

BME M.S. Program Curriculum

FALL Year 1

16:125:xxx	First BME Core Course (3cr)
16:125:xxx	Second BME Core Course (3cr)
16:148:514	Molecular Biology of Cells (3cr)
16:155:507	Analytical Methods Bioengineering (3cr), or 16:642:527 -Methods of Applied Math
16:125:601	Journal Club and Seminar in BME (1cr)

SPRING Year 1

16:125:xxx	Third BME Core Course (3cr)
16:125:581	Mammalian Physiology (3cr)
16:125:xxx	Bioengineering Elective I (3cr)
16:125:602	Survival Skills and Seminar in BME (1cr)

SUMMER Year 1

Optional registration for Research
Optional 1-month long lab rotations to aid in Advisor Selection (if necessary)

FALL & SPRING Year 2

16:125:xxx	Bioengineering Elective II (3cr)
16:125:628	Clinical Practicum (1cr)
16:125:601/602	Journal Club/Survival Skills and Seminar in BME (1cr/1cr)
16:125:701/702	Research (3cr/6cr)*

BME Core Courses Must take 3 out of 4:

- 1) 16:125:571 Biosignal Processing and Biomedical Imaging (3cr) Fall
- 2) 16:125:572 Biocontrol, Modeling and Computation (3cr) Spring
- 3) 16:125:573 Kinetics, Thermodynamics and Transport in Biomedicine (3cr) Fall
- 4) 16:125:574 Biomechanics Systems (3cr) Spring

Advanced Engineering Mathematics

- 1) 16:155:507 Analytical Methods Chem/Bioengineering (3cr) Fall
- Or 16:642:527 Methods of Applied Math (3cr) Fall

Molecular Biology

- 1) 16:148:514 Molecular Biology of Cells (3cr) Fall

Mammalian Physiology

- 1) 16:125:581 Mammalian Physiology (3cr) Spring

Developmental Courses Must take 3 out of 5:

- 1) 16:125:601 Journal Club and Seminar (1cr) Fall
- 2) 16:125:602 Survival Skills and Seminar (1cr) Spring
- 3) 16:125:607 Preparing Future Faculty I (1cr) Fall (**2nd year only**)
- 4) 16:125:608 Preparing Future Faculty II (1cr) Spring (**2nd year only**)
- 5) 16:125:628 Clinical Practicum (1cr) Spring (**REQUIRED**)

Summary of Minimum M.S. Requirements

3 out of 4 BME Core Courses	9 credits
Advanced Engineering Math Course	3 credits
Molecular Biology Course	3 credits
Mammalian Physiology	3 credits
2 Bioengineering Electives	6 credits
3 out of 5 Developmental Courses	3 credits
* Research Plan A	6 credits
* Research Plan B	3 credits (MUST take additional 3 credit elective)
Total	33 credits

BME Ph.D. Program Curriculum

FALL Year 1

16:125:xxx	First BME Core Course (3cr)
16:125:xxx	Second BME Core Course (3cr)
16:148:514	Molecular Biology of Cells (3cr)
16:155:507	Analytical Methods Bioengineering (3cr), or 16:642:527 -Methods of Applied Math
16:125:601	Journal Club and Seminar in BME (1cr)

SPRING Year 1

16:125:xxx	Third BME Core Course (3cr)
16:125:581	Mammalian Physiology (3cr)
16:125:xxx	Bioengineering Elective I (3cr)
16:125:602	Survival Skills and Seminar in BME (1cr)
16:125:628	Clinical Practicum (1cr)

SUMMER Year 1

Qualifying Exam for Doctoral Studies (June)

Optional 1-month long lab rotations to aid in Advisor Selection (if necessary)

FALL Year 2

16:125:xxx	Bioengineering Elective II (3cr)
16:125:xxx	Bioengineering Elective III (3cr)
16:125:607	Preparing Future Faculty I (1cr)*
16:125:601	Journal Club and Seminar in BME (1cr)
16:125:701	Research (3+cr)

SPRING Year 2

16:125:xxx	Second Life or Medical Sciences Core Course (3cr)
16:125:608	Preparing Future Faculty II (1cr)*
16:125:602	Seminar and Survival Skills in BME (1cr)
16:125:702	Research (3+cr)

* *Preparing Future Faculty I & Preparing Future Faculty II are recommended for all Ph.D. students*

SUMMER Year 2

Summer Industrial Internship (Optional)

FALL Year 3

Seminar in BME (Optional: participation in seminars is expected but not required)

Research

Electives (Optional)

Defend Thesis/Dissertation Proposal

SPRING Year 3

Seminar in BME (Optional: participation in seminars is expected but not required)

Research

Electives (Optional)

Years 4-7

Seminar in BME (Optional: participation in seminars is expected but not required)

Research

Electives (Optional)

Final Thesis/Dissertation and Defense (Year 5)

BME Core Courses Must take 3 out of 4:

- 1) 16:125:571 Biosignal Processing and Biomedical Imaging (3cr) Fall
- 2) 16:125:572 Biocontrol, Modeling and Computation (3cr) Spring
- 3) 16:125:573 Kinetics, Thermodynamics and Transport in Biomedicine (3cr) Fall
- 4) 16:125:574 Biomechanics Systems (3cr) Spring

Advanced Engineering Mathematics

- 1) 16:155:507 Analytical Methods Chem/Bioengineering (3cr) Fall
Or 16:642:527 Methods of Applied Math (3cr) Fall

Molecular Biology

- 1) 16:148:514 Molecular Biology of Cells (3cr) Fall

Mammalian Physiology

- 1) 16:125:581 Mammalian Physiology (3cr) Spring

Developmental Courses Must take 5 out of 7:

- 1) 16:125:601 Journal Club and Seminar (1cr) Fall (**1st and 2nd years required**)
2) 16:125:602 Survival Skills and Seminar (1cr) Spring (**1st and 2nd years required**)
3) 16:125:607 Preparing Future Faculty I (1cr) Fall
4) 16:125:608 Preparing Future Faculty II (1cr) Spring
5) 16:125:628 Clinical Practicum (1cr) Spring (**REQUIRED**)

Life Science or Medical Core Courses

A total of 2 Life Science/Medical Core courses are required. 16:115:511 or 16:148:514 are required courses, but they count as the first Life Science or Medical Core course. Any of the following 3 BME courses can be taken to satisfy Life Science/Medical Core Electives or general electives:

- 1) 16:125:582 Nano-and Micro-engineered Biointerfaces (3cr) Spring
2) 16:125:583 Biointerfacial Characterization (3cr) Fall
3) 16:125:584 Integrative Molecular and Cell Bioengineering (3cr) Spring

A list of other possible electives can be found under “Life Science and Medical Electives”

Summary of Minimum Ph.D. Requirements

3 out of 4 BME Core Courses	9 credits
Advanced Engineering Math Course	3 credits
Molecular Biology Course	3 credits
Mammalian Physiology	3 credits
Life Science/Medical Elective	3 credits
3 Bioengineering Electives	9 credits
5 out of 7 Developmental Courses	5 credits
Research (minimum)	37 credits
Total	72 credits

Notes:

- **3 core courses and Mammalian Physiology must be taken during the first year to prepare for the written qualifying exam.**
- Prerequisite work, e.g., 01:146:356 Systems Physiology, is not included in this plan and does not count as an elective.
- The core courses 571 and 573 are offered in the fall, and 572 and 574 in the spring semester. Since only 3 out of 4 core courses are required, this usually leaves room for an elective.
- The graduate school considers a course load of 9 credits as “full-time”; students may need to register for enough research credits to remain full-time.