# Secondary Science Education, B.S.

## Degree Offered

- Bachelor of Science

## Nature of the Program

The Bachelor of Science in Secondary Science Education program in WVU's School of Education prepares students to meet the content, pedagogical, and professional demands of teaching science in middle and high school settings. Students will choose from among the following content and certification specializations:

- General Science (5-Adult)
- Biology (9-Adult)
- Chemistry (9-Adult)
- Physics (9-Adult)

Graduates are eligible for certification to teach in their specialization area upon completion of the program.

Students complete more than 900 hours of field and clinical experiences in a variety of public school classrooms. This includes over 125 hours of field observation prior to a year-long residency during the final year of the program. The residency consists of a half-time placement in the first semester and a full-time placement in the second semester. These experiences are grounded in strong partnerships with local schools, offering rich opportunities to work closely with experienced teachers and diverse student populations.

Program coursework is designed with a strong commitment to academic excellence, informed by state and national standards and certification requirements. Courses focus on the specialized work of teaching science, including understanding students and how they learn, curriculum design, instructional strategies, and school contexts. Faculty members are active in their fields as educators and as scholars, bringing relevant and robust expertise to our teacher education programs.

The program also prepares students for key certification milestones, including the Praxis II content exam and the edTPA performance assessment. In addition, students receive ongoing support from academic advisors and career development specialists through the Office of Student Success in the College of Applied Human Sciences.

Designed with flexibility in mind, the program allows students to apply transfer credits, pursue general education electives, or add a minor or second major, particularly in their science field of interest. Students may also have the option to complete their final-year residency in their home communities or at a distance, depending on placement availability and program approval.

Graduates of the B.S. in Secondary Science Education program emerge as well-prepared, reflective educators equipped to meet the challenges and opportunities of today's middle and high school classrooms.

## Admissions for 2026-2027

### FIRST-TIME FRESHMEN

Admission to the B.S. in Secondary Science Education program is consistent with admission requirements for First-Time Freshmen applying to WVU. You can find more information at:

Admission Requirements for First-Time Freshmen - Undergraduate Admissions at WVU (https://admissions.wvu.edu/how-to-apply/first-time-freshmen/admission-requirements/)

### CURRENT WVU STUDENTS

Students admitted from other majors within WVU must have a 2.5 minimum cumulative GPA.

### TRANSFER STUDENTS

Students transferring from another institution must have a 2.5 minimum cumulative GPA.

## General Education Foundations

Please use this link to view a list of courses that meet each GEF requirement. **(**http://registrar.wvu.edu/gef/**)**

NOTE: Some major requirements will fulfill specific GEF requirements. Please see the curriculum requirements listed below for details on which GEFs you will need to select.

| Code | Title | Hours |
|---|---|---|
| **General Education Foundations** | | |
| F1 - Composition & Rhetoric | | 3-6 |
| ENGL 101 & ENGL 102 | Introduction to Composition and Rhetoric and Composition, Rhetoric, and Research | |
| or ENGL 103 | Accelerated Academic Writing | |
| F2A/F2B - Science & Technology | | 4-6 |
| F3 - Math & Quantitative Reasoning | | 3-4 |
| F4 - Society & Connections | | 3 |
| F5 - Human Inquiry & the Past | | 3 |
| F6 - The Arts & Creativity | | 3 |
| F7 - Global Studies & Diversity | | 3 |
| F8 - Focus (may be satisfied by completion of a minor, double major, or dual degree) | | 9 |
| Total Hours | | 31-37 |

Please note that not all of the GEF courses are offered at all campuses. Students should consult with their advisor or academic department regarding the GEF course offerings available at their campus.

## Curriculum Requirements

| Code | Title | Hours |
|---|---|---|
| A minimum GPA of 2.5 is required for graduation. | | |
| University Requirements | | 39 |
| Secondary Science Education Major Requirements | | 81 |
| Total Hours | | 120 |

## University Requirements

| Code | Title | Hours |
|---|---|---|
| General Education Foundations (GEF) 1, 2, 3, 4, 5, 6, 7, and 8 (31-37 Credits) | | |
| Outstanding GEF Requirements (GEF 1, 5, 6, 7) | | 15 |
| CAHS 191 | First-Year Seminar | 2 |
| General Electives | | 22 |
| Number of available credits for general electives may vary based on selected science certification endorsement area | | |
| Total Hours | | 39 |

## Secondary Science Education Major Requirements

| Code | Title | Hours |
|---|---|---|
| A minimum GPA of 2.5 is required in all Secondary Science Education Major requirements | | |
| **SECONDARY EDUCATION CORE COURSEWORK** | | |
| EDUC 205 | Introduction to Teaching and Learning in Secondary Schools (New course added to CIM; showing as inactive) | 3 |
| EDUC 304 | Place-based and Emotionally Responsive Teaching | 3 |
| RDNG 422 | Reading in the Content Areas | 3 |
| SPED 404 | Special Education in Contemporary Society (GEF 4) | 3 |
| SPED 460 | Differentiation of Instruction | 3 |
| **SCIENCE METHODS/PEDAGOGY COURSEWORK** | | |
| EDUC 342 | Teaching & Learning Science in Secondary Schools 1 | 3 |
| or EDUC 339 | Mathematics & Science Methods for Secondary Teachers 1 | |
| EDUC 442 | Teaching & Learning Science in Secondary Schools 2 | 3 |
| or EDUC 439 | Mathematics & Science Methods for Secondary Teachers 2 | |
| **SCIENCE CONTENT COURSEWORK** | | |
| EDUC 445 | Practical Applications in Science and Science Teaching | 3 |
| EDUC 449 | History & Philosophy of Science | 3 |

| | | |
|---|---|---|
| Certification Endorsement Content Coursework | | 33-39 |
| Biology (33 hours) | | |
| Chemistry (35 hours) | | |
| General Science (39 hours) | | |
| Physics (35 hours) | | |
| **PROFESSIONAL FIELD AND CLINICAL EXPERIENCE COURSEWORK** | | |
| EDUC 313 | Field Experience & Technology Applications in Secondary Schools 1 | 2 |
| EDUC 314 | Field Experience & Technology Applications in Secondary Schools 2 | 2 |
| EDUC 412 | Clinical Experience in Secondary Schools/Residency 1 | 5 |
| EDUC 413 | Clinical Experience in Secondary Schools/Residency 2 | 9 |
| EDUC 485 | Residency/Technology Capstone in Secondary Education | 3 |
| Total Hours | | 81-87 |

## Content Coursework for Biology (9-Adult) Certification Endorsement (Teacher Certification Code T127)

| Code | Title | Hours |
|---|---|---|
| BIOL 115<br>& 115L | Principles of Biology<br>and Principles of Biology Laboratory | 4 |
| BIOL 117<br>& 117L | Introductory Physiology<br>and Introductory Physiology Laboratory | 4 |
| BIOL 219<br>& 219L | Cellular and Molecular Biology<br>and Cellular & Molecular Biology Laboratory | 4 |
| BIOL 221 | Ecology and Evolution | 3 |
| SUST 101<br>& 101L | Sustainable Earth<br>and Sustainable Earth Laboratory | 4 |
| MATH 150 | Applied Calculus | 3 |
| CHEM 115<br>& 115L | Fundamentals of Chemistry 1<br>and Fundamentals of Chemistry 1 Laboratory | 4 |
| PHYS 105<br>& 105L | Conceptual Physics<br>and Conceptual Physics Laboratory | 4 |
| ASTR 106 | Descriptive Astronomy | 3 |
| Total Hours | | 33 |

## Content Coursework for Chemistry (9-Adult) Certification Endorsement (Teacher Certification Code T128)

| Code | Title | Hours |
|---|---|---|
| CHEM 115<br>& 115L | Fundamentals of Chemistry 1<br>and Fundamentals of Chemistry 1 Laboratory | 4 |
| CHEM 116<br>& 116L | Fundamentals of Chemistry 2<br>and Fundamentals of Chemistry 2 Laboratory | 4 |
| CHEM 215<br>& 215L | Introductory Analytical Chemistry<br>and Introductory Analytical Chemistry Laboratory | 4 |
| CHEM 231<br>& 231L | Organic Chemistry: Brief Course<br>and Organic Chemistry: Brief Course Laboratory | 4 |
| PHYS 105<br>& 105L | Conceptual Physics<br>and Conceptual Physics Laboratory | 4 |
| SUST 101<br>& 101L | Sustainable Earth<br>and Sustainable Earth Laboratory | 4 |
| MATH 155 | Calculus 1 | 4 |
| BIOL 101<br>& 101L | General Biology 1<br>and General Biology 1 Laboratory | 4 |
| ASTR 106 | Descriptive Astronomy | 3 |
| Total Hours | | 35 |

## Content Coursework for General Science (5-Adult) Certification Endorsement (Teacher Certification Code T133)

| Code | Title | Hours |
|---|---|---|
| SUST 101 & 101L | Sustainable Earth and Sustainable Earth Laboratory | 4 |
| SUST 102 | Global Sustainability | 3 |
| SUST 201 & 201L | Earth System Science and Earth System Science Laboratory | 4 |
| GEOL 321 | Geomorphology | 3 |
| GEOL 365 | Environmental Geology | 3 |
| ASTR 106 | Descriptive Astronomy | 3 |
| BIOL 101 & 101L | General Biology 1 and General Biology 1 Laboratory | 4 |
| BIOL 102 & 102L | General Biology 2 and General Biology 2 Laboratory | 4 |
| CHEM 115 & 115L | Fundamentals of Chemistry 1 and Fundamentals of Chemistry 1 Laboratory | 4 |
| PHYS 105 & 105L | Conceptual Physics and Conceptual Physics Laboratory | 4 |
| MATH 150 | Applied Calculus | 3 |
| Total Hours | | 39 |

## Content Coursework for Physics (9-Adult) Certification Endorsement (Teacher Certification Code T140)

| Code | Title | Hours |
|---|---|---|
| PHYS 111 & 111L | General Physics 1 and General Physics 1 Laboratory | 4 |
| PHYS 112 & 112L | General Physics 2 and General Physics 2 Laboratory | 4 |
| PHYS 314 | Introductory Modern Physics | 4 |
| CHEM 115 & 115L | Fundamentals of Chemistry 1 and Fundamentals of Chemistry 1 Laboratory | 4 |
| BIOL 101 & 101L | General Biology 1 and General Biology 1 Laboratory | 4 |
| MATH 155 | Calculus 1 | 4 |
| MATH 156 | Calculus 2 | 4 |
| SUST 101 & 101L | Sustainable Earth and Sustainable Earth Laboratory | 4 |
| ASTR 106 | Descriptive Astronomy | 3 |
| Total Hours | | 35 |

## WV Certification Requirements

To be able to be recommended for teacher certification in the area of Biology (9-Adult), Chemistry (9-Adult), General Science (5-Adult), or Physics (9-Adult) as a certification program completer, students will also need to meet the following requirements, in addition to completing the major coursework requirements:

- Documentation of Pre-Professional Skills requirement in Reading, Writing, and Mathematics, using one of the following allowable evidence indicated in the West Virginia Licensure Testing Directory.
- Receive a passing score on the appropriate Praxis II licensure content exam in the endorsement area, prior to the clinical/Residency experience:
  - #5236: Biology Content Knowledge
  - #5246: Chemistry

- #5436: General Science
- #5266: Physics

- Complete, submit, and pass the edTPA professional education assessment during the clinical/Residency experience.
- Maintain at least a cumulative GPA of 2.5.

## Suggested Plan of Study

**First Year**

| Fall | Hours | Spring | Hours |
|---|---|---|---|
| CAHS 191 | 2 | ENGL 102 (GEF 1) | 3 |
| ENGL 101 (GEF 1) | 3 | Science Certification Endorsement Content Course (GEF 8) | 4 |
| Science Certification Endorsement Content Course (GEF 2B) | 4 | Science Certification Endorsement Content Course (GEF 8) | 3 |
| Science Certification Endorsement Content Course (GEF 8) | 3 | General Elective | 3 |
| General Elective | 3 | General Elective | 3 |
| | 15 | | 16 |

**Second Year**

| Fall | Hours | Spring | Hours |
|---|---|---|---|
| EDUC 205 | 3 | Science Certification Endorsement Content Course | 4 |
| Science Certification Endorsement Content Course | 4 | Science Certification Endorsement Content Course | 3 |
| Science Certification Endorsement Content Course | 4 | GEF 6 | 3 |
| GEF 5 | 3 | GEF 7 | 3 |
| General Elective | 1 | General Elective | 3 |
| | 15 | | 16 |

**Third Year**

| Fall | Hours | Spring | Hours |
|---|---|---|---|
| EDUC 313 | 2 | EDUC 314 | 2 |
| SPED 404 (GEF 4) | 3 | EDUC 342 or 339 | 3 |
| EDUC 445 | 3 | RDNG 422 | 3 |
| Science Certification Endorsement Content Course | 4 | SPED 460 | 3 |
| General Elective | 3 | General Elective | 3 |
| | | General Elective | 3 |
| | 15 | | 17 |

**Fourth Year**

| Fall | Hours | Spring | Hours |
|---|---|---|---|
| EDUC 412 | 5 | EDUC 413 | 9 |
| EDUC 442 or 439 | 3 | EDUC 485 | 3 |
| EDUC 449 | 3 | | |
| EDUC 304 | 3 | | |
| | 14 | | 12 |

Total credit hours: 120

## Suggested Plan of Study for Transfer Students

**Third Year**

| Fall | Hours | Spring | Hours |
|---|---|---|---|
| EDUC 205 | 3 | EDUC 314 | 2 |
| EDUC 313 | 2 | EDUC 342 or 339 | 3 |
| SPED 404 (GEF 4) | 3 | RDNG 422 | 3 |
| EDUC 445 | 3 | SPED 460 | 3 |
| Science Certification Endorsement Content Course | 4 | General Elective or Science Certification Endorsement Content Course | 4 |

| | | | |
|---|---|---|---|
| General Elective or Science Certification Endorsement Content Course | 3 | General Elective or Science Certification Endorsement Content Course | 3 |
| | 18 | | 18 |

**Fourth Year**

| Fall | Hours | Spring | Hours |
|---|---|---|---|
| EDUC 412 | 5 | EDUC 413 | 9 |
| EDUC 442 or 439 | 3 | EDUC 485 | 3 |
| EDUC 449 | 3 | | |
| EDUC 304 | 3 | | |
| | 14 | | 12 |

Total credit hours: 62

# Major Learning Outcomes

## SECONDARY SCIENCE EDUCATION

1. **Content Knowledge for Teaching -** Teacher candidates will demonstrate and use a deep and specialized knowledge of science content, including how scientific ideas develop and are connected in and out of the curriculum, to inform their work supporting meaningful learning of science.
2. **Learners and Learning -** Teacher candidates will use awareness of how learners grow and develop and an understanding of differences across individual learners to design and implement developmentally appropriate learning experiences to engage all students in the learning process.
3. **Learning Environments** - Teacher candidates will collaborate with others to create academically safe classroom environments that foster positive and active engagement in learning for all learners.
4. **Planning for Instruction** - Teacher candidates will develop content goals for student learning that align with state standards and will design plans for instruction that engage students in meaningful learning experiences toward those goals.
5. **Pedagogy and Instructional Strategies -** Teacher candidates will facilitate learning experiences using a variety of instructional strategies, including the use of appropriate technology tools, to motivate and engage students in discussion and learning.
6. **Assessment of Student Learning -** Teacher candidates will design and implement both formative and summative assessments of student progress and learning as part of reflecting on and continuously improving instruction and to provide feedback to students about their own development.
7. **Professional Dispositions and Behaviors** - Teacher candidates will model the ethical standards expected for the teaching profession in the classroom, school, and the community, by engaging in ongoing professional learning and productively collaborating with colleagues, administrators, families, and community members.