



FLORIDA
GULF COAST
UNIVERSITY

U.A. WHITAKER
COLLEGE OF
ENGINEERING

U.A. Whitaker College of Engineering

Bioengineering Program Guidebook

AY2019-2020

Forward
Chair's Welcome

Welcome to the 2019-2020 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 2019-2020, 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 and construction 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 growing 4% over the next decade (2018-2028), equal to the average growth for all occupations. As described by the Bureau, "Increasing numbers of technologies and applications to medical equipment and devices, along with the medical needs of a growing and aging population, will require the services of biomedical engineers."

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 identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics;
- 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;
- an ability to communicate effectively with a range of audiences;
- 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;
- 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;
- an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions;
- an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

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 [here](#).

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 [here](#). 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 2312 with a minimum grade of "C" by the end of the summer following Semester 2.
- Complete EGN 1041C and BSC 1010C with a minimum grade of "C" by the end of Semester 3.
- Complete MAP 2302 and CHM 1046C with a minimum grade of "C" by the end of Semester 4.
- Complete EGM 3420C and PHY 2049C with a minimum grade of "C" by the end of Semester 5.
- Complete EGN 3433C and BME 3403C 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 3100C and BME 3506C with a minimum grade of "C" by the end of Semester 7.
- Apply for graduation by the deadline in Semester 7.

Sample Course Schedule

Freshman Year				
Course	Course Title	Credit	Prerequisites	Milestones
Fall (Semester 1)				
EGS 1006L	Intro to Engineering Profession	1	MAC 1147	Overall GPA \geq 2.00 Meet with Engineering Advisor and develop a SMART plan.
ENC 1101	Composition I (W)	3		
XXX XXXX	Humanities* STATE CORE	3		
MAC 2311	Calculus I	4	MAC 1147	
CHM 1045 & CHM 1045L	Gen Chemistry I w/lab	4	MAC 1105	
	Total	15		

Spring (Semester 2)				
EGN 1041C	Computational Tools for Engineering	2	MAC 2311 & EGS 1006L	Overall GPA \geq 2.00
PHY 2048C	General Physics I w/lab	4	MAC 2311	
MAC 2312	Calculus II	4	MAC 2311	
ENC 1102	Composition II (W)	3	ENC 1101	
CHM 1046 & CHM 1046L	Gen Chemistry II w/lab	4	CHM 1045C or CHM 1045 & CHM 1045L	
	Total	17		

Summer				
XXX XXXX	Social Science STATE CORE (recommend ECO 2013)	3		Overall GPA \geq 2.00
XXX XXXX	Social Science – (POS 2041 or AMH 2020 recommended)	3		Complete MAC 2312 with a “C” or better by end of summer
XXX XXXX	Humanities	3		
	Total	9		

Sophomore Year				
Fall (Semester 3)				
EGM 3420C	Engineering Mechanics	4	PHY 2048C	Overall GPA \geq 2.00
MAP 2302	Diff Equations	3	MAC 2312	
BSC 1010C	General Biology I w/lab	4		Complete EGN 1041C and BSC 1010C with a “C” or better
PHY 2049C	General Physics II w/lab	4	MAC 2312 & PHY 2048C	
	Total	15		

Spring (Semester 4)				
EGN 3433C	Design For Manufacturing	3	EGN 1041C & PHY 2048C	Overall GPA \geq 2.00 Complete MAP 2302 & CHM 1046C with a "C" or better
STA 2037 / STA 2023 / STA X032	Statistics with Calculus OR Statistical Methods OR Applied Statistics for Engineers and Scientists	3	MAC 2311 OR MAC 1105	
MAC 2313	Calculus III	4	MAC 2312	
BME 3403C	Human Physiology Engineers I	3	EGN 1041C, BSC 1010C, CHM 1046C, MAP 2302 & PHY 2048C	
	Total	13		

Junior Year				
Fall (Semester 5)				
EGN 3641C	Engineering Entrepreneurship	3	EGN 3433C	Overall GPA \geq 2.00 Complete EGM3420C and PHY 2049C with a "C" or higher
CHM 2210 & CHM 2210L	Organic Chemistry I w/lab	4	CHM 1046C or CHM 1046 and CHM 1046L	
BME 3100C	Introduction to Biomaterials	3	EGN 3420C, STA 2037 or STA 2023 & CHM 1046C or CMH 1046 and CHM 1046L	
BME 3404C	Human Physiology Engineers II	3	BME 3403C & PHY 2049C	
BME 3506C	Circuits for Bioengineers	3	PHY 2049C & MAP 2302	
	Total	16		

Spring (Semester 6)				
XXX XXXX	Humanities	3		Overall GPA \geq 2.00 Complete EGN 3433C & BME 3403C with a "C" or higher by the end of the summer following semester 6
BME 3507C	Signals Syst Bioengineers	3	BME 3506C & BME 3403C	
BME 4800C	Bioengineering Product Design	3	BME 3100C, BME 3403C & EGN 3433C	
BME 4722	Health Care Engineering	3	BME 3100C	
BME 3101C	Biological Performance of Materials	3	BME 3100C & BME 3403C	
	Total	15		

Senior Year				
Fall (Semester 7)				
BME 4884	Bioengineering Senior Design I	2	EGN 3641C, BME 3101C, BME 3507C BME 4722 & BME 4800C	Overall GPA \geq 2.00 Complete a graduation check with engineering advisor
BME 4211C	Biomechanics	3	BME 3100C & BME 3403C	
BME 4503C	Biomedical Instrumentation	3	BME 3507C & BME 3404C	Apply for graduation prior to University deadline
BME 3261C	Biofluid Mechanics	3	BME 3404C & MAC 2313	
XXX XXXX	Technical Elective 1**	3		
	Total	14		Complete BME 3100C and BME 3506C with a “C” or better

Spring (Semester 8)				
BME 4885	Bioengineering Sr Design II	3	BME 4884	Overall GPA \geq 2.00
BME 4513C	Data Acquisition and Control in Bioengineering	3	BME 3506C	
BME 4632C	Biotransport Phenomena	3	BME 3261C	
IDS 3920	University Colloquium (W)	3	Sophomore Standing	
XXX XXXX	Technical Elective 2**	3		
	Total	15		

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 [here](#).

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 online through the Office of Student Conduct [website](#).

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 [here](#).

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](#).

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 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](#). 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 [here](#).

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 [here](#).

College Forms

The following WCE forms can be found online [here](#).

- 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

Florida Gulf Coast University, 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 see me or 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 Video Phone (VP) 239-243-9453. In addition to classroom and campus accommodations, individuals with disabilities are encouraged to create their personal emergency evacuation plan and FGCU is committed to providing information on emergency notification procedures. You can find information on the emergency exits and Areas of Rescue Assistance for each building, as well as other emergency preparedness materials on the Environmental Health and Safety and University Police Department websites. If you will need assistance in the event of an emergency due to a disability, please contact Adaptive Services for available services and information.

Counseling and Psychological Services (CAPS)

CAPS provides free counseling and therapy services (including psychiatry) to all FGCU students. Please walk in to the second floor Howard Hall office any week day between 8:30 and 4:30 to schedule an initial contact appointment. Visit the CAPS website at www.fgcu.edu/caps for more information. CAPS offers a 24/7 Helpline at (239) 745-3277 (EARS).

Distance-Learning

Information on distance learning courses and technology requirements is available online at [here](#).

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 [here](#).

Service Learning

Information on service learning at FGCU is available online [here](#).

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.