FIU Arts, Sciences & Education
School of Environment, Arts and Society

Department of Biological Sciences

BACHELOR OF SCIENCE

PROGRAM OF STUDY

Biotechnology Track
(BIOL:BS/ BIOTECH)

Revised for Fall 2024. Please meet with your advisor each semester for the latest advising sheet, as program requirements, distribution designations and/or prerequisites may change.

PLEASE READ COURSE DESCRIPTIONS in the UNDERGRADUATE COURSE CATALOG (catalog.fiu.edu). Most elective courses have prerequisites that must be taken BEFORE you take the elective course. To see your own progress, you can view your Panther Degree Audit from your My FIU. If you need assistance or have any questions, you are encouraged to see an advisor prior to each registration period by making an appointment via the Panther Success Network. All Biology faculty members serve as biology career advisors and have designated advising times. All Science and Math courses must be completed with a grade of "C" or better to satisfy the requirements. ***The Biological Sciences BS has enrollment and completion success markers that will be used to monitor your progress in the major. In cases where students are not making good progress, a change of major may be required.***
The FIU Biotechnology track is designed for students interested in biotechnology research either in academia or industry. The purpose of this track is to guide students with a set of biotechnology related lecture and laboratory courses that will equip them with the background, essential laboratory skills, and bioinformatics necessary to be a competitive candidate for entry level laboratory research positions in the field of biotechnology.

LOWER DIVISION PROGRAM

( ) = credit hours

☐ General Biology I and II with labs	BSC 2010 (3) and BSC 2010L (1) BSC 2011 (3) and BSC 2011L (1)
☐ General Chemistry I and II with labs	CHM 1045 (3) and CHM 1045L (1) CHM 1046 (3) and CHM 1046L (1)
☐ Organic Chemistry I and II with labs	CHM 2210 (4) and CHM 2210L (1) CHM 2211 (3) and CHM 2211L (1)
☐ Physics I and lab	PHY 2048 (4) and PHY 2048L (1) [Using Calculus 1] OR PHY 2053 (4) and PHY2048L (1) [Using Algebra and Trigonometry]
☐ Physics II and lab	PHY 2049 (4) and PHY 2049L (1) [Using Calculus 2] OR PHY 2054 (4) and PHY 2049L (1) [Using Algebra and Trigonometry] OR CAP 2752(3) - Fundamentals of Data Science*

***Fundamentals of Data Science -CAP 2752** (3) can be used to substitute Physics II. Please check with your advisor to confirm this course falls in the appropriate category on the degree audit; also confirm whether this course is appropriate for career goals.

☐ Mathematics - Students must complete sub-requirements (A) and (B)

(A) Calculus I	MAC 2311 (4)

Students should take MAC 1147 as a prerequisite for MAC 2311. Only students who have started the MAC 1114/MAC 1140 sequence at their previous institution may request permission from the Math Department to get into the next course in the sequence.

(B) Calculus II	MAC2312 (4)
OR	
Statistics I and II	STA 3111(3) & STA 3112 (3) Designed for Biology OR STA 2122 (3) & STA 3123 (3) Designed for Psychology

Note: Calculus I and Statistics I together do not satisfy the requirement
STUDENTS WHO TAKE STATISTICS I AND II MUST ALSO COMPLETE CALCULUS I

Upper Division Program Requirements for Biotechnology Track (35 credits)

Core Courses	Pre-Requisites	Credits
BSC 3848 Science and Career Literacy	BSC 2010 & BSC 2011	1
PCB 3043 Ecology	BSC 2010 + BSC 2011	3
PCB 3063 Genetics	BSC 2010	3
PCB 4023 Cell Biology	PCB 3063 + CHM 1046	3
PCB 4674 Evolution	PCB 3043 + PCB 3063	3

Distribution Requirement- One lecture from each of the following areas. Areas B-D have required courses you must choose from.	Required Course	Pre-Requisites	Credits
A. Ecology Distribution	Must choose one course from the department's Distribution A (Ecology) area.	Depends on course chosen	3
B. Organismal Diversity Distribution	BSC 4434 Bioinformatics for Biologists ***(required)***	BSC2010, BSC2011, PCB3063	3
C. Physiology/Biochemistry Distribution	BCH3033 General Biochemistry ***(required)***	CHM2211 and BSC2010	3
D. Structure/Development Distribution	BSC 4422 Biotechnology ***(required)***		3

Additional Upper Division Electives	Pre-Requisites	Credits
MCB 3020 General Microbiology ***(required)***	CHM2210, BSC2010, and BSC2011	3
One additional Biology Upper Division Elective chosen at the student's discretion from courses in any of the distribution areas.	Depends on course chosen	3

* ***See next page for a list of elective courses to choose from***

** ***Please note that there may be limited course availability in summer.***

*** ***Refer to course catalog for list of courses not applicable to the upper division Major electives: http://catalog.fiu.edu/***

Lab Requirement-	Credits
BSC 3466L Make Your Mutant Lab ***(required)***	1
BSC 4422L Biotechnology Lab ***(required)***	1
Must select two additional labs from the list below:	
BCH 3033L General Biochemistry Lab	1
BSC 4401L Principles of Forensic Biology Lab	1
BSC 4450L Computational Biology Lab	1
MCB 3020L General Microbiology Lab	1
PCB 3063L Genetics Lab	1
PCB 4023L Cellular Biology Lab	1

Updated on 10/22/2024

ELECTIVES COURSES - DISTRIBUTION REQUIREMENT

Courses listed may be subject to change. Please confirm course availability by searching for courses on your MyFIU.

BSC 4473C - Introduction to Scientific Diving Prerequisites: (OCB3043+lab or PCB3043+lab or CHS4600 or OCE3014), open water diving certification, permission of the instructor, FIU Diving Medical clearance, pass standardized swim test, at least 18 years old. Lab fee of $1,158 applied.

BSC 3941 - Biological Sciences Research Internship: Supervised, practical experience in a professional, laboratory or field setting in which biologists may work. Instructor permission is required. This does **NOT** fulfill any lab or elective lecture requirement for Biology Majors or Minors.

The following **Biology BA courses are NOT applicable to Biology BS** students: BCH3034 and BSC2077. The non-major courses of BSC2085+L and BSC2086+L are also NOT applicable to Biology BS majors.

BSC 4481 & BSC 4482: Do not count as upper division Biology electives for the Biotechnology track.

A. Ecology Distribution

Select at least one of the following lecture options:	**Prerequisites**
• BOT4601 – General Plant Ecology (3)	PCB3043
• BOT4601L - General Plant Ecology Lab (1)	BOT4601
• BSC4303 – Biogeography (3)	PCB3043, PCB4674
• BSC4304 - Environments of the Past (3)	
• BSC4363 - Biodiversity in the Caribbean Basin (3)	BSC2010, BSC2011
• MCB4603 - Microbial Ecology (3)	MCB 3020
• MCB4603L - Microbial Ecology Lab (1)	MCB 3020+L, MCB4603
• OCB3043 - Marine Biology & Oceanography (3)	BSC2010, BSC2011
• OCB3043L - Marine Biology & Oceanography Lab (1)	OCB3043
• OCB3075C - Mariculture for Conservation and Restoration (4)	
• OCB3264 - Coral Reef Biology (3)	BSC2011
• OCB4004 - Biological Oceanography at Sea I (3)	OCB3043
• OCB4005C - Biological Oceanography at Sea II (4)	OCB4004
• OCB4070 - Coastal Marine Conservation (3)	OCB3043 or PCB3043
• OCB4104C - Field Methods in Marine Ecology (4)	OCB3043 or PCB3043
• OCB4633 - Marine Community Ecology (3)	PCB3043
• OCB4711 - Fisheries Science (3)	BSC2010, BSC2011
• PCB3374 - Tropical Ecology (3)	PCB3043
• PCB4301 - Freshwater Ecology (3)	PCB3043
• PCB4401 - Global Change Ecology: How humans changed the face of Earth (3)	PCB3043
• PCB4403C - Urban Vector Biology (4)	BSC 2010+L, BSC2011+L
• PCB4414 - Behavioral Ecology (3)	PCB3043
• PCB4452 - Introduction to Wetland Ecology and Management (3)	PCB3043
• PCB4462C - Introduction to Landscape Ecology with GIS (4)	BSC2010, BSC2011, PCB3043
• PCB4467C - Marine Protected Areas (4)	BSC2010 and BSC2011
• PCB4553 - General Population Genetics (3)	PCB3063
• PCB4673 - Evolutionary Ecology (3)	PCB3043, PCB3063
• PCB4932 - Topics in Ecology (3)	BSC2010+L, BSC2011+L
• ZOO4513 - Animal Behavior (3)	BSC2010, BSC2011

- ZOO4513L - Animal Behavior Laboratory (2) — ZOO4513

B. Organismal Diversity Distribution

Select at least one of the following lecture options:

	Prerequisites
• BOT3154 - Local Flora (3)	BOT1010 or BSC2011, BOT3154L
• BOT3154L - Local Flora Lab (1)	BOT1010 or BSC2011, BOT3154
• BOT3663 - Tropical Botany (3)	BSC2011
• BOT3810 - Economic Botany (3)	BSC2011 or BOT1010
• BOT4402 - Marine Botany (3)	BSC2011
• BOT4404C – Phycology (4)	BSC2010, BSC2011
• BOT4404L - Phycology Lab (1)	BSC2010, BSC2011, BOT4404
• BOT4684 - Taxonomy of Tropical Plants (3)	BOT3154 or BOT3663
• BOT4684L - Taxonomy of Tropical Plants Lab (1)	BOT4684
• BSC3400 - Wildlife Conservation, Forensic and Crime Science (3)	BSC2010, BSC2011
• BSC4205 - Topics in Organismal Diversity (3)	BSC2010+L, BSC2011+L
• BSC4434 - Bioinformatics for Biologists (3)	BSC2010, BSC2011, PCB3063
• BSC4480 - Introduction to Veterinary Medicolegal and Live Animal Forensic Investigations (3)	
• ENY4060 – Entomology (3)	BSC2010, BSC2011
• ENY4060L - Entomology Lab (1)	ENY4060
• MCB3020 - General Microbiology (3)	CHM2210, BSC2010, BSC2011
• MCB3020L - General Microbiology Lab (1)	MCB3020
• MCB4022 - Diversity of Microbes (3)	MCB3020
• OCB4303 - Biology of Marine Mammals (3)	PCB3043 or OCB3043
• PCB4676 - Human Evolution (3)	BSC2011 and PCB3063
• ZOO3205C - Invertebrate Zoology (4)	BSC1011
• ZOO3303 - Vertebrate Zoology (3)	BSC2010+L, BSC2011+L
• ZOO3303L - Vertebrate Zoology Lab (1)	ZOO3303
• ZOO4234 - General Parasitology (3)	BSC2010, ZOO4234L
• ZOO4234L - General Parasitology Lab (1)	BSC2010, ZOO4234
• ZOO4454 - Fish Biology (3)	BSC2010, BSC2011, PCB3043
• ZOO4462C – Herpetology (4)	BSC2010, BSC2011, PCB3043
• ZOO4484 - Primate Biology (3)	BSC2010, BSC2011
• ZOO4484L - Primate Biology Lab (1)	ZOO4484

C. Physiology/Biochemistry Distribution

Select at least one of the following lecture options:

	Prerequisites
• BCH3033 - General Biochemistry (3)	CHM2211, BSC2010
• BCH3033L - Gen. Biochemistry Lab (1)	CHM2211, BSC2010, BCH3033
• BOT4503 - Plant Physiology (3)	BSC2010, BSC2011, CHM1045, CHM1046
• BOT4503L - Plant Physiology Lab (1)	BOT4503
• BSC4443 - Functional Genomics and Proteomics (3)	PCB3063
• MCB4503 – Virology (3)	CHM2210, PCB3063
• PCB3702 - Intermediate Human Physiology (3)	BSC2010 or BSC2011
• PCB3702L - Intermediate Human Physiology Lab (1)	BSC2010 or BSC2011, PCB3702
• PCB3703 - Human Physiology I (3)	BSC2010
• PCB3703L - Human Physiology Lab I (1)	PCB3703

- PCB3704 - Human Physiology II (3) BSC2010
- PCB3704L - Human Physiology Lab II (1) PCB3704
- PCB4232 – The Biology of Acquired Immune Deficiency Syndrome (AIDS) (3) BSC2010, BSC2011, CHM1045, CHM1046
- PCB4233 – Immunology (3) PCB3063
- PCB4234 - Biology of Cancer (3) PCB3063, PCB3043
- PCB4524 - Molecular Biology (3) PCB3063, (BCH3033 or CHM4304)
- PCB4524L - Molecular Biology Lab (1) PCB4524
- PCB4717 - Topics in Physiology/Biochemistry (3) BSC2010+L, BSC2011+L
- PCB4723 - Animal Physiology (3) BSC2010, BSC2011
- PCB4724 - Comparative Physiology (3) BSC2010, BSC2011, CHM2210
- PCB4776 - Physiological and Behavioral Ecology of Marine Animals (3) BSC2010, BSC2011, PCB3043
- PCB4805 – Endocrinology (3) BSC2011, one physiology course
- PCB4810 - Biology of Stress (3) BSC2010, BSC2011
- ZOO4744 – Neurobiology (3) BSC2010, BSC2011
- ZOO4781 - Sensory Systems in Neurobiology (3) BSC2010, BSC2011

D. Structure/Development Distribution

Select at least one of the following lecture options: **Prerequisites**

- BOT3353 - Morphology of Vascular Plants (3) BSC2010
- BOT3353L - Morphology of Vascular Plants Lab (1) BOT3353
- BSC4401 - Principles of Forensic Biology (3) BSC2010
- BSC4401L - Principles of Forensic Biology Lab (1) PCB3063, BSC4401
- BSC4422 - Biotechnology: Applications in Industry, Agriculture and Medicine (3)
- BSC 4422L - Biotechnology Laboratory (1) BSC4422
- PCB3660 - Sex, Gender, and Orientation: A Biological Perspective (3) BSC2010, BSC2011
- PCB4133 - Topics in Structure/Development (3) BSC2010+L, BSC2011+L
- PCB4253 - Developmental Biology (3) PCB3063 or BCH3033
- PCB4561 – Epigenetics (3) BSC1011, PCB3063
- PCB4663 - General Human Genetics (3) PCB3063
- ZOO3603 – Embryology (3) BSC2010+L, BSC2011+L
- ZOO3603L - Embryology Lab (1) ZOO3603
- ZOO3713C - Comparative Vertebrate Anatomy (4) BSC2010, BSC2011
- ZOO3731 - Human Anatomy (3) (BSC2010, BSC2023, MCB2000, or HSC3549), & ZOO3731L
- ZOO3731L - Human Anatomy Demonstration (1) ZOO3731
- ZOO3753 – Histology (3) BSC2010, BSC 2011, ZOO 3753L
- ZOO3753L - Histology Lab (1) BSC2010, BSC 2011, ZOO3753
- ZOO4733 - Survey of Regional Anatomy (3) BSC2011+L, CHM1046+L, (PHY2048 or PHY 2053)
- ZOO4743C – Neuroscience (4) BSC2010, BSC2011, CHM2211

Other graduation requirements:

University Requirements

- ☐ UCC –University Core Curriculum (Note: Transfer students with an AA degree from a Florida College System or other Florida State University are exempt from the UCC).
- ☐ FLENT/FLEX Foreign Language requirement
- ☐ Summer Enrollment: Students entering the University with fewer than 60 hours must complete 9 hours of coursework during the summer semester
- ☐ Civic Literacy Requirement

- ☐ Global Learning Requirement (consider using upper division courses here)

For more information on these requirements, please visit: https://transfer.fiu.edu/transfer-101/guides-resources/graduation-requirements/index.html

- ☐ 120 Total credit hours required

College of Arts, Sciences & Education Requirements

- ☐ 45 Upper Division hours required
- ☐ 9 Credit hours of courses outside the major required within the last 60 hours of enrollment

Success Markers: are guideposts that help students remain on track for graduation. The Biological Sciences Department has identified important courses in the major that indicate you are on track for successful degree completion.

- 30 credits- Complete MAC 1105 (or higher) with a C
- 30 credits- Complete CHM 1045/CHM 1045L with a C
- 45 credits- Complete MAC 1147 (or higher) with a C
- 45 credits- Complete BSC 2010/2010L or BSC 2011/2011L with a C or better
- 45 credits- Enroll in CHM 1046/1046L
- 60 credits- Enroll in CHM 2210/L or PHY 2048 (or PHY 2053)/PHY 2048L
- 75 credits- Pass CHM 2210/L **and** PHY 2048 (or PHY 2053)/2048L with a C or better
- 75 credits- Enroll in CHM 2211/L **and** PHY 2049 (or PHY 2054)/PHY 2049L

In cases where students are not making good progress, a change of major may be required.

Minor in Biology: The requirements to complete a Minor in Biology can be found here: https://case.fiu.edu/advising/case-minor/biology-minor.pdf