BIOLOGY MAJOR (B.S.)
(COMBINED B.S./M.A.T. WITH
TEACHER CERTIFICATION
IN BIOLOGICAL SCIENCE
(PRESCHOOL-GRADE 12) AND
TEACHER OF STUDENTS WITH
DISABILITIES)

Program Requirements
Students must complete 42 credits of General Education requirements (http://catalog.montclair.edu/undergraduate-graduate-degree-requirements/general-education-requirements) and 3-9 credits of World Languages and Cultures Requirements (http://catalog.montclair.edu/undergraduate-graduate-degree-requirements/world-languages-cultures-requirement).

Requirements for the graduate portion of this dual degree program can be found here (http://catalog.montclair.edu/programs/teaching-certification-biological-sciences-preschool-grade-12-students-disabilities-combined-bs-mat).

Biology Major (Combined BS/MAT)
Biology Major Requirements
BIOL 112 Principles of Biology I 4
BIOL 113 Principles of Biology II 4
BIOL 213 Introduction to Ecology 4
BIOL 230 Cell and Molecular Biology 4
BIOL 380 Genetics 4
BIOL 417 Evolutionary Biology 3

Biology Major Electives
Complete four requirements (see list below) 14

Collateral Chemistry Courses
CHEM 120 General Chemistry I 4
CHEM 121 General Chemistry II 4
CHEM 230 Organic Chemistry I 3
CHEM 231 Organic Chemistry II 3
CHEM 232 Experimental Organic Chemistry I 2

Collateral Physics Courses
Select one of the following sequences: 8
PHYS 191 University Physics I
& PHYS 192 and University Physics II
PHYS 193 College Physics I
& PHYS 194 and College Physics II

Collateral Mathematics Courses
Select one of the following sequences: 8
MATH 122 Calculus I
& MATH 221 and Calculus II
MATH 110 Statistics for the Biological Sciences
& MATH 116 and Calculus A

Collateral Earth Science Course
Select one of the following: 4

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>EAES 101</td>
<td>Planet Earth</td>
</tr>
<tr>
<td>EAES 105</td>
<td>Physical Geology</td>
</tr>
<tr>
<td>EAES 107</td>
<td>Earth and the Environment</td>
</tr>
<tr>
<td>EAES 240</td>
<td>Historical Geology</td>
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</tbody>
</table>

Other Electives
Select one of the following with advisor approval: (Will also count towards graduate portion of the program). 3-4
BIOL 505 Experimental Cell Culture
BIOL 512 Topics in Modern Genetics
BIOL 513 Instrumentation and Techniques for Biological Science
BIOL 515 Population Genetics
BIOL 520 Plant Physiology
BIOL 521 Field Studies of Flowering Plants
BIOL 522 Plant Pathology
BIOL 529 Advanced Herpetology
BIOL 532 Advanced Entomology
BIOL 533 Advanced Cell Biology
BIOL 540 Mammalian Physiology
BIOL 542 Advanced Endocrinology
BIOL 543 Advances in Immunology
BIOL 544 Advanced Comparative Animal Physiology
BIOL 545 Experimental Endocrinology
BIOL 546 Topics in Physiology
BIOL 547 Molecular Biology I
BIOL 548 Molecular Biology II
BIOL 549 Topics in Developmental Biology
BIOL 550 Topics in Microbiology
BIOL 551 Intermediate Metabolism I
BIOL 552 Biology of Lipids
BIOL 554 Microbial Physiology
BIOL 555 Medical Genetics
BIOL 556 Molecular Physiology
BIOL 557 Virology
BIOL 558 Microbial Genetics
BIOL 560 Molecular Genetics
BIOL 561 Genomics
BIOL 562 Short Topics in Molecular Biology
BIOL 563 Statistical Genomics
BIOL 564 Proteomics
BIOL 565 Advanced Plant Molecular Genetics
BIOL 566 Bioinformatics
BIOL 568 Advanced Neuroscience
BIOL 570 Ecology
BIOL 571 Physiological Plant Ecology
BIOL 572 Wetland Ecology
BIOL 573 Shoreline Ecology
BIOL 574 Behavioral Ecology
BIOL 575 Avian Biology
BIOL 576 Biology of Extreme Habitats
BIOL 579 Physiological Ecology of Animals
BIOL 586 Selected Advanced Topics in Biology
### Biology Major (B.S.) (Combined B.S./M.A.T. with Teacher Certification in Biological Science (Preschool-Grade 12) and Teacher of Students with Disabilities)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 587</td>
<td>Selected Advanced Topics in Molecular Biology</td>
<td></td>
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<tr>
<td>BIOL 588</td>
<td>Selected Advanced Topics in Physiology</td>
<td></td>
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<tr>
<td>BIOL 589</td>
<td>Selected Advanced Topics in Ecology</td>
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<tr>
<td>BIOL 593</td>
<td>Molecular Ecology</td>
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<td>BIOL 594</td>
<td>Signal Transduction</td>
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<tr>
<td>BIOL 595</td>
<td>Conservation Biology: The Preservation of Biological Diversity</td>
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</tbody>
</table>

**Total Credits: 76**

### Biology Major Electives

Complete the four requirements, including at least one 4-credit course (One course cannot be used in 2 areas)

#### Cell and Molecular

Select one of the following: 3-4
- BIOL 350 Microbiology
- BIOL 410 Toxicology
- BIOL 415 Population Genetics
- BIOL 433 Developmental Biology
- BIOL 434 Molecular Biology
- BIOL 435 Experimental Molecular Biology
- BIOL 444 Cell Physiology
- BIOL 445 Immunology
- BIOL 446 Endocrinology
- BIOL 457 Virology
- BIOL 458 Microbial Genetics
- BIOL 468 Neurobiology
- BIOL 475 Medical Genetics
- BIOL 476 Biology of Cancer
- BIOL 482 Research Community I: Molecular Biology
- BIOL 483 Research Community II: Molecular Biology
- BIOL 487 Statistical Genomics
- BIOL 488 Selected Topics in Cell and Molecular Biology
- BIOL 493 Molecular Ecology
- BIOL 497 Genomics

#### Ecology

Select one of the following: 3-4
- AQUA 351 Aquatic Biological Processes
- BIMS 220 Introduction to Marine Biology
- BIOL 300 Environmental Biology and Related Controversial Issues
- BIOL 330 Introduction to Animal Behavior
- BIOL 370 Principles of Ecology
- BIOL 415 Population Genetics
- BIOL 420 Economic Botany
- BIOL 426 New Jersey Flora
- BIOL 429 Herpetology
- BIOL 430 Ornithology
- BIOL 431 Entomology
- BIOL 436 Phylogenetic Zoology
- BIOL 451 Comparative Animal Physiology
- BIOL 460 Biological Oceanography
- BIOL 461 Aquatic Ecology
- BIOL 484 Research Community I: Ecology
- BIOL 485 Research Community II: Ecology
- BIOL 493 Molecular Ecology

#### Organismal

Select one of the following: 3-4
- BIOL 410 Toxicology
- BIOL 425 Elementary Plant Physiology
- BIOL 432 Medical Entomology
- BIOL 433 Developmental Biology
- BIOL 439 Biology of Animal Parasites
- BIOL 440 Gross Mammalian Anatomy
- BIOL 441 Comparative Anatomy of Vertebrates
- BIOL 442 Human Physiology
- BIOL 443 Vertebrate Embryology
- BIOL 445 Immunology
- BIOL 446 Endocrinology
- BIOL 447 Fundamentals of Pharmacology
- BIOL 448 Mammalian Microanatomy
- BIOL 450 Medical Microbiology
- BIOL 451 Comparative Animal Physiology
- BIOL 457 Virology
- BIOL 468 Neurobiology
- BIOL 476 Biology of Cancer
- BIOL 480 Research Community I: Organism Biology
- BIOL 481 Research Community II: Organism Biology
- BIOL 489 Selected Topics in Organismal Biology

#### Research

Select one of the following: 3-4
- BIOL 409 Externship in Biological Research (Co-operative Education)
- BIOL 418 Biology Independent Research
- BIOL 480 Research Community I: Organism Biology
- BIOL 481 Research Community II: Organism Biology
- BIOL 482 Research Community I: Molecular Biology
- BIOL 483 Research Community II: Molecular Biology
- BIOL 484 Research Community I: Ecology
- BIOL 485 Research Community II: Ecology

**Total Credits: 14**

### Teacher Ed Program Requirements (P-12, Bachelor's/MAT)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 100</td>
<td>Biological Sciences</td>
<td></td>
</tr>
<tr>
<td>BIOL 107</td>
<td>Biology for Survival</td>
<td></td>
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<tr>
<td>BIOL 110</td>
<td>The Biology of Human Life</td>
<td></td>
</tr>
<tr>
<td>BIOL 215</td>
<td>Human Heredity</td>
<td></td>
</tr>
<tr>
<td>BIOL 240</td>
<td>Mammalian Anatomy and Physiology I</td>
<td></td>
</tr>
<tr>
<td>BIOL 241</td>
<td>Mammalian Anatomy and Physiology II</td>
<td></td>
</tr>
<tr>
<td>BIOL 243</td>
<td>Human Anatomy and Physiology</td>
<td></td>
</tr>
</tbody>
</table>

#### Health for Teacher Education

Select one of the following: 3-4
- BIOL 100 Biological Sciences
- BIOL 107 Biology for Survival
- BIOL 110 The Biology of Human Life
- BIOL 215 Human Heredity
- BIOL 240 Mammalian Anatomy and Physiology I
- BIOL 241 Mammalian Anatomy and Physiology II
- BIOL 243 Human Anatomy and Physiology
Biology Major (B.S.) (Combined B.S./M.A.T. with Teacher Certification in Biological Science (Preschool-Grade 12) and Teacher of Students with Disabilities)

| BIOL 380  | Genetics                       |
| HLTH 101  | Personal Health Issues         |
| HLTH 207  | Injury Prevention and Emergency Care |
| HLTH 208  | Study of Human Diseases        |
| HLTH 213  | Perspectives on Drugs          |
| HLTH 220  | Mental Health                  |
| HLTH 290  | Human Sexuality                |
| HLTH 330  | Health Education Methods       |
| HLTH 411  | School Health and Community Services |
| HLTH 430  | Counseling Skills for Public Health Professionals |
| HONP 210  | Honors Seminar in Science      |
| HONP 211  | Honors Seminar in Contemporary Issues in Science |
| HPEM 150  | Principles and Practice of Emergency Care |
| NUFD 182  | Nutrition                      |

**Speech for Teacher Education**

| CMST 101  | Fundamentals of Speech: Communication Requirement 3 |

**Additional Teacher Ed Pre-Requisites**

| EDFD 200  | Psychological Foundations of Education 3 |
| or PSYC 200 | Educational Psychology |  |
| EDFD 220  | Philosophical Orientation to Education 3 |
| EDFD 221  | Historical Foundations of American Education 3 |

Select one of the following: 3

| EDFD 210  | Public Purposes of Education: Democracy and Schooling |
| READ 210  | Public Purposes of Education: Democracy and Schooling |
| SASE 210  | Public Purposes of Education: Democracy and Schooling |

**Undergraduate Professional Sequence I**

| SASE 305  | Teaching for Equity and Diversity 3 |
| SASE 312  | Educating English Language Learners 1 |
| SPED 279  | Foundation and Philosophy of Inclusive Education 3 |

**Undergraduate Professional Sequence II**

| READ 411  | Language and Literacy 3 |
| SPED 367  | Language-Based Strategies for Inclusive Classrooms 3 |

**Undergraduate Professional Sequence III**

| SPED 469  | Inclusive Methods for Middle and Secondary Schools 3 |
| SPED 488  | Promoting Prosocial Behaviors in Inclusive Settings 3 |

**Graduate Sequence**

| SPED 566  | Creating Curricular Access for Adolescents with Disabilities 2 3 |
| SPED 586  | Educational Planning for Adolescents with Disabilities 2 3 |

**Total Credits** 43-44

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1. Or pass the MSU Health Knowledge Test available through the Center of Pedagogy.
2. Courses will also count toward graduate portion of this program.