UNIVERSITY of VIRGINIA | SCHOOL of ENGINEERING & APPLIED SCIENCE
Department of Chemical Engineering

B.S. Chemical Engineering – Biotechnology Concentration

	Fall Semester		Spring Semester	
First Year	APMA 1110	Single Variable Calculus II[a]	APMA 2120	Multivariable Calculus III
	CHEM 1410	General Chemistry I	CHEM 1420	General Chemistry II
	CHEM 1411	General Chemistry I: Lab	CHEM 1421	General Chemistry II: Lab
	ENGR 1010	Engineering Foundations I	PHYS 1425	Gen. Physics I: Mechanics, Thermo.
	HSS Elective		PHYS 1429	Gen. Physics I: Workshop
			CS 111X	Intro. to Programming
			ENGR 1020	Engineering Foundations II
Second Year	APMA 2130	Differential Equations	APMA 3110	Applied Probability & Statistics
	CHE 2215	Material & Energy Balances	CHE 2202	Thermodynamics
	CHE 2246	Intro. to Biotechnology	CHE 2216	Modeling & Simulation in ChE
	CHEM 2410	Organic Chemistry I	CHEM 2420	Organic Chemistry II
	Physics II & Laboratory[b]		STS 2600	Engineering Ethics
Third Year	CHE 3316	Chemical Thermo. & Staged Ops.	CHE 3318	Chemical Reaction Engineering
	CHE 3321	Transport Processes I	CHE 3322	Transport Processes II
	Physical Chemistry[c]		CHE 3398	Chemical Engineering Lab I
	CHEM 2411	Organic Chemistry Lab	CHE 3347	Biochemical Engineering
	HSS Elective		HSS Elective	
Fourth Year	CHE 4474	Process Syn., Modeling & Control	CHE 4476	Chemical Engineering Design
	CHE 4475	Intro. to Process Safety	CHE 4456	Bioprocess & Bioproduct Engineering
	CHE 4491	Chemical Engineering Lab II	STS 4600	STS & Engineering Practice
	CHE 4448	Bioseparation Engineering	Unrestricted Elective	
	STS 4500	STS & Engineering Practice	Unrestricted Elective	
	Unrestricted Elective			

[a] **Calculus**: Students starting with APMA1090 can succeed in chemical engineering and graduate on time. Please consult your academic advisor for guidance.
[b] **Physics II & Laboratory:** Chosen from either ECE 2200 (4 credits) or both PHYS 2415 (3 credits, lecture) and PHYS 2419 (1 credit, laboratory)
[c] **Physical Chemistry:** Chosen from CHE 4561 (Topic: Physical Chemistry for Engineers), CHEM 3410, or CHEM 3610

Note: *The information contained in this document is for informational purposes only. The Undergraduate Record represents the official repository for academic program requirements: http://records.ureg.virginia.edu/*

November 17, 2023

Pre– and co–requisites for CHE courses, chemistry courses, and minimum grade requirements

Course	Pre-requisites	Co-requisites
CHE 2202		APMA 2120
CHE 2215	CHEM 1410 or CHEM 1810; APMA 1110	
CHE 2216	CS 111X; CHE 2215	APMA 2130
CHE 2246	CHEM 1410 or CHEM 1810	
CHE 3316	CHE 2202; CHE 2215	
CHE 3318	CHE 2216; CHE 3316	CHE 3322
CHE 3321	APMA 2130; CHE 2215; CHE 2216	
CHE 3322	CHE 2216; CHE 3316; CHE 3321	
CHE 3347	CHE 2246 or BME 2315 or MAE 3420; CHE 3321 or MAE 3210 or BME 3240 or Instructor Permission	CHE 3318; CHE 3322 or MAE 3140 or BME 3240
CHE 3398	CHE 2215; CHE 3316; CHE 3321	CHE 3322
CHE 4417	CHEM 1420 or CHEM 1810; APMA 2130; an introductory course in cell and molecular biology or Instructor Permission	
CHE 4442	Instructor Permission	
CHE 4445	CHE 3321 or MAE 3210 or BME 3240; CHE 3322 or MAE 3140 or BME 3240	
CHE 4448	CHE 3322 or BME 3240 or MAE 3140 or Instructor Permission	
CHE 4449		CHE 3321 or BME 3240 or MAE 3140 or Permission
CHE 4450	CHE 2202 or MAE 2100 or MSE 3050; CHEM 1410 or CHEM 1810	
CHE 4452	CS 111X; APMA 2120; APMA 2130; APMA 3110; CHE 2216 or BME 2315 or MAE 3420	
CHE 4456	4th year or higher CHE or BME standing or Instructor Permission	
CHE 4474	CHE 3318; CHE 3322	CHE 4475
CHE 4475	CHE 3318; CHE 3322	CHE 4474
CHE 4476	CHE 2216; CHE 3318; CHE 3322; CHE 4474; CHE 4475	
CHE 4491	CHE 3318; CHE 3322; CHE 3398	

Minimum Grade Requirements for ChE Prerequisite Courses

A grade of C or CR is the standard required in core CHE courses that are prerequisites for other CHE courses. Students cannot have more than one passing grade of less than C or CR in core CHE prerequisite courses to enroll in any subsequent CHE courses. Students with more than one grade below C and/or CR in more than one core CHE prerequisite course (CHE 2202, 2215, 2216, 3316, 3318, 3321, 3322, 3398, 4474, and 4475) will have to retake the prerequisite(s) and receive a grade of CR or C or higher before taking any subsequent CHE courses. This policy applies to students pursuing either the B.S. degree or the minor in chemical engineering.

Chemistry Course Requirements

Note: The Department of Chemistry maintains their own minimum grade requirements: https://chemistry.as.virginia.edu/policies

■ General Chemistry: ChE students take CHEM 1410 (3 hr), CHEM 1411 (1 hr), CHEM 1420 (3 hr), and CHEM 1421 (1 hr). Students with AP Chemistry credit still must take the CHEM 1411 and CHEM 1421 labs.

■ Organic Chemistry: ChE students take CHEM 2410 (3 hr) and CHEM 2420 (3 hr) and the laboratory CHEM 2411 (3 hr). Note that CHEM 2411 can also be taken concurrently with CHEM 2410 during the third semester.

■ 1800 Series Chemistry: Students taking the 1800 series chemistry course sequence satisfy all the chemical engineering general chemistry and organic chemistry requirements (listed above) by taking:

CHEM 1810 Principles of Chemical Structures (3 hr); CHEM 1811 Principles of Chemical Structures Lab (2 hr);
CHEM 1820 Principles of Organic Chemistry (3 hr); CHEM 1821 Principles of Org Chem Lab (3 hr);
CHEM 2810 Principles of Organic & Bioorganic Chemistry (3 hr); Selected CHEM course* (3 hr)

*Chosen from: CHEM 2820 (Principles of Chemical Thermodynamics and Kinetics), CHEM 4090 (Analytical Chemistry), CHEM 4320 (Inorganic Chemistry), CHEM 4440 (Biochemistry for Pre-Health), CHEM 4410 (Biological Chemistry I), or another CHEM 4xxx or 5xxx course with approval by the CHE Program

Please Note: The 1800 series chemistry sequence is an 'all or nothing' replacement of the 1400 series chemistry requirements. Students should complete the sequence they start and should not switch sequences during their program of study.

■ Physical Chemistry: ChE students should take CHE 4561 (Topic: Physical Chemistry for Engineers) (3 hr). CHEM 3410 Physical Chemistry - Quantum Theory (3 hr), cross-listed as CHEM 3610, also satisfies this requirement.