

 FLORIDA ATLANTIC UNIVERSITY	NEW/CHANGE PROGRAM REQUEST Undergraduate Programs		UUPC Approval _____ UFS Approval _____ Banner _____ Catalog _____
	Department Biomedical Engineering College Engineering and Computer Science		
Program Name Biomedical Engineering	<input type="checkbox"/> New Program* <input checked="" type="checkbox"/> Change Program*	Effective Date (TERM & YEAR) Fall 2024	
<p>Please explain the requested change(s) and offer rationale below or on an attachment.</p> <p>The BOG has approved the BSBME program. This has been a two year process. There were a couple issues that came up when putting it into the catalog - a couple course number changes, 2 pre-requisite changes and a math error that needed to be addressed. The proposed changes are designed to address those issues. All are minor housekeeping</p>			
<p><small>*All new programs and changes to existing programs must be accompanied by a catalog entry showing the new or proposed changes.</small></p>			
Faculty Contact/Email/Phone Frederick Bloetssher, Ph.D., P.E., Professor and Associate Dean for Undergraduate Studies and Community Outreach		Consult and list departments that may be affected by the change(s) and attach documentation All departments in the college - approved by UG committee of college	
Approved by Department Chair _____ College Curriculum Chair <i>Hongbo Su</i> College Dean _____ UUPC Chair _____ Undergraduate Studies Dean _____ UFS President _____ Provost _____		Date _____ 1/15/24 _____ 1/16/2024 _____ 1-16-24 _____ _____ _____	

Email this form and attachments to mjenning@fau.edu seven business days before the UUPC meeting.

BIOMEDICAL ENGINEERING BACHELOR OF SCIENCE

(Minimum of 120 credits required)

(New program effective spring 2024.) The program of study leading to the Bachelor of Science in Biomedical Engineering (B.S.B.M.E.) reflects the breadth of the profession. Students complete coursework in basic science and mathematics, engineering sciences and engineering systems and materials. The major includes five areas of focus: 1. Biomaterials and Tissue Engineering; 2. Smart Health Systems; 3. Biorobotics; 4. Bioinformatics; and 5. Nursing Technologist. The Biomedical Engineering program is the first to offer the Nursing Technologist track and an interface with the artificial intelligence center that will add benefits to the Biorobotics and Smart Health Systems focus areas.

Biomedical Engineering Educational Objectives and Student Outcomes

The Biomedical Engineering program strongly supports the educational objectives and learning outcomes of the College of Engineering and Computer Science (see the [Educational Objectives](#) and [Expected Student Learning Outcomes](#) subsections previously listed in this section).

Program Educational Objectives are broad statements that describe the expected accomplishments and professional status of Biomedical Engineering graduates a few years beyond the baccalaureate degree.

The Biomedical Engineering program at Florida Atlantic University is dedicated to graduating engineers who, within a few years after graduation will:

1. **Practice biomedical engineering** within the general areas of biomaterials and tissue engineering, bio-robotics, bioinformatics, nursing technology and smart health systems in the organizations that employ them;
2. **Advance their knowledge of biomedical engineering**, both formally and informally, by engaging in lifelong learning experiences including attainment of professional licensure and/or graduate studies;
3. **Serve as effective professionals** based on strong interpersonal and teamwork skills, an understanding of professional and ethical responsibility and a willingness to take the initiative and seek progressive responsibilities; and
4. **Participate as leaders** in activities that support service to, and/or economic development of, the community, the region, the state and the nation.

The ~~student outcomes~~ ~~educational objectives~~ of the Bachelor of Science in Biomedical Engineering program are achieved by ensuring that graduates have the following characteristics ~~or student outcomes~~:

1. An ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics;
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety and welfare, as well as global, cultural, social, environmental and economic factors;
3. An ability to communicate effectively with a range of audiences;
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental and societal contexts;
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives;
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgment to draw conclusions; and
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Admission Requirements

All students must meet the minimum admission requirements of the University. Please refer to the [Admissions](#) section of this catalog. All students must meet the preprofessional requirements listed above to be accepted in the B.S.B.M.E. program.

Prerequisite Coursework for Transfer Students

Students transferring to Florida Atlantic University must complete both lower-division requirements (including the requirements of the Intellectual Foundations Program) and requirements for the college and major. Lower-division requirements may be completed through the A.A. degree from any Florida public college, university or community college or through equivalent coursework at another regionally accredited institution. Before transferring and to ensure timely progress toward the baccalaureate degree, students must also complete the prerequisite courses for their major as outlined in the Transition Guides and below.

All courses not approved by the Florida Statewide Course Numbering System that will be used to satisfy

requirements will be evaluated individually on the basis of content and will require a catalog course description and a copy of the syllabus for assessment.

Degree Requirements

The Bachelor of Science in Biomedical Engineering degree will be awarded to students who:

1. Meet all general degree requirements of the University.
2. Complete the curriculum for the B.S. in Biomedical Engineering degree (see below).

Curriculum

The Bachelor of Science in Biomedical Engineering degree requires 120 credits. For credit toward the degree, a grade of "C" or better must be received in each course listed. In addition, all prerequisites for each mathematics, science or engineering course must be completed with a grade of "C" or better before enrollment is permitted. The degree components are listed below.

Intellectual Foundations Program		
College Writing 1 (2, 3)	ENC 1101	3
College Writing 2 (2, 3)	ENC 1102	3
Intellectual Foundations Program: Society and Human Behavior Courses		6
Intellectual Foundations Program: Global Citizenship Courses		6
Intellectual Foundations Program: Humanities Courses		6
Foundations of Math and Quantitative Reasoning		
Calculus with Analytic Geometry 1 (1,4)	MAC 2311	4
Calculus with Analytic Geometry 2 (1,4)	MAC 2312	4
Foundations of Science and the Natural World		
General Chemistry 1 (1,5)	CHM 2045	3 and
General Chemistry 1 Lab	CHM 2045L	1
General Physics for Engineers 1 (1,5,7)	PHY 2048	3 and
General Physics 1 Laboratory	PHY 2048L	1
Total		40
Basic Mathematics and Science		
Statistics Restricted Elective		3
Engineering Mathematics 1	MAP 3305	3 or

Differential Equations 1	MAP 2302	3	
BioPrinciples1 (5)	BSC 1010	3 and	
BioPrinciples Lab	BSC 1010L	1	
Biodiversity 1 (5)	BSC 1011	3 and	Formatted: Font color: Red
Biodiversity Lab	BSC 1011L	1	Formatted: Font color: Red
General Chemistry 2 (5)	CHM 2046	3 and	
General Chemistry 2 Lab	CHM 2046L	1	
General Physics 2 (5)	PHY 2049	3 and	Formatted: Font color: Red
General Physics 2 Laboratory	PHY 2049L	1	Formatted: Font color: Red
Organic Chemistry 1	CHM 2210	3	
Organic Chemistry 2	CHM 2211	3	
Organic Chemistry 2 Lab	CHM 2211L	1	Formatted: Font color: Red
Biochemistry 1	BCH 3033	3 and	
Biochemistry Laboratory	BCH 3103L	1	
Anatomy and Physiology 1	BSC 2085	3 and	
Anatomy and Physiology 1 Lab	BSC 2085L	1	
Genetics	PCB 3063	4	
Total	-	3332	Formatted: Font color: Red

Statistics Restricted Elective: Probability and Statistics for Engineers (STA 4032), Stochastic Models for Computer Science (STA 4821), Probability and Statistics 1 (STA 4442), Introduction to Biostatistics (STA 3173) or equivalent.

Total above is ~~732~~, leaving ~~487~~ credits of Engineering courses to comply with ABET criteria.

Formatted: Font color: Red
Formatted: Font color: Auto
Formatted: Font color: Red

Engineering Fundamentals

Fundamentals of Engineering	EGN 1002	3	
<i>Engineering Graphics Elective (pick one)</i>			
Computer Aided Design	CGN 2327	3 or	
Engineering Graphics	EGN 1111C	3	
		6	

Basic Engineering

Introduction to Programming in Python	COP 3035	3	
Statics	EGN 3311	3	
Dynamics	EGN 3321	3	
Circuits 1	EEL 3111	3	

<u>Fluid Mechanics</u>	EML 3701	3	Formatted: Font color: Red
Introduction to Biomedical Engineering	BME 5000	3	
		18	Formatted: Font color: Red
<i>For the <u>Bioimaging, Bioinformatics or Smart Health Tracks as a pre-requisite</u></i>			
Data Structures and Algorithms Analysis	COP 3410	3	Formatted: Font color: Red
<u>Strength of Materials</u>	ENG 3331	3	Formatted: Font color: Red
<i>For the <u>Biorobotics or Biomaterials and Tissue Engineering Tracks as a pre-requisite</u></i>			
Engineering Thermodynamics	EGN 3343	3	
Total		27	Formatted: Font color: Red
Capstone Design Core			
RI: Engineering Design 1 (5)	EGN 4950C	3	
RI: Engineering Design 2 (5)	EGN 4952C	3	
Total		6	
Choose two Focus Areas for a total of 12 credits, 6 from each area			
<i>Biomaterials and Tissue Engineering Focus Area - Choose two courses from the list</i>			
Neural Engineering	BME 4361	3	
Nanotechnology	BME 4571	3 or	
Introduction to Nanobiotechnology	BME 4574	3	
Total		6	
<i>Biorobotics Focus Area - Choose two courses from the list</i>			
Introduction to Microfluidics d BioMEMS	BME 4561	3	
Electro-Mechanical Devices	EGM 4045	3	
Introduction to Robotics	EML 4800	3	
Total		6	
<i>Bioimaging / Nursing Technologies Focus Area - Choose two courses from the list</i>			
<u>Signal and Digital Filter Design</u>	EEL3502	3	
Introduction to Biosignal Processing	BME 4509	3	
Introduction to Bioimaging	BME 4536	3	
Total		6	
<i>Bioinformatics Focus Area - Take the following two courses</i>			
Computational Genomics	CAP 4511	3	
Algorithms for Bioinformatics	CAP 4543	3	
Total		6	
<i>Smart Health Systems Focus Area - Choose two courses from the list</i>			
Introduction to Deep Learning	CAP 4613	3	

Introduction to Artificial Intelligence	CAP 4630	3
Introduction to Data Mining and Machine Learning	CAP 4770	3
Total		6

Technical Electives - Choose 23 credits from the list

Professional Internship	IDS 3949	0-4 or 4
Engineering Professional Internship	EGN 3941	0-4
Directed Independent Research in Engineering and Computer Science (6)	EGN 4915	1-3
For pre-med students, choose biology lab and organic chemistry lab for 3 credits		
Total		32
<u>Total Program</u>		120

Notes:

1. Contributes to University Core Curriculum.
2. Contributes to Writing Across Curriculum (Gordon Rule) writing.
3. Intellectual Foundations Program courses, totaling 6 credits, must be selected to satisfy Writing Across Curriculum (Gordon Rule) writing requirements.
4. Contributes to Gordon Rule mathematics.
5. Includes a 1-credit laboratory.
6. Grading: S/U.
7. PHY 2048, General Physics for Engineers 1 (4 credits) is an acceptable substitute, but only 3 credits will apply toward the degree.

Internships

Biomedical Engineering students are strongly encouraged to gain practical experience through participation in internship opportunities. However, internships require prior approval from the department and coordinated with the Career Center (EGN 3941, Engineering Professional Internship). For more information, contact the FAU Career Center at 561-297-3533 or visit www.fau.edu/cdc.