

B.S. IN BIOLOGY AND EDUCATION WITH ENDORSEMENT IN SECONDARY EDUCATION IN BIOLOGY (BY.EDS.BS)

| Code | Title | Credits |
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| Major Requirements/Biology (30-31 credits)¹ | | |
| BY-119 | Introductory Biology Major Seminar | 1 |
| BY-109 | Introduction to Biodiversity and Evolution <i>(Satisfies Natural Sciences in General Education)</i> | 4 |
| BY-110 | Introduction to Cell and Molecular Biology | 4 |
| BY-216 | Introduction to Genetics <i>(Satisfies Technological Literacy (TL) in General Education)</i> | 4 |
| BY-310 | Biochemistry and Lab | 4 |
| BY-495 | Senior Seminar | 1 |
| Select Option "A" or Option "B" | | 12-13 |
| Option A | | |
| Complete the following courses: | | |
| BY-205 | Zoology | |
| BY-220 | Environmental Biology and Policy | |
| BY-440 | Ecology | |
| Select one course from the following list: | | |
| BY-317 | Tropical Island Ecology | |
| BY-322 | Ichthyology | |
| BY-324 | Applied Microbiology | |
| BY-342 | Coastal Zone Management | |
| BY-360 | The Business of Biotechnology: From the Bench to the Market | |
| BY-370 | Cell Biology | |
| BY-404 | Animal Behavior | |
| BY-406 | Introduction to Neurosciences | |
| BY-410 | Molecular Biology | |
| BY-430 | Neuroscience Beyond Neurons | |
| BY-431 | Immunology | |
| BY-424 | Evolution | |
| BY-425 | Principles of Developmental Biology | |
| BY-427 | Cancer Biology | |
| BY-450 | Research in Molecular Cell Physiology | |
| BY-475 | Endocrinology | |
| Option B | | |
| BY-375L | Laboratory in Molecular and Cellular Biology | |
| Select 9 additional Biology credits with at least 4 credits at the 300 or 400 level | | |
| BY-220 | Environmental Biology and Policy | |
| BY-299, BY-399 or BY-499 Independent Study | | |
| BY-201 | Introduction to Biotechnology | |

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| BY-209 | Environment and Human Health | |
| BY-211 | Physiology with Anatomy I | |
| BY-212 | Physiology with Anatomy II | |
| BY-223 | General Microbiology | |
| BY-250 | Research in Molecular Cell Physiology | |
| BY-264 | Environmental Field Methods | |
| BY-317 | Tropical Island Ecology | |
| BY-324 | Applied Microbiology | |
| BY-342 | Coastal Zone Management | |
| BY-360 | The Business of Biotechnology: From the Bench to the Market | |
| BY-370 | Cell Biology | |
| BY-404 | Animal Behavior | |
| BY-406 | Introduction to Neurosciences | |
| BY-410 | Molecular Biology | |
| BY-424 | Evolution | |
| BY-425 | Principles of Developmental Biology | |
| BY-427 | Cancer Biology | |
| BY-431 | Immunology | |
| BY-450 | Research in Molecular Cell Physiology | |
| BY-475 | Endocrinology | |
| Major Requirements/Education (24 credits)² | | |
| ED-250 | Psychological and Philosophical Foundations of Education | 3 |
| EDS-330 | Foundations of Special Education: Child & Adolescent Development and Transition to Adulthood | 3 |
| EDS-336 | Classroom Management | 3 |
| ED-319 | Content Literacy | 3 |
| ED-320 | Teaching English Language Learners in Mainstream Classroom | 3 |
| <i>(Satisfies Reasoned Oral Discourse (RD) in General Education)</i> | | |
| Select 9 credits as follows: ³ | | |
| ED-416 & 416S | Clinical Practice and Clinical Practice Seminar | 9 |
| Biology Interdisciplinary Requirements (30 credits) | | |
| MA-115 | Pre-Calculus Modeling for the Biological Sciences | 3 |
| or MA-116 Calculus for the Biological Sciences <i>(Satisfies Mathematics in General Education)</i> | | |
| <i>(Satisfies Mathematics in General Education)</i> | | |
| MA-151 | Statistics with Applications | 3 |
| CE-111 | General Chemistry I | 3 |
| CE-111L | General Chemistry Laboratory I | 1 |
| CE-112 | General Chemistry II | 3 |
| CE-112L | General Chemistry Laboratory II | 1 |
| CE-241 | Organic Chemistry I | 3 |
| CE-241L | Organic Chemistry Laboratory I | 2 |
| CE-242 | Organic Chemistry II | 3 |
| PH-105 | Physics for the Life Sciences I | 3 |
| PH-105L | Physics for the Life Sciences Laboratory I | 1 |
| PH-106 | Physics for the Life Sciences II | 3 |

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| PH-106L | Physics for the Life Sciences Laboratory II | 1 |
| Education Methods Requirements (6 credits)³ | | |
| ED-369 | Methods of Teaching Science for the Secondary Teacher Part I | 3 |
| ED-370 | Methods of Teaching Science for the Secondary Teacher Part II | 3 |
| Free Electives (0 credits)⁴ | | |
| The number of free electives, if any, will be determined in consultation with your advisor. ⁴ | | |
| General Education Requirements (30 credits)⁵ | | |
| Complete 30 credits as outlined on the General Education table. ⁵ | | 30 |
| Total Credits | | 120-121 |

1
BY-102 Applications in Biotechnology (3 cr.), BY-104 Human Biology (3 cr.), BY-105 Introductory Biology and Human Development (3 cr.), and BY-106 The Brain - Highs and Lows (3 cr.) are not available to BY majors.

2
Minimum grade of "C" required for Education Courses

3
Students must complete the appropriate test requirement(s) with a passing score PRIOR to Clinical Practice.

4
 Please consult with your advisor regarding the required number of free electives that must be completed.

5
The General Education curriculum requires the completion of 45 credits. However, students may be able to share credits from within their major or interdisciplinary requirements. Please consult with your advisor to determine which General Education (<http://catalog.monmouth.edu/undergraduate-catalog/academic-programs-support-services-regulations/general-education-requirements/>) courses must be completed.

Additional Endorsements Available

- TSD - Teacher of Students with Disabilities - Secondary
- ESL - English as a Second Language - Secondary

Notes

- 54 credits must be completed at the 200 level or higher.
- Education majors are required to have an overall GPA of 3.00 for State Certification.
- By state regulation, all Education Majors seeking content area endorsement must complete 30 content credits (12+ credits at the 300+ level).

Sequence Chart

| First Year | | | |
|----------------------------------------------------------|---------|----------------------------------------------------------|---------|
| Fall | Credits | Spring | Credits |
| BY-109 Introduction to Biodiversity and Evolution or 110 | | 4 EN-102 College Composition II | 3 |
| BY-119 Introductory Biology Major Seminar | 1 | BY-109 Introduction to Biodiversity and Evolution or 110 | 4 |
| CE-111 & 111L | 4 | CE-112 & 112L | 4 |

| MA-115 Pre-Calculus Modeling for the Biological Sciences or 116 | 3 | ED-250 Psychological and Philosophical Foundations of Education | 3 |
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| EN-101 College Composition I | 3 | FO-xxx Gen*Ed World Language | 3 |
| Semester Credits | 15 | Semester Credits | 17 |
| Second Year | | | |
| Fall | Credits | Spring | Credits |
| BY-216 Introduction to Genetics (Gen*Ed Technological Literacy (TL)) | | 4 BY-xxx Biology Elective | 3 |
| CE-241 & 241L | 5 | CE-242 Organic Chemistry II | 3 |
| ED-320 Teaching English Language Learners in Mainstream Classroom (Gen*Ed Reasoned Oral Discourse (RD) and Writing Intensive (WT)) | 3 | EDS-330 Foundations of Special Education: Child & Adolescent Development and Transition to Adulthood | 3 |
| Gen*Ed Aesthetics (AT) AR,DA,MU,TH | 3 | Gen*Ed Cultural Diversity (CD) or Global Understanding (GU) | 3 |
| | | Gen*Ed Social Science Survey (SS.SV) | 3 |
| Semester Credits | 15 | Semester Credits | 15 |
| Third Year | | | |
| Fall | Credits | Spring | Credits |
| BY-xxx Biology Elective | | 3 BY-xxx Biology Elective | 3 |
| BY-310 Biochemistry and Lab | 4 | PH-106 & 106L | 4 |
| PH-105 & 105L | 4 | MA-151 Statistics with Applications | 3 |
| EDS-336 Classroom Management | 3 | Gen*Ed Historical Perspectives (HS.SV) | 3 |
| | | ED-319 Content Literacy | 3 |
| Semester Credits | 14 | Semester Credits | 16 |
| Fourth Year | | | |
| Fall | Credits | Spring | Credits |
| ED-369 Methods of Teaching Science for the Secondary Teacher Part I | | 3 ED-416 Clinical Practice | 8 |
| ED-370 Methods of Teaching Science for the Secondary Teacher Part II | 3 | ED-416S Clinical Practice Seminar | 1 |
| Gen*Ed Historical Perspectives (HS.SV) or Social Science Survey (SS.SV) | 3 | Gen*Ed Interdisciplinary Perspectives | 3 |
| BY-xxx Biology Elective | 3 | | |
| BY-4xx Biology Elective | 3-4 | | |
| BY-495 Senior Seminar | 1 | | |
| Semester Credits | 16-17 | Semester Credits | 12 |
| Total Credits 120-121 | | | |