

BACHELOR OF SCIENCE IN BIOMEDICAL ENGINEERING: NEURAL ENGINEERING TRACK

Neural Engineering

This area uses fundamental and applied engineering techniques to help solve basic and clinical problems in the neurosciences. At the fundamental level, it attempts to understand the behavior of individual neurons, their growth, signaling mechanisms between neurons, and how populations of neurons produce complex behavior. Such information has broad application to a better understanding of the communication that occurs between the various parts of the nervous system and the brain. For example, such an understanding can be applied to the development of replacement parts for impaired neural systems, such as the auditory, visual, and motor systems, as well as achieving a better understanding of how normal and diseased systems work.

Required Courses

Biomedical Engineering Core Requirements		(27)
BME 100	Introduction to the Profession	2
BME 200	Biomedical Engineering Application of MATLAB	2
BME 310	Biomaterials	3
BME 315	Instrumentation and Measurement Laboratory	2
BME 320	Fluids Laboratory	1
BME 330	Analysis of Biosignals and Systems	3
BME 405	Physiology Laboratory	2
BME 419	Introduction to Design Concepts in Biomedical Engineering	2
BME 420	Design Concepts in Biomedical Engineering	3
BME 433	Biomedical Engineering Applications of Statistics	3
BME 453	Quantitative Physiology	3
BME 490	Senior Seminar	1
Neural Engineering Requirements		(40-41)
CS 115	Object-Oriented Programming I	2
ECE 211	Circuit Analysis I	3
ECE 213	Circuit Analysis II	4
ECE 218	Digital Systems	4
BME 309	Biomedical Imaging	3
BME 438	Neuroimaging	3
BME 443	Biomedical Instrumentation and Electronics	3
BME 445	Quantitative Neural Function	3
MATH 333	Matrix Algebra and Complex Variables	3-4
or CHEM 237	Organic Chemistry I	
CHEM 239	Organic Chemistry II ¹	3
Select three BME electives ²		9
Mathematics Requirements		(18)
MATH 151	Calculus I	5
MATH 152	Calculus II	5
MATH 251	Multivariate and Vector Calculus	4
MATH 252	Introduction to Differential Equations	4
Physics Requirements		(8)
PHYS 123	General Physics I: Mechanics	4
PHYS 221	General Physics II: Electricity and Magnetism	4
Chemistry Requirements		(8)
CHEM 124	Principles of Chemistry I with Laboratory	4
CHEM 125	Principles of Chemistry II with Laboratory	4
Biology Requirements		(4)
BIOL 115	Human Biology	3

BIOL 117	Human Biology Laboratory	1
Interprofessional Projects (IPRO)		(6)
See IIT Core Curriculum, section E		6
Humanities and Social Science Requirements		(21)
See IIT Core Curriculum, sections B and C		21
Total Credit Hours		132-133

¹ A technical elective may substitute for CHEM 239.

² BME elective must be chosen from the approved list of 300+ level engineering courses in BME, ECE, CHE, MMAE, CAE, or CS. ENGR 497 will apply.

Bachelor of Science in Biomedical Engineering: Neural Engineering Track Curriculum

		Year 1	
Semester 1	Credit Hours	Semester 2	Credit Hours
BME 100	2	BIOL 115	3
CS 115	2	BIOL 117	1
CHEM 124	4	CHEM 125	4
MATH 151	5	MATH 152	5
Humanities 200-level Course	3	PHYS 123	4
	16		17
		Year 2	
Semester 1	Credit Hours	Semester 2	Credit Hours
ECE 211	3	BME 200	2
ECE 218	4	ECE 213	4
MATH 252	4	MATH 251	4
Social Sciences Elective	3	PHYS 221	4
Humanities or Social Sciences Elective	3	Social Sciences Elective (300+)	3
	17		17
		Year 3	
Semester 1	Credit Hours	Semester 2	Credit Hours
BME 309	3	BME 310	3
BME 315	2	BME 320	1
BME 330	3	BME 443	3
BME 433	3	BME 445	3
MATH 333 or CHEM 237	3-4	BME Elective ¹	3
IPRO Elective I	3	CHEM 239 ²	3
	17-18		16
		Year 4	
Semester 1	Credit Hours	Semester 2	Credit Hours
BME 405	2	BME 420	3
BME 419	2	BME 438	3
BME 453	3	BME 490	1
IPRO Elective II	3	BME Elective ¹	3
BME Elective ¹	3	Social Sciences Elective (300+)	3
Humanities Elective (300+)	3	Humanities Elective (300+)	3
	16		16

Total Credit Hours: 132-133

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This program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).