



U.A. Whitaker College of Engineering

**Bioengineering Program Guidebook**

AY2018-2019

Forward  
Chair's Welcome

Welcome to the 2018-2019 Academic Year at Florida Gulf Coast University (FGCU), U.A. Whitaker College of Engineering.

The Bioengineering Program Guidebook is designed to assist you with the standards, policies, procedures and guidelines that will help you have a positive academic experience. Please be aware that the policies, guidelines and forms contained in this Bioengineering Program Guidebook remain under review and any section or part may be revised without notice or obligation during your tenure in the program.

It is your responsibility to read the FGCU University Academic Catalog 2018-2019, FGCU Student Guidebook, and the Student Code of Conduct and to follow all guidelines, rules and regulations as they relate to FGCU, The U.A. Whitaker College of Engineering and the Bioengineering Program.

I hope this is a rewarding and successful year for you.

Sincerely,

Chris Geiger, Ph.D.  
Chair, Bioengineering  
Associate Professor  
U.A. Whitaker College of Engineering

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## Introduction

### College of Engineering Vision and Mission

#### Vision

To provide the best value in high-quality engineering education.

#### Mission

To produce engineering leaders in selected disciplines with strong technical competence and professional skills to meet the challenges of Southwest Florida and beyond.

## Bioengineering Overview

Bioengineering, synonymous at Florida Gulf Coast University (FGCU) with the term "biomedical engineering," is the discipline that advances and makes use of knowledge in engineering, the life sciences, physical sciences, mathematics and medicine for the betterment of mankind. Bioengineers work to help people by improving human health through interdisciplinary activities that integrate engineering and life sciences with biomedical sciences and clinical practice. Bioengineers pursue a wide variety of careers in both public and private sectors that make use of their unique skills. For example, in the medical device and biotechnology industries, bioengineers may work to design, develop, manufacture or market new surgical instruments, implants, medical equipment, software, technologies, or therapies. Within the field of health care, bioengineers work closely with other health care professionals such as doctors, nurses, physical therapists, or rehabilitation specialists. At federal agencies such as the Food and Drug Administration, bioengineers hold important jobs in government service focused on ensuring that medical and biologic devices in our country are safe and effective. Bioengineers can also pursue advanced degrees in our field at the Masters and Doctorate level to become better qualified to undertake careers in research, working in cutting edge areas such as cell and tissue engineering, or advanced medical imaging technologies. For those students interested in professional degree programs such as health professions or law school, an undergraduate degree in Bioengineering is an excellent stepping-stone for entry into those schools and careers as well.

The [Bureau of Labor Statistics](#) lists Bioengineering/Biomedical Engineering as one of the top engineering careers for the next decade. Employment of bioengineers and biomedical engineers is projected to grow by 23% from 2014 to 2024. This projected growth rates is over three times the average growth rate for all professions combined in the United States.

## Bioengineering Mission and Vision

The FGU Bioengineering Undergraduate Program will be recognized for excellence in high value education that:

- Delivers graduates with a strong foundation in engineering and the life and physical sciences who are well prepared for careers in a variety of environments, including the medical device industry, health care, and biotechnology.
- Prepares graduates to be valued contributors in their chosen fields, as well as for further graduate study and professional training.
- Provides an entrepreneurial and service oriented environment and curriculum that values diversity, professionalism, and collaboration across multiple disciplines.

## Program Educational Objectives and Student Outcomes

The Bioengineering Program has formulated the following Program Educational Objectives, which describe the career and professional accomplishments that our B.S. Bioengineering degree program is preparing graduates to attain. In support of these objectives, the faculty have also identified the following Student Outcomes, which describe what students are expected to know and be able to do by the time of graduation.

### Program Educational Objectives

**Graduates of the FGCU B.S. Bioengineering degree program are expected to attain within a few years of graduation:**

- technical competence as bioengineers and recognition as contributors in their communities as professionals or in the pursuit of advanced education,
- accomplishment in communicating and working collaboratively in a diverse, dynamic, multidisciplinary environment, and
- proficiency in making use of entrepreneurial and/or learning skills to successfully adapt to a global society.

### Student Outcomes

**Students by the time of graduation will have attained:**

- an ability to apply knowledge of mathematics, science, and engineering;
- an ability to design and conduct experiments, as well as to analyze and interpret data;
- an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, manufacturability, sustainability, ethical, health and safety;
- an ability to function on multi-disciplinary teams;
- an ability to identify, formulate, and solve engineering problems;
- an understanding of professional and ethical responsibility;
- an ability to communicate effectively;
- the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
- a recognition of the need for, and an ability to engage in life-long learning;
- a knowledge of contemporary issues;
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

## Bioengineering Program Requirements

Program specific requirements as well as general education and university requirements are included in the University Academic Catalog. Links to the specific pages in the catalog are listed below.

The General Education Program Website is located at [http://www.fgcu.edu/general\\_education](http://www.fgcu.edu/general_education)  
**To prevent or minimize excess hours, select general education courses that satisfy common prerequisite requirements for your intended major.**

Program requirements for the B.S. in Bioengineering program can be found within the University Academic Catalog, located at <http://www.fgcu.edu/Catalog/uwsedetail.asp?ID=6>. This link provides program specific information including:

- Common Prerequisites
- Engineering Common Core
- Required Courses in the Major
- Restricted Electives
- University Requirements
- Additional Electives
- Additional Graduation Requirements

## Timely Progression Toward Degree

The U.A. Whitaker College of Engineering (WCE) uses academic milestones to monitor academic progress throughout the major. This monitoring ensures that students are on track for graduation in a timely fashion. In addition, transfer students must meet mapping guidelines to be accepted into their majors. A sample schedule for the bioengineering program is provided below. This sample schedule serves as a general guideline to help the student build a full schedule each term.

Missing any of the milestones listed below will result in registration holds. Students are allowed no more than two milestone non-compliance issues in the bioengineering program. The first missed milestone in the major results in a hold being placed on the student's account, requiring students to meet with their advisor for additional assistance prior to registration for the subsequent semester. At this time, remaining milestone deadlines may be adjusted per the student's plan to graduation. If a student is in non-compliance with the milestones for a second time, a hold is placed on the student's account and the student will be required to meet with an advisor to change majors.

For the B.S. in Bioengineering, the following milestones must be successfully completed, along with maintaining an overall GPA of 2.0 or higher at all times. Note that the semester number refers to the number of semesters after a student enters the WCE.

- Meet with an engineering academic advisor and have a smart plan on file by the end of Semester 1. Smart plans will be completed with the advisor and available to the student through Canvas.
- Complete MAC 2311 with a minimum grade of "C" by the end of the summer following Semester 2.
- Complete EGN 1041C with a minimum grade of "C" by the end of Semester 3.
- Complete MAC 2312, PHY 2048C and BSC 1010C with a minimum grade of "C" by the end of Semester 4.
- Complete EGM 3420C with a minimum grade of "C" by the end of Semester 5.
- Complete EGN 3433C, MAP 2302 and CHM 1046C with a minimum grade of "C" by the end of the summer following Semester 6.
- Make a graduation check appointment with advising by the beginning of Semester 7.
- Complete BME 3403C with a minimum grade of "C" by the end of Semester 7.
- Apply for graduation by the deadline in Semester 7.

## Sample Course Schedule

<b>Freshman Year</b>				
Course	Course Title	Credit	Prerequisites	Milestones
<b>Fall (Semester 1)</b>				
<b>EGS 1006L</b>	Intro to Engineering Profession	1	MAC 1147	Meet with Engineering Advisor and develop a SMART plan.
<b>ENC 1101</b>	Composition I (W)	3		
<b>XXX XXXX</b>	Humanities* STATE CORE	3		
<b>MAC 2311</b>	Calculus I	4	MAC 1147	
<b>BSC 1010C</b>	General Biology I w/lab	4		
	<b>Total</b>	<b>15</b>		

<b>Spring (Semester 2)</b>				
<b>EGN 1041C</b>	Computational Tools for Engineering	2	MAC 2311 & EGS 1006L	Overall GPA $\geq$ 2.00
<b>PHY 2048C</b>	General Physics I w/lab	4	MAC 2311	
<b>MAC 2312</b>	Calculus II	4	MAC 2311	
<b>ENC 1102</b>	Composition II (W)	3	ENC 1101	
<b>XXX XXXX</b>	Humanities	3		
	<b>Total</b>	<b>16</b>		

<b>Summer</b>				
<b>XXX XXXX</b>	Social Science STATE CORE (recommend ECO 2013)	3		Complete MAC 2311 with a "C" or better by end of summer
<b>XXX XXXX</b>	Social Science – (POS 2041 or AMH 2020 recommended)	3		
<b>XXX XXXX</b>	Humanities	3		
	<b>Total</b>	<b>9</b>		

<b>Sophomore Year</b>				
<b>Fall (Semester 3)</b>				
<b>EGM 3420C</b>	Engineering Mechanics	4	PHY 2048C	Complete EGN 1041C with a "C" or better
<b>MAC 2313</b>	Calculus III	4	MAC 2312	
<b>CHM 1045 &amp; CHM 1045L</b>	Gen Chemistry I w/lab	4	MAC 1105	
<b>PHY 2049C</b>	General Physics II w/lab	4	PHY 2048C	
	<b>Total</b>	<b>16</b>		

<b>Spring (Semester 4)</b>				
<b>EGN 3433C</b>	Design For Manufacturing	3	EGN 1041C, PHY 2048C & MAC 2312	Overall GPA $\geq$ 2.00
<b>STA 2037 / STA 2023 / STA X032</b>	Statistics with Calculus <b>OR</b> Statistical Methods <b>OR</b> Applied	3	MAC 2311 OR MAC 1105	Complete MAC 2312, PHY 2048C, & BSC 1010C with a "C" or better

	Statistics for Engineers and Scientists			
<b>MAP 2302</b>	Diff Equations	3	MAC 2312	
<b>CHM 1046 &amp; CHM 1046L</b>	Gen Chemistry II w/lab	4	CHM 1045C or CHM 1045 & CHM 1045L	
	<b>Total</b>	<b>13</b>		

<b>Junior Year</b>				
<b>Fall (Semester 5)</b>				
<b>EGN 3641C</b>	Engineering Entrepreneurship	3	EGN 3433C	Complete EGM3420C with a "C" or higher  Overall GPA $\geq$ 2.00
<b>CHM 2210 &amp; CHM 2210L</b>	Organic Chemistry I w/lab	4	CHM 1046C or CHM 1046 and CHM 1046L	
<b>BME 3100C</b>	Introduction to Biomaterials	3	EGN 3420C & STA 2037 or STA 2023	
<b>BME 3403C</b>	Human Physiology Engineers I	3	EGN 1041C, BSC 1010C, CHM 1046C, PHY 2049C & MAP 2302	
<b>BME 3506C</b>	Circuits for Bioengineers	3	EGN 1006L, PHY 2049C & MAP 2302	
	<b>Total</b>	<b>16</b>		

<b>Spring (Semester 6)</b>				
<b>BME 3404C</b>	Human Physiology Engineers II	3	BME 3403C	Overall GPA $\geq$ 2.00  Complete EGN 3433C, MAP 2302 & CHM 1046C with a "C" or higher by the end of the summer following semester 6
<b>BME 3507C</b>	Signals Syst Bioengineers	3	BME 3506C, BME 3403C & MAC 2313	
<b>BME 4800C</b>	Bioengineering Product Design	3	BME 3100C, BME 3403C & BME 3403C	
<b>BME 4722</b>	Health Care Engineering	3	EGN 3433C, BME 3403C, and (STA 2037 or STA 2023)	
<b>BME 3101C</b>	Biological Performance of Materials	3	BME 3100C	
	<b>Total</b>	<b>15</b>		

<b>Senior Year</b>				
<b>Fall (Semester 7)</b>				
<b>BME 4884</b>	Bioengineering Senior Design I	2	EGN 3641C, BME 3101C, BME 3507C BME 4722 & BME 4800C	Complete a graduation check with engineering advisor and apply for graduation at the beginning of semester 7
<b>BME 4211C</b>	Biomechanics	3	BME 3100C & BME 3404C	
<b>BME 4503C</b>	Biomedical Instrumentation	3	BME 3507C	Complete BME 3403C with a “C” or better by the end of semester 7
<b>BME 3261C</b>	Biofluid Mechanics	3	BME 3404C & MAC 2313	
<b>XXX XXXX</b>	Technical Elective 1**	3		
	<b>Total</b>	<b>14</b>		

<b>Spring (Semester 8)</b>				
<b>BME 4885</b>	Bioengineering Sr Design II	3	BME 4884	Overall GPA $\geq$ 2.00
<b>BME 4513C</b>	Data Acquisition and Control in Bioengineering	3	BME 4503C	
<b>BME 4632C</b>	Biotransport Phenomena	3	BME 3261C	
<b>IDS 3920</b>	University Colloquium (W)	3	Sophomore Standing	
<b>XXX XXXX</b>	Technical Elective 2**	3		
	<b>Total</b>	<b>15</b>		

## Course Repeat Policy

An undergraduate Bioengineering degree requires 129 semester credit hours for graduation. In order to ensure that students remain on track for a timely graduation, the program has implemented a course repeat policy as described below. For the purposes of this policy, Bioengineering majors must earn a grade of “C” or better in all classes listed in: common program prerequisites, engineering common core, required courses in the major and restricted electives. Withdrawals and grade forgiveness are considered non-progression, and are subject to the course repeat policy.

Within Bioengineering, students may not exceed three repeats in total for all required courses in the program, nor exceed two repeats for any single course. In addition, students are only allowed a single repeat for **one** of the following core pre-requisite courses: Calculus I, Calculus II, General Chemistry I, General Physics I and EGS1006L, Introduction to the Engineering Profession. Exceeding the allowable number of repeats for the core pre-requisite courses listed above, a single course, or in total for the program will result in a hold being placed on the

student's account, requiring the student will be required to meet with an advisor to change majors.

## Advising

Academic advising by designated WCE advisors is provided to maintain the standards of the program and to guide each student. The purpose of academic advising is to assist the student in his/her academic progression throughout the program. Additional information can be found at <http://www.fgcu.edu/Eng/advising.html>

Academic advisors also provide the following services for students:

- Academic advising and program information for current and potential students
- Referral to faculty mentors and campus resources for career planning
- Communication regarding internship opportunities
- Orientation for students applying for admission to the school
- Assistance with issues related to registration and academic standing
- Evaluation of academic transcripts and articulation of transfer credits
- Maintenance of academic advising records and degree audits
- Certification of graduation

**Students are expected to take primary responsibility to meet with their academic advisor on a regular basis to insure completion of all requirements for graduation.**

In addition to academic advising, all students are assigned faculty mentor. Students are required to meet with their faculty mentor prior to registering for classes **each semester starting in the term the student is enrolled in EGM 3420C**. Faculty mentors provide career specific guidance including:

- Service Learning Opportunities
- How to Establish relationships with Faculty and Industry
- Internships
- Technical Electives
- SMART Plan Updates
- Undergraduate Research & Lab Work
- Career Goals
- Plans after Graduation
  - Grad School
  - Job Search

## Standards of Conduct

All students are expected to demonstrate honesty in their academic pursuits. In safeguarding the essential professional standards of honesty and integrity, faculty are compelled to apply

academic sanctions which can be as severe as dismissal from the Bioengineering Program. The University policies regarding Standards of Conduct can be found on the Dean of Students' Office website under Student Resources:

[https://www2.fgcu.edu/generalcounsel/files/regulations/FGCU\\_4002\\_StudentCode\\_04112017.pdf](https://www2.fgcu.edu/generalcounsel/files/regulations/FGCU_4002_StudentCode_04112017.pdf)

## Appeal Process - Grades

In accordance with University guidelines, students may appeal the following:

- Grades or other academic action taken by an instructor.
- Grades resulting from an instructor's:
  - Alleged deviation from established and announced grading policy.
  - Alleged errors in application of grading procedures.
  - Alleged lowering of grades for non-academic reasons.

Please refer to the FGCU Office of Judicial Affairs for the complete Student Grade Appeals process for DEPARTMENT LEVEL, COLLEGE LEVEL and FINAL APPEAL, available online at

[https://www2.fgcu.edu/studentguidebook/Student\\_Grade\\_Appeal\\_Procedure\\_\(Guidebook\).pdf](https://www2.fgcu.edu/studentguidebook/Student_Grade_Appeal_Procedure_(Guidebook).pdf)

## Attendance and Punctuality

An expectation of professional practice is that students attend all classes, laboratory experiences, class demonstrations, field trips and other academic experiences. Responsibility and accountability for meeting course obligations is a fundamental component of professionalism.

### In Classroom:

Students assume responsibility for attending all classes, however in the event a class period is missed, the student is responsible for all material covered and all announcements. Further, punctuality and attentiveness is courteous behavior exemplified by:

- Being on time and remaining for the entire class period.
- Remaining in the classroom until a break or end of the period
- Turning off cell phone and other communication devices.

## Civility

The learning environment (classroom, laboratories, field trips, hallways, offices etc.) in which students gain knowledge, values, and competencies is co-created by all who enter into this environment. Students in the WCE conform to, and express themselves in conventional patterns of social behavior. Such behavior is consistently expressed through social politeness, keen sensitivity, respect, and courteous treatment to others.

## E-mail Policy

E-mail is an important communication tool used in the WCE. Upon admission to FGCU, all students are assigned an e-mail address that is accessible from any computer via the web page located at FGCU Webmail at <http://email.fgcu.edu/>.

The FGCU assigned eagle e-mail address is the **only** address used by WCE faculty to communicate with students via e-mail. Students are responsible and accountable for information sent via this e-mail address and should frequently check e-mails. Faculty in the WCE may use

email to communicate information, announcements, and memoranda. Course information such as assignments, handouts, and schedule changes may also be communicated through the email function in the Canvas Learning Management System.

Students should contact the FGCU Computing Services Helpdesk at [Trackit@fgcu.edu](mailto:Trackit@fgcu.edu) or (239) 590-1188 for issues associated with email. The ability to receive and read e-mail, open attachments, and access online information is vital to student success in the WCE.

## Grading System

In the WCE, a grade of “C” or better constitutes satisfactory progression. A grade of C- does not constitute satisfactory course completion. It is the responsibility of the student to read and understand the course syllabus and grading policy for each class.

## Test Taking Policy

The Bioengineering Department has adopted a program-wide policy for all tests, quizzes and exams (denoted as exam) in program-specific courses. The following policies will be applied for all exams unless explicitly stated by the instructor of record:

- Calculators used on for exam purposes must conform to the NCEES standards for the Fundamentals of Engineering Exam. The list of approved calculators can be found at the following link: <https://ncees.org/exams/calculator-policy/> The FGCU library has approved calculators available for student use.
- Students may not leave and re-enter a classroom while an exam is in progress. If a student must leave during an exam, the exam must be submitted to the instructor. The instructor will treat the submission as a final exam submission.
- Cell phones, tablets, computers and other electronic devices are not allowed on or near work surfaces during an exam.

## Student Grievance Procedure

The university grievance procedure can be found at [https://www2.fgcu.edu/studentguidebook/Student\\_Grievance\\_Procedure\\_\(Guidebook\).pdf](https://www2.fgcu.edu/studentguidebook/Student_Grievance_Procedure_(Guidebook).pdf)

## Undergraduate Student Workload Policy

The Bioengineering Program is rigorous and demanding of time, energy, and talent. When making decisions about employment, students are to carefully consider workload expectations of credit hours registered for at FGCU. For example, a 3 credit hour course requires 3 hours classroom plus a minimum of 9-10 additional hours of study time outside of the classroom each week. **Students are expected to make realistic employment decisions as to the hours worked outside of the University, and will not use these decisions as an excuse for failing to meet academic and practice performance standards. Students are also responsible in ensuring their work schedule does not conflict with the Bioengineering Program’s class schedule.**

## General Information

### Canvas

“Canvas” is the name of the FGCU Learning Management System. Information about Canvas and the log-in page can be found at <https://canvas.fgcu.edu/index.asp>

### College Forms

The following WCE forms can be found online at <http://www.fgcu.edu/Eng/advising.html>

- Request to Change Major/Minor/Catalog Year
- Course Withdrawal Form
- Grade Forgiveness Applications
- Request for Dual Major/Degree
- WCE Appeal for Late Withdrawal Without Academic Penalty
- WCE Incomplete Grade Agreement Form

### Confidentiality and Privacy Rights

Cognizance of, and respect for, rights and privileges of others is an expectation of all within the helping professions. Faculty honor and respect the student’s privacy rights and conform to FERPA requirements. Students honor, respect, and maintain confidences and privacy of clients and conform to HIPPA requirements. All student-client encounters, written, oral, or other, obligate confidentiality under all circumstances. For written assignments, only client initials are used as identifiers.

### Disability Accommodations Services

FGCU, in accordance with the Americans with Disabilities Act and the university’s guiding principles, will provide classroom and academic accommodations to students with documented disabilities. If you need to request an accommodation in this class due to a disability, or you suspect that your academic performance is affected by a disability, please contact the Office of Adaptive Services. The Office of Adaptive Services is located in the Wellness Building. The phone number is 239-590-7956 or TTY 239-590-7930

### Distance-Learning

Information on distance learning courses and technology requirements is available online at <http://www.fgcu.edu/distance/>

### Name and Address Change

It is the student’s responsibility to report any name or address change to the Office of the Registrar.

### Scholarships

FGCU offers University Foundation Scholarships awarded on the basis of academic achievement, financial need, and/or other specifications set by donors. To apply for FGCU Foundation Scholarships, students must fill out the online scholarship application. The

application will be available on-line annually between November 15th and March 1st for the following academic year. Useful link for scholarship information is <https://www.fgcu.edu/admissionsandaid/financialaid/graduate/typesofaid/scholarships.aspx>

### Service Learning

Information on service learning at FGCU is available online at <http://www.fgcu.edu/Connect/index.html>

### Student Observance of Religious Holidays

All students at FGCU have a right to expect that the University will reasonably accommodate their religious observances, practices, and beliefs. Students, upon prior notification to their instructors, shall be excused from class or other scheduled academic activity to observe a religious holy day of their faith. Students shall be permitted a reasonable amount of time to make up the material or activities covered in their absence. Students shall not be penalized due to absence from class or other scheduled academic activity because of religious observances. Where practicable, major examinations, major assignments, and University ceremonies will not be scheduled on a major religious holy day. A student who is to be excused from class for a religious observance is not required to provide a second party certification of the reason for the absence.