

**Major Program Guide for a B.S.Ed. in Science Education**  
**Concentration: Physics**  
**Suggested Course Sequence for 8-semester plan<sup>#</sup>**

Liberal Studies	42 (33) hours (9 hours are met through major requirements in math and science)
Profession Education Sequence	23 hours
Science Education/Physics	65 hours
General Electives	<u>7</u> hours
	128 hours

Freshman Year							
Fall				Spring			
Prefix or LS requirement	Course number	Title	Credit Hours	Prefix or LS requirement	Course number	Title	Credit Hours
SCI	150	Intro. Secondary Sci. Educ.	1	CHEM	140	Historical Geology	4
CHEM	139	General Chemistry I	4	MATH	153	Calculus I	4
MATH	146	Precalculus	4	C1: ENGL	101	Composition I	3
C3: CMHC	201	Intro. Speech Comm.	3	P6*	-	World Cultures	3
C4	-	Wellness	3	P1*	-	Social Sciences	3
1 <sup>st</sup> Year Sem.	190/191	-	3				
			18				17
Sophomore Year							
Fall				Spring			
Prefix or LS requirement	Course number	Title	Credit Hours	Prefix or LS requirement	Course number	Title	Credit Hours
EDCI	201	Teaching Leadership & ...	3	PHYS	230	General Physics I	4
BIOL	140	Principles of Biology I	4	BIOL	141	Principles of Biology II	4
MATH	255	Calculus II	4	PHYS/CHEM	325/352	Thermo./Phys. Chem. I	3
C1: ENGL	102	Composition II	3	P4*	-	Humanities	3
P5*	-	Fine & Performing Arts	3	P1*	-	Social Sciences	3
			17				17
Junior Year							
Fall				Spring			
Prefix or LS requirement	Course number	Title	Credit Hours	Prefix or LS requirement	Course number	Title	Credit Hours
PHYS	231	General Physics II	4	PHYS	310	Modern Physics	3
GEOL	150	Methods in Geology	4	PHYS	322	Optics	3
PSY	323	Underst. Dev., Learning, ...	3	SCI	301	Nature of Science	3
SPED	339	Designing Classrooms...	3	GEOL	155	Historical Geography	4
P3*	-	History	3	EDSE	322	Princ. & Meth. of Teaching	2
			17				15
Senior Year							
Fall				Spring			
Prefix or LS requirement	Course number	Title	Credit Hours	Prefix or LS requirement	Course number	Title	Credit Hours
SCI	422	Princ. & Meth. Sci. Educ.	3	SCI	491	Supervised Teach. Science	3
PHYS	380	Research Capstone	3	EDSE	490	Supervised Teaching	6
PHYS	360	Lab Physics	2	EDSE	495	Seminar	3
Gen. Elective	-		7				
			15				12

<sup>#</sup> This plan is a suggestion that should guide registration. Variations of this plan on possible in consult with your advisor.  
<sup>\*</sup> One of LS perspectives must be an upper-level, 300-400, course

### Course Check Sheet for B.S.Ed. in Science Education, Concentration in Physics

Term	Grade	Course	Hours
<b>Professional Education Sequence</b>			<b>23</b>
		EDCI 201 - Teacher Leadership in a Diverse Society	3
		PSY 323 – Underst. Develop., Learning and Assessment for Responsive Instruction	3
		SPED 339 - Designing Classrooms as Responsive Learning Communities	3
		EDSE 322 - Principles and Methods of Teaching	2
		SCI 491 - Supervised Student Teaching in the Sciences	3
		EDSE 490 - Supervised Student Teaching	6
		EDSE 495 - Seminar	3

<b>Science and Math Requirements in Physics Concentration</b>			<b>65</b>
		SCI 150 - Introduction to Secondary Science Education	1
		SCI 301 - Nature of Science	3
		SCI 422 - Principles and Methods of Science Education	3
		MATH 146 - Precalculus	4
		MATH 153 - Calculus I	4
		MATH 255 – Calculus II	4
		BIOL 140 - Principles of Biology I	4
		BIOL 141 - Principles of Biology II	4
		CHEM 139 - General Chemistry I	4
		CHEM 140 - Advanced General Chemistry	4
		GEOL 150 - Methods in Geology	4
		GEOL 155 - Historical Geology	4
		PHYS 230 - General Physics I	4
		PHYS 231 - General Physics II	4
		PHYS 310 – Modern Physics	3
		PHYS 322 - Optics	3
		PHYS 325 - Thermodynamics <b>OR</b> CHEM 352 – Physical Chemistry I	3
		PHYS 360 – Lab Physics	2
		Capstone PHYS 380 – Research in Physics	3

<b>Liberal Studies (C2--Math and C5--Science core areas met with major requirements)</b>			<b>33</b>
		First Year Seminar, 190 or 191	3
		C1: ENGL 101 Composition	3
		C1: ENGL 102 Composition	3
		C3: CMHC 201 Intro. to Speech Communication	3
		C4: Wellness	3
		P1: Social Science, course 1	3
		P1: Social Science, course 2 ( <i>must be from a different discipline than other P1 course</i> )	3
		P3: History	3
		P4: Humanities	3
		P5: Fine & Performing Arts	3
		P6: World Cultures	3
		<i>*Note: at least one of LS perspectives must be an upper-level, 300-400, course</i>	

<b>General Electives</b>			<b>7</b>
		General Electives—any set of courses for a total of at least 7 credits	7

## **Course Descriptions for B.S.Ed. in Science Education, Concentration in Physics**

### **----- Professional Education Sequence, Course Descriptions -----**

#### **EDCI 201 - Teacher Leadership in a Diverse Society**

Developing a vision for teaching, learning and leading in the 21st Century school; understanding the philosophical, historical, cultural and social framework of schooling. Field experience and subscription to TaskStream© required. Credits: (3)

#### **PSY 323 - Understanding Development, Learning and Assessment for Responsive Instruction**

Exploration of the universal and developmental needs of 21st century learners and the assessment techniques teachers utilize in the development of responsive instruction. Field experience and subscription to TaskStream© required. PREQ: EDCI 201. Credits: (3)

#### **SPED 339 - Designing Classrooms as Responsive Learning Communities**

Creating learning communities responsive to individual and cultural differences and exceptionalities. Field experience and subscription to TaskStream© required. PREQ: EDCI 201. Credits: (3)

#### **EDSE 322 - Principles and Methods of Teaching**

Methods, strategies, materials, and techniques of clinical and classroom teaching. PREQ: Admission to the teacher education program. Credits: (2)

#### **SCI 491 - Supervised Student Teaching in the Sciences, 9-12**

A full-time supervised teaching experience in the Sciences. COREQ: EDSE 490, 495. Credits: (3)

#### **EDSE 490 - Supervised Student Teaching**

A full-time teaching experience. PREQ: Admission to the Teacher Education Program. COREQ: 495 and ART, ENGL, GER, HIST, MATH, MUS, SCI, or SPAN 491. Credits: (6)

#### **EDSE 495 - Seminar**

Theory related to practice during student teaching or internship. PREQ: Admission to the Teacher Education Program. COREQ: 490 and ART, ENGL, GER, HIST, MATH, MUS, SCI, or SPAN 491. Credits: (3)

### **----- Science and Math Requirements in Physics Concentration, Course Descriptions -----**

#### **SCI 150 - Introduction to Secondary Science Education**

Introduction to the role and importance of science literacy in modern society; basics of teaching and learning in the sciences. Credits: (1)

#### **SCI 301 - Nature of Science**

The theory and practice of inquiry science. Investigation into inquiry, the nature of science, and science literacies for pre-service secondary science teachers. Credits: (3)

#### **SCI 422 - Principles and Methods of Science Education**

Philosophy and techniques of inquiry teaching applied to the science curriculum. Field experience required. PREQ: Admission to teacher education, EDSE 322. Credits: (3)

#### **MATH 146 - Precalculus**

Functions using equations, graphs, and numerical data; linear, exponential, logarithmic, trigonometric, polynomial, and rational functions; transformations, compositions, inverses, and combinations of functions; trigonometry with identities. Credits: (4)

#### **MATH 153 - Calculus I**

Limits, continuity, derivative, and integrals of algebraic and trigonometric functions with applications. PREQ: 146, or consent of the director of mathematics placement. Credits: (4)

#### **MATH 255 – Calculus II**

Derivatives and integrals of transcendental functions, techniques of integration, indeterminate forms, improper integrals, infinite series. PREQ: 153. Credits: (4)

#### **BIOL 140 - Principles of Biology I**

Introduction to biology for majors. Basic cell structure and function, bioenergetics, introduction to genetics and molecular biology. 3 Lecture, 3 Lab. (Lecture-4 credits, Lab-0 credit) (Lab is required). COREQ: 140 lecture and 140 lab. Credits: (4)

#### BIOL 141 - Principles of Biology II

Second course for biology majors. A comparative introduction to structure, physiology, and evolutionary trends among organisms. 3 Lecture, 3 Lab. (Lecture-4 credits, Lab-0 credit). (Lab is required). PREQ: 140. COREQ: 141 Lecture and 141 Lab. Credits: (4)

#### CHEM 139 - General Chemistry I

Basic chemistry; atomic structure, chemical bonding, stoichiometry, acid/base; lab introduction to experimentation. 3 Lecture, 3 Lab. Credits: (4)

#### CHEM 140 - Advanced General Chemistry

Bonding, thermochemistry, equilibria, acid/base principles, kinetics, and redox chemistry. Laboratory uses an inquiry-based approach. PREQ: High school chemistry. Credits: (4)

#### CHEM 352 – Physical Chemistry I

Introduction to chemical thermodynamics and kinetics. PREQ: 242; MATH 140 or 153. Credits: (3)

#### GEOL 150 - Methods in Geology

Topics related to earth materials and solid and surficial earth processes explored through field, analytical, and computing methods, developing investigation and communication skills. 3 Lecture, 3 Lab. (C5) Credits: (4)

#### GEOL 155 - Historical Geology

Major events and changes in life forms in North American geological history; fossils, ancient environments, and geologic interpretation. 3 Lecture, 2 Lab. Credits: (4)

#### PHYS 230 - General Physics I

Calculus-based study of motion, force, energy, wave motion, and thermodynamics. 3 Lecture, 3 Lab. PREQ: MATH 152 or MATH 153. COREQ: PHYS 230 lecture and PHYS 230 lab. Credits: (4)

#### PHYS 231 - General Physics II

A continuation of PHYS 230 covering electricity, magnetism, optics, and modern topics. 3 Lecture, 3 Lab. PREQ: PHYS 230. Credits: (4)

#### PHYS 310 – Modern Physics

Special relativity, quantum physics, the wave nature of matter, atomic and nuclear structure, and elementary particles. PREQ: 131 or 231; MATH 140 or 153. Credits: (3)

#### PHYS 322 – Optics

Geometrical and physical optics, introduction to quantum optics. PREQ: 131, MATH 252 or MATH 255. Credits: (3)

#### PHYS 325 – Thermodynamics

Classical theory of heat, first and second laws of thermodynamics, enthalpy, entropy, introductory kinetic theory, and statistical thermodynamics. PREQ: 131, MATH 256. Credits: (3)

#### PHYS 360 – Laboratory Physics

Intermediate experiments in modern physics. PREQ: 131 or 231. Credits: (2)

#### PHYS 380 – Research in Physics

Physics research projects for individual students. Lab; 3 hours weekly in lab per credit hour. PREQ: Permission of instructor. Credits: (3)