

## Bachelor of Science

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

The secondary physics education major is designed for students who are preparing to be high school physics teachers. This curriculum provides a solid foundation in both contemporary physics and in education pedagogy.

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

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 the Office of Clinical Experiences website at <https://www.odu.edu/oce> (<https://www.odu.edu/oce/>).

## Admission

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

### Required Grade Point Averages (GPA)

- A cumulative GPA of 2.75 is required.
- A major/content GPA of 2.75 is required - all physics courses 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 physics teacher preparation 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. Physics courses must be passed with a grade of C- 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, Physics 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, Physics content knowledge (test code: 5266) – passing score of 145 is required.

Students are encouraged to complete the following courses (or their approved equivalents) prior to taking the Praxis content knowledge licensure tests:

CHEM 121N, CHEM 122N, CHEM 123N, and CHEM 124N  
PHYS 231N and PHYS 232N  
PHYS 323

Please consult with your academic advisor with any questions and before registering for your licensure test.

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/>).

## Requirements

### Lower-Division General Education

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

Mathematics: satisfied by the major

Information Literacy and Research: CS 120G, CS 121G or OEAS 130G

Nature of Science: satisfied by the major

### Upper-Division General Education

The professional education core satisfies the Upper-Division General Education requirement.

### 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 Senior Assessment,

completion of the Physics Exit Exam with a minimum score of 20<sup>th</sup> percentile, 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 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.

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.

## Professional Education Core

STEM 103	Foundations of STEM Teaching: An Inquiry-Based Approach	2
STEM 201	Knowing and Learning in STEM Education	3
STEM 202	Classroom Interactions in STEM Education	3
STEM 401	Project Based Instruction in STEM Education	3
STEM 485	Apprentice Teaching	9
SPED 400	Foundations of Special Education: Legal Aspects and Characteristics	3
TLED 408	Reading and Writing in Content Areas	3
<b>Total Credit Hours</b>		<b>26</b>

## Secondary Physics Education Major

### General Education

Complete lower-division requirements 30-36

Complete upper-division requirements (met by the professional education core)

### Professional Education Core

Complete the professional education core requirements 26

### Secondary Physics Education

MATH 211	Calculus I	4
MATH 212	Calculus II	4
MATH 307	Ordinary Differential Equations	3
or MATH 280	Transfer Credit for Ordinary Differential Equations	
MATH 312	Calculus III	4
or MATH 285	Transfer Credit for Calculus III	
CHEM 121N & CHEM 122N	Foundations of Chemistry I Lecture and Foundations of Chemistry I Laboratory	4
CHEM 123N & CHEM 124N	Foundations of Chemistry II Lecture and Foundations of Chemistry II Laboratory	4
CS 151	Introduction to Programming with Java	4
or CS 153	Introduction to Programming with Python	
ASTP 103N	Introductory Astronomy of the Solar System	4
or ASTP 104N	Introductory Astronomy of Galaxies and Cosmology	
PHYS 261N	Advanced University Physics I	4
or PHYS 231N	University Physics I	
or PHYS 226N	Honors: University Physics I	
PHYS 262N	Advanced University Physics II	4
or PHYS 232N	University Physics II	
or PHYS 227N	Honors: University Physics II	
PHYS 323	Modern Physics	3
PHYS 319	Analytical Mechanics	3
PHYS 303	Intermediate Experimental Physics	3
PHYS 120	Physics in the 21st Century	1
or PHYS 309	Physics on the Back of an Envelope	
PHYS 355	Mathematical Methods of Physics	3
PHYS 413	Methods of Experimental Physics	3

PHYS 425	Electromagnetism I	3
PHYS 499W	Senior Thesis *	3
or PHYS 489W & PHYS 490W	Senior Thesis I and Senior Thesis II	
<b>Total Credit Hours</b>		<b>117-123</b>

\* Grade of C or better required in PHYS 499W or both PHYS 489W and PHYS 490W

## Elective Credit

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

## BS Degree with Honors

Qualified students may receive the BS degree with honors (to be noted on their diplomas) by completing specified additional requirements. At the time of application for this designation, a student must have a GPA of 3.50 or higher in physics, a GPA of 3.25 or higher overall, must have completed two contract honors courses, and must have completed 60 credit hours (of which at least 54 must be in grade-point graded courses) at Old Dominion University. (Contract honors courses are specialized courses of individual study under the direct supervision of a professor. Permission to take these courses is granted jointly by the Department of Physics and the Honors College.)

## 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>Fall</b>		
ENGL 110C	English Composition (Grade of C or better required)	3
MATH 211	Calculus I	4
Human Creativity		3
Human Behavior		3
<b>Credit Hours</b>		<b>13</b>
<b>Spring</b>		
ENGL 211C or ENGL 231C	(Grade of C or better required)	3
MATH 212	Calculus II	4
CS 151 or CS 153	Introduction to Programming with Java or Introduction to Programming with Python	4
Literature		3
STEM 103	Foundations of STEM Teaching: An Inquiry-Based Approach	2
<b>Credit Hours</b>		<b>16</b>
<b>Sophomore</b>		
<b>Fall</b>		
CHEM 121N and CHEM 122N		4
Select one of the following:		4
PHYS 261N	Advanced University Physics I	
PHYS 231N	University Physics I	
PHYS 226N	Honors: University Physics I	

Select one of the following:		3
CS 120G	Introduction to Information Literacy and Research	
CS 121G	Introduction to Information Literacy and Research for Scientists	
OEAS 130G	Research Skills and Information Literacy for the Natural Sciences	
STEM 201	Knowing and Learning in STEM Education	3
<b>Credit Hours</b>		<b>14</b>
<b>Spring</b>		
CHEM 123N and CHEM 124N		
		4
Select one of the following:		
		4
PHYS 262N	Advanced University Physics II	
PHYS 232N	University Physics II	
PHYS 227N	Honors: University Physics II	
Interpreting the Past		3
STEM 202	Classroom Interactions in STEM Education	3
<b>Credit Hours</b>		<b>14</b>
<b>Junior</b>		
<b>Fall</b>		
MATH 312 or MATH 285		
		4
PHYS 303	Intermediate Experimental Physics	3
PHYS 323	Modern Physics	3
PHYS 355	Mathematical Methods of Physics	3
Oral Communication		3
<b>Credit Hours</b>		<b>16</b>
<b>Spring</b>		
MATH 307 or MATH 280		
		3
PHYS 319	Analytical Mechanics	3
ASTP 103N or ASTP 104N	Introductory Astronomy of the Solar System or Introductory Astronomy of Galaxies and Cosmology	4
SPED 400	Foundations of Special Education: Legal Aspects and Characteristics	3
Philosophy and Ethics		3
<b>Credit Hours</b>		<b>16</b>
<b>Senior</b>		
<b>Fall</b>		
PHYS 425	Electromagnetism I	3
PHYS 413	Methods of Experimental Physics	3
Select one of the following:		
		3
PHYS 499W	Senior Thesis	
PHYS 489W	Senior Thesis I	
PHYS 490W	Senior Thesis II	
PHYS 120* or PHYS 309*		1
Impact of Technology		3

STEM 401	Project Based Instruction in STEM Education	3
<b>Credit Hours</b>		<b>16</b>
<b>Spring</b>		
STEM 485	Apprentice Teaching	9
TLED 408	Reading and Writing in Content Areas	3
Elective or Language and Culture course if needed		3
<b>Credit Hours</b>		<b>15</b>
<b>Total Credit Hours</b>		<b>120</b>

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

\*PHYS 120 is offered fall semester only. PHYS 309 is offered spring semester only.