

# Physics Education, B.S.

Prepares the student to teach high school physics and AP physics. The program allows for those interested to supplement their studies with extra courses in physics or other science through elective upper division credit. A seminar course provides the student with exposure to careers in physics.

## Matriculation Requirements

1. Students are admitted directly to the Baccalaureate degree program in Physics Education upon acceptance to the Secondary Education Program.
2. Students must obtain the departmental Advisor's signature on an approved program plan prior to enrollment in their second semester of study.

## Secondary Education Requirements

1. ENGL and MATH QL courses must have a grade C or higher.
2. GPA of 3.0 or higher with no grade lower than a C in content area courses.
3. Completion of all General Education requirements and 70% of content area courses.
4. Pass LiveScan Criminal Background Check.

## Program Requirements

| Code   | Title  | Credit Hours      |
|--|--|-------------------|
| <b>Total Credit Hours</b>                        |  | <b>120</b>        |
| <b>General Education Requirements</b>            |  | <b>38 Credits</b> |
| ENGL 1010<br>or ENGH 1005                        | Introduction to Academic Writing CC<br>Literacies and Composition Across Contexts CC | 3                 |
| ENGL 2010  | Intermediate Academic Writing CC   | 3                 |
| MATH 1210<br>or PHYS 1100                        | Calculus I QL<br>Introductory Math Techniques for Physics and Engineering            | 4                 |
| Complete one of the following:                   |  | 3                 |
| HIST 1700  | American Civilization AS (3)   |                   |
| HIST 2700<br>& HIST 2710                         | US History to 1877 AS<br>and US History since 1877 AS (6)                            |                   |
| HIST 1740  | US Economic History AS (3)   |                   |
| POLS 1000  | American Heritage AS (3)   |                   |
| POLS 1100  | American National Government AS (3)  |                   |
| Complete the following:                          |  |                   |
| PHIL 2050  | Ethics and Values IH   | 3                 |
| HLTH 1100<br>or EXSC 1097                        | Personal Health and Wellness TE<br>Fitness for Life TE                               | 2                 |
| Distribution Courses:                            |  |                   |
| Biology  |  | 3                 |
| CHEM 1210  | Principles of Chemistry I PP (To be taken with CHEM 1215)                            | 4                 |
| CHEM 1220  | Principles of Chemistry II PP (To be taken with CHEM 1225)                           | 4                 |
| Humanities                                       |  | 3                 |
| Fine Arts  |  | 3                 |
| Social/Behavioral Science                        |  | 3                 |
| <b>Discipline Core Requirements <sup>1</sup></b> |  | <b>77 Credits</b> |
| CHEM 1215  | Principles of Chemistry I Laboratory   | 1                 |
| CHEM 1225  | Principles of Chemistry II Laboratory  | 1                 |
| HIST 4320  | History of Scientific Thought  | 3                 |
| MATH 1220  | Calculus II  | 4                 |
| MATH 2210  | Calculus III   | 4                 |
| PHYS 2210  | Physics for Scientists and Engineers I PP  | 4                 |
| PHYS 2215  | Physics for Scientists and Engineers I Lab   | 1                 |

|   |  |                     |
|---|--|---------------------|
| PHYS 2220                                       | Physics for Scientists and Engineers II PP                   | 4                   |
| PHYS 2225                                       | Physics for Scientists and Engineers II Lab                  | 1                   |
| PHYS 3010                                       | Physics Experiments for Secondary Education                  | 1                   |
| PHYS 3110                                       | Modern Physics I   | 3                   |
| PHYS 3115                                       | Introduction to Experimental Physics I WE                    | 2                   |
| Education Courses:                              |  |                     |
| EDSC 1010                                       | Introduction to Education                                    | 2                   |
| EDSC 3000                                       | Educational Psychology                                       | 3                   |
| EDSC 325G                                       | Equitable Technology Integration GI                          | 2                   |
| EDSC 4200                                       | Classroom Management I                                       | 2                   |
| EDSC 4250                                       | Classroom Management II                                      | 2                   |
| EDSC 4440                                       | Content Area Literacies                                      | 3                   |
| EDSC 445G                                       | Multicultural and Multilingual Education                     | 3                   |
| EDSC 455G                                       | Secondary Curriculum Instruction and Assessment GI           | 3                   |
| EDSC 4850                                       | Student Teaching Secondary                                   | 8                   |
| EDSC 4990                                       | Teacher Assessment Project                                   | 2                   |
| EDSP 340G                                       | Exceptional Students GI                                      | 2                   |
| Complete the following set:                     |  |                     |
| SCIE 4210                                       | Science Teaching Methods I                                   | 3                   |
| SCIE 4220                                       | Teaching Methods in Science II                               | 3                   |
| PHYSICS:  |  |                     |
| PHYS 490R                                       | Seminar (must be repeated two times)                         | 1                   |
| Complete 9 credits from the following:          |  | 9                   |
| ASTR 3050                                       | Astrophysics I (3)   |                     |
| ASTR 3060                                       | Astrophysics II (3)  |                     |
| PHYS 1100                                       | Introductory Math Techniques for Physics and Engineering (3) |                     |
| PHYS 2500                                       | Elementary Fluids and Thermal Physics (3)                    |                     |
| PHYS 3120                                       | Modern Physics II (3)  |                     |
| PHYS 3125                                       | Introduction to Experimental Physics II WE (2)               |                     |
| PHYS 3230                                       | Principles of Electronics for the Physical Sciences (3)      |                     |
| PHYS 3300                                       | Mathematical and Computational Physics I (3)                 |                     |
| PHYS 3400                                       | Classical Mechanics (3)                                      |                     |
| PHYS 3500                                       | Thermodynamics (3)   |                     |
| PHYS 3800                                       | Energy Use on Earth GI (3)                                   |                     |
| PHYS 4700                                       | Acoustics (3)  |                     |
| <b>Elective Requirements</b>                    |  | <b>5</b>            |
| Complete 5 credits of upper division electives. |  | <b>Credits</b><br>5 |

1

Must be completed with a grade B- or higher.

## Graduation Requirements

1. Completion of a minimum of 120 semester credits with a minimum of 40 upper-division credits.
2. Overall Grade of 3.0 (B) or above with no grade lower than a C or better in major required content courses and no grade lower than a B- in Licensure and Methods courses.
3. Residency hours -- minimum of 30 credit hours through course attendance at UVU, with at least 10 hours earned in the last 45 hours.
4. Completion of GE and specified departmental requirements.
5. A minimum of 52 credit hours must be in the major with a minimum of 20 credits taken at UVU. A minimum of 24 chemistry and physics credits must be upper-division.
6. Successful completion of at least one Global/Intercultural course.

## Graduation Plan

This graduation plan is a sample plan and is intended to be a guide. Your specific plan may differ based on your Math and English placement and/or transfer credits applied. You are encouraged to meet with an advisor and set up an individualized graduation plan in Wolverine Track (<http://www.uvu.edu/wolverinetrack/>).

### First Year

| Semester 1                |  | Credit Hours |
|---------------------------|--|--------------|
| EDSC 1010                 | Introduction to Education  | 2            |
| ENGL 1010                 | Introduction to Academic Writing CC  | 3            |
| MATH 1210<br>or PHYS 1100 | Calculus I QL<br>or Introductory Math Techniques for Physics and Engineering | 4            |
| Americal Institutions     |  | 3            |
| PHIL 2050                 | Ethics and Values IH   | 3            |
| HLTH 1100<br>or EXSC 1097 | Personal Health and Wellness TE<br>or Fitness for Life TE                    | 2            |
| <b>Credit Hours</b>       |  | <b>17</b>    |

### Semester 2

|                      |  |           |
|----------------------|--|-----------|
| ENGL 2010            | Intermediate Academic Writing CC           | 3         |
| MATH 1220            | Calculus II                                | 4         |
| PHYS 2210            | Physics for Scientists and Engineers I PP  | 4         |
| PHYS 2215            | Physics for Scientists and Engineers I Lab | 1         |
| Biology Distribution |  | 3         |
| <b>Credit Hours</b>  |  | <b>15</b> |

### Second Year

#### Semester 3

|                         |   |           |
|-------------------------|---|-----------|
| MATH 2210               | Calculus III                                | 4         |
| PHYS 2220               | Physics for Scientists and Engineers II PP  | 4         |
| PHYS 2225               | Physics for Scientists and Engineers II Lab | 1         |
| CHEM 1210               | Principles of Chemistry I PP                | 4         |
| CHEM 1215               | Principles of Chemistry I Laboratory        | 1         |
| Humanities Distribution |   | 3         |
| <b>Credit Hours</b>     |   | <b>17</b> |

#### Semester 4

|                        |                                       |           |
|------------------------|---------------------------------------|-----------|
| CHEM 1220              | Principles of Chemistry II PP         | 4         |
| CHEM 1225              | Principles of Chemistry II Laboratory | 1         |
| Physics Electives      |                                       | 6         |
| Fine Arts Distribution |                                       | 3         |
| <b>Credit Hours</b>    |                                       | <b>14</b> |

### Third Year

#### Semester 5

|   |                                     |             |
|---|-------------------------------------|-------------|
| HIST 4320                               | History of Scientific Thought       | 3           |
| Social/ Behavioral Science Distribution |                                     | 3           |
| EDSC 3000                               | Educational Psychology              | 3           |
| EDSC 325G                               | Equitable Technology Integration GI | 2           |
| PHYS 490R                               | Seminar                             | 0.5         |
| SCIE 4210                               | Science Teaching Methods I          | 3           |
| <b>Credit Hours</b>                     |                                     | <b>14.5</b> |

#### Semester 6

|                         |   |           |
|-------------------------|---|-----------|
| EDSC 4440               | Content Area Literacies                     | 3         |
| PHYS 3010               | Physics Experiments for Secondary Education | 1         |
| EDSC 445G               | Multicultural and Multilingual Education    | 3         |
| Upper Division Elective |   | 3         |
| SCIE 4220               | Teaching Methods in Science II              | 3         |
| <b>Credit Hours</b>     |   | <b>13</b> |

### Fourth Year

#### Semester 7

|                          |  |     |
|--------------------------|--|-----|
| EDSC 4200                | Classroom Management I                             | 2   |
| EDSP 340G                | Exceptional Students GI                            | 2   |
| EDSC 455G                | Secondary Curriculum Instruction and Assessment GI | 3   |
| PHYS 490R                | Seminar  | 0.5 |
| Upper Division Electives |  | 2   |

|                           |   |             |
|---------------------------|---|-------------|
| PHYS 3110                 | Modern Physics I                          | 3           |
| PHYS 3115                 | Introduction to Experimental Physics I WE | 2           |
| <b>Credit Hours</b>       |   | <b>14.5</b> |
| <b>Semester 8</b>         |   |             |
| EDSC 4850                 | Student Teaching Secondary                | 8           |
| EDSC 4250                 | Classroom Management II                   | 2           |
| EDSC 4990                 | Teacher Assessment Project                | 2           |
| Physics elective          |   | 3           |
| <b>Credit Hours</b>       |   | <b>15</b>   |
| <b>Total Credit Hours</b> |   | <b>120</b>  |

## Program Learning Outcomes

1. Demonstrate how to teach about how science and physics work in practice by correctly using evidence, experiment and observation, interpretation, physical concepts, etc.
2. Learn to apply and teach about fundamental physical concepts including conservation laws, forces, fields, energy, optics, thermal and statistical physics, relativity, and quantum mechanics.
3. Use mathematics and mathematical models correctly to solve physics problems.
4. Follow practices necessary for safely using laboratory equipment.
5. Demonstrate understanding of the role of computation in physics and appropriate computer skills.
6. Communicate effectively about physics in writing and in presentations, in both formal and informal settings.
7. Demonstrate physics research skills and use ethical research practices.