**BIOLOGY (BIO/MRN/MIC)**

Two specific Bachelor of Science degrees, Biology and Microbiology, are available for students interested in the biological sciences. The B.S. in Biology allows students to concentrate in such areas as Ecology, Cell & Molecular Biology, Physiology, and Marine Biology. The degree is preparatory for careers in such areas as teaching, agriculture, medicine, dentistry, conservation, and biotechnology, or for post-baccalaureate study in the various life sciences. The B.S. in Microbiology provides students with the broad range of courses necessary to qualify for certification by the National Registry of Microbiologists, American Society of Microbiology, and employment in microbiology and related fields.

In addition to a set of courses in biology, students must have a thorough preparation in other areas of natural sciences to be competitive for jobs or for further study beyond the baccalaureate. A modern biology curriculum is built on a foundation of mathematics, chemistry and physics. Students should study the requirements listed below and then make maximum use of the vigorous advising program maintained by the Department in structuring their programs.

### Requirements for Entrance into either the Biology or Microbiology Degrees

1. Completion of two semesters of college-level basic biology (BSC 2010 and BSC 2011, or equivalents); two semesters of college-level basic chemistry (CHM 2045 and CHM 2046, or equivalents); and one semester of any college-level mathematics, physics, or statistics course.
2. A cumulative GPA of at least 2.75 in the five courses listed above.

These requirements will NOT BE WAIVED for students who pass major courses beyond college-level basic biology, but do not have the necessary cumulative GPA (2.75) in the five courses listed above.

### Requirements for Entrance into the Biology Degree with a Concentration in Marine Biology

Student applies to Marine Biology Program after meeting all entrance requirements of BIO major. In addition, a student must have a major GPA of at least 3.0 at the time of application and maintain a major GPA of at least 3.0 throughout the Program.

### Requirements for the Biology B.S. Major (BIO)

**Prerequisites (State Mandated Common Prerequisites) for Students Transferring from a Community College:** Students should complete the following prerequisite courses listed below at the lower level prior to entering the university. If these courses are not taken at the community college, they must be completed before the degree is granted. Unless stated otherwise, a grade of “C” is the minimum acceptable grade.

**BSC 1010/1010L**
Introduction to Biology I-Cellular Processes (with lab)

**BSC 1011/1011L**
Introduction to Biology II-Diversity (with lab)

**CHM 2045**
General Chemistry I (3)

**CHM 2046**
General Chemistry II (3)

**CHM 2210**
Organic Chemistry I (3)

**CHM 2211**
Organic Chemistry II (3)

**MAC 2311**
Calculus I (4)

**MAC 2312**
Calculus II (4)

**PHY 2048**
General Physics I (3)

**PHY 2049**
General Physics II (3)

**STA 2023**
Introductory Statistics I (4)

**MAC 2231**
Calculus I (4)

**MAC 2232**
Calculus II (4)

**STA 2023**
Introductory Statistics I (4)

**MAC 2422**
Life Sciences Calculus II (4)

**MAC 2281**
Engineering Calculus I (4)

**MAC 2282**
Engineering Calculus II (4)

**STA 2023**
Introductory Statistics I (4)

**PHY 2048L**
General Physics I Laboratory (1)

**PHY 2049L**
General Physics II Laboratory (1)

**MAC 2231**
Calculus I (4)

**MAC 2232**
Calculus II (4)

**STA 2023**
Introductory Statistics I (4)

**PHY 2048**
General Physics I (3)

**PHY 2049**
General Physics II (3)

**PHY 2053**
General Physics (3)

**PHY 2054**
General Physics (3)

**Acceptable substitutes:**
- PHY 3043/3043L, PHY 3048/3048L, PHY 3049/3049L, or equivalent
- CHM 2045/2045L, CHM 2046/2046L, CHM 2210/2210L, CHM 2211/2211L

**Required Courses for the Biology Major**

1. **Department of Biology Courses-minimum 40 credit hours**
   a. **BSC 2010** Biology I Celllar Processes (3)
   b. **BSC 2010L** Biology I Celllar Processes Laboratory (1)
   c. **BSC 2011** Biology II Diversity (3)
   d. **BSC 2011L** Biology II Diversity Laboratory (1)
   e. **CHM 2210** Organic Chemistry I (3)
   f. **CHM 2210L** Organic Chemistry I Laboratory (2)
   g. **MAC 2311** Calculus I (4)
   h. **MAC 2312** Calculus II (4)

2. **Supporting Courses in the Natural Sciences-minimum 32 credit hours**
   a. **CHM 2045** General Chemistry I (3)
   b. **CHM 2046** General Chemistry II (3)
   c. **CHM 2046L** General Chemistry II Laboratory (1)
   d. **CHM 2210** Organic Chemistry I (3)
   e. **CHM 2210L** Organic Chemistry I Laboratory (2)
   f. **CHM 2211** Organic Chemistry II (3)
   g. **CHM 2211L** Organic Chemistry II Laboratory (2)
   h. **MAC 2241** Life Sciences Calculus I (4)
   i. **MAC 2242** Life Sciences Calculus II (4)
   j. **MAC 2281** Engineering Calculus I (4)
   k. **MAC 2282** Engineering Calculus II (4)
   l. **MAC 2231** Calculus I (4)
   m. **MAC 2232** Calculus II (4)
   n. **STA 2023** Introductory Statistics I (4)
   o. **PHY 2048** General Physics I (3)
   p. **PHY 2049** General Physics II (3)
   q. **PHY 2053** General Physics (3)
   r. **PHY 2054** General Physics (3)

Please be aware of the immunization, foreign language, and continuous enrollment policies of the university. This is a nonlimited access program with the above courses recommended.
3. Meet all College and University requirements.

Requirements for the Biology B.S. Major with a Concentration in Marine Biology (MRN)

Prerequisites (State Mandated Common Prerequisites) for Students Transferring from a Community College: Students should complete the following prerequisite courses listed below at the lower level prior to entering the university. If these courses are not taken at the community college, they must be completed before the degree is granted. Unless stated otherwise, a grade of “C” is the minimum acceptable grade.

**BSC 1010/1010L**
Introduction to Biology I - Cellular Processes (with lab)
Acceptable substitutes: PCB X010, PCB X011, PCB X021, PCB X131, BSC X040, BSC 2012

**BSC 1011/1011L**
Introduction to Biology II - Diversity (with lab)
Acceptable substitutes: ZOO X010, BOT X010, BSC X041, BSC X013

**CHM 1045/1045L** General Chemistry I (with lab)
Acceptable substitutes: PHY 3043/3043L, PHY 3048/3048L, PHY 3049/3049L, or equivalent

**CHM 2211/2211L** Organic Chemistry II (with lab)
Acceptable substitutes: PHY 3053/3053L, PHY 3048/3048L, PHY 3049/3049L, or equivalent

**MAC X311** Calculus I
Acceptable substitutes: MAC 2233, MAC 2253, MAC X281

**MAC X312** Calculus II
Acceptable substitutes: STA 2122, 2023, 2034, 2043, or equivalent; MAC 2234, 2254, 3282

Please be aware of the immunization, foreign language, and continuous enrollment policies of the university. This is a non-limited access program with the above courses recommended.

Required Courses for the Biology Major with a Marine Biology Concentration

1. Department of Biology Courses-minimum 42 credit hours
   a. BSC 2010 Biology I Cellular Processes (3)
   BSC 2010L Biology I Cellular Processes Laboratory (1)
   BSC 2011 Biology II Diversity (1)
   BSC 2011L Biology II Diversity Laboratory (1)
   b. PCB 3023 Cell Biology (3)
   PCB 3043 Principles of Ecology (3)
   PCB 3063 General Genetics (3)
   c. **ONE** of the following:
      PCB 3023L Cell Biology Laboratory (1)
      PCB 3043L Principles of Ecology Laboratory (1)
      PCS 3063L General Genetics Laboratory (1)
   d. BSC 3263C Marine Biology (3)
   e. **ONE** of the following (with laboratory):
      BOT 4503 Plant Physiology (3)
      MCB 4404 Microbial Physiology and Genetics (4)
      PCB 4723 Animal Physiology (3)
   f. At least one of the following: Vascular Plants (BOT 3373C), Microbiology (MCB 3020C), Vertebrate Zoology (ZOO 2303C), Comparative Vertebrate Anatomy (ZOO 3713C), Advanced Vertebrate Zoology and Lab. (ZOO 3205C)
   g. Seminar in Marine Biology (3)
   h. The remaining credit hours to meet the minimum requirements must come from courses listed in (f) above and/or from the following list. A maximum of six (6) credits may be taken in courses from other departments/colleges. At least eight (8) of these credit hours must be at the 4000 level or higher:
      OCB 6050 Biological Oceanography
      OCC 6050 Chemical Oceanography
      OCG 6051 Geophysical Oceanography
      OCP 6050 Physical Oceanography
      GLY 4734 Beaches and Coastal Environments
      GEO 5177 Geographic Information Systems
      ZOO 5456 + ZOO 5456L Ichthyology
      MCB 5600 Applied Environmental Microbiology
      ZOO 5555C Marine Animal Ecology
      ZOO 4513 Animal Behavior
      PCB 4674 Organic Evolution
      BOT 5185C Marine Botany
      BSC 4933 Advanced Marine Biology and lab
   i. A maximum of four (4) credit hours of Undergraduate Research (BSC 4910 or MCB 4910) or Biology Honors Thesis (BSC 4970) may be applied.
   j. A minimum of 20 hours of Biology courses must be taken in residency and be applicable to the major.

2. Supporting Courses in the Natural Sciences-minimum 32 credit hours
   a. CHM 2045 General Chemistry I (3)
   CHM 2045L General Chemistry I Laboratory (1)
   b. CHM 2046 General Chemistry II (3)
   CHM 2046L General Chemistry II Laboratory (1)
   c. CHM 2210 Organic Chemistry I (3)
   CHM 2210L Organic Chemistry I Laboratory (1)
   d. CHM 2211 Organic Chemistry II (3)
   CHM 2211L Organic Chemistry II Laboratory (1)
   e. MAC 2241 Life Sciences Calculus I (4)
   f. OR MAC 2242 Life Sciences Calculus II (4)
   g. OR MAC 2281 Engineering Calculus I (4)
   h. OR MAC 2282 Engineering Calculus II (4)
   i. OR MAC 2311 Calculus I (4)
   j. OR MAC 2312 Calculus II (4)
   k. OR STA 2023 Introductory Statistics I (4)
      (may be substituted for Calculus II)
   l. OR PHY 2048 General Physics I (3)
   PHY 2049 General Physics II (3)
   OR PHY 2049L General Physics II Laboratory (1)
   m. OR PHY 2053 General Physics (3)
   PHY 2053L General Physics Laboratory (1)
   OR PHY 2054 General Physics (3)
   OR PHY 2054L General Physics Laboratory (1)
   n. OR BSC 4970 Biology Honors Thesis (3)
1. Meet all College and University requirements.

Requirements for the Microbiology B.S. Major (MIC)

Prerequisites (State Mandated Common Prerequisites)

Students should complete the following prerequisite courses listed below at the lower level prior to entering the university. If these courses are not taken at the community college, they must be completed before the degree is granted. Unless stated otherwise, a grade of “C” is the minimum acceptable grade.

**BSC X010/X010L**
Introduction to Biology I - Cellular Processes (with lab)
Acceptable substitutes: PCB X010, PCB X011, PCB X021, PCB X131, BSC X040, BSC 2012

**BSC X011/X011L**
Introduction to Biology II - Diversity (with lab)
Acceptable substitutes: ZOO X010, BOT X010, BSC X041, BSC X013

**CHM X045/X045L** General Chemistry I (with lab)

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**UNIVERSITY OF SOUTH FLORIDA - 2005/2006 UNDERGRADUATE CATALOG**

**COLLEGE OF ARTS AND SCIENCES**
CHM X046/X046L General Chemistry II (with lab)
CHM X210/X210L Organic Chemistry I (with lab)
Acceptable substitutes: PHY 3043/3043L, PHY 3048/3048L, PHY 3049/3049L, or equivalent.
CHM X211/X211L Organic Chemistry II (with lab)
Acceptable substitutes: PHY 3053/3053L, PHY 3048/3048L, PHY 3049/3049L, or equivalent.
MAC X311 Calculus I
Acceptable substitutes: MAC 2233, MAC 2253, MAC X281.

Please be aware of the immunization, foreign language, and continuous enrollment policies of the university. This is a non-limited access program with the above courses recommended.

### Required Courses for the Microbiology Major

1. **Department of Biology Courses:** minimum 42 credit hours
   a. **BSC 2010 Biology I Cellular Processes** (3)
      BSC 2010L Biology I Cellular Processes Laboratory (1)
   b. **BSC 2011 Biology II Diversity** (3)
      BSC 2011L Biology II Diversity Laboratory (1)
   c. **PCB 3023 Cell Biology** (3)
      PCB 3023L Cell Biology Laboratory (1)
   d. **PCB 5202C General Microbiology** (4)
      MCB 4115 Determinative Bacteriology (5)
      MCB 4404 Microbial Physiology and Genetics (4)
      MCB 4404L Microbial Physiology and Genetics Laboratory (1)
   e. A maximum of four (4) credit hours of Undergraduate Research (MCB 4910) or Biology Honors Thesis (BSC 4970) may be applied.
   f. A minimum of 20 hours of Biology courses must be taken in residency and be applicable to the major.

2. **Supporting Courses in the Natural Sciences:** minimum 35 credit hours
   a. **CHM 2045 General Chemistry I** (3)
      CHM 2045L General Chemistry I Laboratory (1)
      CHM 2046 General Chemistry II (3)
      CHM 2046L General Chemistry II Laboratory (1)
   b. **CHM 2210 Organic Chemistry I** (3)
      CHM 2210L Organic Chemistry I Laboratory (2)
      CHM 2211 Organic Chemistry II (3)
      CHM 2211L Organic Chemistry II Laboratory (2)
   c. **MAC 2241 Life Sciences Calculus I** (4)
      and
      MAC 2242 Life Sciences Calculus II (4)
      OR
      MAC 2281 Engineering Calculus I (4)
      and
      MAC 2282 Engineering Calculus II (4)
      OR
      MAC 2311 Calculus I (4)
      and
      MAC 2312 Calculus II (4)
      OR
      STA 2023 Introductory Statistics I (4)
      (may be substituted for Calculus II)
   d. **PHY 2048 General Physics I** (3)
      PHY 2048L General Physics I Laboratory (1)
      PH 2049 General Physics II (3)
      PHY 2049L General Physics II Laboratory (1)
      OR
      PHY 2053 General Physics (3)
      PHY 2053L General Physics Laboratory (1)
      PH 2054 General Physics (3)
      PHY 2054L General Physics Laboratory (1)
      e. **BCH 3023 Introductory Biochemistry** (3)

### Minimum Grade for Majors

A student must receive a "C" grade or better in all Department of Biology courses and Supporting Courses in the Natural Sciences, except if they are used as Free Elective courses. This specification applies to both USF and transfer courses. D and F grades earned in attempting to satisfy major requirements will be used in calculating the GPA, except if they are removed by grade forgiveness.

### Biology Honors Program

The Biology Honors Program is a program that provides a challenging and enriching program for highly motivated students. Students must major in Biology, and they begin taking courses together upon entry to USF. They are admitted to the program at the end of their second semester. Criteria include a minimum 3.5 GPA. The program provides a research experience in a Biology Faculty laboratory. [http://www.cas.usf.edu/biology/index.html](http://www.cas.usf.edu/biology/index.html), and requires a written thesis. A Research Seminar is presented by the student.

#### Year 1
- **BSC 2010** Biology I with lab- Honors section 4
- **BSC 2011** Biology II with lab- Honors section 4
- **BSC 4931** Selected Topics - Honors Seminar I - Introduction to Biology Research 1

#### Year 2
- **BSC 4932** Selected Topics - Honors Seminar II - Philosophy/Ethics 3
- **BSC 4933** Selected Topics - Honors Seminar III - Scientific Approaches 3

#### Year 3
- **BSC 4910** Undergraduate Research - Biology Faculty Member's Laboratory 2
- **BSC 4933** Selected Topics - Honors Seminar IV - Biology Department Seminar 1

Credits: 8 beyond normal Biology degree (4 research credits can count towards total of 40 Biology credits) 2 beyond University Honors (HS II and HS III & Research counts toward University Honors)