

# BACHELOR OF SCIENCE IN BIOMEDICAL ENGINEERING: MEDICAL IMAGING TRACK

## Medical Imaging

This area combines knowledge of unique physical properties of electromagnetic and acoustic energy with high-speed electronic data processing, signal analysis, and rapid display to generate an image of a body part or, more recently, of a bodily function. Often, these images can be obtained with minimal or completely noninvasive procedures, making them less painful and more readily repeatable than invasive techniques. Moreover, many of the devices require no ionizing radiation doses, thereby lessening the danger of secondary radiation effects on the patient. The students learn the theoretical bases underlying the common forms of medical imaging, such as magnetic resonance imaging (MRI), computerized axial tomography scanning (CAT-scan), positron emission tomography (PET), and the limitations and the applicability of such techniques.

## Required Courses

Code	Title	Credit Hours
<b>Biomedical Engineering Core Requirements</b>		<b>(27)</b>
BME 100	Introduction to the Profession	2
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
<b>Medical Imaging Requirements</b>		<b>(40-41)</b>
CS 104	Introduction to Computer Programming for Engineers	2
CS 201	Accelerated Introduction to Computer Science	4
ECE 211	Circuit Analysis I	3
ECE 213	Circuit Analysis II	4
ECE 437	Digital Signal Processing I <sup>1</sup>	3
ECE 481	Image Processing	3
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	
PHYS 224	General Physics III for Engineers	3
or CHEM 239	Organic Chemistry II	
Select one BME elective <sup>2</sup>		3
<b>Mathematics Requirements</b>		<b>(18)</b>
MATH 151	Calculus I	5
MATH 152	Calculus II	5
MATH 251	Multivariate and Vector Calculus	4
MATH 252	Introduction to Differential Equations	4
<b>Physics Requirements</b>		<b>(8)</b>
PHYS 123	General Physics I: Mechanics	4
PHYS 221	General Physics II: Electricity and Magnetism	4

<b>Chemistry Requirements</b>		<b>(8)</b>
CHEM 124	Principles of Chemistry I with Laboratory	4
CHEM 125	Principles of Chemistry II with Laboratory	4
<b>Biology Requirements</b>		<b>(4)</b>
BIOL 115	Human Biology	3
BIOL 117	Human Biology Laboratory	1
<b>Interprofessional Projects (IPRO)</b>		<b>(6)</b>
See Illinois Tech Core Curriculum, section E		6
<b>Humanities and Social Science Requirements</b>		<b>(21)</b>
See Illinois Tech Core Curriculum, sections B and C		21
<b>Total Credit Hours</b>		<b>132-133</b>

<sup>1</sup> A BME elective may be substituted for ECE 437.

<sup>2</sup> 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: Medical Imaging Track Curriculum

		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-level Course	3		
		<b>16</b>	<b>16</b>
		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
		<b>15</b>	<b>17</b>
		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 Sciences Elective (300+)	3	I PRO Elective I	3
		<b>17</b>	<b>16-17</b>
		Year 4	
Semester 1	Credit Hours	Semester 2	Credit Hours
BME 419	2	BME 420	3
BME 433	3	BME 438	3
ECE 437 <sup>1</sup>	3	ECE 481	3
PHYS 224 or CHEM 239	3	BME Elective <sup>2</sup>	3
Humanities Elective (300+)	3	Social Sciences Elective (300+)	3
I PRO Elective II	3	Humanities or Social Science Elective	3
		<b>17</b>	<b>18</b>

**Total Credit Hours: 132-133**

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<sup>2</sup> 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.

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