

MAJOR IN CHEMISTRY

The major in Chemistry requires completion of required and elective courses. A student may repeat no more than three courses, including multiple attempts at the same course, required for the Chemistry major or minor. This includes all foundation courses, as well as required courses and electives for the major and minor.

This major is recommended for students who intend to teach in secondary schools, or to work in hospital laboratories, the chemical industry, technical libraries, chemical or instrument sales, or related professions. Students who plan to pursue chemically oriented careers in medicine, dentistry, pharmacy, veterinary medicine, environmental science, agriculture or other allied fields should also consider this major. Students who wish to pursue graduate studies in chemistry, or to enter a career in the chemical industry should consider the Professional Track. Students who plan to teach in secondary schools should elect the Chemistry major or Chemistry Secondary Education Concentration. The Chemistry major makes a good double major for students in the Molecular Biology, Biochemistry and Bioinformatics, or Environmental Science and Studies (Environmental Chemistry Track) programs, as well as majors in Biology, Geology, and Physics.

Students should contact the Department of Chemistry and be assigned an adviser to assist them in designing programs to meet their career needs.

Requirements

The Chemistry major consists of 35 units of required chemistry courses, 15-16 units of additional required courses and 6 units of elective courses for a total of 56-57 units.

Code	Title	Units
Required Chemistry Courses		
CHEM 131 & 131L	GENERAL CHEMISTRY I LECTURE and GENERAL CHEMISTRY I LABORATORY	4
CHEM 132 & 132L	GENERAL CHEMISTRY II LECTURE and GENERAL CHEMISTRY II LABORATORY	4
CHEM 220 & 220L	ANALYTICAL CHEMISTRY [LECTURE] and ANALYTICAL CHEMISTRY [LAB]	5
CHEM 334 & CHEM 336 & CHEM 337 & CHEM 339	ORGANIC CHEMISTRY I [LECTURE] and INTRODUCTORY ORGANIC CHEMISTRY LABORATORY and ORGANIC CHEMISTRY II [LECTURE] and INTERMEDIATE ORGANIC CHEMISTRY LABORATORY	10
CHEM 323	INORGANIC CHEMISTRY	5
CHEM 345	PRINCIPLES OF PHYSICAL CHEMISTRY	3
CHEM 351	BIOCHEMISTRY	3
CHEM 372	PHYSICAL CHEMISTRY LABORATORY	2
Additional Required Courses		
MATH 231	BASIC STATISTICS	3-4
or MATH 237	ELEMENTARY BIostatISTICS	
or MATH 274	CALCULUS II	
MATH 273	CALCULUS I	4

PHYS 211 & PHYS 212	GENERAL PHYSICS I; NON CALCULUS-BASED and GENERAL PHYSICS II; NON CALCULUS-BASED ¹	8
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Total Units 51-52

¹ PHYS 241 and PHYS 242 may be taken in place of PHYS 211 and PHYS 212

In addition to the required courses listed above, students must complete a minimum of 6 additional units of electives. At least 2 units must be selected from Elective Group A. The remaining units can be selected from either Elective Group A or Elective Group B.

Code	Title	Units
Elective Courses		
Elective Group A (minimum 2 units):		
CHEM 310	INSTRUMENTAL ANALYSIS	
CHEM 346	THEORETICAL FOUNDATIONS OF PHYSICAL CHEMISTRY ¹	
CHEM 356	BIOCHEMISTRY LAB	
CHEM 357	ADVANCED BIOCHEMISTRY	
CHEM 461	ADVANCED LECTURE TOPICS	
CHEM 462	ADVANCED LABORATORY TECHNIQUES	
CHEM 472	APPLICATIONS OF ENVIRONMENTAL CHEMISTRY	
CHEM 480	CHEMICAL TOXICOLOGY	
CHEM 499	HONORS THESIS IN CHEMISTRY	
FRSC 363	CHEMISTRY OF DANGEROUS DRUGS	
FRSC 367	FORENSIC CHEMISTRY	
FRSC 467	FORENSIC ANALYTICAL CHEMISTRY	
Elective Group B		
CHEM 391	SPECIAL PROBLEMS IN CHEMISTRY I	
CHEM 395	INTERNSHIP IN CHEMISTRY	
CHEM 401	COMMUNICATION SKILLS IN CHEMISTRY	
CHEM 491	RESEARCH IN CHEMISTRY	
CHEM 495	INDEPENDENT STUDY IN CHEMISTRY	
BIOL 408	CELL BIOLOGY ¹	
BIOL 409	MOLECULAR BIOLOGY ¹	
BIOL 421	IMMUNOLOGY ¹	
BIOL 428	VIROLOGY ¹	
GEOL 331	MINERALOGY ¹	
GEOL 415	HYDROGEOLOGY	
MATH 330	INTRODUCTION TO STATISTICAL METHODS ¹	
MATH 374	DIFFERENTIAL EQUATIONS ¹	
MATH 378	EXPERIMENTAL MATHEMATICS ¹	
MBBB 301	INTRO TO BIOINFORMATICS	
MBBB 401	ADVANCED BIOINFORMATICS ¹	
PHYS 307	INTRODUCTORY MATHEMATICAL PHYSICS ¹	
PHYS 311	MODERN PHYSICS I ¹	
PHYS 352	THERMODYNAMICS AND KINETIC THEORY	

PHYS 354 ELECTRICITY AND MAGNETISM ¹**Total Units** 6¹ Course has prerequisite(s) not listed among the required courses above.

Four-Year Plan of Study

Sample Four-Year Plan

The selected course sequence below is an example of the simplest path to degree completion. Based on course schedules, student needs, and student choice, individual plans may vary. Students should consult with their adviser to make the most appropriate elective choices and to ensure that they have completed the required number of units (120) to graduate.

Freshman

Term 1	Units Term 2	Units
CHEM 131 & 131L (Core 7/8)	4 CHEM 132 & 132L (Core 7/8)	4
MATH 273 (Core 3)	4 Select one of the following:	3-4
Core 1 (or Core 2)	3 MATH 231	
Core 4	3 MATH 237	
Core 5	3 MATH 274	
	Core 2 (or Core 1)	3
	Core 6	3
	17	13-14

Sophomore

Term 1	Units Term 2	Units
CHEM 220 & 220L	5 CHEM 336	2
CHEM 334	3 CHEM 337	3
PHYS 211 or 241	4 PHYS 212 or 242	4
Core 9	3 Core 10	3
	Core 11	3
	15	15

Junior

Term 1	Units Term 2	Units
CHEM 339	2 CHEM 372	2
CHEM 351	3 CHEM 323	5
CHEM 345	3 Core 14	3
Core 12	3 Elective	3
Elective	3 Elective	3
	14	16

Senior

Term 1	Units Term 2	Units
Core 13	3 Elective Group B	3
Elective Group A	3 Elective	3
Elective	3 Elective	3
Elective	3 Elective	3
Elective	3 Elective	3
	15	15

Total Units 120-121

Learning Outcomes

1. Explain important chemical concepts and solve chemical problems by application of relevant concepts and analytical tools.
2. Design an experiment to test a hypothesis or theory in chemistry, and collect and interpret experimental data within the framework of the appropriate chemical theory.
3. Prepare written laboratory reports in a journal format that provide a description of the experiment, explain the experiment and reasoning clearly, and provide an appropriate conclusion. Students will be able to give oral presentations on topics in chemistry.
4. Use computer resources effectively.