

## Bachelor of Science

# Biology with a Major in Secondary Biology Education (6-12) (BS)

## Requirements

### Lower-Division General Education

Written Communication ( <a href="http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#written">http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#written</a> )	6
Oral Communication ( <a href="http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#oral">http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#oral</a> )	3
Mathematics ( <a href="http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#math">http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#math</a> )	3
Language and Culture ( <a href="http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#language">http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#language</a> )	0-6
Information Literacy and Research ( <a href="http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#information">http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#information</a> )	3
Human Behavior ( <a href="http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#behavior">http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#behavior</a> )	3
Human Creativity ( <a href="http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#creativity">http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#creativity</a> )	3
Interpreting the Past ( <a href="http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#interpret">http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#interpret</a> )	3
Literature ( <a href="http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#literature">http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#literature</a> )	3
Philosophy and Ethics ( <a href="http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#philosophy">http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#philosophy</a> )	3
The Nature of Science ( <a href="http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#nature">http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#nature</a> )	8
Impact of Technology ( <a href="http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#impact">http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#impact</a> )	3

Mathematics: Select MATH 205 or MATH 211; C or better required

Information Literacy and Research: CS 121G, CS 126G or OEAS 130G required

Nature of Science: met by CHEM 121N-CHEM 122N and CHEM 123N-CHEM 124N

### Upper-Division General Education Requirements

Met in the major through professional education coursework.

### Requirements for Graduation

Requirements for graduation include completion of ENGL 110C, ENGL 211C or ENGL 231C, and the writing intensive (W) course in the major with a grade of C or better, completion of the Biology and Senior Assessments, a minimum cumulative 2.75 GPA, in the major area, and in the professional education core, with no grade less than a C in the major and C- in the professional education core; successful completion of the Teacher Candidate Internship and a minimum of 120 credit hours, which must include both a minimum of 30 credit hours overall and 12 credit hours in upper-level courses in the major program from Old Dominion University. Note that a grade of C (2.0) or better must be earned in all biology courses used to satisfy departmental requirements.

Licensure requirements also include certificate of completion in First Aid/AED/CPR, Dyslexia Awareness Training, Child Abuse and Neglect Recognition and Intervention Training, and Regulations Governing the Use of Restraint and Seclusion in Elementary and Secondary Schools, and Cultural Competence Training.

## Biology Core

**Required Biology Core Courses (C or better required in each course)**

BIOL 121N & BIOL 122N	General Biology I and General Biology I Lab	4
BIOL 123N & BIOL 124N	General Biology II and General Biology II Lab	4

Upon completion of the above sequences, students must complete the following core courses, some of which are prerequisites or corequisites for upper-level biology courses (see course descriptions for individual courses):

BIOL 291	Ecology	3
BIOL 292	Evolution	3
BIOL 293	Cell Biology	3
BIOL 294	Genetics	3

**Total Credit Hours** 20

## Biology with a Major in Secondary Biology Education (6-12)

This program leads to eligibility for teacher licensure in Virginia and is available only to individuals holding a baccalaureate degree or completing requirements for a Bachelor of Science degree in biology.

### General Education

Complete lower-division requirements 33-40

Complete upper-division requirements (met in the major through professional education coursework)

### Biology Core

Complete biology core requirements 20

### Biology Requirements

BIOL 240	Fundamentals of Anatomy and Physiology I	4
or BIOL 250	Human Anatomy and Physiology I	
BIOL 307	Invertebrate Zoology	4-5
or BIOL 336	Vertebrate Zoology	
BIOL 308	Botany	4
Biology electives *		8

### Non-Biology Requirements

CHEM 121N	Foundations of Chemistry I Lecture	3
CHEM 122N	Foundations of Chemistry I Laboratory	1
CHEM 123N	Foundations of Chemistry II Lecture	3
CHEM 124N	Foundations of Chemistry II Laboratory	1
CHEM 211	Organic Chemistry I Lecture	3
Select one of the following:		3

OEAS 110N	Earth Science	
OEAS 111N	Physical Geology	
PHYS 111N	Introductory General Physics	
STAT 130M	Elementary Statistics	3
or STAT 310	Introductory Data Analysis	

### Professional Education Coursework (overall 2.75 GPA required)

STEM 103	Foundations of STEM Teaching: An Inquiry-Based Approach	2
STEM 110T	Technology and Your World	3
STEM 201	Knowing and Learning in STEM Education	3
STEM 401	Project Based Instruction in STEM Education	3
STEM 402	Perspectives on STEM	3
STEM 485	Apprentice Teaching	9
BIOL 468W	Research Methods in Mathematics and Science	3

**Total Credit Hours** 116-124

- \* Electives must be at the 300 level or above, to include one lab or field course. See the secondary biology education advisor of chief departmental advisor for details.

## Elective Credit

Elective credit may be needed to meet the minimum requirement of 120 credit hours for the degree.

## Additional Requirements and Information

### Admission

Students must first declare secondary biology education (6-12) as their major with the appropriate advisor. All students must apply for and be admitted into the approved secondary biology education program. Students must meet the required criteria for admission by earning the minimum required grade point averages (GPA).

### Virginia Board of Education Prescribed Assessments for Admission to an Approved Teacher Education Program

Old Dominion University students seeking admission to an approved teacher education program must satisfy the Virginia Board of Education required assessment for admission into an approved teacher education program. The requirement can be satisfied by meeting a passing score in the following:

- Virginia Communication and Literacy Assessment (VCLA): Scaled passing score of 235 for the reading subtest and score of 235 for the writing subtest OR a composite score of 470 for the assessment.

For the most current information on the prescribed Virginia Board of Education admission assessment, visit the Virginia Department of Education at <https://www.doe.virginia.gov/>.

### Required grade point averages (GPA)

- A cumulative GPA of 2.75 is required.
- A major/content GPA of 2.75 is required - all biology courses must be passed with a grade of C (2.0) or above and all other science content courses must be passed with a grade of C- or higher.
- A professional education GPA of 2.75 is required – all professional education courses must be passed with a grade of C- or higher

Although students may enroll in a limited number of education courses, students must be admitted into the approved secondary biology education program prior to enrolling in any instructional strategies practicum education course. Students must also meet with an education advisor in the Office of Clinical Experiences.

### Continuance

Students must maintain a cumulative GPA of 2.75, a major/content GPA of 2.75 and a professional education GPA of 2.75. Biology courses must be passed with a grade of C (2.0) or higher. The remaining courses required for the major and in the professional education core must be completed with a grade of C- or higher for continuance. A professional education GPA of 2.75 is required for continuance. Students must take and pass the Praxis Subject Assessment, Biology content knowledge (formerly Praxis II) prior to or while enrolled in the instructional strategies course. All assessments must be passed prior to the start of the Teacher Candidate Internship Orientation session.

### Background Clearance Requirement

Old Dominion University requires a background clearance check of candidates interested in many of the professional education programs. Professional education programs have several field experiences that are required for continuance and graduation from the program. The background clearance must be successfully completed prior to a field experience placement. Candidates will be provided a field experience placement when the background check process is completed with resolution of any issues. The process to complete the ODU clearance background check is located at: <http://www.odu.edu/success/academic/teacher-education/placement/background-checks> (<http://www.odu.edu/success/academic/>

teacher-education/placement/background-checks/). The ODU clearance process includes: an FBI fingerprint, a child protective service/social service review, and a Virginia State Police sex offender registry review. Candidates interested in the professional education programs are advised to complete this clearance process immediately upon entry into the program since the clearance process takes a minimum of eight weeks to complete.

### Virginia Board of Education Prescribed Assessments for Licensure

Praxis Subject Assessment, Biology content knowledge: (test code: 5236) – passing score of 154 is required

To review more information on the Virginia Board of Education prescribed assessments visit the Office of Clinical Experiences website, [www.odu.edu/oce](http://www.odu.edu/oce) (<http://www.odu.edu/oce/>).

Due to changing University requirements, national accreditation standards, and the Virginia Board of Education licensure regulations, the teacher preparation programs in the College of Sciences are under constant revision. Any changes resulting from these factors supersede the program requirements described in this Catalog. Students are encouraged to obtain current program information from their advisors and from the Office of Clinical Experiences website at: [www.odu.edu/oce](http://www.odu.edu/oce) (<http://www.odu.edu/oce/>).

## Honors Program in Biology

### A. Honors Research

Undergraduates with junior or senior standing and a GPA of 3.00 or better are eligible to participate in Honors Research. After consultation with the program director (Dr. Deborah A. Waller), students select a professor who agrees to oversee the research project. Students then enroll in two courses, BIOL 487 and BIOL 488W. The courses may be taken in any sequence: fall-spring, spring-summer, summer-summer, summer-fall. Normally both semesters are required but a student may receive credit for only one semester. The research project, time commitment by the student and the basis for the grade are mutually determined by the student and professor. Because first-semester research results are often preliminary, the grade for BIOL 487 is based on a review paper and/or research proposal, which provides the student with an overview of the field. The second semester is graded on the final research paper and a seminar presented to the honors committee and interested faculty. Professors should encourage students to publish results and present papers at scientific meetings when appropriate. Students should also be urged to apply for funds from agencies that provide seed money to undergraduates. The program director can provide information on scientific societies that sponsor meetings and/or offer small grants. Successful completion of both courses with a C (2.0) or better will allow the student to use BIOL 488W as a lab course in meeting his/her requirements.

### B. Bachelor's Degree with Honors in Biological Sciences and Honors Designation for Biology courses

Students maintaining an overall GPA of at least 3.25 and of 3.50 in biology can receive a "Bachelor's Degree with Honors in Biological Sciences" subject to satisfaction of the minimum University standards for the Honors degree and completion of one of the following two options:

**Option 1:** Successful completion of two semesters of biological research taken as BIOL 487 / BIOL 488W (Honors Research).

**Option 2:** Successful completion of three upper-division courses in Biological Sciences and achievement of the "Honors" designation in each.

Students petitioning for designation of an upper-division biology course as "Honors" must have a minimum overall GPA of 3.25 and a GPA of at least 3.50 in biology.

To receive the "Honors" designation for a course, students must achieve a final course score of at least 95% or the equivalent of an "A" on the University grade scale.

Faculty are encouraged to assign and work with students on other activities deemed appropriate for an "Honors" course designation and utilize the results of these activities in the assignment of a course grade.

## Degree Program Guide

The Degree Program Guide is a suggested curriculum to complete this degree program in four years. It is just one of several plans that will work and is presented only as broad guidance to students. Each student is strongly encouraged to develop a customized plan in consultation with their academic advisor. Additional information can also be found in Degree Works.

Course	Title	Credit Hours
<b>Freshman</b>		
<b>First Semester</b>		
ENGL 110C	English Composition (Grade of C or better required)	3
MATH 162M	Precalculus I	3
BIOL 121N & BIOL 122N		4
CHEM 121N	Foundations of Chemistry I Lecture	3
CHEM 122N	Foundations of Chemistry I Laboratory	1
<b>Credit Hours</b>		<b>14</b>
<b>Second Semester</b>		
ENGL 211C or ENGL 231C	Writing, Rhetoric, and Research or Writing, Rhetoric, and Research: Special Topics	3
BIOL 123N & BIOL 124N		4
CHEM 123N	Foundations of Chemistry II Lecture	3
CHEM 124N	Foundations of Chemistry II Laboratory	1
MATH 205 or MATH 211	Calculus for Life Sciences or Calculus I	3
STEM 103	Foundations of STEM Teaching: An Inquiry-Based Approach	2
<b>Credit Hours</b>		<b>16</b>
<b>Sophomore</b>		
<b>First Semester</b>		
BIOL 291	Ecology	3
BIOL 292	Evolution	3
STAT 130M	Elementary Statistics	3
Oral Communication		3
STEM 201	Knowing and Learning in STEM Education	3
<b>Credit Hours</b>		<b>15</b>
<b>Second Semester</b>		
BIOL 293	Cell Biology	3
BIOL 294	Genetics	3
STEM 202	Classroom Interactions in STEM Education	3
Human Behavior		3

CS 121G or CS 126G or OEAS 130G	Introduction to Information Literacy and Research for Scientists or Honors: Introduction to Information Literacy and Research or Research Skills and Information Literacy for the Natural Sciences	3
<b>Credit Hours</b>		<b>15</b>

### Junior

#### First Semester

CHEM 211	Organic Chemistry I Lecture	3
BIOL 240 or BIOL 250	Fundamentals of Anatomy and Physiology I or Human Anatomy and Physiology I	4
Literature		3
BIOL 308	Botany	4
<b>Credit Hours</b>		<b>14</b>

#### Second Semester

300/400-level Biology elective		4
Select one of the following:		4
OEAS 111N	Physical Geology	
OEAS 112N	Historical Geology	
PHYS 111N	Introductory General Physics	
Philosophy and Ethics		3
Impact of Technology		3
Interpreting the Past		3
<b>Credit Hours</b>		<b>17</b>

### Senior

#### First Semester

BIOL 468W	Research Methods in Mathematics and Science (C or better required)	3
STEM 401	Project Based Instruction in STEM Education	3
BIOL 307 or BIOL 336	Invertebrate Zoology or Vertebrate Zoology	5
300/400-level Biology elective		3-4
Human Creativity		3
<b>Credit Hours</b>		<b>17-18</b>

#### Second Semester

STEM 485	Apprentice Teaching	9
STEM 402	Perspectives on STEM	3
<b>Credit Hours</b>		<b>12</b>
<b>Total Credit Hours</b>		<b>120-121</b>

Language and Culture I & II may be met in high school and are not included in this 4-year plan. Please see requirement details.

## BA or BS to MBA (Master of Business Administration) Linked Program

The linked BA/MBA or BS/MBA program is an early entry to the MBA program of study. The early-entry program is designed for well qualified non-business undergraduate ODU students to start their MBA program prior to completing their undergraduate degree. Well qualified non-business undergraduate students may take MBA-level courses as early as three semesters prior to graduation and count up to 12 graduate credits toward their undergraduate degree. Students participating in the early-

entry program must earn a minimum of 150 credit hours (120 discrete credit hours for the undergraduate degree and 30 discrete credit hours for the graduate degree). Early-entry program students should carefully consider their undergraduate degree program requirements when planning their course of study. Students in the early-entry program work in close consultation with the MBA Program Office and should refer to information in the Strome College of Business section in the graduate catalog (<http://catalog.odu.edu/graduate/stromecollegeofbusiness/>) to develop an individualized plan of study based on the required coursework.

## **BA or BS to MPA (Master of Public Administration) Linked Program**

The linked BA/MPA or BS/MPA program provides qualified Old Dominion University undergraduate students with the opportunity to earn a master's degree in public administration while taking credits in the MPA program as an undergraduate student. The program is designed for highly motivated students with the desire to immediately continue their education after the bachelor's degree. The program is especially relevant to individuals seeking to work (or currently working) in the public or non-profit sectors, but is suitable for students from any undergraduate major. Graduate courses may be taken during the fall and spring semester of the student's senior undergraduate year. Up to 12 graduate credits can count toward both the undergraduate and graduate degree and can meet upper-level General Education requirements. After receiving the undergraduate degree, a student will continue with the MPA program, taking MPA courses until completing the required 39 credit hours. Students in the linked program must earn a minimum of 150 credit hours (120 discrete credit hours for the undergraduate degree and 30 discrete credit hours for the graduate degree).

Requirements for admission to the graduate program can be found in the School of Public Service section of the Graduate Catalog (<http://catalog.odu.edu/graduate/business/public-service/>). For additional information, please contact the School of Public Service in the Strome College of Business.