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The School of Biomedical Engineering, Science and Health Systems

[The School of Biomedical Engineering, Science, and Health Systems](#) (formerly the Biomedical Engineering and Science Institute, founded in 1961) is a nationally recognized center for research in biomedical engineering and science offering multidisciplinary instruction on a full- and part-time basis at the graduate and undergraduate levels.

The School of Biomedical Engineering, Science, and Health Systems offers two undergraduate Bachelor of Science degree programs:

- [Biomedical Engineering](#)
- [Health Systems and Technology](#)

Because of the interdisciplinary nature of both programs, personalized faculty advising is stressed. In both programs, students work closely with faculty advisors to select core and elective courses offered by the School of Biomedical Engineering, Science, and Health Systems as well as other academic units of the University, including the College of Engineering; the College of Arts and Sciences; the LeBow College of Business; the College of Information Systems and Technology; and the School of Environmental Science, Engineering, and Policy.

The School is the beneficiary of a major endowment that sponsors chair professorships and assistantships. Areas of strength in research and education include biosensors, biomedical ultrasound, biomedical imaging, biomedical systems and signal processing, biomechanics, biomaterials, tissue and cellular engineering, neuroengineering, human performance, and cardiovascular systems. New academic initiatives focus on biomedical optics and bioinformatics and computational biomedicine.

The faculty includes individuals with specialties in engineering, physics, mathematics, biostatistics, life science, medicine, and clinical work. Of the 93 associated full-time Drexel faculty members, 20 are core faculty members and 73 have joint appointments. Some 52 adjunct faculty members from regional institutions and industry participate in research and academic programs of the School.

Metropolitan Philadelphia has one of the highest concentrations of medical institutions and pharmaceutical, biotechnology, and medical devices and systems industries in the nation. In 2002, Drexel University merged with MCP Hahnemann University, which includes the MCP Hahnemann School of Medicine—one of the nation's largest medical schools. The School has also formed an academic alliance with Thomas Jefferson University, another prominent medical university, and has entered into a joint initiative in bioinformatics with the Coriell Institute for

Medical Research and the Windber Research Institute. These initiatives ensure that students will have ample opportunities in basic research and clinical experience as well as innovative new academic programs.

Program Description

Biomedical engineering is concerned with the application of engineering and science methodologies to the analysis and solution of biological and physiological problems and to the delivery of health care. The biomedical engineer requires the analytical tools and broad physical and mathematical knowledge of modern engineering and science, a fundamental understanding of the biological or physiological system, and familiarity with recent technological breakthroughs. The biomedical engineer connects traditional engineering disciplines with living systems and may work in either direction, applying the patterns of living organisms to engineering design or engineering new approaches to human health. Thus on the one hand, the biomedical engineer may use his or her knowledge of physiological systems to develop artificial tissues or neural networks. On the other hand, he or she may use engineering know-how to create new equipment or environments for such purposes as maximizing human performance, accelerating wound healing, or providing noninvasive diagnostic tools.

The School of Biomedical Engineering, Science, and Health Systems, in collaboration with the College of Engineering, offers a unique B.S. degree program in [biomedical engineering](#). This program differentiates itself from those offered at other institutions in several ways, including an emphasis on a fundamental and comprehensive education in the principles and methods of engineering, case-study and interdisciplinary courses, professional electives, a capstone design project, and several terms of employment in industry, in clinics or medical research laboratories (co-op program).



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Biomedical Engineering

Bachelor of Science Degree: 192.0 credits

About the major

Biomedical engineering is an innovative Bachelor of Science degree program developed and delivered in collaboration with the College of Engineering. It prepares students to conceive, design, and develop devices and systems that improve human health and quality of life. Biomedical engineering is the convergence of life sciences with engineering. Biomedical engineers combine the strengths of both fields. From child car seats and football helmets to drug-delivery systems, minimally invasive surgery, and noninvasive imaging technology, the work of the biomedical engineer makes a difference in everyone's life.

As preparation for the major in biomedical engineering, students are strongly encouraged to take AP biology courses in high school.

Program objectives

The undergraduate biomedical engineering curriculum is designed to strike a balance between academic breadth in biomedical engineering and specialization in an area of concentration:

- [Biomaterials and Tissue Engineering](#)
- [Biomechanics and Human Performance Engineering](#)
- [Biomedical Informatics](#)
- [Biomedical Systems and Imaging](#)
- [Neuroengineering](#)

Following the tDEC model, the program provides innovative experiences in hands-on experimentation and engineering design as well as opportunities for personal growth and development of leadership and communication skills.

Working with a faculty advisor, students can select their core and elective courses from the curricula offered by the School of Biomedical Engineering, Science, and Health Systems and the Departments of Bioscience and Biotechnology, Chemistry, Physics, Mathematics, Computer Science, Chemical Engineering, Mechanical Engineering, Materials Engineering, Electrical and Computer Engineering, and the College of Information Science and Technology.

For more information, visit the [The School of Biomedical Engineering, Science, and Health Systems'](#) web site.



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Biomaterials and Tissue Engineering

Bachelor of Science Degree in Biomedical Engineering: 198.0 credits

About the concentration

The concentration in Biomaterials and Tissue Engineering includes courses from the Departments of Chemical and Materials Engineering. The program builds on the fundamental knowledge of natural and synthetic biomaterials and cellular biology and educates students in the emerging field of cellular and tissue engineering.

Biomaterials research has recently expanded to include fibrous materials and various prosthetic devices requiring the use of both synthetic and natural fibers. The emphasis is on improved materials and design of biological replacement tissues through cellular tissue engineering.

For more information about this concentration, see Drexel's [School of Biomedical Engineering, Science, and Health Systems](#) web site.



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Biomedical Engineering

Biomaterials and Tissue Engineering Concentration

Bachelor of Science Degree: 192.0 credits

General education requirements		Credits
HIST 285	Technology in Historical Perspective	3.0
HUM 106	Humanities and Communications I	3.0
HUM 107	Humanities and Communications II	3.0
HUM 108	Humanities and Communications III	3.0
UNIV 101	The Drexel Experience	2.0
	Liberal studies electives (3)	9.0
	General studies electives* (2)	6.0

Engineering core courses		Credits
TDEC 110	Mathematical Foundations of Engineering I	3.0
TDEC 111	Physical Foundations of Engineering I	3.0
TDEC 112	Mathematical Foundations of Engineering II	3.0
TDEC 113	Physical Foundations of Engineering II	3.0
TDEC 114	Mathematical Foundations of Engineering III	3.0
TDEC 115	Physical Foundations of Engineering III	3.0
TDEC 120	Chemical and Biological Foundations of Engineering I	3.0
TDEC 121	Chemical and Biological Foundations of Engineering II	3.0
TDEC 122	Chemical and Biological Foundations of Engineering III	3.0
TDEC 130	Engineering Design and Laboratory I	3.0
TDEC 131	Engineering Design and Laboratory II	3.0
TDEC 132	Engineering Design and Laboratory III	3.0
TDEC 150	Freshman Engineering Design I	1.0
TDEC 151	Freshman Engineering Design II	1.0
TDEC 152	Freshman Engineering Design III	1.0
TDEC 201	Energy I	3.0
TDEC 202	Energy II	3.0
TDEC 211	Materials I	3.0
TDEC 221	Systems I	3.0
TDEC 222	Systems II	3.0
TDEC 231	Evaluation/Presentation of Experimental Data I	4.0

Required Biomedical Engineering courses

BIO 201	Human Physiology I	4.0
BIO 203	Human Physiology II	4.0
BMES 125	Foundations of Biomedical Engineering	2.0
BMES 212	The Body Synthetic	3.0
BMES 221	Engineering Principles of Living Systems I	4.0
BMES 222	Engineering Principles of Living Systems II	4.0
BMES 301	Experimental Biomechanics Laboratory	2.0
BMES 338	Biomedical Ethics and Law	4.0
BMES 491	Senior Design I	3.0
BMES 492	Senior Design II	3.0
BMES 493	Senior Design III	3.0
ECE 201	Foundations of Electric Circuits	3.0
MATH 290	Linear Modeling for Engineers	4.0

Biomaterials and Tissue Engineering concentration courses

BIO 214	Principles of Cell Biology	3.0
BIO 215	Techniques of Cell Biology	2.5
BIO 218	Principles of Molecular Biology	3.0
BIO 219	Techniques of Molecular Biology	2.5
BMES 375	Computational Bioengineering	4.0
BMES 451	Transport Phenomena in Living Systems I	4.0
BMES 461	Biomaterials I	3.0
BMES 462	Biomaterials II	3.0
BMES 471	Foundations of Tissue Engineering I	4.0
BMES 472	Foundations of Tissue Engineering II	4.0
BMES 473	Foundations of Tissue Engineering III	4.0
CHEM 241	Organic Chemistry I	4.0
CHEM 242	Organic Chemistry II	4.0
CHEM 244	Organic Chemistry Laboratory I	3.0
CHEM 245	Organic Chemistry Laboratory II	3.0
MEM 202	Engineering Mechanics: Statics	3.0
MEM 230	Mechanics of Materials I	4.0
MATE 280	Advanced Materials Laboratory	4.0
MATE 214	Introduction to Polymers	4.0

*General studies electives include all liberal arts electives plus additional subjects, such as business, which do not fall under the subject area of are science, math or engineering. See the [Biomedical Engineering General and Liberal Studies List](#) for approved courses.

Writing-Intensive Course Requirements

In order to graduate, all students beginning with the entering class of 2002/01 (fall, 2002) must pass three writing-intensive courses after their freshman year. Two writing-intensive courses must be in a student's major. The third can be in any discipline. Students are advised to take one writing-intensive class each year, beginning with the sophomore year, and to avoid "clustering" these courses near the end of their matriculation. Transfer students need to meet with an academic advisor to review the number of writing-intensive courses required to graduate.

A "WI" next to a course in this catalog indicates that this course can fulfill a writing-intensive requirement. Departments will designate specific sections of such courses as writing-intensive. Sections of writing-intensive courses are not indicated in this catalog. Students should check the section comments in Banner when registering. Students scheduling their courses in Banner can also conduct a search for courses with the attribute "WI" to bring up a list of all writing-intensive courses available that term. For more information on writing-intensive courses, see the Drexel University Writing Program's [Writing-Intensive Course](#) page.



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Recommended Plan of Study

BS Biomedical Engineering

Biomaterials and Tissue Engineering

Bachelor of Science Degree

[4-yr co-op](#) [5-yr co-op](#)

Term 1	Credits
HUM 106 Humanities and Communications I	3.0
TDEC 110 Mathematical Foundations of Engineering I	3.0
TDEC 111 Physical Foundations of Engineering I	3.0
TDEC 120 Chemical and Biological Foundations of Engineering I	3.0
TDEC 130 Engineering Design and Laboratory I	3.0
TDEC 150 Freshman Engineering Design I	1.0
UNIV 101 The Drexel Experience	1.0
<i>Term credits</i>	<i>17.0</i>
Term 2	Credits
HUM 107 Humanities and Communications II	3.0
TDEC 112 Mathematical Foundations of Engineering II	3.0
TDEC 113 Physical Foundations of Engineering II	3.0
TDEC 121 Chemical and Biological Foundations of Engineering II	3.0
TDEC 131 Engineering Design and Laboratory II	3.0
TDEC 151 Freshman Engineering Design II	1.0
UNIV 101 The Drexel Experience	1.0
<i>Term credits</i>	<i>17.0</i>
Term 3	Credits
HUM 108 Humanities and Communications III	3.0
TDEC 114 Mathematical Foundations of Engineering III	3.0
TDEC 115 Physical Foundations of Engineering III	3.0
TDEC 122 Chemical and Biological Foundations of Engineering III	3.0
BMES 125 Foundations of Biomedical Engineering	2.0
TDEC 132 Engineering Design and Laboratory III	3.0
TDEC 152 Freshman Engineering Design III	1.0
<i>Term credits</i>	<i>18.0</i>
Term 4	Credits
TDEC 201 Energy I	3.0
TDEC 211 Materials I	3.0
TDEC 221 Systems I	3.0
TDEC 231 Evaluation/Presentation of Experimental Data I	4.0
BMES 221 Engineering Principles of Living Systems I	4.0
<i>Term credits</i>	<i>17.0</i>
Term 5	Credits
TDEC 202 Energy II	3.0
TDEC 222 Systems II	3.0
TDEC 232 Evaluation/Presentation of Experimental Data II	4.0
BMES 212 The Body Synthetic	3.0
BMES 222 Engineering Principles of Living Systems II	4.0
<i>Term credits</i>	<i>17.0</i>
Term 6	Credits
BIO 201 Human Physiology I	4.0
ECE 201 Foundations of Electric Circuits	3.0

HIST 285	Technology in Historical Perspective	3.0
BMES 301	Biomedical Engineering Lab I: Experimental Biomechanics	2.0
MATH 290	Linear Modeling for Engineers	4.0
<i>Term credits</i>		16.0
Term 7		Credits
BIO 203	Human Physiology II	4.0
MEM 202	Engineering Mechanics: Statics	3.0
BIO 214	Principles of Cell Biology	3.0
BIO 215	Techniques in Cell Biology	2.5
	Liberal Studies elective ¹	3.0
<i>Term credits</i>		15.5
1	See the Biomedical Engineering Liberal Studies and General Studies page for a list of acceptable courses.	
Term 8		Credits
CHEM 241	Organic Chemistry I	4.0
BIO 218	Principles of Molecular Biology	3.0
BIO 219	Techniques in Molecular Biology	2.5
BMES 338	Biomedical Ethics and Law	3.0
BMES 375	Computational Bioengineering	4.0
<i>Term credits</i>		16.5
Term 9		Credits
CHEM 242	Organic Chemistry II	4.0
CHEM 244	Organic Chemistry Lab I	3.0
MEM 230	Mechanics of Materials I	4.0
BMES 451	Transport Phenomena in Living Systems I	4.0
	General studies elective	3.0
<i>Term credits</i>		18.0
Term 10		Credits
CHEM 245	Organic Chemistry Lab II	3.0
BMES 471	Tissue Engineering I	4.0
BMES 491	Senior Design Project I	2.0
MATE 214	Introduction to Polymers	4.0
MATE 280	Advanced Materials Laboratory	4.0
<i>Term credits</i>		17.0
Term 11		Credits
BMES 461	Biomaterials I	3.0
BMES 472	Tissue Engineering II	4.0
BMES 492	Senior Design Project II	2.0
	General studies elective ¹	3.0
<i>Term credits</i>		12.0
1	See the Biomedical Engineering Liberal Studies and General Studies page for a list of acceptable courses.	
Term 12		Credits
BMES 462	Biomaterials II	3.0
BMES 473	Tissue Engineering III	4.0
BMES 493	Senior Design Project III	4.0
	Two Liberal studies electives ¹	6.0
<i>Term credits</i>		17.0
1	See the Biomedical Engineering Liberal Studies and General Studies page for a list of acceptable courses.	
Total credits (minimum)		198.0



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Biomechanics and Human Performance Engineering

Bachelor of Science Degree in Biomedical Engineering: 192.0 credits

About the concentration

The Biomechanics concentration applies engineering principles to study the interactions between humans and various machine systems in both working and living environments. Courses in this area of specialization cover such topics as the mechanics of materials, chronobiology, biomechanics, and human factors and cognitive engineering.

For more information about this concentration, see Drexel's [School of Biomedical Engineering, Science, and Health Systems](#) web site.



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Biomedical Engineering

Biomechanics and Human Performance Engineering Concentration

Bachelor of Science Degree: 192.0 credits

General education requirements	Credits
HIST 285 Technology in Historical Perspective	3.0
HUM 106 Humanities and Communications I	3.0
HUM 107 Humanities and Communications II	3.0
HUM 108 Humanities and Communications III	3.0
UNIV 101 The Drexel Experience	2.0
Liberal studies electives (2)	6.0
General studies electives* (2)	6.0
Free elective	2.0

Engineering core courses	Credits
TDEC 110 Mathematical Foundations of Engineering I	3.0
TDEC 111 Physical Foundations of Engineering I	3.0
TDEC 112 Mathematical Foundations of Engineering II	3.0
TDEC 113 Physical Foundations of Engineering II	3.0
TDEC 114 Mathematical Foundations of Engineering III	3.0
TDEC 115 Physical Foundations of Engineering III	3.0
TDEC 120 Chemical and Biological Foundations of Engineering I	3.0
TDEC 121 Chemical and Biological Foundations of Engineering II	3.0
TDEC 122 Chemical and Biological Foundations of Engineering III	3.0
TDEC 130 Engineering Design and Laboratory I	3.0
TDEC 131 Engineering Design and Laboratory II	3.0
TDEC 132 Engineering Design and Laboratory III	3.0
TDEC 150 Freshman Engineering Design I	1.0
TDEC 151 Freshman Engineering Design II	1.0
TDEC 152 Freshman Engineering Design III	1.0
TDEC 201 Energy I	3.0
TDEC 202 Energy II	3.0
TDEC 211 Materials I	3.0
TDEC 221 Systems I	3.0
TDEC 222 Systems II	3.0

TDEC 231 Evaluation/Presentation of Experimental Data I	4.0
TDEC 232 Evaluation/Presentation of Experimental Data II	4.0

Required Biomedical Engineering courses

BIO 201 Human Physiology I	4.0
BIO 203 Human Physiology II	4.0
BMES 125 Foundations of Biomedical Engineering	2.0
BMES 212 The Body Synthetic	3.0
BMES 221 Engineering Principles of Living Systems I	4.0
BMES 222 Engineering Principles of Living Systems II	4.0
BMES 301 Experimental Biomechanics Laboratory	2.0
BMES 338 Biomedical Ethics and Law	4.0
BMES 491 Senior Design I	3.0
BMES 492 Senior Design II	3.0
BMES 493 Senior Design III	3.0
ECE 201 Foundations of Electric Circuits	3.0
MATH 290 Linear Modeling for Engineers	4.0

Biomechanics and Human Performance Engineering concentration courses

BMES 302 Biomeasurements Laboratory	2.0
BMES 303 Biomedical Electronics Laboratory	2.0
BMES 304 Ultrasound Images Laboratory	2.0
BMES 375 Computational Bioengineering	4.0
or	
BMES 401 Biosensors I	4.0
BMES 411 Chronoengineering I	3.0
BMES 412 Chronoengineering II	3.0
BMES 440 Biodynamics	3.0
BMES 441 Biomechanics I	4.0
BMES 442 Biomechanics II	4.0
BMES 451 Transport Phenomena in Living Systems I	4.0
MEM 202 Engineering Mechanics: Statics	3.0
MEM 230 Mechanics of Materials I	4.0
MEM 238 Engineering Mechanics: Dynamics	4.0
PSY 101 General Psychology	3.0
Biomechanics and Human Performance electives (4)	12.0

Suggested Biomechanics and Human Performance concentration electives

BMES 443 Biomechanics III	4.0
PSY 213 Sensation and Perception	3.0
PSY 332 Human Factors and Cognitive Engineering	3.0
PSY 410 Neuropsychology	3.0
BMES 310 Biomedical Statistics	4.0

*General studies electives include all liberal arts electives plus additional subjects, such as business, which do not fall under the subject area of are science, math or engineering. See the [Biomedical Engineering General and Liberal Studies List](#) for approved courses.

Writing-Intensive Course Requirements

In order to graduate, all students beginning with the entering class of 2002/01 (fall, 2002) must pass three writing-intensive courses after their freshman year. Two writing-intensive courses must be in a student's major. The third can be in any discipline. Students are advised to take one writing-intensive class each year, beginning with the sophomore year, and to avoid "clustering" these courses near the end of their matriculation. Transfer students need to meet with an academic advisor to review the number of writing-intensive courses required to graduate.

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Recommended Plan of Study

BS Biomedical Engineering

Biomechanics and Human Performance Engineering

Bachelor of Science Degree

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HUM 106 Humanities and Communications I	3.0
TDEC 110 Mathematical Foundations of Engineering I	3.0
TDEC 111 Physical Foundations of Engineering I	3.0
TDEC 120 Chemical and Biological Foundations of Engineering I	3.0
TDEC 130 Engineering Design and Laboratory I	3.0
TDEC 150 Freshman Engineering Design I	1.0
UNIV 101 The Drexel Experience	1.0
<i>Term credits</i>	<i>17.0</i>
Term 2	Credits
HUM 107 Humanities and Communications II	3.0
TDEC 112 Mathematical Foundations of Engineering II	3.0
TDEC 113 Physical Foundations of Engineering II	3.0
TDEC 121 Chemical and Biological Foundations of Engineering II	3.0
TDEC 131 Engineering Design and Laboratory II	3.0
TDEC 151 Freshman Engineering Design II	1.0
UNIV 101 The Drexel Experience	1.0
<i>Term credits</i>	<i>17.0</i>
Term 3	Credits
HUM 108 Humanities and Communications III	3.0
TDEC 114 Mathematical Foundations of Engineering III	3.0
TDEC 115 Physical Foundations of Engineering III	3.0
TDEC 122 Chemical and Biological Foundations of Engineering III	3.0
BMES 125 Foundations of Biomedical Engineering	2.0
TDEC 132 Engineering Design and Laboratory III	3.0
TDEC 152 Freshman Engineering Design III	1.0
<i>Term credits</i>	<i>18.0</i>
Term 4	Credits
TDEC 201 Energy I	3.0
TDEC 211 Materials I	3.0
TDEC 221 Systems I	3.0
TDEC 231 Evaluation/Presentation of Experimental Data I	4.0
BMES 221 Engineering Principles of Living Systems I	4.0
<i>Term credits</i>	<i>17.0</i>
Term 5	Credits
TDEC 202 Energy II	3.0
TDEC 222 Systems II	3.0
TDEC 232 Evaluation/Presentation of Experimental Data II	4.0
BMES 212 The Body Synthetic	3.0
BMES 222 Engineering Principles of Living Systems II	4.0
<i>Term credits</i>	<i>17.0</i>
Term 6	Credits
BIO 201 Human Physiology I	4.0
ECE 201 Foundations of Electric Circuits	3.0

HIST 285	Technology in Historical Perspective	3.0
BMES 301	Biomedical Engineering Lab I: Experimental Biomechanics	2.0
MATH 290	Linear Modeling for Engineers	4.0
<i>Term credits</i>		16.0
Term 7		Credits
BIO 203	Human Physiology II	4.0
MEM 202	Engineering Mechanics: Statics	3.0
MEM 238	Engineering Mechanics: Dynamics	4.0
BMES 302	Biomedical Engineering Lab II: Biomeasurements	2.0
PSY 101	General Psychology I	3.0
<i>Term credits</i>		16.0
Term 8		Credits
MEM 230	Mechanics of Materials I	4.0
PSY 213	Sensation and Perception	3.0
BMES 303	Biomedical Engineering Lab III: Biomedical Electronics	2.0
BMES 411	Chronoengineering I: Bio rhythms	3.0
	General studies elective ¹	3.0
<i>Term credits</i>		15.0
1	See the Biomedical Engineering Liberal Studies and General Studies page for a list of acceptable courses.	
Term 9		Credits
BMES 304	Biomedical Engineering Lab IV: Ultrasound Images	2.0
BMES 338	Biomedical Ethics and Law	3.0
BMES 412	Chronoengineering II: Sleep Functions	3.0
BMES 440	Biodynamics	3.0
BMES 451	Transport Phenomena in Living Systems I	4.0
<i>Term credits</i>		15.0
Term 10		Credits
BMES 441	Biomechanics I	4.0
BMES 444	Biofluid Mechanics	3.0
BMES 491	Senior Design Project I	2.0
	Liberal Studies elective ¹	3.0
BMES 375	Computational Bioengineering	4.0
or		
BMES 401	Biosensors I	4.0
<i>Term credits</i>		16.0
1	See the Biomedical Engineering Liberal Studies and General Studies page for a list of acceptable courses.	
Term 11		Credits
PSY 410	Neuropsychology	3.0
BMES 442	Biomechanics II	4.0
BMES 492	Senior Design Project II	2.0
	General studies elective ¹	3.0
	Liberal Studies elective ²	3.0
<i>Term credits</i>		15.0
1	See the Biomedical Engineering Liberal Studies and General Studies page for a list of acceptable courses.	
2	See the Biomedical Engineering Liberal Studies and General Studies page for a list of acceptable courses.	
Term 12		Credits
PSY 332	Human Factors and Cognitive Engineering	3.0
BMES 443	Biomechanics III	4.0
BMES 493	Senior Design Project III	4.0
	Elective	2.0
<i>Term credits</i>		13.0
Total credits (minimum)		192.0



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Biomedical Informatics

Bachelor of Science Degree in Biomedical Engineering: 192.0 credits

About the concentration

Biomedical informatics is an emerging field of science that is concerned with the management, analysis and visualization of the flood of data being generated in molecular and cellular biology, genomics and other areas of biology and biomedicine. The field of bioinformatics enables information at the gene, protein, cell, tissue, organ, and system level to be integrated and interpreted for early detection, accurate diagnosis, and effective treatment of complex diseases such as cancer.

The Biomedical informatics concentration includes courses in biology, computer science, and information technology. The concentration introduces information handling systems for people in the allied health professions, with specific examples drawn from health care and covers locating, manipulating, and displaying information in the health system setting. Students are also introduced to the mathematical and computational analysis of biological systems. The systems analyzed include the genome, protein and gene networks, cell division cycles, and cellular level disease. Mathematical tools include matrix algebra, differential equations, cellular automata, and cluster analysis.

For more information about this concentration, see Drexel's [School of Biomedical Engineering, Science, and Health Systems](#) web site.



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Biomedical Engineering

Biomedical Informatics Concentration

Bachelor of Science Degree: 192.0 credits

General education requirements	Credits
HIST 285 Technology in Historical Perspective	3.0
HUM 106 Humanities and Communications I	3.0
HUM 107 Humanities and Communications II	3.0
HUM 108 Humanities and Communications III	3.0
UNIV 101 The Drexel Experience	2.0
Liberal studies electives (3)	9.0
General studies electives* (2)	6.0

Engineering core courses	Credits
TDEC 110 Mathematical Foundations of Engineering I	3.0
TDEC 111 Physical Foundations of Engineering I	3.0
TDEC 112 Mathematical Foundations of Engineering II	3.0
TDEC 113 Physical Foundations of Engineering II	3.0
TDEC 114 Mathematical Foundations of Engineering III	3.0
TDEC 115 Physical Foundations of Engineering III	3.0
TDEC 120 Chemical and Biological Foundations of Engineering I	3.0
TDEC 121 Chemical and Biological Foundations of Engineering II	3.0
TDEC 122 Chemical and Biological Foundations of Engineering III	3.0
TDEC 130 Engineering Design and Laboratory I	4.0
TDEC 131 Engineering Design and Laboratory II	4.0
TDEC 132 Engineering Design and Laboratory III	4.0
TDEC 201 Energy I	3.0
TDEC 202 Energy II	3.0
TDEC 211 Materials I	3.0
TDEC 221 Systems I	3.0
TDEC 222 Systems II	3.0
TDEC 231 Evaluation/Presentation of Experimental Data I	4.0
TDEC 232 Evaluation/Presentation of Experimental Data II	4.0

Required Biomedical Engineering courses

BIO 201	Human Physiology I	4.0
BIO 203	Human Physiology II	4.0
BMES 125	Foundations of Biomedical Engineering	2.0
BMES 212	The Body Synthetic	3.0
BMES 221	Engineering Principles of Living Systems I	4.0
BMES 222	Engineering Principles of Living Systems II	4.0
BMES 301	Experimental Biomechanics Laboratory	2.0
BMES 338	Biomedical Ethics and Law	4.0
BMES 491	Senior Design I	3.0
BMES 492	Senior Design II	3.0
BMES 493	Senior Design III	3.0
ECE 201	Foundations of Electric Circuits	3.0
MATH 290	Linear Modeling for Engineers	4.0

Biomedical Informatics concentration courses

BIO 122	Cells and Genetics	4.5
BIO 218	Principles of Molecular Biology	3.0
BIO 219	Techniques of Molecular Biology	2.5
BMES 302	Biomeasurements Laboratory	2.0
BMES 303	Biomedical Electronics Laboratory	2.0
BMES 304	Ultrasound Images Laboratory	2.0
BMES 375	Computational Bioengineering	4.0
BMES 401	Biosensors I	4.0
CS 171	Computer Programming I	3.0
CS 172	Computer Programming II	3.0
INFO 110	Human-Computer Interaction I	3.0
INFO 200	Systems Analysis I	3.0
INFO 210	Database Management Systems	3.0
INFO 355	Systems Analysis II	3.0
Bioinformatics concentration electives (2)		6.0

Suggested Bioinformatics electives

BMES 335	Biomedical Informatics I	3.0
BMES 336	Biomedical Informatics II	3.0

*General studies electives include all liberal arts electives plus additional subjects, such as business, which do not fall under the subject area of are science, math or engineering. See the [Biomedical Engineering General and Liberal Studies List](#) for approved courses.

Writing-Intensive Course Requirements

In order to graduate, all students beginning with the entering class of 2002/01 (fall, 2002) must pass three writing-intensive courses after their freshman year. Two writing-intensive courses must be in a student's major. The third can be in any discipline. Students are advised to take one writing-intensive class each year, beginning with the sophomore year, and to avoid "clustering" these courses near the end of their matriculation. Transfer students need to meet with an academic



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Recommended Plan of Study

BS Biomedical Engineering

Biomedical Informatics

Bachelor of Science Degree

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Term 1	Credits
HUM 106 Humanities and Communications I	3.0
TDEC 110 Mathematical Foundations of Engineering I	3.0
TDEC 111 Physical Foundations of Engineering I	3.0
TDEC 120 Chemical and Biological Foundations of Engineering I	3.0
TDEC 130 Engineering Design and Laboratory I	3.0
TDEC 150 Freshman Engineering Design I	1.0
UNIV 101 The Drexel Experience	1.0
<i>Term credits</i>	<i>17.0</i>
Term 2	Credits
HUM 107 Humanities and Communications II	3.0
TDEC 112 Mathematical Foundations of Engineering II	3.0
TDEC 113 Physical Foundations of Engineering II	3.0
TDEC 121 Chemical and Biological Foundations of Engineering II	3.0
TDEC 131 Engineering Design and Laboratory II	3.0
TDEC 151 Freshman Engineering Design II	1.0
UNIV 101 The Drexel Experience	1.0
<i>Term credits</i>	<i>17.0</i>
Term 3	Credits
HUM 108 Humanities and Communications III	3.0
TDEC 114 Mathematical Foundations of Engineering III	3.0
TDEC 115 Physical Foundations of Engineering III	3.0
TDEC 122 Chemical and Biological Foundations of Engineering III	3.0
BMES 125 Foundations of Biomedical Engineering	2.0
TDEC 132 Engineering Design and Laboratory III	3.0
TDEC 152 Freshman Engineering Design III	1.0
<i>Term credits</i>	<i>18.0</i>
Term 4	Credits
TDEC 201 Energy I	3.0
TDEC 211 Materials I	3.0
TDEC 221 Systems I	3.0
TDEC 231 Evaluation/Presentation of Experimental Data I	4.0
BMES 221 Engineering Principles of Living Systems I	4.0
<i>Term credits</i>	<i>17.0</i>
Term 5	Credits
TDEC 202 Energy II	3.0
TDEC 222 Systems II	3.0
TDEC 232 Evaluation/Presentation of Experimental Data II	4.0
BMES 212 The Body Synthetic	3.0
BMES 222 Engineering Principles of Living Systems II	4.0
<i>Term credits</i>	<i>17.0</i>
Term 6	Credits
BIO 201 Human Physiology I	4.0
ECE 201 Foundations of Electric Circuits	3.0

BMES 301	Biomedical Engineering Lab I: Experimental Biomechanics	2.0
BMES 338	Biomedical Ethics and Law	3.0
MATH 290	Linear Modeling for Engineers	4.0
<i>Term credits</i>		16.0
Term 7		Credits
BIO 203	Human Physiology II	4.0
BIO 122	Cells and Genetics	4.5
BMES 302	Biomedical Engineering Lab II: Biomeasurements	2.0
General studies elective ¹		3.0
<i>Term credits</i>		13.5
1	See the Biomedical Engineering Liberal Studies and General Studies page for a list of acceptable courses.	
Term 8		Credits
BIO 214	Principles of Cell Biology ¹	3.0
BIO 215	Techniques in Cell Biology	2.5
BMES 303	Biomedical Engineering Lab III: Biomedical Electronics	2.0
BMES 375	Computational Bioengineering	4.0
CS 171	Computer Programming I	3.0
INFO 110	Human-Computer Interaction	3.0
<i>Term credits</i>		17.5
1	Instead of BIO 214 and BIO 215, students can select the alternative set of Biology courses in molecular biology: BIO 218 Principles of Molecular Biology and BIO 219 Techniques in Molecular Biology.	
Term 9		Credits
CS 172	Computer Programming II	3.0
HIST 285	Technology in Historical Perspective	3.0
BMES 304	Biomedical Engineering Lab IV: Ultrasound Images	2.0
BMES 401	Biosensors I	4.0
INFO 200	Systems Analysis I	3.0
<i>Term credits</i>		15.0
Term 10		Credits
BMES 432	Biomedical Systems and Signals	3.0
BMES 491	Senior Design Project I	2.0
INFO 210	Database Management Systems	3.0
Two Liberal studies electives ¹		6.0
<i>Term credits</i>		14.0
1	See the Biomedical Engineering Liberal Studies and General Studies page for a list of acceptable courses.	
Term 11		Credits
BMES 335	Biomedical Informatics I	3.0
BMES 483	Quantitative Systems Biology	4.5
BMES 492	Senior Design Project II	2.0
INFO 355	Systems Analysis II	3.0
General studies elective ¹		3.0
<i>Term credits</i>		15.5
1	See the Biomedical Engineering Liberal Studies and General Studies page for a list of acceptable courses.	
Term 12		Credits
BMES 336	Biomedical Informatics II	3.0
BMES 484	Gene and Genome Informatics	4.5
BMES 493	Senior Design Project III	4.0
Liberal Studies elective ¹		3.0
<i>Term credits</i>		14.5
1	See the Biomedical Engineering Liberal Studies and General Studies page for a list of acceptable courses.	
Total credits (minimum)		192.0



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Biomedical Systems and Imaging

Bachelor of Science Degree in Biomedical Engineering: 192.0 credits

About the concentration

Biomedical imaging focuses on the theoretical and practical issues related to machine vision, image processing and analysis, and signal processing associated with such medical applications as ultrasound, optics, magnetic resonance, and autoradiographic imaging.

The concentration covers the fundamentals of modern imaging methodologies, covering aspects of light imaging, ultrasound imaging, and volumetric and functional imaging systems, and the principles of Magnetic Resonance Imaging (MRI).

For more information about this concentration, see Drexel's [School of Biomedical Engineering, Science, and Health Systems](#) web site.



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Biomedical Engineering

Biomedical Systems and Imaging Concentration

Bachelor of Science Degree: 192.0 credits

General education requirements	Credits
HIST 285 Technology in Historical Perspective	3.0
HUM 106 Humanities and Communications I	3.0
HUM 107 Humanities and Communications II	3.0
HUM 108 Humanities and Communications III	3.0
UNIV 101 The Drexel Experience	2.0
Liberal studies electives (3)	9.0
General studies electives* (2)	6.0
Free elective	3.0

Engineering core courses	Credits
TDEC 110 Mathematical Foundations of Engineering I	3.0
TDEC 111 Physical Foundations of Engineering I	3.0
TDEC 112 Mathematical Foundations of Engineering II	3.0
TDEC 113 Physical Foundations of Engineering II	3.0
TDEC 114 Mathematical Foundations of Engineering III	3.0
TDEC 115 Physical Foundations of Engineering III	3.0
TDEC 120 Chemical and Biological Foundations of Engineering I	3.0
TDEC 121 Chemical and Biological Foundations of Engineering II	3.0
TDEC 122 Chemical and Biological Foundations of Engineering III	3.0
TDEC 130 Engineering Design and Laboratory I	3.0
TDEC 131 Engineering Design and Laboratory II	3.0
TDEC 132 Engineering Design and Laboratory III	3.0
TDEC 150 Freshman Engineering Design I	1.0
TDEC 151 Freshman Engineering Design II	1.0
TDEC 152 Freshman Engineering Design III	1.0
TDEC 201 Energy I	3.0
TDEC 202 Energy II	3.0
TDEC 211 Materials I	3.0
TDEC 221 Systems I	3.0
TDEC 222 Systems II	3.0

TDEC 231 Evaluation/Presentation of Experimental Data I	4.0
TDEC 232 Evaluation/Presentation of Experimental Data II	4.0

Required Biomedical Engineering courses

BIO 201 Human Physiology I	4.0
BIO 203 Human Physiology II	4.0
BMES 125 Foundations of Biomedical Engineering	2.0
BMES 212 The Body Synthetic	3.0
BMES 221 Engineering Principles of Living Systems I	4.0
BMES 222 Engineering Principles of Living Systems II	4.0
BMES 301 Experimental Biomechanics Laboratory	2.0
BMES 338 Biomedical Ethics and Law	4.0
BMES 491 Senior Design I	3.0
BMES 492 Senior Design II	3.0
BMES 493 Senior Design III	3.0
ECE 201 Foundations of Electric Circuits	3.0
MATH 290 Linear Modeling for Engineers	4.0

Biomedical Systems and Imaging concentration courses

BMES 302 Biomeasurements Laboratory	2.0
BMES 303 Biomedical Electronics Laboratory	2.0
BMES 304 Ultrasound Images Laboratory	2.0
BMES 375 Computational Bioengineering	4.0
BMES 401 Biosensors I	4.0
BMES 421 Biomedical Imaging I	4.0
BMES 422 Biomedical Imaging II	4.0
BMES 423 Biomedical Imaging III	4.0
BMES 432 Biomedical Systems and Signals	3.0
ECES 302 Transform Methods and Filtering	4.0
ECES 304 Dynamic Systems and Stability	4.0
ECES 306 Introduction to Modulation and Coding	4.0
or	
ECES 356 Theory of Control	4.0
ECES 352 Digital Signals	4.0
MATH 311 Probability and Statistics I	4.0
Biomedical Systems and Imaging electives (2)	6.0
Technical elective	3.0

Suggested Biomedical Systems and Imaging electives

BMES 391 Biomedical Instrumentation I	3.0
BMES 392 Biomedical Instrumentation II	3.0

*General studies electives include all liberal arts electives plus additional subjects, such as business, which do not fall under the subject area of are science, math or engineering. See the [Biomedical Engineering General and Liberal Studies List](#) for approved courses.

Writing-Intensive Course Requirements

In order to graduate, all students beginning with the entering class of 2002/01 (fall, 2002) must pass three writing-intensive courses after their freshman year. Two writing-intensive courses must be in a student's major. The third can be in any discipline. Students are advised to take one writing-intensive class each year, beginning with the sophomore year, and to avoid "clustering" these courses near the end of their matriculation. Transfer students need to meet with an academic advisor to review the number of writing-intensive courses required to graduate.

A "WI" next to a course in this catalog indicates that this course can fulfill a writing-intensive requirement. Departments will designate specific sections of such courses as writing-intensive. Sections of writing-intensive courses are not indicated in this catalog. Students should check the section comments in Banner when registering. Students scheduling their courses in Banner can also conduct a search for courses with the attribute "WI" to bring up a list of all writing-intensive courses available that term. For more information on writing-intensive courses, see the Drexel University Writing Program's [Writing-Intensive Course](#) page.



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Recommended Plan of Study

BS Biomedical Engineering

Biomedical Systems and Imaging

Bachelor of Science Degree

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Term 1	Credits
HUM 106 Humanities and Communications I	3.0
TDEC 110 Mathematical Foundations of Engineering I	3.0
TDEC 111 Physical Foundations of Engineering I	3.0
TDEC 120 Chemical and Biological Foundations of Engineering I	3.0
TDEC 130 Engineering Design and Laboratory I	3.0
TDEC 150 Freshman Engineering Design I	1.0
UNIV 101 The Drexel Experience	1.0
<i>Term credits</i>	<i>17.0</i>
Term 2	Credits
HUM 107 Humanities and Communications II	3.0
TDEC 112 Mathematical Foundations of Engineering II	3.0
TDEC 113 Physical Foundations of Engineering II	3.0
TDEC 121 Chemical and Biological Foundations of Engineering II	3.0
TDEC 131 Engineering Design and Laboratory II	3.0
TDEC 151 Freshman Engineering Design II	1.0
UNIV 101 The Drexel Experience	1.0
<i>Term credits</i>	<i>17.0</i>
Term 3	Credits
HUM 108 Humanities and Communications III	3.0
TDEC 114 Mathematical Foundations of Engineering III	3.0
TDEC 115 Physical Foundations of Engineering III	3.0
TDEC 122 Chemical and Biological Foundations of Engineering III	3.0
BMES 125 Foundations of Biomedical Engineering	2.0
TDEC 132 Engineering Design and Laboratory III	3.0
TDEC 152 Freshman Engineering Design III	1.0
<i>Term credits</i>	<i>18.0</i>
Term 4	Credits
TDEC 201 Energy I	3.0
TDEC 211 Materials I	3.0
TDEC 221 Systems I	3.0
TDEC 231 Evaluation/Presentation of Experimental Data I	4.0
BMES 221 Engineering Principles of Living Systems I	4.0
<i>Term credits</i>	<i>17.0</i>
Term 5	Credits
TDEC 202 Energy II	3.0
TDEC 222 Systems II	3.0
TDEC 232 Evaluation/Presentation of Experimental Data II	4.0
BMES 212 The Body Synthetic	3.0
BMES 222 Engineering Principles of Living Systems II	4.0
<i>Term credits</i>	<i>17.0</i>
Term 6	Credits
BIO 201 Human Physiology I	4.0
ECE 201 Foundations of Electric Circuits	3.0

BMES 301	Biomedical Engineering Lab I: Experimental Biomechanics	2.0
BMES 338	Biomedical Ethics and Law	3.0
MATH 290	Linear Modeling for Engineers	4.0
<i>Term credits</i>		16.0
Term 7		Credits
BIO 203	Human Physiology II	4.0
ECES 302	Transform Methods and Filtering	4.0
HIST 285	Technology in Historical Perspective	3.0
BMES 302	Biomedical Engineering Lab II: Biomeasurements	2.0
	Liberal Studies elective ¹	3.0
<i>Term credits</i>		16.0
1	See the Biomedical Engineering Liberal Studies and General Studies page for a list of acceptable courses.	
Term 8		Credits
ECES 304	Dynamic Systems	4.0
MATH 311	Probability and Statistics I	4.0
BMES 303	Biomedical Engineering Lab III: Biomedical Electronics	2.0
BMES 375	Computational Bioengineering	4.0
BMES 401	Biosensors I	4.0
<i>Term credits</i>		18.0
Term 9		Credits
ECES 352	Digital Signal Processing	4.0
BMES 304	Biomedical Engineering Lab IV: Ultrasound Images	2.0
	Biomedical Engineering technical elective	3.0
	Elective	3.0
	General studies elective ¹	3.0
<i>Term credits</i>		15.0
1	See the Biomedical Engineering Liberal Studies and General Studies page for a list of acceptable courses.	
Term 10		Credits
BMES 391	Biomedical Instrumentation I	3.0
BMES 421	Biomedical Imaging Systems I	4.0
BMES 432	Biomedical Systems and Signals	3.0
BMES 491	Senior Design Project I	2.0
ECES 306	Modulation and Coding	4.0
or		
ECES 356	Theory of Control	4.0
or		
	Biomedical Engineering technical elective	3.0
<i>Term credits</i>		15.0
Term 11		Credits
BMES 392	Biomedical Instrumentation II	3.0
BMES 422	Biomedical Imaging Systems II	4.0
BMES 492	Senior Design Project II	2.0
	General studies elective ¹	3.0
<i>Term credits</i>		12.0
1	See the Biomedical Engineering Liberal Studies and General Studies page for a list of acceptable courses.	
Term 12		Credits
BMES 423	Biomedical Imaging Systems III	4.0
BMES 493	Senior Design Project III	4.0
	Two Liberal studies electives ¹	6.0
<i>Term credits</i>		14.0
1	See the Biomedical Engineering Liberal Studies and General Studies page for a list of acceptable courses.	
Total credits (minimum)		192.0



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Neuroengineering

Bachelor of Science Degree in Biomedical Engineering: 192.5 credits

About the concentration

This concentration focuses on the theory of neural signaling, as well as addressing issues that have a neuroscientific basis, such as locomotion and pattern generation, central control of movement, and the processing of sensory information. Students pursuing this concentration will learn the fundamental theory of cellular potentials and chemical signaling, the Hodgkin Huxley description of action potential generation, circuit representations of neurons and be able to derive and integrate equations describing the circuit as well as design computer models.

For more information about this concentration, see Drexel's [School of Biomedical Engineering, Science, and Health Systems](#) web page.



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Biomedical Engineering

Neuroengineering Concentration

Bachelor of Science Degree: 192.5 credits

General education requirements	Credits
HIST 285 Technology in Historical Perspective	3.0
HUM 106 Humanities and Communications I	3.0
HUM 107 Humanities and Communications II	3.0
HUM 108 Humanities and Communications III	3.0
UNIV 101 The Drexel Experience	2.0
Liberal studies electives (2)	6.0
General studies electives* (2)	6.0

Engineering core courses	Credits
TDEC 110 Mathematical Foundations of Engineering I	3.0
TDEC 111 Physical Foundations of Engineering I	3.0
TDEC 112 Mathematical Foundations of Engineering II	3.0
TDEC 113 Physical Foundations of Engineering II	3.0
TDEC 114 Mathematical Foundations of Engineering III	3.0
TDEC 115 Physical Foundations of Engineering III	3.0
TDEC 120 Chemical and Biological Foundations of Engineering I	3.0
TDEC 121 Chemical and Biological Foundations of Engineering II	3.0
TDEC 122 Chemical and Biological Foundations of Engineering III	3.0
TDEC 130 Engineering Design and Laboratory I	4.0
TDEC 131 Engineering Design and Laboratory II	4.0
TDEC 132 Engineering Design and Laboratory III	4.0
TDEC 201 Energy I	3.0
TDEC 202 Energy II	3.0
TDEC 211 Materials I	3.0
TDEC 221 Systems I	3.0
TDEC 222 Systems II	3.0
TDEC 231 Evaluation/Presentation of Experimental Data I	4.0
TDEC 232 Evaluation/Presentation of Experimental Data II	4.0

Required Biomedical Engineering courses

BIO 201	Human Physiology I	4.0
BIO 203	Human Physiology II	4.0
BMES 125	Foundations of Biomedical Engineering	2.0
BMES 212	The Body Synthetic	3.0
BMES 221	Engineering Principles of Living Systems I	4.0
BMES 222	Engineering Principles of Living Systems II	4.0
BMES 301	Experimental Biomechanics Laboratory	2.0
BMES 338	Biomedical Ethics and Law	4.0
BMES 491	Senior Design I	3.0
BMES 492	Senior Design II	3.0
BMES 493	Senior Design III	3.0
ECE 201	Foundations of Electric Circuits	3.0
MATH 290	Linear Modeling for Engineers	4.0

Neuroengineering concentration courses

BIO 214	Principles of Cell Biology	3.0
BIO 215	Techniques of Cell Biology	2.5
BMES 302	Biomeasurements Laboratory	2.0
BMES 303	Biomedical Electronics Laboratory	2.0
BMES 304	Ultrasound Images Laboratory	2.0
BMES 375	Computational Bioengineering	4.0
or		
BMES 401	Biosensors I	4.0
BMES 411	Chronoengineering I	3.0
BMES 451	Transport Phenomena in Living Systems I	4.0
BMES 477	Neuroengineering I	4.0
BMES 478	Neuroengineering II	4.0
ECES 302	Transform Methods and Filtering	4.0
ECES 304	Dynamic Systems and Stability	4.0
ECES 356	Theory of Control	4.0
PSY 101	General Psychology	3.0
PSY 213	Sensation and Perception	3.0
Neuroengineering electives (2)		6.0
Technical electives (2)		6.0

Suggested Neuroengineering concentration electives

BMES 310	Biomedical Statistics	4.0
MEM 202	Engineering Mechanics: Statics	3.0

*General studies electives include all liberal arts electives plus additional subjects, such as business, which do not fall under the subject area of are science, math or engineering. See the [Biomedical Engineering General and Liberal Studies List](#) for approved courses.

Writing-Intensive Course Requirements

In order to graduate, all students beginning with the entering class of 2002/01 (fall, 2002) must pass three writing-intensive courses after their freshman year. Two writing-intensive courses must be in a student's major. The third can be in any discipline. Students are advised to take one writing-intensive class each year, beginning with the sophomore year, and to avoid "clustering" these courses near the end of their matriculation. Transfer students need to meet with an academic advisor to review the number of writing-intensive courses required to graduate.

A "WI" next to a course in this catalog indicates that this course can fulfill a writing-intensive requirement. Departments will designate specific sections of such courses as writing-intensive. Sections of writing-intensive courses are not indicated in this catalog. Students should check the section comments in Banner when registering. Students scheduling their courses in Banner can also conduct a search for courses with the attribute "WI" to bring up a list of all writing-intensive courses available that term. For more information on writing-intensive courses, see the Drexel University Writing Program's [Writing-Intensive Course](#) page.



Drexel University

Catalog 2005 / 2006

Undergraduate Catalog

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- Business
- Education
- Engineering
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Graduate Catalog

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Prospective Students

Apply Online

Recommended Plan of Study

BS Biomedical Engineering

Neuroengineering

Bachelor of Science Degree

[4-yr co-op](#) [5-yr co-op](#)

Term 1		Credits
HUM 106	Humanities and Communications I	3.0
TDEC 110	Mathematical Foundations of Engineering I	3.0
TDEC 111	Physical Foundations of Engineering I	3.0
TDEC 120	Chemical and Biological Foundations of Engineering I	3.0
TDEC 130	Engineering Design and Laboratory I	3.0
TDEC 150	Freshman Engineering Design I	1.0
UNIV 101	The Drexel Experience	1.0
<i>Term credits</i>		<i>17.0</i>
Term 2		Credits
HUM 107	Humanities and Communications II	3.0
TDEC 112	Mathematical Foundations of Engineering II	3.0
TDEC 113	Physical Foundations of Engineering II	3.0
TDEC 121	Chemical and Biological Foundations of Engineering II	3.0
TDEC 131	Engineering Design and Laboratory II	3.0
TDEC 151	Freshman Engineering Design II	1.0
UNIV 101	The Drexel Experience	1.0
<i>Term credits</i>		<i>17.0</i>
Term 3		Credits
HUM 108	Humanities and Communications III	3.0
TDEC 114	Mathematical Foundations of Engineering III	3.0
TDEC 115	Physical Foundations of Engineering III	3.0
TDEC 122	Chemical and Biological Foundations of Engineering III	3.0
BMES 125	Foundations of Biomedical Engineering	2.0
TDEC 132	Engineering Design and Laboratory III	3.0
TDEC 152	Freshman Engineering Design III	1.0
<i>Term credits</i>		<i>18.0</i>
Term 4		Credits
TDEC 201	Energy I	3.0
TDEC 211	Materials I	3.0
TDEC 221	Systems I	3.0
TDEC 231	Evaluation/Presentation of Experimental Data I	4.0
BMES 221	Engineering Principles of Living Systems I	4.0
<i>Term credits</i>		<i>17.0</i>
Term 5		Credits
TDEC 202	Energy II	3.0
TDEC 222	Systems II	3.0
TDEC 232	Evaluation/Presentation of Experimental Data II	4.0
BMES 212	The Body Synthetic	3.0
BMES 222	Engineering Principles of Living Systems II	4.0
<i>Term credits</i>		<i>17.0</i>
Term 6		Credits
BIO 201	Human Physiology I	4.0
ECE 201	Foundations of Electric Circuits	3.0

HIST 285	Technology in Historical Perspective	3.0
BMES 301	Biomedical Engineering Lab I: Experimental Biomechanics	2.0
MATH 290	Linear Modeling for Engineers	4.0
<i>Term credits</i>		16.0
Term 7		Credits
BIO 203	Human Physiology II	4.0
ECES 302	Transform Methods and Filtering	4.0
MEM 202	Engineering Mechanics: Statics	3.0
BMES 302	Biomedical Engineering Lab II: Biomeasurements	2.0
	Liberal Studies elective	3.0
<i>Term credits</i>		16.0
Term 8		Credits
BMES 303	Biomedical Engineering Lab III: Biomedical Electronics	2.0
BMES 310	Biomedical Statistics	4.0
BMES 411	Chronoengineering I: Bio rhythms	3.0
PSY 101	General Psychology I	3.0
BMES 375	Computational Bioengineering	4.0
	or	
BMES 401	Biosensors I	4.0
<i>Term credits</i>		16.0
Term 9		Credits
ECES 304	Dynamic Systems	4.0
BIO 214	Principles of Cell Biology	3.0
BIO 215	Techniques in Cell Biology	2.5
BMES 304	Biomedical Engineering Lab IV: Ultrasound Images	2.0
BMES 451	Transport Phenomena in Living Systems I	4.0
	General studies elective	3.0
<i>Term credits</i>		18.5
Term 10		Credits
ECES 356	Theory of Control	4.0
PSY 213	Sensation and Perception	3.0
BMES 491	Senior Design Project I	2.0
	Two Liberal studies electives	6.0
<i>Term credits</i>		15.0
Term 11		Credits
BMES 477	Neuroengineering I	4.0
BMES 492	Senior Design Project II	2.0
	Biomedical Engineering technical elective	4.0
	General studies elective	3.0
<i>Term credits</i>		13.0
Term 12		Credits
BMES 478	Neuroengineering II	4.0
BMES 493	Senior Design Project III	4.0
	Biomedical Engineering technical elective	4.0
<i>Term credits</i>		12.0
Total credits (minimum)		192.5