ENGINEERING PHYSICS (BS)

The Department of Physics and Astronomy offers a wide variety of courses and programs that examine and employ the laws of nature from both theoretical and applied perspectives.

Transfer students pursuing a major in Engineering Physics must take a minimum of 40% of the coursework required for the major at Benedictine College.

Guidelines for Acceptance to a Physics & Astronomy Department Major

In order to ensure that students are on a successful academic trajectory, it is recommended that students who have not earned at least a C average in both Classical Physics I and II should not declare a major in the Physics & Astronomy Department. Students who have not achieved this minimum grade guideline but who still seek acceptance to a major in one of the programs in the Physics & Astronomy Department must meet with and receive approval from the Department Chair.

Program Mission

The mission of the Engineering Physics Program is to combine the fundamental principles of physics with the engineering disciplines to enable students to solve real-world problems for the benefit of society, thereby allowing students to engage in a wide range of pursuits and professional advancements especially in academics or industry.

Program Outcomes

1. Graduates will have knowledge of physics and its role within the liberal arts.
2. Graduates will be able to function as both a physicist and an engineer.
3. Graduates will be competent in laboratory skills and in the theory and application of data analysis, economic analysis, and design.
4. Graduates will have the tools to achieve personal and careers goals in a spectrum of pursuits, such as academics, education, industry, and health science.
5. Graduates will have the interpersonal and professional skills to solve technically complex problems working individually or as a member or leader of teams of varied cultural and experiential background regardless of cultural differences.

Program Requirements

Code	Title	Hours
Requirements (65 hours)		
ENGR-1500	Technical Drawing	2
ENGR-1200	Introduction to Engineering	2
ENGR-2300	Statics	3
ENGR-2310	Dynamics	3
or PHYS-4100	Mechanics I	
ENGR-3170	Engineering Economy & Society	3
ENGR-2320	Mechanics of Materials	3
ENGR-3300	Fluid Mechanics	3
ENGR-3410	Thermofluids Laboratory	2
Select one of the following:		3-5
ENGR-3500	Materials Science (3)	
or PHYS-4700 (3) and ENGR-3400 (2)		
ENGR-3600	Heat & Mass Transfer	3
PHYS-2100 & PHYS-2101	Classical Physics I and Classical Physics I Lab	4
PHYS-2110 & PHYS-2111	Classical Physics II and Classical Physics II Lab	4
PHYS-3200	Relativity & Atomic Physics	3
PHYS-3201	Modern Physics Lab	1
Select one of the following:		3
PHYS-3210 & PHYS-3211	Nuclear & Elementary Particle Physics and Modern Physics Lab II	
or Technical Elective		
Select one of the following:		4
EENG-2060 & EENG-3060	Linear Circuit Analysis I and Circuits Laboratory I	
or PHYS-3500		
PHYS-4400	Thermodynamics	3
or ENGR-3250	Thermodynamics	
PHYS-4600	Electricity & Magnetism I	3
PHYS-COMP	Senior Comprehensive Exam	0
PHYS-4900 & PHYS-4901 & PHYS-4902 & PHYS-4903	Physics Colloquium and Physics Colloquium and Physics Colloquium and Physics Colloquium	0
PHYS-4910	Physics & Astronomy Research	1
Required Supporting Courses (25 hours)		
MATH-1300	Calculus I	4
MATH-1350	Calculus II	4
MATH-2300	Calculus III	4
MATH-3100	Differential Equations	3
CHEM-1200	General Chemistry I Lecture	3
CHEM-1201	General Chemistry I Laboratory	1
Select one of the following:		4
CHEM-1210 & CHEM-1211	General Chemistry II Lecture and General Chemistry II Lab	
or Technical Elective		
Select one of the following:		2-3
ENGR-2000	Computer Applications in Engineering	
or CSCI-230(	Programming for Scientists & Engineers	
Technical Electives (9 credits, chosen from the following):		**9**
PHYS-4300	Optics (3)	
PHYS-4301	Optics Laboratory (1)	
PHYS-4610	Electricity & Magnetism II (3)	
PHYS-4110	Mechanics II (3)	
MENG-4240	System Dynamics & Control (3)	
MENG-3180	Manufacturing Proccess Lab I (1)	
MENG-3220	Design of Machinery (3)	
MENG-4700	Senior Seminar (1)	
MENG-4730	Mechanical Measurements & Control Lab (2)	
ENGR-3150	Statistical Analysis of Data (3)	
MATH-2500	Linear Algebra (3)	
MATH-3300	Numerical Computation (3)	
Design Elective (one course chosen from the following):		**2-3**

MENG-3240	Junior Design (2)	
MENG-4600	Engineering Design I (3)	
MENG-4610	Mechanical Engineering Design II (3)	
CIVL-4600	Civil Engineering Design (3)	
Instrumentation Elective:		**2**
MENG-4730	Mechanical Measurements & Control Lab (2)	
Total Hours		**91-95**

Suggested Sequence of Courses for a Bachelor of Science Degree in Engineering Physics

Course	Title	Hours
Freshman Year		
First Semester		
ENGR-1200	Introduction to Engineering	2
GNST-1000	BC Experience	1
MATH-1300	Calculus I	4
PHYS-2100	Classical Physics I	3
PHYS-2101	Classical Physics I Lab	1
PHIL-1750	Principles of Nature	3
CHEM-1200	General Chemistry I Lecture	3
CHEM-1201	General Chemistry I Laboratory	1
	Hours	**18**
Second Semester		
ENGR-1500	Technical Drawing	2
MATH-1350	Calculus II	4
PHYS-2110	Classical Physics II	3
PHYS-2111	Classical Physics II Lab	1
ENGL-1010	English Composition	3
Select one of the following:		4
CHEM-1210 & CHEM-1211	General Chemistry II Lecture and General Chemistry II Lab	
or Technical Elective		
	Hours	**17**
Sophomore Year		
First Semester		
PHYS-3200	Relativity & Atomic Physics	3
PHYS-3201	Modern Physics Lab	1
ENGR-2300	Statics	3
MATH-2300	Calculus III	4
THEO-1100	Introduction to Theology	3
Select one of the following:		3-5
PHYS-4700 & ENGR-3400	Condensed Matter Physics and Materials Laboratory	
or ENGR-3500		
	Hours	**17-19**
Second Semester		
Select one of the following:		3
PHYS-3210 & PHYS-3211 & PHYS-3201	Nuclear & Elementary Particle Physics and Modern Physics Lab II and Modern Physics Lab	
or Technical Elective		
MATH-3100	Differential Equations	3
Select one of the following:		4
EENG-2060 & EENG-3060	Linear Circuit Analysis I and Circuits Laboratory I	
or PHYS-3500		
PHYS-4400	Thermodynamics	3
Select one of the following:		2-3
ENGR-2000 or CSCI-2300	Computer Applications in Engineering or Programming for Scientists & Engineers	
Faith Foundation		3
	Hours	**18-19**
Junior Year		
First Semester		
PHYS-4100 or ENGR-2310	Mechanics I or Dynamics	3
ENGR-3170	Engineering Economy & Society	3
ENGR-3300	Fluid Mechanics	3
PHYS-4900	Physics Colloquium	0
EXSC-1115	Wellness for Life	1
Philosophical Inquiry Foundation		3
Foreign Language		3
	Hours	**16**
Second Semester		
ENGR-3600	Heat & Mass Transfer	3
ENGR-3410	Thermofluids Laboratory	2
PHYS-4901	Physics Colloquium	0
Technical Elective		3
PHYS-4910	Physics & Astronomy Research	1
Foreign Language		3
EXSC Fitness Course		1
Aesthetic Foundation		3
	Hours	**16**
Senior Year		
First Semester		
PHYS-4600	Electricity & Magnetism I	3
Instrumentation Elective		3
PHYS-4902	Physics Colloquium	0
Philosophical Inquiry Foundation		3
Technical Elective		3
Aesthetic Foundation		3
Historical Inquiry		3
	Hours	**18**
Second Semester		
PHYS-4800	Quantum Mechanics	3
Faith Foundation		3
Historical Inquiry Foundation		3
Technical Elective		3
PHYS-COMP	Senior Comprehensive Exam	0
PHYS-4903	Physics Colloquium	0

Design Elective		3
	Hours	**15**
	Total Hours	**135-138**