



What is Biomedical Engineering? Biomedical Engineering applies quantitative engineering analysis and design to biological and medical problems. It is a field dedicated to revealing basic knowledge of disease mechanisms to improve human health, and to developing new technologies and therapies to improve the quality of life.

Endless career opportunities

Biomedical engineering applies fundamental engineering principles to the study of biology, medicine and health. A degree in this field leads to a variety of careers in the biomedical industry, such as medical devices, pharmaceuticals and imaging. Biomedical engineers also enter into advanced studies, including medical school, graduate school and other professional programs.

Areas of expertise at UD that provide opportunities for undergraduate research include:

Bioimaging, Biomedical Computing and Biodevices:

Learn biomedical signal and image processing, biomedical instrumentation, medical imaging modalities (including CT, MRI and ultrasound) for patient-specific modeling, modeling and analysis of biomedical data, biomedical text mining, human-computer interaction systems, universal access design, biosensors and applications of nanotechnology to biomedicine.

Biomechanics: Apply experimental and computational approaches to explore biomechanical function across multiple scales including the molecule, cell, tissue, organ and whole body.

Biomolecular Engineering, Cellular Engineering and Systems Biology: Study, model and modify biomolecules (including nucleic acids and proteins), cells and the regulatory networks that control genetic, biochemical, cellular and physiological functions.

Neuroengineering and Rehabilitation Engineering:

Explore the neural control of posture and movement, brain-machine and other neural interfaces, biomimetics, motor learning and robotic training for rehabilitation, decision-making and artificial intelligence, and modeling of the neuromuscular system.

Tissue Engineering, Biomaterials and Drug Delivery:

Examine the application of biologically inspired and biologically produced materials for the delivery of therapeutic molecules, the understanding of cell biology and mechanotransduction, the repair of damaged tissues and the creation of functional substitutes.

Our program

Our program equips students with a strong foundation in mathematics and the life sciences, as well as engineering analysis and design. It enables students to identify, formulate and solve engineering problems based on fundamental biomedical concepts; to design and conduct laboratory experiments; and to critically analyze and interpret data. The curriculum includes courses in bioinstrumentation, systems physiology, biomaterials, biomechanics, cell and tissue engineering and medical imaging. It also fulfills the requirements for advanced training in medical school and other allied health professions.

Additional study opportunities

Exploring the humanities and social sciences through the breadth requirements

All engineering curricula include self-selected humanities and social science courses. The required 21 credits of breadth coursework include 18 credits of humanities and social sciences, and 3 credits of chemistry, math or physics.

Please note: 3 of the above credits must also satisfy the Multicultural Requirement (University requirement); 6 credits must be above the introductory level (College requirement); and already completed Advanced Placement (AP) credit may apply toward these requirements.

Exploring other subjects through minors

A minor is a small set of courses in a particular subject area that differs from a student's major. Minors normally require five to seven courses to be completed in the subject area. Students may double-count courses for credit against both majors and minors. If electives are chosen carefully, minors can easily be integrated into the program requirements. Nearly half of all engineering students have at least one minor, many have two or three.

Career resources

The Career Services Center provides comprehensive services to all matriculated undergraduate students, primarily in the development and implementation of career and educational plans. The Career Services Center can help you determine a major, find internships or full-time jobs, build your resume and cover letter, practice interview skills, apply to graduate or professional school, or network with employers. Visit www.udel.edu/CSC for details.



Biomedical Engineering Curriculum

Fall

First Year		
COURSE #	COURSE DESCRIPTION	CREDITS
BMEG 101	Introduction to Biomedical Engineering (FYE)	2
CHEM 103	General Chemistry I	4
MATH 241	Analytic Geometry & Calculus A	4
CICS 106	General Computer Science for Engineers	3
	Breadth Requirement Elective 1	3
		16

Second Year		
COURSE #	COURSE DESCRIPTION	CREDITS
MATH 243	Analytic Geometry & Calculus C	4
CHEM 321	Organic Chemistry I	4
BISC 208	Introductory Biology II	4
PHYS 207	Fundamentals of Physics I	4
		16

Third Year		
COURSE #	COURSE DESCRIPTION	CREDITS
MSEG 302	Materials Science for Engineers	3
CHEM 527	Introduction to Biochemistry	3
BMEG 310	Bioengineering Mechanics	4
BMEG 401	Systems Physiology I	3
	Technical Elective 1	3
		16

Fourth Year		
COURSE #	COURSE DESCRIPTION	CREDITS
BMEG 450	Biomedical Engineering Design (DLE)	6
MSEG 460	Biomaterials & Tissue Engineering	3
	Breadth Requirement Elective 3	3
	Breadth Requirement Elective 4	3
		15

Spring

First Year		
COURSE #	COURSE DESCRIPTION	CREDITS
BISC 207	Introductory Biology I	4
CHEM 104	General Chemistry II	4
MATH 242	Analytic Geometry & Calculus B	4
ENGL 110	Critical Reading & Writing	3
		15

Second Year		
COURSE #	COURSE DESCRIPTION	CREDITS
CHEM 322	Organic Chemistry II	4
MATH 305	Applied Mathematics for Biomed, Chem & Biomole Eng	3
PHYS 208	Fundamentals of Physics II	4
ELEG 305	Signals & Systems	3
	Breadth Requirement Elective 2	3
		17

Third Year		
COURSE #	COURSE DESCRIPTION	CREDITS
CHEG 404	Probability & Statistics for Engineers	3
BMEG 330	Biomedical Instrumentation	4
BMEG 311	Bioengineering Mechanics II	3
BMEG 402	Systems Physiology II	3
BMEG 320	Biological Transport Phenomena	3
		16

Fourth Year		
COURSE #	COURSE DESCRIPTION	CREDITS
BMEG 479	Introduction to Medical Imaging Systems	3
PHIL 444	Medical Ethics*	3
	Technical Elective 2	3
	Technical Elective 3	3
	Breadth Requirement Elective 5	3
		15

TOTAL CREDIT HOURS: 126

A list of Breadth Requirement courses is available at: http://www.engr.udel.edu/advise/breadth_req.html
See UD Catalog for course descriptions and a list of technical electives.

*PHIL 444 counts as an upper level COE additional Breadth Requirement.