

Department of Physics & Engineering Physics

Bachelor of Science in Education (for High School Teachers)

PHYSICS EDUCATION MAJOR

The teaching of physics offers a unique career opportunity. Enthusiastic, innovative and well-prepared teachers are needed not only to prepare high school students for careers in science but also to provide all students with an appreciation of science and how it has benefited society. This is especially true in physics, the most fundamental of the physical sciences. Physics describes and explains not only what goes on in our immediate surroundings but also in the minute world of atoms and elementary particles and the vast world of stars and galaxies. Physics teachers can help provide the knowledge that students need to understand and appreciate the world in which they live, and to show the many scientific ideas upon which modern technology is built.

The Bachelor of Science in Education degree with a major in Physics Education is divided into two options:

The **B.S. in Physics Education – Physics option** is a 57-60 hour major focusing specifically on the area of physics and satisfying the Missouri certification for high school teaching of physics only. However, once the Missouri Physics teaching certification is obtained, endorsements in other areas (e.g. biology or chemistry) may be added by passing the appropriate subject area Praxis II exam.

The **B.S. in Physics Education - Unified Science option** is a 72 hour major certifying the student to teach any of the major science areas at the high school level in the state of Missouri. This degree is particularly attractive to rural high schools that need a single instructor to teach several different sciences, however, this course of study may take 5 years to complete.

FACULTY ADVISOR:

Dr. Margaret Hill

CAREER OPPORTUNITIES:

Physics Teacher, General Science Teacher, Chemistry Teacher, Biology Teacher, Earth Science Teacher, Educational Administrator, Science Supply Salesman, Textbook Sales Representative and Laboratory Technician.

EMPLOYMENT OUTLOOK:

There is currently a shortage of qualified physics teachers at the secondary level for which there is no immediate solution. Thus, graduates will have no difficulty in obtaining teaching positions. A national awareness of this problem has led to the speculation that salaries will increase substantially in the future to attract needed qualified teachers.

HIGH SCHOOL PREPARATION FOR MAJOR:

Students should have completed four years of mathematics, which includes trigonometry and an introduction to calculus. Four years of science, including physics and chemistry, is highly recommended. A strong background in English and a speech course are desirable since a teaching position requires effective written and verbal communication.

Major: Physics Education
Option: Physics

Degree: Bachelor of Science in Education

MINIMUM DEGREE REQUIREMENTS

I. University Studies (up to 24 hours can be met within sections II and III in the following curriculum) **51 hours (27 actual)**

NOTE: The following University Studies courses are required for teacher certification:

EN140	Rhetoric & Critical Thinking #	(3)	US105	American History I	(3)
PS103	U.S. Political Systems	(3)		or US107 American History II	
EC101	Econ. Problems & Policies		SC105	Fundamentals of Oral Communication #	(3)
	or EC215 Ppls. of Microecon.##	(3)			

II. Required Courses for the Major **57-60 hrs.**

A.	History/Philosophy of Science and Technology	UI422*	Scientific Reasoning	(3)*
			Total History/Philosophy:	3 hours
B.	Biology	BS108* or BS218* or BO200 or ZO200	Biology for Living Biological Science: A Process Approach Plant Biology Animal Biology	(3)*
			Total Biology:	3 hours
C.	Chemistry	CH181/001/081* CH185/005/085* CH186	Basic Principles of Chemistry or General Chemistry I and General Chemistry II	(5)* (5)* (3)
			Total Chemistry:	5 - 8 hours
D.	Mathematics	MA140 MA145 MA240 MA245	Analytic Geometry and Calculus I Analytic Geometry and Calculus II Analytic Geometry and Calculus III Vector Calculus	(5)* (4) (3) (2)
			Total Mathematics:	14 hours
E.	Physics	PH230/030 PH231/031 EP100 PH341 UI330 PH360 PH370 PH371	General Physics I General Physics II Physics & Engineering Concepts Optics Experimental Methods I (PH345) Modern Physics Mechanics Electromagnetics	(5) (5) (1) (3) (3)* (3) (3) (3)
			Total Physics:	26 hours
F.	Geoscience	UI318 or GO110 or GO220 or GO320	Earth Science: A Process Approach* Physical Geology Meteorology Oceanography	(3)*
			Total Geoscience:	3 hours
H.	Environmental Science	BS105 or BI332 or GO305 or UI372* or UI360*	Environmental Biology General Ecology Environmental Geoscience Earthquakes & Society Recycling & Waste Management	(3)*
			Total Environmental Science:	3 hours

III. Professional Education (includes 6 credits university studies – PY222 and SE275) **44 hours**

Minimum Degree Requirements **128-131 hours**

#course must be passed with grade of C or higher; ## prerequisite of AD101; *denotes University Studies courses

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SUGGESTED PLAN

<u>First Semester</u>		<u>Hrs</u>	<u>Second Semester</u>		<u>Hrs</u>
EP100	Physics & Eng. Concepts (fall only)	1	MA145	Analytic Geometry & Calculus II	4
MA140	Analytic Geometry & Calculus I	5	PH230	General Physics I Lecture	5
CH181/001/081	Basic Principles of Chemistry (lecture, recitation, laboratory) OR		PH030	General Physics I Laboratory	+
CH185/005/085	General Chemistry I [§] (lecture, recitation, laboratory)	5	CH186	General Chemistry II [§]	3
UI100	First Year Seminar	3	ED251	Intro to MSE Technology	2
EN100	English Composition	<u>3</u>	ED250	Intro to MSE Teaching	<u>2</u>
		17			16
<u>Third Semester</u>		<u>Hrs</u>	<u>Fourth Semester</u>		<u>Hrs</u>
MA240	Analytic Geometry & Calculus III	3	MA245	Vector Calculus (spring only)	2
PH231	General Physics II Lecture	5	PH341	Optics** (even spring)	3
PH031	General Physics II Laboratory	+	EF304	School and Society	2
BS108	Biology for Living	3	SE305	Secondary Block II Field Exp.	2
PY222	Development of the Adolescent	3	SE306	Theories of Learning & Mgmt	2
SC105	Fund. of Oral Communication	<u>3</u>	SE307	Teaching Reading in Sec. School	2
		17	SE308	Fund. of High School Education	<u>3</u>
					16
<u>Fifth Semester</u>		<u>Hrs</u>	<u>Sixth Semester</u>		<u>Hrs</u>
PH360	Modern Physics (fall only)	3	PS103	U.S. Political Systems	3
PH371	Electromagnetics (odd fall)	3		Environmental Science elective	3
UI330	Experimental Methods I (PH345)	3	UI422	Scientific Reasoning (spring only, evenings)	3
US105	American History I	3	SE300	Technology to Enhance Learning§	2
EN140	Rhetoric & Critical Thinking	3	SE320	Techniques of Teaching Science***	3
SE275	Diversity in America's Schools§	<u>3</u>	SE370	Secondary Block III Field Exp.***	<u>2</u>
		18			16
<u>Seventh Semester</u>		<u>Hrs</u>	<u>Eighth Semester</u>		<u>Hrs</u>
PH370	Mechanics (even fall)	3	EX390	Psych. & Educ. Of Except. Child§	3
UI318	Earth Sci.: A Process Approach	3	EF400	Seminar for Student Teachers	1
	Literary Expression	3	SE463	Student Teaching Experience I	6
	Artistic Expression	3	SE464	Student Teaching Experience II	<u>6</u>
EC101	Econ. Problems & Policies	<u>3</u>			16
		15			
TOTAL HOURS					131

[§] CH186 is required in a subsequent semester if the CH185/005/085 option is chosen.

This course is offered once every two years in the spring semester and may have to be taken in the **Sixth or Eighth Semester.

***offered spring only—meets M-F, 8-11 am

§ These courses can be taken out of sequence

Admission to Teacher Education Program: students must complete 57 hours of coursework, PY222, and Block I (with a written recommendation); pass the CBASE exam; and fill out an application for admission to the teacher ed. program. No Block II or higher education course (including SE275) may be registered for without admission to the teacher education program.