

CHEMISTRY B.S.

Requirements

Code	Title	Units
Core Curriculum Requirements (https://catalog.vanguard.edu/college/core-curriculum/)		54-52
Major Core Requirements		66-65
Total Units		120-117

Chemistry Major Core Requirements

Code	Title	Units
Lower Division Chemistry Core Courses		
CHEM-120 & 120L	General Chemistry I and General Chemistry I Lab ¹	4
CHEM-121 & 121L	General Chemistry II and General Chemistry II Lab	4
CHEM-252 & 252L	Analytical Chemistry and Analytical Chem Techniques	4
MATH-180C	Calculus I	4
MATH-181C	Calculus II	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
Upper Division Chemistry Core Courses		
CHEM-304 & 304L	Organic Chemistry I and Organic Chemistry Techniques I	4
CHEM-305 & 305L	Organic Chemistry II and Organic Chemistry Technqs II	4
CHEM-430 & 430L	Biochemistry and Experimental Tech/Biochemistry	4
CHEM-440 & 440L	Instrumental Analysis and Instrumental Analysis Lab	4
CHEM-456 & 456L	Physical Chemistry: Thermodynamics and Physical Chemistry Technique Lab	4
CHEM-457	Physical Chemistry: Kinetics	2
CHEM-458	Physical Chemistry: Quantum Mechanics	2
CHEM-485	Undergraduate Research	2
CHEM-499C	Chemistry Capstone Seminar	2
Upper Division Chemistry Electives		
Select one course from the following:		3
CHEM-435	Advanced Biochemistry	
CHEM-470	Special Topic:	
And select two courses from the following:		6-7
MATH-207	Computer Programming	
MATH-281	Multivariable Calculus	
MATH-300	Linear Algebra	
MATH-310	Differential Equations	
MATH-365	Probability and Statistics	
MATH-390	Numerical Analysis	

PSCI-227	Waves, Optics and Modern Physics	
Total Units		65-66

¹ 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 Chemical and Environmental Sciences.

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 1 Term 1		
CORE-100C	Cornerstone	1
CHEM-120	General Chemistry I	3
CHEM-120L	General Chemistry I Lab	1
MATH-180C	Calculus I	4
ENGL-120C	Persuasive Writing	3
NT-101C	New Testament Survey	3
KINE-146C	Lifetime Fitness/Well Activity	1
Units		16
Year 1 Term 2		
CHEM-121	General Chemistry II	3
CHEM-121L	General Chemistry II Lab	1
MATH-181C	Calculus II	4
FINA-PLCR	Fine Arts Core Curriculum Requirement	3
THEO-101C	Foundations of Christian Life	3
KINE-145C	Lifetime Fitness/Wellness Lect	1
HIST-PLCR2	History Core Requirement (World Civ)	3
Units		18
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
CHEM-252	Analytical Chemistry	3

CHEM-252L	Analytical Chem Techniques	1
CHEM-304	Organic Chemistry I	3
CHEM-304L	Organic Chemistry Techniques I	1
	Units	16
Year 2 Term 2		
PSCI-225	Electricity and Magnetism	3
PSCI-225L	Electricity and Magnetsm Lab	1
OT-201C	Old Testament Survey	3
CHEM-305	Organic Chemistry II	3
CHEM-305L	Organic Chemistry Technqs II	1
CHEM-PLUD4A	Upper Division STEM Elective (4 units)	4
	Units	15
Year 3 Term 1		
CHEM-456	Physical Chemistry: Thermodynamics	2
CHEM-440	Instrumental Analysis	2
CHEM-440L	Instrumental Analysis Lab	2
CHEM-PLUD4A	Upper Division STEM Elective (4 units)	4
THEO-300C	Developing a Christian World View	3
ENGL-220C	Researched Writing	3
	Units	16
Year 3 Term 2		
CHEM-456L	Physical Chemistry Technique Lab	1-2
CHEM-457	Physical Chemistry: Kinetics	2
CHEM-458	Physical Chemistry: Quantum Mechanics	2
CHEM-485	Undergraduate Research	1-4
CHEM-PLUD4A	Upper Division STEM Elective (4 units)	4
PSYC-103C	Introduction to Psychology	3
	Units	13-17
Year 4 Term 1		
ENGL-230C	Literature and the Human Experience	3
COMM-201C	Speech Composition and Presentation	3
CHEM-430	Biochemistry	3
CHEM-430L	Experimental Tech/Biochemistry	1
HIST-PLCR2	History Core Requirement (World Civ)	3
	Units	13
Year 4 Term 2		
CHEM-499C	Chemistry Capstone Seminar	2
CHEM-PLUD4A	Upper Division STEM Elective (4 units)	4
CHIS-400C	Christian Heritage	3
SOC-PLCR	Social Science Core Curriculum Req'm't	3
	Units	12
	Total Units	119-123

