

Biomedical Engineering Sample Degree Plan - Core Research Areas

First year BME students take 12 credit hours in the fall and spring, and 6 credit hours in the summer. In subsequent years they are enrolled in 9 credit hours in fall and spring, and 6 credit hours in the summer. Typically, didactic course work is completed in the first two years, and in subsequent years students are enrolled for research, seminars or journal clubs totaling full-time enrollment equivalency. Advancement of the student to Ph.D. candidacy is dependent upon passing the qualifying examination (Exam I), which generally takes place in the second year. Additional Advanced Elective courses can be taken with permission from the student's research supervisor.

Year	Term	Title	Credit Hour	Total Credit Hrs/Term	
First Year	Fall	Professionalism, Responsible Conduct of Research, and Ethics I	1		
		Anatomy and Physiology for Engineers	3		
		BME Core Course or Advanced Elective	3		
		Laboratory Rotations	5	Semester Total: 12	
	Spring	Professionalism, Responsible Conduct of Research, and Ethics II	1		
		BME Core Course	3		
		BME Core Course or Advanced Elective	3		
		Laboratory Rotations	5	Semester Total: 12	
		Research	6	Semester Total: 6	
Second Year	Fall	Works in Progress in Biomedical Engineering	1		
		BME Exam 1 Preparation Course	1		
		BME Core Course or Advanced Elective	3		
		Advanced Elective	3		
		Research	1	Semester Total: 9	
	Spring	Works in Progress in in Biomedical Engineering	1		
		BME Exam I (Qualifying Exam)	1		
		BME Core Course or Advanced Elective	3		
		Research	4	Semester Total: 9	
	Summer		Dissertation Research	6	Semester Total: 6
Third Year	Fall	Works in Progress in Biomedical Engineering	1		
		Dissertation Research	8	Semester Total: 9	
	Spring	Works in Progress in Biomedical Engineering	1		
		BME Dissertation Proposal	1		
		Dissertation Research	7	Semester Total: 9	
	Summer		Dissertation Research	6	Semester Total: 6
	Fourth Year & Beyond	Fall	Works in Progress in Biomedical Engineering	1	
Dissertation Research			8	Semester Total: 9	
Spring		Works in Progress in Biomedical Engineering	1		
		Dissertation Research	8	Semester Total: 9	
Summer			Dissertation Research	6	Semester Total: 6

BME Core Course Requirements

All students are required to take Anatomy and Physiology for Engineers (3 credit hours)

- Students are also required to take at least two of the following three courses, depending on their academic background and research interests.
 - Engineering Mathematics (3 credit hours) **or** Mathematical Foundations of Quantitative Biology I & II (4 credit hours total)
 - Advanced Engineering Design Principles (3 credit hours)
 - Machine Learning (3 credit hours)

BME Core Course (Required)	Credit Hour	Campus	Course #
Anatomy and Physiology for Engineers	3	UTSW	BME 5096*

BME Core Courses (choose 2)	Credit Hour	Campus	Course #
Engineering Mathematics	3	UTSW	BME 5096*
Advanced Engineering Design Principles	3	UTSW	BME 5096*
Artificial Intelligence/Machine Learning	3	UTSW	BME 5096*

*temporary course number

Advanced Electives:

In addition to the BME Core Courses, students are required to take advanced engineering and life science elective courses to reach the minimum of 21 hours of didactic coursework. These courses are generally selected based on their research interests and mentor recommendations. A partial list of available courses is provided below.

Biomaterials, Mechanics, and Tissue Engineering Related Courses (Partial List)	Credit Hour	Campus	Course #
Optical Microscopy	1.5	UTSW	CMB 5106
Multiscale Microscopy for Biomedical Research	3	UTSW	CMB 5306
Developmental Principles in Regenerative Science and Medicine	3	UTSW	GDD 5301
Cell Physiology for Bioengineers	3	UTA	BE 5301
Tissue Biomechanics and Bioengineering	3	UTA	BE 5312
Biomedical Implants	3	UTA	BE 5314
Biopolymers and Biocompatibility	3	UTA	BE 5331
Transport Phenomena in Biomedical Engineering	3	UTA	BE 5337
Biomaterials and Blood Compatibility	3	UTA	BE 5361
Tissue Engineering	3	UTA	BE 5364
Biomaterials and Medical Devices	3	UTD	BMEN 6342
Self-Assembly of Biomaterials	3	UTD	BMEN 6345
Nanotechnology and Sensors	3	UTD	BMEN 6355
Engineering Systems: Modeling and Simulation	3	UTD	BMEN 6372
Medical Imaging Techniques and Image Processing	3	UTD	BMEN 6394

Biomedical and Molecular Imaging Related Courses (Partial List)	Credit Hour	Campus	Course #
Current Topics in Neuroimaging	3	UTSW	BME 5096*
Fundamentals of Imaging in Medicine	3	UTSW	BME 5303
Principles of MRI	3	UTSW	BME 5374
Metabolic Imaging of Disease	3	UTSW	BME 5375
Multiscale Microscopy for Biomedical Research	3	UTSW	CMB 5306
Advanced NMR Spectroscopy	1.5	UTSW	MB 5154
Fundamentals of Biomolecular Imaging	3	UTA	BE 5315
Tissue Ultrasound – Optical Imaging	3	UTA	BE 5326
Polymers and Biocompatibility	3	UTA	BE 5331
Medical Imaging	3	UTA	BE 5346
Digital Processing of Biological Signals	3	UTA	BE 5352
Nanotechnology and Sensors	3	UTD	BMEN 6355
Image-Guided Drug Delivery	3	UTD	BMEN 6366
Engineering Systems: Modeling & Simulation	3	UTD	BMEN 6372
Introduction to Protein Engineering	3	UTD	BMEN 6377
Digital Image Processing	3	UTD	EESC 6363

Translational Nanomedicine and Drug Delivery Related Courses (Partial List)	Credit Hour	Campus	Course #
Translational Nanomedicine I	2	UTSW	BME 5103
Mechanisms of Drug Action	3	UTSW	CMB 5301
Molecular Probe Development	3	UTSW	BME 5373
Metabolic Imaging of Disease	3	UTSW	BME 5375
Multiscale Microscopy for Biomedical Research	3	UTSW	CMB 5306
Cancer Biology I	1.5	UTSW	CAN 5152
Cancer Biology II	1.5	UTSW	CAN 5162
Nanotechnology and Sensors	3	UTD	BMEN 6355
Image-Guided Drug Delivery	3	UTD	BMEN 6366
Drug Delivery	3	UTA	BE 5372

*temporary course number

For more detailed descriptions and additional listings of courses available, see the UTSW course descriptions webpages or the websites below.

<http://catalog.uta.edu/engineering/bio/>

http://www.utdallas.edu/student/catalog/gradcurrent/ECS/BME/coursedescriptions_biomed.htm