

BIOENGINEERING (B.S.)

Bioengineering plays an important role in transforming discoveries at the intersection of engineering, the life sciences, and health care into innovative new products and capabilities. By combining engineering principles with biology and physiology from the molecular, cell, and tissue level up to the human form, bioengineers solve problems to help improve human health and quality of life. Upon graduation, bioengineers can work in the medical device and biotechnology industries, in health care and research, and for government agencies, such as the Food and Drug Administration (FDA).

The Bachelor of Science (B.S.) in Bioengineering emphasizes the application of new technology to biomaterials, biomechanics, and biomedical tools and procedures. Students learn how to solve problems associated with interactions between living and non-living materials and systems. They complete core courses common to all engineering majors as well as specialized courses in bioengineering. With the addition of another 4-credit general biology course, graduates will also meet the prerequisites for most medical schools.

Program Progression and Additional Graduation Requirements

Students admitted to FGCU as a degree seeking student in good academic standing may declare a major in engineering. All engineering majors must satisfy the academic milestones as described in the student guidebook. Refer to the Bioengineering (B.S.) Student Guidebook for further information on milestones.

In addition to the program requirements, students must:

- Complete a minimum of 129 credits.
- Complete at least 48 of the 129 credits at the upper division (3000-4999 level).
- Earn a cumulative GPA of 2.0 for all coursework attempted at FGCU.
- Satisfy the College-Level Skills and foreign language entrance requirements.
- Satisfy the Service-Learning requirement.
- Satisfy Civic Literacy requirement.
- Satisfy the residency requirement: 32 of the last 60 credits, including 12 credits in the major must be completed at FGCU. Also, BME 4884 Bioengineering Senior Design I and BME 4885 Bioengineering Sr Design II must be taken at FGCU.
- Complete the summer course enrollment requirement.
- Submit an application for graduation by the deadline listed in the FGCU Academic Calendar.

Program Requirements

Code Title Credits
FGCU General Education Program (<https://www.fgcu.edu/academics/undergraduatelstudies/generaleducation/>)

To prevent or minimize excess hours, select general education courses that satisfy common prerequisite requirements for your intended major.

Common Prerequisites

For this major, common prerequisite courses with an asterisk (*) require prior knowledge and skills demonstrated through degree acceleration programs (e.g., the College Board's Advanced Placement Program [AP], International Baccalaureate Program [IB], College-Level Examination Program [CLEP], Advanced International Certificate of Education Program [AICE]); dual enrollment; placement exam; or college coursework.

A minimum grade of C is required in each course

BSC 1010C	General Biology with Lab I (Acceptable Substitute: [BSCX010 and (BSCX010L or BSCX044L)] or BSCX010C)	4
CHM 1045 & 1045L	General Chemistry I and General Chemistry I Laboratory (Acceptable Substitute: (CHMX045 and CHMX045L) or CHMX045C or CHSX440C or (CHMX095 and CHMX095L) or (CHSX440 and CHSX440L)) ^{*, 1}	4
CHM 1046 & 1046L	General Chemistry II and General Chemistry II Lab (Acceptable Substitute: CHMX046C or (CHMX046 and CHMX046L) or (CHMX096 and CHMX096L))	4
CHM 2210 & 2210L	Organic Chemistry I and Organic Chemistry I Laboratory (Acceptable Substitute: CHMX210C or (CHMX210 and CHMX210L) or CHMX217)	4
MAC 2311 & MAC 2312 & MAC 2313	Calculus I and Calculus II and Calculus III (Acceptable Substitute: (MACX311 and MACX312 and MACX313) or (MACX281 and MACX282 and MACX283)) ^{*, 2}	12
MAP 2302	Differential Equations (Acceptable Substitute: MAPX302 or MAPX305 or ECHX301)	3
PHY 2048 & 2048L	General Physics I and General Physics I Laboratory (Acceptable Substitute: PHYX048C or [PHYX048 and (PHYX048L or PHYX064L)])	4
PHY 2049 & 2049L	General Physics II and General Physics II Laboratory (Acceptable Substitute: PHYX049C or [PHYX049 and (PHYX049L or PHYX064L)])	4
STA 2023	Statistical Methods (Acceptable Substitute : STAX023 or STAX037)	3

Engineering Common Core (10 credits)

A minimum grade of C is required in each course

EGM 3420C	Engineering Mechanics	4
EGN 1041C	Computational Tools for Eng	2
EGN 3060C	Intro to Mechatronic Design	3
EGS 1006L	Intro to the Engineering Prof.	1

Required Courses in the Major (47 credits)

A minimum grade of C is required in each course

BME 3100C	Introduction to Biomaterials	3
BME 3261C	Biofluid Mechanics	3
BME 3403C	Human Physiology Engineers I	3
BME 3404C	Human Physiology Engineers II	3
BME 3506C	Circuits for Bioengineers	3
BME 3507C	Signals Syst Bioengineers	3

BME 4211C	Biomechanics	3
BME 4332C	Cellular & Tissue Engineering	3
BME 4503C	Biomedical Instrumentation	3
BME 4632C	Biotransport Phenomena	3
BME 4722	Health Care Engineering	3
BME 4800C	Bioengineering Product Design	3
BME 4884	Bioengineering Senior Design I	2
BME 4885	Bioengineering Sr Design II	3
EGN 3433C	Design for Manufacturing	3
Complete one from the following:		
BME 3101C	Bio Performance of Materials ³	3
BME 4504C	Bioelectricity ³	3
BME 4513C	Bioengineering Data Acqn&Ctrl ³	3
BME 4930	Special Topics Bioengineering ³	3

Restricted Electives in the Major (6 credits)

A minimum grade of C is required in each course

The Restricted Electives must total a minimum of 6 credits, are typically upper division (3000-4999 level), and can include any of the following or other selected courses as approved by the Academic Unit housing the degree program or major (assuming all course prerequisites are fulfilled). Restricted electives in general should provide increased depth in engineering, science, business, entrepreneurship, mathematics or another area that is pertinent to a career served by the Bioengineering (B.S.) degree.

For depth in engineering and bioengineering		
BME 3101C	Bio Performance of Materials ³	3
BME 4504C	Bioelectricity ³	3
BME 4513C	Bioengineering Data Acqn&Ctrl ³	3
BME 4930	Special Topics Bioengineering ³	1-3
EGN 3343C	Thermodynamics	3
EGN 3441C	Data Sci & Eng Sys Analysis	3
EGN 3641C	Engineering Entrepreneurship	3
For depth in biology and biotechnology		
PCB 3023C	Cell Biology	4
PCB 3063C	Genetics	4
PCB 4233C	Immunology	3
MCB 2010C	Microbiology with Lab	4
MCB 3020C	General Microbiology	4
For depth in chemistry and biochemistry		
BCH 3023C	Biochemistry	3
CHM 2211 & 2211L	Organic Chemistry II and Organic Chemistry II Laborator	4
CHM 3120	Analytical Chemistry	3
CHM 3120L	Analytical Chemistry Lab	1
For depth in mathematics, modeling, and computation		
MAD 3107	Discrete Mathematics	3
MAD 4401	Numerical Analysis	3
MAP 3161	Math for Science & Engineering	4
MAS 3105	Linear Algebra	3
MHF 2191	Mathematical Foundations	3
For depth in business and entrepreneurship		
ENT 3004	Entrepreneurship & Creativity	3
MAN 3025	Principles of Management	3

MAN 3046	Leading Teams	3
MAN 3600	International Business	3
MAR 3023	Introduction to Marketing (junior standing required)	3
Pre-med and other health professions students should typically take		
BCH 3023C	Biochemistry	3
CHM 2211 & 2211L	Organic Chemistry II and Organic Chemistry II Laborator	4
Sustainability Course Graduation Requirement		(3 credits)

Select at least 3 credits in sustainability coursework (SCGR Attribute)

Additional Electives

As needed to reach total credit hours required for the degree

- ¹ Prerequisites of MAT 1033 Intermediate Algebra minimum grade of C then MAC 1105 College Algebra minimum grade of C; or relevant accelerated credit; or placement exam
- ² Prerequisites of MAT 1033 Intermediate Algebra minimum grade of C then MAC 1105 College Algebra minimum grade of C then MAC 1147 Precalculus minimum grade of C; or relevant accelerated credit; or placement exam
- ³ Courses used to satisfy a required course in the major cannot be used to satisfy a restricted elective.

Total Credits Required: 129