Sample schedule for MSE/BME Additional Majors in the BMTE Track

Updated 7/19/19

Materials Science & Engineering

First Year

	Fall	Units
27-100	Engineering Materials of the Future	12
21-120	Differential and Integral Calculus	10
33-141	Physics for Engineering Students I	12
99-101	Computing @CarnegieMellon (C@CM)	3
XX-XXX	Approved PCC/SDM CIT Gen Ed Elective	9
	Total:	**46**

	Spring	Units
21-122	Integration and Approx.	10
xx-xxx	Second Introductory Engineering Course	12
09-101	Introduction to Experimental Chemistry	3
33-142	Physics II for Engineers	12
76-101	Interpretation and Argument	9
	Total:	**46**

Second Year

	Fall	Units
27-201	Structure of Materials	9
27-210	Materials Engineering Essentials	6
27-215	Thermodynamics of Materials	12
21-259	Calculus in 3D	9
15-110 or 15-112	Principles of Computing or Fundamentals of Programming and Computer Science	10
09-105	Modern Chemistry I	10
39-210	Experiential Learning [1]	0
	Total:	**56**

	Spring	Units
27-202	Defects of Materials	9
27-205	Introduction to Materials Characterization	3
27-216	Transport in Materials	9
27-217	Phase Relations and Diagrams	12
21-260	Differential Equations	9
XX-XXX	Approved PCC/SDM/II/WE Elective [1]	9
39-220	Experiential Learning [2]	0
	Total:	**51**

Third Year

	Fall	Units
27-301	Microstructure and Properties I	9
27-xxx	MSE Restricted Elective [1]	9
33-225 or 03-121 or 09-217	Quantum Phys. and the Structure of Matter or Modern Biology or Organic Chemistry	9
XX-XXX	Approved PCC/SDM/II/WE Elective [2]	9
XX-XXX	Free Elective [1]	9
39-310	Experiential Learning [3]	0
	Total:	**45**

	Spring	Units
27-367	Selection and Performance of Materials	6
27-xxx	MSE Restricted Elective [2]	9
27-xxx	MSE Restricted Elective [3]	9
XX-XXX	Approved PCC/SDM/II/WE Elective [3]	9
36-220	Engineering Statistics and Quality Control	9
42-xxx	Free Elective [2]	9
	Total:	**51**

Materials Science & Engineering and BME

First Year

	Fall	Units
27-100	Engineering Materials of the Future	12
21-120	Differential and Integral Calculus	10
33-106	Physics for Engineering Students I	12
99-101	Computing @CarnegieMellon (C@CM)	3
03-121	**Modern Biology**	**9**
	Total:	**46**

	Spring	Units
21-122	Integration and Approx.	10
42-101	**Introduction to Biomedical Engineering**	**12**
09-101	Introduction to Experimental Chemistry	3
33-107	Physics II for Engineers	12
76-101	Interpretation and Argument	9
	Total:	**46**

Second Year

	Fall	Units
27-201	Structure of Materials	9
27-210	Materials Engineering Essentials	6
27-215	Thermodynamics of Materials	12
21-259	Calculus in 3D	9
42-202 or 42-203	**Physiology or BME Lab**	**9**
09-105	Modern Chemistry I	10
39-210	Experiential Learning [1]	0
	Total:	**55**

	Spring	Units
27-202	Defects of Materials	9
27-205	Introduction to Materials Characterization	3
27-216	Transport in Materials	9
27-217	Phase Relations and Diagrams	12
21-260	Differential Equations	9
42-201	**Professional Issues in BME**	**3**
42-202 or 42-203	**Physiology or BME Lab**	**9**
39-220	Experiential Learning [2]	0
	Total:	**54**

Third Year

	Fall	Units
27-301	Microstructure and Properties I	9
27-xxx	MSE Restricted Elective [1]	9
15-110 or 15-112	Principles of Computing or Fundamentals of Programming and Computer Science	10
XX-XXX	Approved PCC/SDM/II/WE Elective [1]	9
XX-XXX	Approved PCC/SDM/II/WE Elective [2]	9
39-310	Experiential Learning [3]	0
42-XXX	**BMTE Track Elective OR 42-302 Biomedical Engineering Systems Modeling and Analysis**	**9**
	Total:	**55**

	Spring	Units
27-367	Selection and Performance of Materials	6
27-xxx	MSE Restricted Elective [2]	9
27-xxx	MSE Restricted Elective [3]	9
XX-XXX	Approved PCC/SDM/II/WE Elective [3]	9
36-220	Engineering Statistics and Quality Control	9
42-XXX	**BMTE Track Elective OR 42-302 Biomedical Engineering Systems Modeling and Analysis**	**9**
	Total:	**51**

Fourth Year

	Fall	Units
27-401	MSE Capstone Course I	12
27-XXX	MSE Restricted Elective [4]	9
XX-XXX	Approved PCC/SDM/II/WE Elective [4]	9
xx-xxx	H&SS Elective [1]	9
xx-xxx	Free Elective [3]	9
	Total:	**48**

	Spring	Units
xx-xxx	MSE Approved CIT Technical Elective	9
xx-xxx	Free Elective [4]	9
xx-xxx	Free Elective [5]	9
xx-xxx	H&SS Elective [2]	9
	Total:	**36**

Fourth Year

	Fall	Units
27-401	Capstone Design	12
42-401	**Foundations of BME Design**	6
XX-XXX	Approved PCC/SDM/II/WE Elective [4]	9
xx-xxx	H&SS Elective [1]	9
XX-XXX	Approved PCC/SDM/II/WE Elective	9
42-XXX	**BMTE Track Elective**	**9**
	Total:	**54**

	Spring	Units
27-xxx	MSE Restricted Elective [4]	9
42-402	**BME Design**	9
xx-xxx	H&SS Elective [2]	9
42-XXX	**BMTE Track Elective**	**9**
	Total:	**36**

Minimum no. of units to graduate: 379 (MSE), 398 (BME/MSE)

Core courses (All Required)
42-101 Introduction to Biomedical Engineering - Fall and Spring
42-201 Professional Issues in Biomedical Engineering - Fall and Spring
42-202 Physiology - Fall and Spring
42-203 Biomedical Engineering Laboratory# - Fall and Spring
42-302 Biomedical Engineering Systems Modeling and Analysis – Fall and Spring
03-121 Modern Biology - Fall and Spring
42-401 Foundations of BME Design* - Fall
42-402 BME Design Project– Spring

Also known as 03-206 for pre-med students.
*42-401 serves as the precursor/pre-requisite for 42-402 BME Design.

Students must fulfill the following BMTE track requirements.

- One (1) **Required** BMTE Elective
- Two (2) BMTE Electives (either **Required** or **Additional**)

Required BMTE Electives (must take at least one of the following)
42-411/27-411 Engineering Biomaterials
42-612/27-520 Tissue Engineering
42-670 Biomaterial Host Interactions in Regenerative Medicine

Additional BMTE Electives
03-320 Cell Biology
42-613/27-570 Polymeric Biomaterials
42-620 Engineering Molecular Cell Biology
42-624 Biological Transport and Drug Delivery
42-643/24-615/06-623 Microfluidics
42-673 Stem Cell Engineering
42-676 Bio-nanotechnology: Principles and Applications
42-X00 BME Research* OR 39-500 CIT Honors Thesis* OR 42-6XX Clinical Course (Surgery for Engineers/ Precision Medicine/ICU Medicine)

* The 42-X00 research project (42-200/300/400 Sophomore/Junior/Senior Biomedical Engineering Research Project OR 39-500 Honors Research Project) must be on a BME topic that is aligned to the track, supervised or co-supervised by a BME faculty member, and conducted for 9 or more units of credit.

Some Special Topics and newly offered or intermittently offered courses may be acceptable as BMTE track electives. Students should consult with their Biomedical Engineering advisors and petition the Biomedical Engineering Undergraduate Affairs Committee for permission to include such courses as BMTE track electives.