Date Submitted: 02/27/26 1:23 pm

Viewing: BS-BME ~~BS-BME-NENG~~ : Bachelor of Science ~~in Biomedical Engineering: Neural Engineering Track~~

Last approved: 05/15/23 12:15 pm

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Changes proposed by: dhar

Catalog Pages Using this Program

Bachelor of Science in Biomedical Engineering: Neural Engineering Track

In Workflow

1. BMED Chair
2. Academic Affairs
3. Undergraduate Academic Affairs
4. AC Dean
5. Undergraduate Studies Committee Chair
6. Faculty Council Chair
7. Academic Affairs

History

1. Oct 26, 2017 by clmig-jwehrheim
2. Nov 8, 2017 by Sarah Pariseau (sparisea)
3. Apr 27, 2018 by Sarah Pariseau (sparisea)
4. Apr 11, 2019 by Philip Troyk (troyk)
5. Mar 19, 2021 by Bonnie Haferkamp (haferkamp)
6. May 15, 2023 by Renee Weaver (weaver)

Program Status	Active		
Requestor Name	Promila Dhar ~~Renee Weaver~~	E-mail	dhar@iit.edu ~~weaver@iit.edu~~
Origination Date	2026-2-27 ~~2023-3-15~~		
Is this an interdisciplinary program?	No		
Is this stem-eligible?	Yes		
Available for direct application?	Yes		
Academic Unit	Biomedical Engineering	College	Armour College of Engineering
Program Title	Bachelor of Science ~~in Biomedical Engineering:~~ ~~Neural Engineering Track~~		
Effective Academic Year	2026 ~~2023~~ - 2027 ~~2024~~	Effective Term	Fall 2026
Academic Level	Undergraduate		

If all courses in a subject in your department are required, please enter each subject followed by the number ranges in the "Quick Add" field in the pop up box when you click the green plus button below. For example: ARCH 100-499.

What courses will factor the major GPA?

Program Type: Degree

Degree Type: Bachelor of Science (BS)

CIP Code
14.0501 - Bioengineering and Biomedical Engineering.

Is there more than one Academic Unit proposer?

No

Program Code: BS-BME ~~BS-BME-NENG~~

Program Attribute

Total Program Credit Hours: 129 ~~132~~

Rationale for change in program credit hours.
Equalizing with other programs at Illinois Tech

Please provide a summary and rationale for the requested program revision.
No Change in the degree program.
Elimination of track-specific (three tracks) BME degrees to one degree on the bulletin. All three tracks are combined into one BS-BME degree, with three concentrations and one general concentration.

BME200 will no longer be required or offered. The 2 credit hours from this course will go to BME 315 and BME 405, ~~405~~ which have both been revised from 1 hour to 2 hours. These labs were revised last semester.

Program Narrative and Justification

Narrative description of how the institution determined the need for the program. For example, describe what need this program will address and how the institution became aware of that need. If the program is replacing a current program(s), identify the current program(s) that is being replaced by the new program(s) and provide details describing the benefits of the new program(s). If the program will be offered in connection with, or in response to, an initative by a governmental entity, provide details of that initiative.

Narrative description of how the program was designed to meet local market needs, or for an online program, regional or national market needs. For example, indicate if Bureau of Labor Statistics data or State labor data systems information was used, and/or if State, regional, or local workforce agencies were consulted. Include how the course content, program length, academic level, admission requirements, and prerequisites were decided; including information received from potential employers about course content; and information regarding the target students and employers.

Narrative description of any wage analysis the institution may have performed, including any consideration of Bureau of Labor Statistics wage data related to the new program.

Narrative description of how the program was reviewed or approved by, or developed in conjunction with, one or more of the following: a) business advisory committees; b) program integrity boards; c) public or private oversight or regulatory agencies (not including the state licensing/authorization agency and accrediting agency); and d) businesses that would likely employ graduates of the program. For example, describe the steps taken to develop the program, identify when and with whom discussions were held, provide relevant details of any proposals or correspondence generated, and/or describe any process used to evaluate the program.

Admission Entry Details

What are the enrollment estimates?

Year 1	Year 2	Year 3

Attach Additional Program Justification Document(s)

Academic Information

Advising

Since quality advising is a key component of good retention, graduation, and career placement, how will students be mentored? What student professional organizations will be formed? How will the department work with the Career Services office to develop industry connections?

Program Resources

Which program resources are necessary to offer this program?

Proposed Catalog Entry

Admission Requirements

Course Requirements

Required Courses -

Biomedical Engineering Core Requirements		**(32)**
BME 100	Introduction to the Profession	2
CS 104	Introduction to Computer Programming for Engineers	2
ECE 211	Circuit Analysis I	3
BME 310	Biomaterials	3
BME 315	Instrumentation and Measurement Laboratory	2
BME 325	Bioelectronics Laboratory	1
BME 405	Physiology Laboratory	2
BME 419	Introduction to Design Concepts in Biomedical Engineering	2
BME 420	Design Concepts in Biomedical Engineering	3
BME 422	Mathematical Methods for Biomedical Engineers	3
BME 433	Biomedical Engineering Applications of Statistics	3
BME 453	Quantitative Physiology	3
ECE 308	Signals and Systems	3
Neural Engineering Requirements		**(32-33)**
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~~
Select two BME electives [2]		6
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 Illinois Tech Core Curriculum, section E		6
Humanities and Social Science Requirements		(21)
See Illinois Tech Core Curriculum, sections B and C		21
Total Credit Hours		129-130
Medical Imaging Concentartion Requirement		
CS 201	Accelerated Introduction to Computer Science	4
ECE 213	Circuit Analysis II	4
ECE 437	Digital Signal Processing I	3

ECE 481	Image Processing	3
BME 309	Biomedical Imaging	3
BME 325	Bioelectronics Laboratory	1
BME 438	Neuroimaging	3
BME 445	Quantitative Neural Function	3
MATH 333	Matrix Algebra and Complex Variables	3-4
or CHEM 237	Organic Chemistry I	
PHYS 224	General Physics III for Engineers	3
or CHEM 239	Organic Chemistry II	
Select one BME elective		
Cell and Tissue Engineering Requirement		
MMAE 202	Mechanics of Solids	3
CHEM 235	Organic Chemistry I	3-4
or CHEM 237	Organic Chemistry I	
CHE 202	Material Energy Balances	3
BIOL 403	Biochemistry	4
BME 301	Bio-Fluid Mechanics	3
BME 335	Thermodynamics of Living Systems	3
BME 418	Reaction Kinetics for BME	3
BME 424	Quantitative Aspects of Cell and Tissue Engineering	3
BME 482	Mass Transport for Biomedical Engineers	3
Select two BME electives		
CHE 202	Material Energy Balances	3
or ECE 218	Digital Systems	
MMAE 202	Mechanics of Solids	3-4
or ECE 213	Circuit Analysis II	
or CS 201	Accelerated Introduction to Computer Science	
CHEM 235	Organic Chemistry I	3
or CHEM 237	Organic Chemistry I	
or MATH 333	Matrix Algebra and Complex Variables	
BIOL 403	Biochemistry	3-4
or CHEM 239	Organic Chemistry II	

or PHYS 224	General Physics III for Engineers	
BME 301	Bio-Fluid Mechanics	3
or BME 309	Biomedical Imaging	
BME 320	Fluids Laboratory	1
or BME 325	Bioelectronics Laboratory	
BME 335	Thermodynamics of Living Systems	3
or BME 443	Biomedical Instrumentation and Electronics	
BME 418	Reaction Kinetics for BME	3
or BME 482	Mass Transport for Biomedical Engineers	
or BME 445	Quantitative Neural Function	
BME 438	Neuroimaging	3
or BME 424	Quantitative Aspects of Cell and Tissue Engineering	
MMAE 202 is recommended for Combo of BME 301 and BME 320		
CS 201 and ECE 213 is recommended for combo of BME 309 and BME 325		
Select two BME electives		

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.

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Sample Curriculum/Program Requirements

Bachelor of Science in Biomedical Engineering

Neural Engineering Concentration

~~Engineering:~~

Year 1

Semester 1	Credit Hours	Semester 2	Credit Hours
BME 100	2	CHEM 125	4
CHEM 124	4	MATH 152	5
CS 104	2	PHYS 123	4
MATH 151	5	Social Sciences Elective	3
Humanities 200	3		
	16		16

Year 2

Semester 1	Credit Hours	Semester 2	Credit Hours
ECE 211	3	BIOL 115	3
ECE 218	4	BIOL 117	1
MATH 252	4	BME 315	2
PHYS 221	4	ECE 213	4
		MATH 251	4
		Social Sciences Elective (300+)	3
	15		17

Year 3

Semester 1	Credit Hours	Semester 2	Credit Hours
BME 309	3	BME 310	3
BME 405	2	BME 325	1
BME 422	3	BME 443	3
BME 453	3	BME 445	3
ECE 308	3	MATH 333 or CHEM 237	3-4
Humanities Elective (300+)	3	IPRO Elective I	3
	17		16-17

Year 4

Semester 1	Credit Hours	Semester 2	Credit Hours
BME 419	2	BME 420	3
BME 433	3	BME 438	3
CHEM 239[1]	3	BME Elective[2]	3
BME Elective[2]	3	IPRO Elective II	3
BME Elective[2]	3	Social Sciences Elective (300+)	3
Humanities Elective (300+)	3	~~Humanities or Social Science Elective~~	~~3~~
	17		15

Total Credit Hours: 129-130

Medical Imaging Concentration

Year 1

Semester 1	Credit Hours	Semester 2	Credit Hours
BME 100	2	CHEM 125	4
CHEM 124	4	MATH 152	5
CS 104	2	PHYS 123	4
MATH 151	5	Social Science Elective	3
Humanities 200-Level course	3		
	16		16

Year 2

Semester 1	Credit Hours	Semester 2	Credit Hours
CS 201	4	BIOL 115	3
ECE 211	3	BIOL 117	1
MATH 252	4	BME 315	2
PHYS 221	4	ECE 213	4

		MATH 251	4
		Humanities Elective (300+)	3
	15		17

Year 3

Semester 1	Credit Hours	Semester 2	Credit Hours
BME 309	3	BME 310	3
BME 405	2	BME 325	1
BME 422	3	BME 443	3
BME 453	3	BME 445	3
ECE 308	3	MATH 333 or CHEM 237	3-4
Social Science Elective (300+)	3	IPRO Elective I	3
	17		16-17

Year 4

Semester 1	Credit Hours	Semester 2	Credit Hours
BME 419	2	BME 420	3
BME 433	3	BME 438	3
ECE 437	3	ECE 481	3
PHYS 224 or CHEM 239	3	BME Elective (300+)	3
Humanities Elective (300+)	3	Socail Science	3
IPRO II	3		
	17		15

Total Credit Hours: 129-130

Cell and Tissue Engineering Concentration

Year 1

Semester 1	Credit Hours	Semester 2	Credit Hours
BME 100	2	CHEM 125	4
CHEM 124	4	MATH 152	5
CS 104	2	PHYS 123	4
MATH 151	5	Social Science Elective	3
Humanities 200-level Course	3		
	16		16

Year 2

Semester 1	Credit Hours	Semester 2	Credit Hours
CHEM 235 or 237	3-4	BIOL 115	3
ECE 211	3	BIOL 117	1
MATH 252	4	BME 315	2
MMAE 202	3	MATH 251	4
		PHYS 221	4
		Social Science Electives (300+)	3
	13-14		17

Year 3

Semester 1	Credit Hours		Semester 3	Credit Hours

BME 405	2	BIOL 403	4
BME 422	3	BME 301	3
BME 453	3	BME 310	3
CHE 202	3	BME 320	1
ECE 308	3	BME 335	3
Social Science Electives(300+)	3	IPRO Elective I	3
	17		17

Year 4

Semester 1	Credit Hours	Semester 2	Credit Hours
BME 418	3	BME 420	3
BME 419	2	BME 424	3
BME 433	3	BME Elective	3
BME 482	3	IPRO Elective II	3
BME Elective	3	Social Siences Elective	3
Humanities Elective (300+)	3		
	17		15

Total Credit Hours: 128-129

Biomedical Engineering_General

Year 1

Semester 1	Credit Hours	Semester 2	Credit Hours
BME 100	2	CHEM 125	4
CHEM 124	4	MATH 152	5
CS 104	2	PHYS 123	4
MATH 151	5	Social Sciences Elective	3
Humanities and Social Sciences Elective	3		
	16		16

Year 2

Semester 1	Credit Hours	Semester 2	Credit Hours
CHE 202 or ECE 218	3	BIOL 115	3
ECE 211	3	BIOL 117	1
MATH 252	4	BME 315	2
MMAE 202, CS 201, or ECE 213	3-4	MATH 251	4
Humanitites (300)	3	PHYS 221	4
		Social Sciences Elective (300+)	3
	16-17		17

Year 3

Semester 1	Credit Hours	Semester 2	Credit Hours
BME 405	2	BIOL 403, CHEM 239, or PHYS 224	3-4
BME 422	3	BME 301 or 309	3
BME 453	3	BME 320 or 325	1
CHEM 235, 237, or MATH 333	3	BME 310	3
ECE 308	3	BME 443 or 335 (Socail Science)	3
Social Sciences Elective (300+)	3	Socail Science and Humanities	3

	17		16-17
			Year 4
Semester 1	Credit Hours	Semester 2	Credit Hours
BME 418, 482, or 445	3	BME 420	3
BME 419	2	BME 424 or 438	3
BME 433	3	BME Elective	3
BME Elective	3	IPRO II	3
IPRO 1	3	Humantities Elective (300+)	3
	14		15

Total Credit Hours: 127-129

1
BME 309 is offered in the Fall, and BME 445 is offered in Spring
MMAE is recommended for Combo BME 301 and BME 320
CS 201 oe ECE 213 is recommended for combo BME 325 and bME 309
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. BME 492 after approval from BME UGCC

~~Neural Engineering Track Curriculum~~

Specialization Requirements

Program Outcomes and Assessment Process

What are your learning objectives in this program? Please list each learning objective in the boxes below:

Note: These should be the same as described in your assessment plan at the bottom of this form.

Upload your assessment plan here:

Undergraduate Program Requirements

What courses will factor the major GPA?

Undergraduate Degree Requirements

Minimum credit hours: 129 ~~132~~

Specialization required?
Yes

Notes about specialization requirement

Minor required?
No

Proposed General Curriculum

Degree credit hours required: 129

Specialization credit hour requirement: 129 ~~132~~

List Major Course Requirements

List Mathematics Requirements

List Science Requirements

List Computer Science Requirements