

# ENGINEERING PHYSICS B.S.

## Program Learning Outcomes

*Mission: The mission of the engineering physics program is to produce graduates with a solid foundation in physics and engineering within the context of a Christian world view. Our mission is to impact society at several levels with vibrant degree programs, and to integrate our scientific training with our knowledge and love for God.*

## Program Learning Outcomes:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. Summarize the key issues in science and faith and recognize the harmony possible while studying God's creation.

## Requirements

Code	Title	Units
Core Curriculum Requirements ( <a href="https://catalog.vanguard.edu/interdisciplinary-offerings/core-curriculum/">https://catalog.vanguard.edu/interdisciplinary-offerings/core-curriculum/</a> ) <sup>1</sup>		46
Engineering Physics Major Requirements		77
General Electives		0
<b>Total Units</b>		<b>123</b>

## Engineering Physics Major Requirements

Code	Title	Units
<b>Lower Division:</b>		
CHEM-120 & 120L	General Chemistry I and General Chemistry I Lab <sup>2</sup>	4
CSCI-110C	Introduction to Computer Science	4
CSCI-208	Java Programming	4
CSCI-218	Python Programming	4
ENGR-110	Introduction to Engineering	3
ENGR-201	Electric Circuits	4
ENGR-202	Engineering Dynamics	3
ENGR-203	Digital Logic Systems	3

ENGR-265	Engineering Statics	3
MATH-180C	Calculus I	4
MATH-181C	Calculus II	4
MATH-265C	Intro to Statistical Methods	3
MATH-281	Multivariable Calculus	4
PSCI-223C & 223CL	Mechanics of Solids and Fluids and Mechanics of Solids and Fluids Lab	4
PSCI-225 & 225L	Electricity and Magnetism and Electricity and Magnetism Lab	4
PSCI-227 & 227L	Waves, Optics and Modern Physics and Waves, Optics, and Modern Physics Lab	4
<b>Upper Division:</b>		
ENGR-301	Embedded Systems	3
ENGR-310 & 310L	Electronics I and Electronics I Lab	4
ENGR-320 & 320L	Optics and Optics Laboratory	5
ENGR-400 & 400L	Introduction to Materials Science Engr. and Intro/Materials Science Laboratory	4
ENGR-485	Undergraduate Research	3
	or ENGR-450 Research Internship Program	
ENGR-499C	Engineering Physics Capstone Seminar	2

**Total Units** **80**

1

Number of units required from the Core Curriculum not included in the major requirements below.

2

See CHEM-120 General Chemistry I course description for prerequisites.

## Four Year Plan

**Disclaimer:** This sample Four Year Plan is provided as a guide for the recommended sequencing of courses. Vanguard University requires that students complete a minimum of 120 units of required course work as outlined on the Requirements tab in order to receive a Bachelor of Arts, Bachelor of Music, Bachelor of Science, or Bachelor of Science in Nursing degree. It is the student's responsibility to confirm with the department the course rotation before enrolling in courses. If applicable, please note the footnotes at the bottom of the page for additional information related to courses listed in a particular year and term. Questions, contact the Department of Physical Sciences and Applied Mathematics.

**Study Abroad Participation:** Students interested in participating in the university's Study Abroad programs are encouraged to reach out to the Global Education and Outreach Office ([studyabroad@vanguard.edu](mailto:studyabroad@vanguard.edu)) for more information and collaboration in their academic course planning. Students using Education and Training Benefits through the U.S. Department of Veteran Affairs are encouraged to also reach out to the School Certifying Official ([veteranscertifyingofficial@vanguard.edu](mailto:veteranscertifyingofficial@vanguard.edu)) for more information regarding how benefits can be applied.



Course	Title	Units			
<b>Year 1 Term 1</b>			ENGR-400	Introduction to Materials Science Engr.	3
CORE-100C	Cornerstone	1	ENGR-400L	Intro/Materials Science Laboratory	1
MATH-180C	Calculus 1	4	FINA-PLCR	Fine Arts Core Curriculum Requirement	3
CHEM-120	General Chemistry I	3	HIST-PLCR1	History Core Req (US Hist Or Democracy)	3
CHEM-120L	General Chemistry I Lab	1	<b>Units</b>		
NT-101C	New Testament Survey	3	<b>13</b>		
CSCI-110C	Introduction to Computer Science	4	<b>Year 4 Term 2</b>		
<b>Units</b>			ENGR-301	Embedded Systems	3
<b>16</b>			ENGR-485	Undergraduate Research	1-4
<b>Year 1 Term 2</b>			ENGR-499C	Engineering Physics Capstone Seminar	2
MATH-181C	Calculus II	4	CHIS-400C	Christian Heritage	3
CSCI-208	Java Programming	4	HIST-PLCR2	History Core Requirement (World Civ)	3
PSCI-223C	Mechanics of Solids and Fluids	3	<b>Units</b>		
PSCI-223CL	Mechanics of Solids and Fluids Lab	1	<b>12-15</b>		
ENGR-110	Introduction to Engineering	3	<b>Total Units</b>		
NT-101C	New Testament Survey	3	<b>122-125</b>		
<b>Units</b>					
<b>18</b>					
<b>Year 2 Term 1</b>					
PSCI-225	Electricity and Magnetism	3			
PSCI-225L	Electricity and Magnetsm Lab	1			
MATH-281	Multivariable Calculus	4			
CSCI-218	Python Programming	4			
SOC-PLCR	Social Science Core Curriculum Reqm't	3			
ENGL-120C	Persuasive Writing	3			
<b>Units</b>					
<b>18</b>					
<b>Year 2 Term 2</b>					
PSCI-227	Waves, Optics and Modern Physics	3			
PSCI-227L	Waves, Optics, and Modern Physics Lab	1			
ENGR-201	Electric Circuits	4			
OT-201C	Old Testament Survey	3			
KINE-148C	Lifetime Fitness and Wellness Lecture	3			
<b>Units</b>					
<b>14</b>					
<b>Year 3 Term 1</b>					
MATH-265C	Intro to Statistical Methods	3			
ENGR-265	Engineering Statics	3			
ENGR-310	Electronics I	3			
ENGR-310L	Electronics I Lab	1			
ENGL-220C	Researched Writing	3			
THEO-300C	Developing a Christian World View	3			
<b>Units</b>					
<b>16</b>					
<b>Year 3 Term 2</b>					
ENGR-202	Engineering Dynamics	3			
MATH-390	Numerical Analysis	3			
COMM-201C	Speech Composition and Presentation	3			
ENGL-230C	Literature and the Human Experience	3			
SOC-PLCR	Social Science Core Curriculum Reqm't	3			
<b>Units</b>					
<b>15</b>					
<b>Year 4 Term 1</b>					
ENGR-203	Digital Logic Systems	3			