**Bachelor of Science**

**Biology with a Major in Biomedical Sciences (BS)**

**Requirements**

**Lower-Division General Education**
- Written Communication: 6
- Oral Communication: 3
- Mathematics: 3
- Language and Culture: 0-6
- Information Literacy and Research: 3
- Human Behavior: 3
- Human Creativity: 3
- Interpreting the Past: 3
- Literature: 3
- Philosophy and Ethics: 3
- The Nature of Science: 8
- Impact of Technology: 3
- Mathematics: 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 in the major by CHEM 121N-CHEM 122N and CHEM 123N-CHEM 124N

**Upper-Division General Education**
- Option A: Approved Disciplinary Minor (a minimum of 12 hours determined by the department), or second degree or second major.
- Option B: Interdisciplinary Minor (specifically 12 hours, 3 of which may be in the major)
- Option C: An approved Certification Program such as teaching licensure
- Option D: Two Upper-Division Courses from outside the College of Sciences and not required by the major (6 hours)

**Requirements for Graduation**

Requirements for graduation include the following:
- Minimum of 120 credit hours.
- Minimum of 30 credit hours overall and 12 credit hours of upper-level courses in the major program from Old Dominion University.
- Minimum overall cumulative grade point average of C (2.00) in all courses taken.
- Minimum overall cumulative grade point average of C (2.00) in all courses taken toward the major.
- Minimum overall cumulative grade point average of C (2.00) in all courses taken toward a minor.

- 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. The W course must be taken at Old Dominion University.
- Completion of Senior Assessment.

**Biology Core**

**Required Biology Core Courses (C or better required in each course)**
- BIOL 121N General Biology I 4
- BIOL 122N General Biology I Lab 4
- BIOL 123N General Biology II 4
- BIOL 124N General Biology II Lab 4

Upon completion of the above sequences, students must complete the following core courses:
- BIOL 293 Cell Biology 3
- BIOL 294 Genetics 3
- BIOL 240 Fundamentals of Anatomy and Physiology I 8
- BIOL 241 Fundamentals of Anatomy and Physiology II 8
- BIOL 250 Human Anatomy and Physiology I 8
- BIOL 251 Human Anatomy and Physiology II 8

**Total Credit Hours** 22

**Biomedical Sciences Major**

**General Education**
- Complete lower-division requirements 33-39
- Complete upper-division requirements (minimum of 6 credit hours) 6

**Biology Core**
- Complete biology core requirements 22

**Biology Upper-Division Required Courses (C or better required in each course)**
- BIOL 300 Fundamental Biomolecules 3
- or CHEM 441 Biochemistry Lecture 3
- BIOL 302 Introduction to immunology 3
- BIOL 316 General Microbiology 3
- BIOL 317 General Microbiology Laboratory 2

**Writing Intensive Requirement**
- Choose a Writing Intensive (W) course from the following Upper-Division Biology Electives or BIOL 405W, which requires the approval of topic/sponsor or a biomedical-specific course section. BIOL 405W will NOT count towards the upper-division Biology electives.

**Upper-Division Biology Elective Courses**

Students must choose 16 elective credit hours from the following Biology elective courses. At least one of the courses must be BIOL 416, BIOL 440, or BIOL 476. Two laboratory-based courses (**) are required in the 16 elective credit hours. Students must pass all Biology electives with a C or better (P=Passing for courses graded Pass/Fail).

Select at least one of the following:
- BIOL 416 Clinical Immunology
- BIOL 440 Methods in Immunological Research **
- BIOL 476 Cancer Immunology and Immunotherapy

Select from the following to complete the Upper-Division Biology Elective Credits
- BIOL 306 Human Genetics
- BIOL 309 Foundations of Pathophysiology **
- BIOL 313 Introduction to Neuroanatomy **
- BIOL 314 Developmental Biology **
- BIOL 355 Stem Cell Biology
Elective Credit

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

### 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, fall-spring. 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 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.

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.
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 122N</td>
<td>Foundations of Chemistry I Laboratory</td>
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**Second Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>ENGL 211C or ENGL 231C</td>
<td>Writing, Rhetoric, and Research (C or better required) or Writing, Rhetoric, and Research: Special Topics</td>
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<tr>
<td>MATH 205</td>
<td>Calculus for Life Sciences</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 123N</td>
<td>General Biology II</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 124N</td>
<td>General Biology II Lab</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 123N</td>
<td>Foundations of Chemistry II Lecture</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 124N</td>
<td>Foundations of Chemistry II Laboratory</td>
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**Credit Hours** 14

**Sophomore**

**First Semester**

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<tr>
<th>Course</th>
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<th>Credit Hours</th>
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<tr>
<td>BIOL 240 or BIOL 250</td>
<td>Fundamentals of Anatomy and Physiology I or Human Anatomy and Physiology I</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 293</td>
<td>Cell Biology</td>
<td>3</td>
</tr>
<tr>
<td>STAT 130M or STAT 310</td>
<td>Elementary Statistics or Introductory Data Analysis</td>
<td>3</td>
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<tr>
<td>CHEM 211</td>
<td>Organic Chemistry I Lecture</td>
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<td>CHEM 212</td>
<td>Organic Chemistry I Laboratory</td>
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**Credit Hours** 15

**Second Semester**

<table>
<thead>
<tr>
<th>Course</th>
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<th>Credit Hours</th>
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<tbody>
<tr>
<td>BIOL 241 or BIOL 251</td>
<td>Fundamentals of Anatomy and Physiology I or Human Anatomy and Physiology II</td>
<td>4</td>
</tr>
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<td>BIOL 294</td>
<td>Genetics</td>
<td>3</td>
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<tr>
<td>PHYS 111N</td>
<td>Introductory General Physics</td>
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<tr>
<td>Human Behavior</td>
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**Credit Hours** 14

**Junior**

**First Semester**

<table>
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<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>BIOL 300 or CHEM 441</td>
<td>Fundamental Biomolecules or Biochemistry Lecture</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 302</td>
<td>Introduction to immunology</td>
<td>3</td>
</tr>
<tr>
<td>CS 121G or CS 126G or OEAS 130G</td>
<td>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</td>
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**Credit Hours** 3

**Second Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>Oral Communication</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Elective or Language and Culture I (May be waived, see requirement details)</td>
<td>3</td>
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**Credit Hours** 15

**Senior**

**First Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 440 or BIOL 446 or BIOL 476</td>
<td>Methods in Immunological Research or Clinical Immunology or Cancer Immunology and Immunotherapy</td>
<td>4</td>
</tr>
</tbody>
</table>

**Upper-Division General Education course** 3

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpretng the Past</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td></td>
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</table>

**Credit Hours** 17-18

**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.