

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 (https://catalog.vanguard.edu/interdisciplinary-offerings/core-curriculum/) ¹		46
Engineering Physics Major Requirements		77
General Electives		0
Total Units		123

Engineering Physics Major Requirements

Code	Title	Units
Lower Division:		
CHEM-120 & 120L	General Chemistry I and General Chemistry I Lab ²	4
CHEM-121 & 121L	General Chemistry II and General Chemistry II Lab	4
CSCI-110C	Introduction to Computer Science	4
MATH-180C	Calculus I	4
MATH-181C	Calculus II	4
MATH-265C	Intro to Statistical Methods	3
MATH-285	Introduction to Advanced Mathematics	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
Upper Division:		
CHEM-440 & 440L	Instrumental Analysis and Instrumental Analysis Lab	4
CHEM-456 & 456L	Physical Chemistry: Thermodynamics and Physical Chemistry Technique Lab	4
CHEM-458	Physical Chemistry: Quantum Mechanics	2
CHEM-485	Undergraduate Research	2
or CHEM-450	UG Research Or Internship Program	
CHEM-499C	Chemistry Capstone Seminar	2
ENGR-307	Computational Problem Solving	4
ENGR-310 & 310L	Electronics I and Electronics I Lab	4
ENGR-400 & 400L	Introduction to Materials Science Engr. and Intro/Materials Science Laboratory	4
MATH-300	Linear Algebra	3
MATH-310	Differential Equations	3
MATH-390	Numerical Analysis	3

Total Units 77

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) 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) for more information regarding how benefits can be applied.



Course	Title	Units	Year 4 Term 1	
Year 1 Term 1			HIST-PLCR2	History Core Requirement (World Civ) 3
CORE-100C	Cornerstone	1	ENGR-310	Electronics I 3
CHEM-120	General Chemistry I	3	ENGR-310L	Electronics I Lab 1
CHEM-120L	General Chemistry I Lab	1	ENGL-220C	Researched Writing 3
MATH-180C	Calculus I	4	ENGR-307	Computational Problem Solving 4
NT-101C	New Testament Survey	3	Units 14	
CSCI-110C	Introduction to Computer Science	4	Year 4 Term 2	
Units 16			CHIS-400C	Christian Heritage 3
Year 1 Term 2			ENGL-230C	Literature and the Human Experience 3
CHEM-121	General Chemistry II	3	MATH-390	Numerical Analysis 3
CHEM-121L	General Chemistry II Lab	1	ENGR-400	Introduction to Materials Science Engr. 3
MATH-181C	Calculus II	4	ENGR-400L	Intro/Materials Science Laboratory 1
MATH-285	Introduction to Advanced Mathematics	3	CHEM-499C	Chemistry Capstone Seminar 2
SOC-PLCR	Social Science Core Curriculum Reqmt	3	Units 15	
Units 14			Total Units 122-123	
Year 2 Term 1				
PSCI-223C	Mechanics of Solids and Fluids	3		
PSCI-223CL	Mechanics of Solids and Fluids Lab	1		
MATH-281	Multivariable Calculus	4		
MATH-300	Linear Algebra	3		
THEO-101C	Foundations of Christian Life	3		
KINE-148C	Lifetime Fitness and Wellness Lecture	3		
Units 17				
Year 2 Term 2				
PSCI-225	Electricity and Magnetism	3		
PSCI-225L	Electricity and Magnetsm Lab	1		
MATH-265C	Intro to Statistical Methods	3		
MATH-310	Differential Equations	3		
OT-201C	Old Testament Survey	3		
SOC-PLCR	Social Science Core Curriculum Reqmt	3		
Units 16				
Year 3 Term 1				
CHEM-456	Physical Chemistry: Thermodynamics	2		
CHEM-440	Instrumental Analysis	2		
CHEM-440L	Instrumental Analysis Lab	2		
ENGL-120C	Persuasive Writing	3		
FINA-PLCR	Fine Arts Core Curriculum Requirement	3		
THEO-300C	Developing a Christian World View	3		
Units 15				
Year 3 Term 2				
CHEM-458	Physical Chemistry: Quantum Mechanics	2		
CHEM-456L	Physical Chemistry Technique Lab	1-2		
CHEM-PLUGR	Undergraduate Research or Internship	2		
HIST-PLCR1	History Core Req (US Hist Or Democracy)	3		
COMM-201C	Speech Composition and Presentation	3		
PSCI-227	Waves, Optics and Modern Physics	3		
PSCI-227L	Waves, Optics, and Modern Physics Lab	1		
Units 15-16				

