

**Bachelor of Science (BS)**

# Physics

Physics is perhaps the most fundamental of the sciences. It involves the study of the nature of basic things, such as motion, forces, energy, matter, heat, sound, light, and the atom. Physics reduces our knowledge of the world around us to a more orderly and satisfying form. It is successfully applied to solving problems of practical importance to society. Modern technology depends heavily upon physics, and technological progress follows advances in physics and the other basic sciences. The interest of physicists extends from the vast world of stars and galaxies to the minute world of atoms and elementary particles. Physicists did the pioneering work in the discovery and development of electrical and nuclear power, communication systems, solid state devices and integrated circuits, computers, jet propulsion, and interplanetary space navigation. They continue to search for more discoveries that will benefit society.

**Physics students will...**

- Obtain a deep understanding of the fundamental principles of science and mathematics.
- Have the ability to use the techniques, skills, and modern tools necessary for physics and engineering careers.
- Have the broad education necessary to understand the impact of physics and engineering solutions in a global, economic, environmental, and societal context.
- Be well prepared to obtain admission to the graduate school of their choice.

**Career Planning**

Career preparation is part of the mission of Southeast. In fact, more than 90% of Southeast students participate in internships, clinical opportunities, student teaching, research assistantships, and study abroad. All graduates find employment in their field or start the graduate programs of their choice within a few months of graduation.

Professional career counselors are available for all students. The Office of Career Services in Academic Hall 057 can provide students with professional career counseling, resume critiques, practice interviews, job search strategies, career events, networking opportunities, and more.

Demonstrated Career Proficiency is a Requirement of all Southeast Students		
CL001/CL002	First Semester	Complete the FOCUS2 assessment and develop a Career Action Plan.
CL003	Junior Year	Students gain information about career planning and job searching resources.
CL004	Senior Year	Students demonstrate advanced proficiency by identifying a position in their field, developing a cover letter, and tailoring a resume for the position. Materials are critiqued to ensure preparedness for a successful job search.

**Internship and Employment Opportunities of Recent Graduates**

- Schaefer's Electrical Enclosures
- Southeast Hospital
- Lighting Science Group Corporation
- U. S. Navy Officer
- U. S. Air Force Officer
- Wright Patterson Air Force Base
- Boeing
- Lockheed Martin
- NASA
- National Geospatial Intelligence Agency
- Valspar Corporation
- Rockwell Collins

**Graduate Schools and Programs of Recent Graduates**

- University of Arkansas – MicroEP Program
- Washington University – Physics
- Missouri S & T – Electrical Engineering
- University of Missouri – Physics
- Ball State University - BioMechanics
- Boise State University – Biomedical Engineering
- Western Kentucky University – Science Teaching
- University of North Texas – Physics
- University of Southern California – Physics
- University of Oklahoma – Physics
- Purdue University – Aerospace Engineering

**Admission Requirements**

A high school student interested in majoring in engineering physics should complete four years of mathematics that include trigonometry and an introduction to calculus. Four years of science, which include both chemistry and physics, is highly recommended. A strong background in English is essential.

**Options with Physics**

The physics major is structured in such a way that with the careful selection of technical electives along with a few extra courses, a student may obtain a minor in a cognate discipline such as engineering physics, computer science, or chemistry.

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This is a guide based on the 2015-2016 Undergraduate Bulletin and is subject to change. The time it takes to earn a degree will vary based on several factors such as dual enrollment, remediation, and summer enrollment. Students will meet with an academic advisor each semester and use DegreeWorks to monitor their individual progress.

### CURRICULUM CHECKLIST

*"Critical Courses" are italicized and bolded. Data shows that students who have completed this course in the first two years and have earned the noted grade are most likely to complete this program of study.*

#### Physics - 56 Hours – No minor required

A grade of 'C' or better is required in each course that is a prerequisite course.

- \_\_\_ EP100 Physics and Engineering Concepts (1)
- \_\_\_ EP240 Circuit Analysis (4)
- \_\_\_ EP340 Electronic Circuits (4)
- \_\_\_ EP361 Thermal Analysis (3)
- \_\_\_ EP462 Materials Science (3)
- \_\_\_ PH230/030 General Physics I (5)
- \_\_\_ PH231/031 General Physics II (5)
- \_\_\_ PH341 Optics (3)
- \_\_\_ PH360 Modern Physics (3)
- \_\_\_ PH370 Mechanics (3)
- \_\_\_ PH371 Electromagnetics (3)
- \_\_\_ PH473 Quantum Mechanics (3)
- \_\_\_ PH477 Physics Seminar (1)
- \_\_\_ PH478 Undergraduate Research (1)
- \_\_\_ PH479 Undergraduate Research (2)
- \_\_\_ PH570 Mathematical Physics (3)
- \_\_\_ UI330 Experimental Methods (3)  
OR
- \_\_\_ PH 345 Experimental Methods (3)
- \_\_\_ XX xxx Technical Electives (6)

#### Support Courses:

A grade of 'C' or better is required in each course that is a prerequisite course.

This sequence of mathematics courses constitutes a minor, but it must be declared.

- \_\_\_ CH185/085/005 General Chemistry (5)
- \_\_\_ CS177 Programming for Scientists and Engineers (3)
- \_\_\_ **MA140 Analytic Geometry and Calculus I (5)**
- \_\_\_ MA145 Analytic Geometry and Calculus II (4)
- \_\_\_ MA244 Analytic Geometry and Calculus III (4)
- \_\_\_ MA350 Differential Equations (3)
- \_\_\_ MAxxx Mathematics Elective (3) (300-500 level)

#### University Studies Requirements (not already listed above):

UI100 First Year Seminar, EN100 English Composition, Artistic Expression, Written Expression, Oral Expression, Literary Expression, Behavioral Systems, Living Systems, Development of a Major Civilization, Economic Systems, Political Systems, Social Systems, one or two IU/UI3XX\*, and one UI4XX

\*Dependent on what is taken in the major

### SAMPLE FOUR-YEAR PLAN

	Fall Semester		Spring Semester	
	Course #	Hrs	Course #	Hrs
<b>FIRST YEAR</b>	UI100	3	EN100	3
	CH185/085/005	5	MA145	4
	CS177	3	PH230/030	5
	EP100	1	Behavioral Systems	3
	<b>MA140</b>	5		
<b>Total</b>	<b>17</b>	<b>Total</b>	<b>15</b>	
Milestone: maintain 2.0 cumulative GPA				
<b>SECOND YEAR</b>	MA244	4	EP240	4
	PH231/031	5	MA350	3
	Living Systems	3	Artistic Expression	3
	Written Expression	3	Develop of a Major Civ	3
			Literary Expression	3
	<b>Total</b>	<b>15</b>	<b>Total</b>	<b>16</b>
Milestone: maintain 2.0 cumulative GPA				
<i>(Summer courses are encouraged to avoid 18-hour semesters.)</i>				
<b>THIRD YEAR</b>	EP361	3	EP340	4
	PH360	3	EP462	3
	PH370	3	PH473	3
	UI330 or PH 345**	3	Math Elective	3
	Oral Expression***	3	IU/UI3XX	3
<b>Total</b>	<b>15</b>	<b>Total</b>	<b>16</b>	
Milestone: maintain 2.0 cumulative GPA				
<b>FOURTH YEAR</b>	PH371	3	PH341	3
	PH477	1	PH479	2
	PH478	1	PH570	3
	Technical Elective	3	Technical Elective	3
	Economic Systems	3	Social Systems	3
	Political Systems	3	UI4XX	3
	<b>Total</b>	<b>14</b>	<b>Total</b>	<b>17</b>
Milestone: maintain 2.0 cumulative GPA				

A "Milestone" signifies a significant stage for a student in the completion of a degree.

\*\*If PH345 is taken, the student must complete an additional IU/UI3XX course.

\*\*\*SC105 highly recommended by department

**Degree requirements for all students:** A minimum of 120 credit hours, completion of University Studies program, career proficiencies (CL001-004), Writing Proficiency Exam (WP003), and completion of the Measure of Academic Proficiency and Progress (MAPP) at the senior level

Refer to the Undergraduate Bulletin or DegreeWorks for additional graduation requirements (i.e., minimum GPA and course work) for your program of study.

Revised  
3/19/2015