SECONDARY EDUCATION AND TEACHING, BACHELOR OF SCIENCE IN EDUCATION (B.S.ED.) WITH A CONCENTRATION IN PHYSICS EDUCATION

The purpose of the B.S.Ed. in Secondary Education and Teaching with a concentration in physics education is to prepare students to serve as initially licensed teachers in grades six through 12, as well as to serve as educators and leaders in schools and community-based settings. Students enrolled in this program will be required to declare a double major in the Bachelor of Science in Physics with a concentration in secondary teacher preparation. The program will focus on providing students with a solid foundation in secondary education and physics to meet the requirements for licensure. Through the core education curriculum, students will become knowledgeable about professional roles and workplace responsibilities while learning basic abilities in the planning and implementation of physics lessons for students in grades six through 12. The core curriculum instills fundamental knowledge and skills, with opportunities for observation and application in a variety of settings. Through the physics curriculum, students will develop the content knowledge and skills in order to deliver relevant and rigorous lessons in physics education. Graduates will be prepared to work in public and private middle and high schools across Virginia, with particular focus in urban and other high-need areas. Graduates will be capable of working with diverse learners and adapting instructional programs based on the needs of their students and clients. Successful completion of the program will result in licensure in secondary physics education (grades six through 12).

Student learning outcomes

1. **Learner and learning:** Students will understand human development and learning theories appropriate to the age group they will teach and acquire an awareness of the diversity of the school-age populations' cultural backgrounds, learning strengths and needs.
2. **Instructional practice:** Students will demonstrate an ability to plan and implement effective teaching and measure student learning in ways that lead to sustained development and learning.
3. **Professional responsibility:** Students will develop an understanding of purposes for education and a defensible philosophical approach toward teaching and demonstrate professional dispositions.

Physics education concentration-specific outcome

1. **Content:** Demonstrate knowledge of the subjects they will teach as physics educators.

Special requirements

- Students must successfully complete all **initial licensure milestone requirements**.
- Students enrolled in this program are required to declare a second major in their content area

Degree requirements for Secondary Education and Teaching, Bachelor of Science in Education (B.S.Ed.) with a concentration in physics education

Course	Title	Hours
General education (https://bulletin.vcu.edu/undergraduate/undergraduate-study/general-education-curriculum/)		
Select 30 credits of general education courses in consultation with an adviser.		30
Major requirements		
• Major core requirements		
EDUS 202	Diversity, Democracy and Ethics	3
EDUS 301	Human Development and Learning	3
SEDP 405	Collaborative Practices to Support Inclusion for Children and Youth with Disabilities	3
SEDP 452	Supporting Multilingual Learners With Disabilities	1
TEDU 412	Curriculum and Assessment: ____	3
TEDU 452	Teaching Multilingual Learners	2
TEDU 510	Instructional Technology in PK-12 Environments	2
TEDU 562	Reading Instruction in the Content Areas	3
TEDU 588	Classroom Management	3
Secondary education		
TEDU 311	Middle School Practicum	2
TEDU 312	High School Practicum	1
TEDU 469	Secondary Internship I	4
TEDU 470	Secondary Internship II	4
TEDU 540	Teaching Middle and High School Sciences	3
• Major electives [1]		6
Concentration requirements		
BIOL 101	Biological Concepts [2]	3
or BIOL 151	Introduction to Biological Sciences I	
PHYS 382	Solar System Astronomy [3]	3
or PHYS 383	Big Bang Cosmology	
or PHYS 483	Introduction to Astrophysics	
Physics/double major		
PHYS 208 & PHYZ 208	University Physics II and University Physics II Laboratory	5
PHYS 301	Classical Mechanics I	3
PHYS 320 & PHYZ 320	Modern Physics and Modern Physics Laboratory	4
PHYS 340	Statistical Mechanics and Thermodynamics	3
PHYS 376	Electromagnetism I	3
PHYS 380	Quantum Physics I	3
PHYS 450	Senior Physics Laboratory	3
PHYS 490	Seminar in Conceptual Physics	1
Additional physics requirements		
MATH 200	Calculus with Analytic Geometry I [4]	4

MATH 201	Calculus with Analytic Geometry II	4
MATH 301	Differential Equations	3
MATH 307	Multivariate Calculus	4
PHYS 207 & PHYZ 207	University Physics I and University Physics I Laboratory [5]	5
AI literacy course [6]		3
Open electives		
Select any course.		5
Total Hours		**120**

[1]

Select courses from the physics and physics-related electives listed in the B.S. in Physics (https://bulletin.vcu.edu/undergraduate/college-humanities-sciences/physics/physics-bs/#degreerequirementstext)

[2]

Satisfies general education BOK for natural sciences and AOI for scientific and logical reasoning

[3]

Credits earned satisfy physics major electives courses.

[4]

Satisfies general education quantitative foundations.

[5]

Satisfies general education BOK for natural sciences and AOI for scientific and logical reasoning.

[6]

Any three credit course offered through the minor in AI studies in humanities and sciences. Students who chose a general education course will take additional electives to fulfill degree requirements.

The minimum number of credit hours required for this degree is 120.

What follows is a sample plan that meets the prescribed requirements within a four-year course of study at VCU. Please contact your adviser before beginning course work toward a degree.

Recommended course sequence/plan of study

Freshman year

Fall semester		**Hours**
BIOL 101 or BIOL 151	Biological Concepts (satisfies general education BOK for natural sciences and AOI for scientific and logical reasoning) or Introduction to Biological Sciences I	3
UNIV 101 or UNIV 102 or UNIV 103	Introduction to the University (satisfies open elective) or Investigations in Learning or Education and Career Planning	1
UNIV 111 Play course video for Introduction to Focused Inquiry: Investigation and Communication	Introduction to Focused Inquiry: Investigation and Communication (satisfies general education UNIV foundations)	3
General education course (select AOI for global perspectives)		3
Open elective		4
	Term Hours:	**14**
Spring semester		
MATH 200	Calculus with Analytic Geometry I (satisfies general education quantitative foundations)	4
PHYS 207 & PHYZ 207	University Physics I and University Physics I Laboratory (satisfies general education BOK for natural sciences and AOI for scientific and logical reasoning)	5
UNIV 200	Advanced Focused Inquiry: Literacies, Research and Communication (satisfies general education UNIV foundations)	3
General education course (select BOK for humanities/ fine arts and AOI for creativity, innovation and aesthetic inquiry)		3
	Term Hours:	**15**
Sophomore year		
Fall semester		
MATH 201	Calculus with Analytic Geometry II	4
PHYS 208 & PHYZ 208	University Physics II and University Physics II Laboratory	5
AI literacy course		3
General education course (select AOI in consultation with advisor)		3
	Term Hours:	**15**
Spring semester		
EDUS 202	Diversity, Democracy and Ethics	3
MATH 307	Multivariate Calculus	4
PHYS 301	Classical Mechanics I	3
PHYS 320	Modern Physics	3
Major elective (select course from the physics and physics-related electives listed in the B.S. in Physics)		3
	Term Hours:	**16**
Junior year		
Fall semester		
EDUS 301	Human Development and Learning	3
MATH 301	Differential Equations	3
PHYZ 320	Modern Physics Laboratory	1
SEDP 405	Collaborative Practices to Support Inclusion for Children and Youth with Disabilities	3
TEDU 510	Instructional Technology in PK-12 Environments	2

Major elective (select course from the physics and physics-related electives listed in the B.S. in Physics)		3
	Term Hours:	**15**
Spring semester		
2.8 GPA required for admission to teacher preparation		
PHYS 340	Statistical Mechanics and Thermodynamics	3
PHYS 376	Electromagnetism I	3
PHYS 450	Senior Physics Laboratory	3
SEDP 452	Supporting Multilingual Learners With Disabilities	1
TEDU 452	Teaching Multilingual Learners	2
TEDU 562	Reading Instruction in the Content Areas	3
	Term Hours:	**15**
Senior year		
Fall semester		
PHYS 380	Quantum Physics I	3
PHYS 382 or PHYS 383 or PHYS 483	Solar System Astronomy or Big Bang Cosmology or Introduction to Astrophysics	3
PHYS 490	Seminar in Conceptual Physics	1
TEDU 311	Middle School Practicum	2
TEDU 312	High School Practicum	1
TEDU 540	Teaching Middle and High School Sciences	3
TEDU 588	Classroom Management	3
	Term Hours:	**16**
Spring semester		
TEDU 412	Curriculum and Assessment: ____	3
TEDU 469	Secondary Internship I	4
TEDU 470	Secondary Internship II	4
General education course (select BOK for social/behavioral sciences and AOI for diversities in the human experience)		3
	Term Hours:	**14**
	Total Hours:	**120**

The minimum number of credit hours required for this degree is 120.