# MARINE BIOLOGY AND COASTAL SCIENCES (B.S.)

Marine Biology and Coastal Sciences represent the wide variety of ecosystems that are linked through water. The study of Marine Biology and Coastal Sciences encompasses freshwater lakes and streams, estuaries, and coastal marine habitats. These habitats are critical for numerous plants and animals, but they can be compromised by human activities. Students who pursue this major are interested in understanding the relationships among plants, animals and humans and how to protect and restore these valuable ecosystems.

This major is an interdisciplinary program of study emphasizing the four core sciences of biology, geology, chemistry, and physics. Students completing this program will be well prepared to enter the work force in research, environmental consulting, education and regulatory agencies (e.g., EPA), as well as in non-profit organizations. Additionally, students will be prepared to undertake further graduate work.

The curriculum was designed for students who have had high school biology, chemistry, and physics, and three years of college preparatory mathematics.

Certain pre-qualified students may be accepted into the major; others will need to complete the following:

2.5 overall GPA required

Please note: The Biology, Molecular Biology, and Marine Biology and Coastal Science majors have retention policies. By the end of their second semester in the major (i.e. spring semester), students must maintain a minimum GPA of 2.5 and have completed the following courses with a C- or better grade: BIOL112 or BIOL113, and CHEM106 or CHEM120, and MATH111 or AMAT120.

Students are required to meet with their assigned advisor.

Contact: Dr. Colette Feehan, Science Hall 132, feehanc@montclair.edu.

**Degree Requirements Overview**

| Code | Title | Credits |
|---|---|---|
| New Student Seminar | | 1 |
| SEEDS General Education Requirements | | 24-27 |
| Major Requirements | | 70-74 |
| Free Electives | | 25-18 |
| **Total Credits** | | **120** |

## Major Requirements

| Code | Title | Credits |
|---|---|---|
| **Major Requirements** | | |
| BIOL 351 | Introduction to Aquatic Ecology | 4 |
| BIMS 220 | Introduction to Marine Biology | 4 |
| BIOL 113 | Principles of Biology: Organisms and Diversity | 4 |
| BIOL 213 | Introduction to Ecology | 4 |
| EAES 105 | Physical Geology | 4 |
| EAES 230 | Hydrology | 3 |
| EAES 322 | Environmental Geochemistry | 3 |
| Select one of the following: | | 4 |
| AQUA 495 | Research in Aquatic and Coastal Sciences | |
| BIMS 490 | Field Methods in the Marine Sciences | |
| BIOL 418 | Biology Independent Research | |
| EAES 494 | Independent Study in Geoscience | |
| **Major Electives** | | |
| Select three courses from the list below. [2] | | 8-12 |
| **Collateral Requirements** | | |
| *Chemistry Collateral* | | |
| CHEM 120 | General Chemistry I | 4 |
| CHEM 121 | General Chemistry II | 4 |
| CHEM 230 | Organic Chemistry I | 3 |
| CHEM 232 | Experimental Organic Chemistry I | 2 |
| *Physics Collateral* | | |
| Select one of the following sequences: | | 8 |
| PHYS 191 & PHYS 192 | University Physics I and University Physics II | |
| PHYS 193 & PHYS 194 | College Physics I and College Physics II | |
| *Mathematics Collateral* | | |
| Select two of the following sequences: | | 8 |
| AMAT 120 or MATH 122 | Applied Calculus A Calculus I | |
| AMAT 220 or MATH 221 | Applied Calculus B Calculus II | |
| STAT 230 & STAT 231 | Data Science and Statistics and Data Science and Biostatistics | |
| **Total Credits** | | **67-71** |

[2] Students in the combined Marine Biology and Coastal Science Major (B.S.)/Marine Biology and Coastal Science (M.S.) program take only 2 elective courses.

## Major Electives

| Code | Title | Credits |
|---|---|---|
| BIMS 490 | Field Methods in the Marine Sciences | 4 |
| BIOL 300 | Environmental Biology and Related Controversial Issues | 3 |
| BIOL 330 | Introduction to Animal Behavior | 3 |
| BIOL 370 | Principles of Ecology | 3 |
| BIOL 380 | Genetics | 4 |
| BIOL 406 | Scanning Electron Microscopy | 4 |
| BIOL 422 | Community Ecology | 3 |
| BIOL 429 | Herpetology | 4 |
| BIOL 430 | Ornithology | 4 |
| BIOL 431 | Entomology | 3 |
| BIOL 436 | Phylogenetic Zoology | 4 |
| BIOL 440 | Gross Mammalian Anatomy | 4 |
| BIOL 451 | Comparative Animal Physiology | 3 |
| BIOL 460 | Biological Oceanography | 3 |
| BIOL 461 | Aquatic Ecology | 3 |
| BIOL 467 | Biology of the Fishes | 4 |
| BIOL 480 | Research Community I: Organism Biology | 4 |
| BIOL 481 | Research Community II: Organism Biology | 4 |

| | | |
|---|---|---|
| BIOL 482 | Research Community I: Molecular Biology | 4 |
| BIOL 484 | Research Community I: Ecology | 4 |
| BIOL 485 | Research Community II: Ecology | 4 |
| BIOL 486 | Special Topics in Biology | 3-4 |
| BIOL 489 | Special Topics in Organismal Biology | 3-4 |
| BIOL 495 | Special Topics in Ecology | 3 |
| CHEM 231 | Organic Chemistry II | 3 |
| CHEM 233 | Experimental Organic Chemistry II | 2 |
| CHEM 310 | Analytical Chemistry | 4 |
| EAES 210 | Introduction to GIS and Remote Sensing | 3 |
| EAES 250 | Introduction to Marine Sciences | 4 |
| EAES 301 | Climatology | 3 |
| EAES 302 | Structural Geology | 3 |
| EAES 303 | Environmental Field Methods | 3 |
| EAES 310 | Geographic Information Systems (GIS) | 3 |
| EAES 311 | Fundamentals of Remote Sensing of Environment | 3 |
| EAES 320 | Igneous Metamorphic Petrology | 4 |
| EAES 330 | Fluvial Geography | 3 |
| EAES 331 | Geohydrology | 3 |
| EAES 332 | Hydroclimatology | 3 |
| EAES 337 | Environmental Isotope Geochemistry | 3 |
| EAES 340 | Sedimentology | 4 |
| EAES 341 | Principles of Soil Science | 3 |
| EAES 350 | Oceanography | 3 |
| EAES 401 | Geo-Ecology | 3 |
| EAES 441 | Stratigraphy | 4 |
| EAES 451 | Coastal Marine Geology | 4 |

## New Student Seminar

| Code | Title | Credits |
|---|---|---|
| Students in the Adult Learner program must take GNED 100. | | |
| Complete one course from the following. Some courses may be restricted by major. Consult with an academic advisor. | | 1 |
| ADVS 198 | Pathways to Success | |
| CHEM 190 | Freshman Seminar in Chemistry | |
| FYS 100 | First Year Seminar | |
| GNED 100 | Adult Academic Success Seminar | |
| GNED 199 | New Student Seminar | |
| HPEM 199 | Freshman Seminar in Health and Physical Education | |
| IDS 155 | Pathways to Adult Learning | |
| JUST 199 | New Student Seminar | |
| MATH 102 | New Student Experience for Mathematical Sciences | |
| MUGN 199 | Freshman Seminar for Music Majors | |
| NURS 199 | Introduction to Nursing | |
| POLS 199 | Freshman Seminar in Political Science and Law | |

## SEEDS General Education Requirements

Click here for a list of courses that fulfill the SEEDS requirements. (http://catalog.montclair.edu/programs/seeds-general-education-requirements/)

| Code | Title | Credits |
|---|---|---|
| **Foundations** | | |
| *Effective Writing I* | | |
| Complete one Effective Writing I course. | | 3 |
| *Effective Writing II* | | |
| Complete one Effective Writing II course. | | 3 |
| *Interactive Communication* | | |
| Complete one Interactive Communication course. | | 3 |
| *Quantitative Reasoning* | | |
| Fulfilled by AMAT 120 or MATH 122 in the major | | |
| *Political and Civic Life* | | |
| Complete one Political and Civic Life course. | | 3 |
| *World Language* | | |
| Complete two sequential classes in one World Language when starting at the Beginner I or Beginner II level. Complete one class when starting at the Intermediate/Advanced Level. | | 3-6 |
| **Exploration** | | |
| Complete one course from four different Exploration categories: | | 9 |
| *Analyzing Cultures and Societies* | | |
| *Creative Expression* | | |
| *Ethical Inquiry* | | |
| *Historical Thinking* | | |
| *Literary and Artistic Analysis* | | |
| *Scientific Reasoning* | | |
| Fulfilled by BIOL 113 in the major. | | |
| **Total Credits** | | **24-27** |

## Recommended Roadmap to Degree Completion

This recommended degree plan is provided as an outline for students to follow in order to complete their degree requirements within four years and 120 credits. This plan is a recommendation and MUST be used in consultation with their academic advisor. Important note: Students should be aware this plan assumes no pre-requisite coursework is required. If pre-requisite coursework is needed, students may have additional requirements to fulfill which do not appear on the plan.

**First Year**

| Fall | Credits | Spring | Credits |
|---|---|---|---|
| New Student Seminar | 1 | SEEDS: Interactive Communication | 3 |
| SEEDS: Effective Writing I | 3 | SEEDS: Effective Writing II | 3 |
| AMAT 120 or MATH 122 (Fulfills SEEDS: Quantitative Reasoning) | 4 | EAES 105 | 4 |
| BIOL 113 (Fulfills SEEDS: Exploration 1 - Scientific Reasoning) | 4 | BIOL 213 | 4 |
| SEEDS: Political and Civic Life | 3 | | |
| | **15** | | **14** |

**Second Year**

| Fall | Credits | Spring | Credits |
|---|---|---|---|
| EAES 320 | 4 | BIMS 220 | 4 |
| CHEM 120 | 4 | CHEM 121 | 4 |
| PHYS 193 | 4 | PHYS 194 | 4 |
| STAT 230 | 3 | STAT 231 | 1 |
| SEEDS: World Language 1 | 3 | SEEDS: World Language 2 or Free Elective | 3 |
| | **18** | | **16** |

**Third Year**

| Fall | Credits | Spring | Credits |
|---|---|---|---|
| SEEDS: Exploration 2 | 3 | SEEDS: Exploration 3 | 3 |
| CHEM 230 | 3 | EAES 322 | 3 |
| CHEM 232 | 2 | Major Elective | 3 |
| BIOL 351 | 4 | Major Elective | 3 |
| Free Elective | 3 | | |
| | **15** | | **12** |

**Fourth Year**

| Fall | Credits | Spring | Credits |
|---|---|---|---|
| SEEDS: Exploration 4 | 3 | Major Elective | 3 |
| BIOL 418 | 4 | Major Elective | 4 |
| Free Elective | 3 | Free Elective | 3 |
| Free Elective | 3 | Free Elective | 3 |
| Free Elective | 3 | Free Elective | 1 |
| | **16** | | **14** |

**Total Credits 120**