	Mechanics of Solids I	3
PHY 223	University Physics III	3
PHY 225	University Physics III Lab	1

ECE 203 or BME 303	Electrical Circuits Laboratory or Cell Engineering Lab	1
HA Cognate ¹		3
Credit Hours		15
Junior Year		
Fall		
BME 310	Mathematical Analysis in Biomedical Engineering	3
BME 312	Biomedical Statistics and Data Analysis	3
BME 330	Foundations of Medical Imaging	3
BME 440	Biomedical Measurements	4
MAE 202	Dynamics	3
Credit Hours		16
Spring		
BME 335	Biomaterials	3
BME 375	Fundamentals of Biomechanics	3
BME 401	Biomedical Design	3
BME 460	Introduction to Physiological Fluid Mechanics	3
HA Cognate ¹		3
PS Cognate ¹		3
Credit Hours		18
Senior Year		
Fall		
BME 402	Senior Design I	2
BME 480	Biomedical Instrumentation	3
BME 506	Computer Aided Design in Biomedical Engineering	1
BME 575	Tissue Mechanics	3
Graduate Technical Elective ⁵		3
Technical Elective Lab ³		1
Undergraduate Technical Elective ²		2-3
Graduate Course ⁴		3
Credit Hours		18-19
Spring		
BME 403	Senior Design II	1
BME 450	Biomedical Transport Phenomena	3
BME 470	Biomedical Signal Analysis	3
BME 512	Regulatory Control of Biomedical Devices	3
Graduate Technical Elective ⁵		3
HA Cognate ¹		3
Graduate Course ⁴		3
Credit Hours		19
Fifth Year (Graduate)		
Fall		
BME 706	Master's Project	3
Graduate Course ⁴		3
Graduate Course ⁴		3
Credit Hours		9
Spring		
Graduate Course ⁴		3
Graduate Course ⁴		3

Graduate Course ⁴	3
Credit Hours	9
Total Credit Hours	156-157

- ¹ PS/HA Cognate: Students must complete a minimum of 1 People & Society (PS) cognate and 1 Humanities & Arts (HA) cognate, to be selected from the list of available cognates (<https://cognates.miami.edu/>). Each cognate should be a minimum of 3 courses (minimum of 9 credits). Students in Premed Concentration are highly encouraged to choose cognates that include PSY 110 and SOC 101.
- ² Technical Electives are chosen from BME course offerings (300 level & above) with the approval of the advisor. Any other course selected needs to be approved by the advisor and the department chairperson.
- ³ Technical Elective Lab is selected from BME 303, BME 495, BME 506, BME 507 or BME 567.
- ⁴ Graduate courses are 600 or 700 level courses chosen from the BME course offerings with the approval of the advisor. Up to 6 credits of graduate courses can be taken in other engineering disciplines.
- ⁵ Technical Electives must be selected from 600-level BME course offerings. BME 601, BME 602, and BME 603 cannot be counted as graduate technical electives.

Suggested Plan of Study

Pre-Med Concentration

Freshman Year		Credit Hours
Fall		
BME 111	Introduction to Engineering I	3
ENG 105	English Composition I	3
MTH 151	Calculus I for Engineers	5
PHY 221	University Physics I	3
PS Cognate ¹		3
Credit Hours		17
Spring		
BME 112	Introduction to Biomedical Engineering	2
CHM 121	Principles of Chemistry	4
CHM 113	Chemistry Laboratory I	1
ENG 107	English Composition II: Science and Technology	3
MTH 162	Calculus II	4
PHY 222	University Physics II	3
PHY 224	University Physics II Lab	1
Credit Hours		18
Sophomore Year		
Fall		
BIL 150	General Biology	4
BIL 151	General Biology Laboratory	1
BME 211	Introduction to Programming for Biomedical Engineers	3
ECE 201	Electrical Circuit Theory	3
MTH 311	Introduction to Ordinary Differential Equations	3
CHM 221	Introduction to Structure and Dynamics	4
Credit Hours		18
Spring		
BIL 160	Evolution and Biodiversity	4
BIL 161	Evolution and Biodiversity Laboratory	1
BME 265	Medical Systems Physiology	3
BME 266	Human Physiology Laboratory	1
PHY 223	University Physics III	3
PHY 225	University Physics III Lab	1
CHM 205	Chemical Dynamics Laboratory	1
Advanced Bioscience Elective ^{5†}		3
Credit Hours		17

Junior Year		
Fall		
BME 303	Cell Engineering Lab	1
BME 310	Mathematical Analysis in Biomedical Engineering	3
BME 330	Foundations of Medical Imaging	3
BME 335	Biomaterials	3
Advanced Bioscience Elective ^{5†}		3
HA Cognate ¹		3
Credit Hours		16
Spring		
BME 312	Biomedical Statistics and Data Analysis	3
BME 375	Fundamentals of Biomechanics	3
BME 401	Biomedical Design	3
BME 440	Biomedical Measurements	4
PS Cognate ¹		3
Credit Hours		16
Senior Year		
Fall		
BME 402	Senior Design I	2
BME 470	Biomedical Signal Analysis	3
BME 512	Regulatory Control of Biomedical Devices	3
Technical Elective Lab ³		1
Technical or Science Lab Elective ⁴		1
PS Cognate ¹		3
Graduate Course ⁶		3
Graduate Course ⁶		3
Credit Hours		19
Spring		
BME 403	Senior Design II	1
BME 450	Biomedical Transport Phenomena	3
BME 480	Biomedical Instrumentation	3
Graduate Technical Elective ⁷		3
HA Cognate ¹		3
HA Cognate ¹		3
Graduate Course ⁶		3
Credit Hours		19
Fifth Year (Graduate)		
Fall		
BME 706	Master's Project	3
Graduate Course ⁶		3
Graduate Course ⁶		3
Credit Hours		9
Spring		
Graduate Course ⁶		3
Graduate Course ⁶		3
Graduate Course ⁶		3
Credit Hours		9
Total Credit Hours		158

¹ PS/HA Cognate: Students must complete a minimum of 1 People & Society (PS) cognate and 1 Humanities & Arts (HA) cognate, to be selected from list of available cognates (<https://cognates.miami.edu/>). Each cognate should be a minimum of 3 courses (minimum of 9 credits). Students in Premed Concentration are highly encouraged to choose cognates that include PSY 110 and SOC 101.

2 Technical Electives are chosen from BME course offerings (300 level & above) with the approval of the advisor. Any other course selected
needs to be approved by the advisor and the department chairperson.

3 Technical Elective Lab is selected from BME 303, BME 495, BME 506, BME 507 or BME 567.

4 Science Elective Lab is selected from a science lab complementing the Adv. Bioscience Elective (e.g., CHM or BIL lab).

5 Advanced Bioscience Elective can be chosen from BIL 250, BIL 255, BIL 268, CHM 202 or BMB 401. Students should verify admission
requirements of their medical school of interest to verify Adv. Bioscience requirements, e.g. organic chemistry II, biochemistry, or both.

6 Graduate courses are 600 or 700 level courses chosen from the BME course offerings with the approval of the advisor. Up to 6 credits of
graduate courses can be taken in other engineering disciplines.

7 Technical Electives must be selected from 600-level BME course offerings. BME 601, BME 602, and BME 603 cannot be counted as graduate
technical electives.

† Students planning on taking the MCAT should take CHM 222 as their first Adv. Bioscience Elective and BMB 401 as their second one.