FLORIDA ATLANTIC UNIVERSITY

NEW/CHANGE PROGRAM REQUEST
Undergraduate Programs

UUPC Approval _____
UFS Approval _____
Banner _____
Catalog _____

Department Biomedical Engineering

College COECS

Program Name
Biomedical Engineering

☐ **New Program***

☑ **Change Program***

Effective Date
(TERM & YEAR)
Spring 2026

Please explain the requested change(s) and offer rationale below or on an attachment.

- Updated the list of affiliated faculty to include newly appointed members.
- Expanded the program objectives from four to five, emphasizing foundational knowledge and ethical principles.
- Revised the curriculum for the three primary tracks (Biomaterials, Biorobotics, and Smart Health) to meet a 120-credit degree requirement.

*All new programs and changes to existing programs must be accompanied by a catalog entry showing the new or proposed changes.

Faculty Contact/Email/Phone
Javad Hashemi/jhashemi@fau.edu/561-297-3438

Consult and list departments that may be affected by the change(s) and attach documentation

Approved by	***Date***
Department Chair Javad Hashemi	9/4/25
College Curriculum Chair Galan Liu	9/4/25
College Dean	9-4-25
UUPC Chair	
Undergraduate Studies Dean	
UFS President	
Provost	

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

Biomedical Engineering

Faculty:
Agaarwal, A.; Asghar, W.; Assis, R.; DeGiorgio, M.; Du, S.; Engeberg, E.; Ghoraani, B.; Hashemi, J.; Kang, Y.; Pavlovic, M.Ranji, M; Pashaie, R.; Shankar, R.; Yi., P.; Zhi, H.

The Department of Biomedical Engineering (BME) at Florida Atlantic University (FAU) integrates engineering principles with biological sciences to address critical challenges in healthcare and medicine. Our program is dedicated to advancing human health through cutting-edge research, exceptional education, and impactful clinical applications. We emphasize hands-on experience through innovative research, state-of-the-art facilities, and collaborative projects with industry and clinical partners. Our comprehensive curriculum covers fundamental engineering principles, biological sciences, and specialized topics such as medical devices, smart health, tissue engineering, biorobotics, and biomaterials.

~~Biomedical Engineering stands at the intersection of the revolution taking place in advanced medical treatments as a result of applying the principles and practice of the engineering and computer science disciplines to the biological, biomedical and medical sciences. Biomedical Engineering is a broad and emerging field that impacts drug delivery, surgery, diagnosis, prevention and treatment. Students successfully completing the Master of Science with major in Biomedical engineering program will be prepared for professional careers in businesses related to medical diagnostics, prosthetic devices and neural and other implants; the pharmaceutical and biotechnology industries; and consulting in health-related fields, as well as other positions in industry, commerce, education and government. Students will also be prepared to continue their formal education at the Ph.D. level in a variety of science and engineering disciplines and at the M.D. level in certain cases. The Master of Science with major in Biomedical Engineering is available in person and fully online.~~

Link to Combined Bachelor of Science in Biomedical Engineering (B.S.B.M.E.)

Link to Master of Science in Biomedical Engineering

biomedical engineering
Bachelor of Science

(Minimum of 120 credits required)

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~~ The curriculum incudes coursework ~~complete coursework~~ in basic science and mathematics, engineering sciences and engineering systems and materials. Students gain a strong interdisciplinary foundation while exploring specialized topics in three areas of focus: ~~The major includes five areas of focus:~~

1. Biomaterials and Tissue Engineering;

2. Smart Health Systems;

3. Biorobotics

~~; 4. Bioinformatics; and 5. Nursing Technologist~~

Graduates of the B.S.B.M.E. program are prepared for careers in medical device design, diagnostics, prosthetics, and biotechnology, as well as roles in healthcare, government, and consulting. The program also serves as an excellent foundation for advanced study in graduate programs, including Master's and Ph.D. degrees in engineering or science disciplines, or for pre-medical tracks leading to medical school.

~~. 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: ~~(how are 1 and 5 PEOs measured?)~~

- ~~**Apply engineering principles** to demonstrate proficiency in solving complex biomedical problems, including designing, analyzing, and evaluating biomedical systems and devices.~~

1. **Practice biomedical engineering disciplines** within the general areas of biomaterials and tissue engineering, bio-robotics 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.**

- ~~**Understand Ethical Implications** related to biomedical engineering practices, ensuring that their work adheres to high standards of professional and ethical conduct.~~

~~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.~~

Commented [FB1]: Javad - these need to be measurable

Also you need an advisory committee that agrees with these objectives

Commented [FB2R1]: And they must be measurable

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The educational objectives of the Bachelor of Science in Biomedical Engineering program are achieved by ensuring that graduates have the following ABET 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 as discussed under General Requirements for admission to the college.

Prerequisite Coursework for Transfer Students
Students transferring to Florida Atlantic University must complete both lower-division requirements (including the General Education ~~Program~~ requirements ~~of the General Education Program~~) and the college and major 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.

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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.

General Education Program	-	
College Writing 1 (2,3)	ENC 1101	3
College Writing 2 (2,3)	ENC 1102	3
General Education Program: Society and Human Behavior Courses	-	6
General Education Program: Global Citizenship Courses	-	6
General Education 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
Bioprinciples 1 (5)	BSC 1010	3 and
Bioprinciples Lab	BSC 1010L	1
General Chemistry 2 (5)	CHM 2046	3 and
General Chemistry 2 Lab	CHM 2046L	1

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~~Organic Chemistry 1**~~	~~CHM 2210~~	~~3 and~~
~~Organic Chemistry 1 lab**~~	~~CHM 2210L~~	~~1~~
~~Organic Chemistry 2~~	~~CHM 2211~~	~~3 and~~
~~Organic Chemistry 2Lab~~	~~CHM 2211L~~	~~1~~
~~Biochemistry 1~~	~~BCH 3033~~	~~3 and~~
~~Anatomy and Physiology 1~~	~~BSC 2085~~	~~3 and~~
~~Anatomy and Physiology 1 Lab~~	~~BSC 2085L~~	~~1~~
~~Genetics~~	~~PCB 3063~~	~~4~~
~~**Total**~~	~~-~~	~~**33**~~

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~~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 74, leaving 46 credits of Engineering courses to comply with ABET criteria.~~

~~**Engineering Fundamentals**~~	~~-~~	~~-~~
~~Fundamentals of Engineering~~	~~EGN 1002~~	~~3~~
~~***Engineering Graphics Elective***~~	~~-~~	~~-~~
~~Computer Aided Design~~	~~CGN 2327~~	~~3~~
~~Engineering Graphics~~	~~EGN 1111C~~	~~3~~
~~**Total**~~	~~-~~	~~**6**~~
~~**Basic Engineering**~~	~~-~~	~~-~~
~~Introduction to Programming in Python~~	~~COP 3035~~	~~3~~
~~Statics~~	~~EGN 3311~~	~~3~~
~~Dynamics~~	~~EGN 3321~~	~~3~~
~~Circuits 1~~	~~EEL 3111~~	~~3~~
~~Introduction to Biomedical Engineering~~	~~BME 5000~~	~~3~~
~~**Total**~~	~~-~~	~~**15**~~
~~***For the Bioimaging, Bioinformatics or Smart Health Track, as a prerequisite:***~~	~~-~~	
~~Data Structures and Algorithms Analysis~~	~~COP 3410~~	~~3 or~~

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For the Biorobotics or Biomaterials and Tissue Engineering Tracks, as a prerequisite:	-	-
Engineering Thermodynamics	EGN 3343	3
Total	-	**3**
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		
Biomaterials and Tissue Engineering Focus Area - Choose two courses from the list		
Neural Engineering	BME 4361	3
Nantechnology	BME 4571	3 **or**
Introduction to Nanotechnology	BME 4574	3
Total	-	**6**
Biorobotics Focus Area - Choose two courses from the list	-	-
Introduction to Microfluidics d BioMEMS	BME 4561	3
Electro-Mechanical Devices	EGM 4045	3
Introduction to Robotics	EML 4800	3
Total	-	**6**
Bioimaging / Nursing Technologies Focus Area - Choose two courses from the list		
Introduction to Biosignal Processing	BME 4509	3
Introduction to Bioimaging	BME 4536	3
Signal and Digital Filter Design	EEL 3502	3
Total	-	**6**
Bioinformatics Focus Area - Take the following two courses	-	-
Computational Genomics	CAP 4511	3
Algorithms for Bioinformatics	CAP 4543	3
Total	-	**6**

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~~***Smart Health Systems Focus Area - Choose two courses from the list***~~		
~~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 3credits from the list***~~	~~-~~	~~-~~
~~Professional Internship~~	~~IDS 3949~~	~~0-4 **or**~~
~~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**~~	~~-~~	~~**3**~~
~~**Total Program**~~	~~-~~	~~**120**~~

Requirement	Course Number	Credits
Communications / Humanities / Social Science		
College Writing 1 (2,3)	ENC 1101	3
College Writing 2 (2,3)	ENC 1102	3
General Education Program: Social Science Courses	Options listed in Audit	6
General Education Program: Humanities Courses	Options listed in Audit	6
Mathematics		
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**~~Natural Science		
General Chemistry 1	CHM 2045	3
General Chemistry 1 Lab	CHM 2045L	1
General Physics for Engineers 1	PHY 2048	~~3~~ 3
General Physics 1 Laboratory	PHY 2048L	~~1~~ 1
		~~3~~ 3
		~~3~~

			~~1~~ 1 ~~1~~	
		Biomaterials	Biomedical	Biorobotics
Additional Mathematics and Science				
Biostatistics	STA 3173	3	3	-
Engineering Mathematics Differential Equations	MAP 3305 or MAP 2302	3	3	3
Physics for Engineers 2	PHY 2049		3	4
General Physics 2 Laboratory	PHY 2049L			1
Bioprinciples	BSC 1010	3	3	3
Bioprinciples Lab	BSC 1010L	1	1	1
Biodiversity	BSC 1011	3		
Biodiversity Lab	BSC 1011L	1		
General Chemistry 2	CHM 2046	3	3	
General Chemistry 2 Lab	CHM 2046L	1	1	
Organic Chemistry 1	CHM 2210	3		
Organic Chemistry 2	CHM 2211	3		
Organic Chemistry 2 Lab	CHM 2211L	2		
Biochemistry 1	BCH 3033	3		
General Microbiology	MCB 3020	3		
General Microbiology Lab	MCB 3020L	1		
Anatomy and Physiology 1	BSC 2085	3	3	3
Anatomy and Physiology 1 Lab	BSC 2085L	1	1	1
Genetics	PCB 3063	4	4	4
Quantitative Analysis	CHM 3120		2	
Quantitative Analysis Lab	CHM 3120L		2	
Engineering Graphics				
Engineering Graphics	EGN 1111C	3	3	3
Engineering Topics				
Fundamentals of Engineering	EGN 1002	3	3	3
Introduction to Programming in Python	COP 3035C	3	3	3
Statics	EGN 3311	3	3	3
Dynamics	EGN 3321	3	3	3
Circuits	EEL 3111	3	3	3
Signals & Digital Filter Design	EEL 3502		3	3
Controls	EEL 4652C			3
Fluid Mechanics	EML 3701		3	3
Strengths of Materials	EGN 3331	3		3
Biomedical Instrumentation	BME 4503C	3	3	3
			3	

Orthopedic Biomechanics	BME 4201	3	3	3
Biomedical Signal Processing	BME 4509		3	3
Intro to Bio-Imaging	BME 4536		3	
Microfabrication Technology	BME 4583		3	
Intro to Robotics	EML 4800			3
N~~ue~~euro-Mechanics	BME 4364			3
Advanced Robotic Lab	BME XXXX			3
Biomaterials	BME 4100	3		
Methods in Biomedical Research	BME 4070C	3	3	3
Engineering Design				
Engineering Design I (5)	EGN 4950C or EML4521C	3	3	3
Engineering Design II (5)	EGN 4952C or EML4551	3	3	3
Technical Electives		6	6	9
	Total Credits:	120	120	120

Requirement	Course Number	Credits
Communications / Humanities / Social Science		
College Writing 1 (2,3)	ENC 1101	3
College Writing 2 (2,3)	ENC 1102	3
General Education Program: Social Science Courses	Options listed in Audit	6
General Education Program: Humanities Courses	Options listed in Audit	6
Mathematics		
Calculus with Analytic Geometry 1 (1,4)	MAC 2311	4
Calculus with Analytic Geometry 2 (1,4)	MAC 2312	4
Natural Science		
General Chemistry 1	CHM 2045	3
General Chemistry 1 Lab	CHM 2045L	1
General Physics for Engineers 1 (5)	PHY 2048	3
General Physics 1 Laboratory	PHY 2048L	1

Courses for Focus Areas		Biomaterials	Biomedical	Biorobotics
Additional Mathematics and Science		Credits	Credits	Credits

Biostatistics	STA 3173	3	3	-
Engineering Mathematics	MAP 3305 or	3	3	3
Differential Equations	MAP 2302			
Physics for Engineers 2	PHY 2049	-	3	4
General Physics 2 Laboratory	PHY 2049L	-	-	1
Bioprinciples	BSC 1010	3	3	3
Bioprinciples Lab	BSC 1010L	1	1	1
Biodiversity	BSC 1011	3		-
Biodiversity Lab	BSC 1011L	1		-
General Chemistry 2	CHM 2046	3	3	-
General Chemistry 2 Lab	CHM 2046L	1	1	-
Organic Chemistry 1	CHM 2210	3	-	-
Organic Chemistry 2	CHM 2211	3	-	-
Organic Chemistry 2 Lab	CHM 2211L	2		-
Biochemistry 1	BCH 3033	3		-
General Microbiology	MCB 3020	3	-	-
General Microbiology Lab	MCB 3020L	1	-	-
Anatomy and Physiology 1	BSC 2085	3	3	3
Anatomy and Physiology 1 Lab	BSC 2085L	1	1	1
Genetics	PCB 3063	4	4	4
Quantitative Analysis	CHM 3120	-	2	-
Quantitative Analysis	CHM 3120L	-	2	-
-	-	-	-	-
Engineering Graphics	-	-	-	-
Engineering Graphics	EGN 1111C	3	3	3
-	-	-	-	-
Engineering	-	-	-	-
Fundamentals of Engineering	EGN 1002	3	3	3
Introduction to Programming in Python	COP 3035C	3	3	3
Statics	EGN 3311	3	3	3
Dynamics	EGN 3321	3	3	3
Circuits	EEL 3111	3	3	3
Signals & Digital Filter Design	EEL 3502		3	3
Controls	EEL 4652C		-	3
Fluid Mechanics	EML 3701		3	3
Strengths of Materials	EGN 3331	3		3
Biomedical Instrumentation	BME 4503C	3	3	3
Orthopedic Biomechanics	BME 4201	3	3	3
Biomedical Signal Processing	BME 4509		3	3
Intro to Bio-Imaging	BME 4536		3	-
Microfabrication Technology	BME 4583		3	-
Intro to Robotics	EML 4800			3

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Nuero-Mechanics	BME 4364			3
Advanced Robotic Lab	BME XXXX			3
Biomaterials	BME 4100	3	3	
Methods in Biomedical Research	BME 4070C	3	3	3
Engineering Design				
Engineering Design I	EGN 4950C or EML4521C	3	3	3
Engineering Design II	EGN 4952C or EML4551	3	3	3
Technical Electives		6	6	9
	Total Credits:	120	120	86

Notes:

1. Contributes to University Core Curriculum.
2. Contributes to Writing Across Curriculum (Gordon Rule) writing.
3. General Education 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.~~5. 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.