

BA in Chemistry (692827) MAP Sheet

Physical and Mathematical Sciences, Chemistry and Biochemistry

For students entering the degree program during the 2024-2025 curricular year

University Core and Graduation Requirements				Suggested Sequence of Courses			
University Core Requirements:				FRESHMAN YEAR		JUNIOR YEAR	
Requirements	# Classes	Hours	Classes	<u>1st Semester</u>		<u>5th Semester</u>	
Religion Cornerstones				CHEM 111	4.00	CHEM 462 or CHEM 584	3.00
Teachings and Doctrines of the Book of Mormon	1	2.00	REL A 275	MATH 112	4.00	CHEM 460 (Req 2; Opt 2.3 only)	1.00
Jesus Christ and the Everlasting Gospel	1	2.00	REL A 250	UNIV 101	2.00	CHEM 497R (opt U/G Research)	1.00
Foundations of the Restoration	1	2.00	REL C 225	Religion Cornerstone Class	2.00	GE Religion	2.00
The Eternal Family	1	2.00	REL C 200	First Year Writing	3.00	GE Arts, Letters, Sciences	3.00
BYU Foundations for Student Success				Total Hours:	15.00	GE Arts, Letters, Sciences	3.00
Foundations for Student Success	1	2.00	UNIV 101	<u>2nd Semester</u>		GE Arts, Letters, Sciences	3.00
The Individual and Society				CHEM 112	3.00	Total Hours:	16.00
American Heritage	1 to 2	3.00-6.00	from approved list	CHEM 113	2.00	<u>6th Semester</u>	
Global and Cultural Awareness	1	3.00	from approved list	CHEM 201	0.50	CHEM 391	3.00
Skills				MATH 113	4.00	CHEM 463 or 468	3.00
First Year Writing	1	3.00	from approved list	Religion Cornerstone Class	2.00	CHEM 464/465 (Req 2; Opt 2.3 only)	2.00
Advanced Written and Oral Communications	1	3.00	CHEM 391*	American Heritage	3.00	CHEM 497R (Opt U/G Research) GE	1.00
Quantitative Reasoning	1	4.00	MATH 112*	Total Hours:	14.50	Religion	2.00
Languages of Learning (Math of Language)	1	4.00	MATH 112*	SOPHMORE YEAR		Open Elective	1.00
Arts, Letters and Sciences (Complete 6 of 7)				<u>3rd Semester</u>		Total Hours:	15.00
Civilization 1	1	3.00	from approved list	CHEM 227	4.00	SENIOR YEAR	
Civilization 2	1	3.00	from approved list	CHEM 351M	3.00	<u>7th Semester</u>	
Arts	1	3.00	from approved list	CHEM 297 (opt U/G research)	0.50	Requirement 4 Option	3.00
Letters	1	3.00	from approved list	STAT 201 or MATH 213 +215	3.00	Global and Cultural Awareness	3.00
Biological Science	1	3.00-4.00	from approved list	PHSCS 121	3.00	GE Arts, Letters, Sciences	3.00
Physical Science	2	7.00	CHEM 111* and PHSCS 121*	Religion Cornerstone Class	2.00	GE Religion	2.00
Social Science	1	3.00	from approved list	Total Hours:	15.50	Open Elective	4.00
Core Enrichment: Electives				<u>4th Semester</u>		Total Hours:	15.00
Religion Electives	3 to 4	6.00	from approved list	CHEM 352M	3.00	<u>8th Semester</u>	
Open Electives	Variable	Variable	personal choice	CHEM 354	1.00	CHEM 495	1.00
Graduation Requirements:				CHEM 381M (Req 2; Opt 2.1, 2.2)	3.00	Requirement 4 Option	3.00
Minimum residence hours required		30.00		CHEM 384 (Req 2; Opt 2.1, 2.2) or Open Elective	1.00	Open Electives	8.00
Minimum hours needed to graduate		120.00		GE Arts, Letters, Sciences	3.00	Total Hours:	12.00
				PHSCS 220	3.00		
				CHEM 497R (opt U/G Research)	1.00		
				GE Religion Cornerstone Class	2.00		
				Total Hours:	17.00		
*These classes fill both university core and program requirements							

Program Requirements

Requirement 1 — Complete 9 Courses

CHEM 111 - Principles of Chemistry 1 4.0
CHEM 112 - Principles of Chemistry 2 3.0
CHEM 113 - Intro General Chemistry Lab 2.0
CHEM 201 - Chem Handling & Safe Lab Prac 0.5
CHEM 227 - Principles of Chem Analysis 4.0
CHEM 351M - Organic Chemistry 1 - Majors 3.0
CHEM 352M - Organic Chemistry 2 - Majors 3.0
CHEM 391 - Tech Writing Using Chem Lit 3.0
CHEM 495 - Senior Seminar 1.0

Note: With departmental approval, Chem 105 may substitute for Chem 111, and Chem 106 for Chem 112; and Chem 107 for Chem 113.

Requirement 2 — Complete 1 of 3 Options

Option 2.1 — Complete 6 Courses

Note: Only 1 credit hour of Chem 354 is required; completion of 2 credit hours will satisfy the requirement for Chem 354 and 1 credit hour of electives under Requirement 4.

CHEM 354 - Organic Chem Lab-Major 1.0v
CHEM 381M - Biochem Fundamentals 3.0
CHEM 384 - Biochem Methods 1.0
CHEM 468 - Biophysical Chemistry 3.0
CHEM 584 - Adv Biochemistry Methods 1 3.0
STAT 201 - Stat for Engineers & Scientist 3.0

Option 2.2 — Complete 7 Courses

Note: Only 1 credit hour of Chem 354 is required; completion of 2 credit hours will satisfy the requirement for Chem 354 and 1 credit hour of electives under Requirement 4.

CHEM 354 - Organic Chem Lab-Major 1.0v
CHEM 381M - Biochem Fundamentals 3.0
CHEM 384 - Biochem Methods 1.0
CHEM 468 - Biophysical Chemistry 3.0
CHEM 584 - Adv Biochemistry Methods 1 3.0
MATH 213 - Elementary Linear Algebra 2.0
MATH 215 - Computational Linear Algebra 1.0

Option 2.3 — Complete 8 Courses

Note: 2 credit hours of Chem 354 are required. Note: Math 314 may substitute for Chem 460.

CHEM 354 - Organic Chem Lab-Major 1.0v
CHEM 460 - Math for Physical Chemistry 1.0
CHEM 462 - Physical Chemistry 1 3.0
CHEM 463 - Physical Chemistry 2 3.0
CHEM 464 - Physical Chemistry Lab 1 1.0
CHEM 465 - Physical Chemistry Lab 2 1.0
MATH 213 - Elementary Linear Algebra 2.0
MATH 215 - Computational Linear Algebra 1.0

Requirement 3 — Complete 4 Courses

MATH 112 - Calculus 1 4.0
MATH 113 - Calculus 2 4.0
PHSCS 121 - Intro to Newtonian Mechanics 3.0

PHSCS 220 - Intro Electricity & Magnetism 3.0

Requirement 4 — Complete 6 hours

After consulting with an advisor, complete 6 hours from the following. NOTE: Courses used for Requirement 2 cannot also be applied to Requirement 4. Chem 355 cannot be taken if Chem 354 was taken for 2 credit hours.

CELL 360 - Cell Biology 3.0
CHEM 355 - Organic Lab 2 - Nonmajors 1.0
CHEM 381M - Biochem Fundamentals 3.0
CHEM 384 - Biochem Methods 1.0
CHEM 397R - Mentored Outreach Svc Learning - *You may take once* 0.5v
CHEM 455 - Synthesis & Qual Organic Analy 4.0
CHEM 460 - Math for Physical Chemistry 1.0
CHEM 462 - Physical Chemistry 1 3.0
CHEM 463 - Physical Chemistry 2 3.0
CHEM 464 - Physical Chemistry Lab 1 1.0
CHEM 465 - Physical Chemistry Lab 2 1.0
CHEM 468 - Biophysical Chemistry 3.0
CHEM 482 - Mechanisms of Molecular Biol 3.0
CHEM 489 - Structural Biochemistry 3.0
CHEM 496R - Academic Internship - *You may take up to 3.0 credit hours* 0.5v
CHEM 498R - Capstone Experience - *You may take up to 3.0 credit hours* 0.5v
CHEM 514 - Inorganic Chemistry 3.0
CHEM 518 - Advanced Inorganic Laboratory 2.0
CHEM 521 - Instrumental Analysis Lecture 2.0
CHEM 523 - Instrumental Analysis Lab 2.0
CHEM 552 - Advanced Organic Chemistry 3.0
CHEM 553 - Advanced Organic Chemistry 3.0
CHEM 563 - Reaction Kinetics 3.0
CHEM 565 - Intro to Quantum Chemistry 3.0
CHEM 567 - Statistical Mechanics 3.0
CHEM 569 - Fundamentals of Spectroscopy 3.0
CHEM 581 - Adv Biochemical Methodology 1 3.0
CHEM 583 - Adv Biochemical Methodology 2 3.0
CHEM 584 - Adv Biochemistry Methods 1 3.0
CHEM 586 - Adv Biochemistry Methods 2 3.0
CHEM 594R - General Seminar - *You may take up to 0.5 credit hours* 0.5
CHEM 596R - Special Topics in Chemistry - *You may take up to 3.0 credit hours* 0.5v
HONRS 499R - Honors Thesis - *You may take up to 3.0 credit hours* 0.5v
PHSCS 123 - Intro to Waves, Optics, Thermo 3.0

Note 1: Elective courses must be different from required courses.

Note 2: With prior approval, certain 300-level and above courses in biology, engineering, physics, and statistics may be taken to satisfy Requirement 4.

Recommended Courses are not required to complete the program

Recommended Courses: Math 213 and 215; Chem 460; Phscs 225.

Note: Supporting courses suggested by most medical and dental schools are found by visiting the Preprofessional Advisement Center (ppa.byu.edu). The more rigorous chemistry, mathematics, and physics courses required for the chemistry majors will satisfy the minimum requirements listed there. Elective courses in biochemistry and in biological science are especially pertinent to these preprofessional programs.

THE DISCIPLINE

The Chemistry Bachelor of Arts degree provides preparation for individuals in preprofessional programs (e.g., medicine, dentistry, business administration, or law). It also provides background for careers in chemistry-related professions (e.g., information specialist, safety engineer, forensics). Chemists and biochemists study the fundamental processes that govern the natural world, including atomic structure and how atoms interact to form molecules and materials. They study the mechanisms of chemical processes, including those that underpin living systems such as the transfer of information from DNA to RNA to proteins. They work to develop simplifying models (theories) that permit the correlation and explanation of observations about the behavior of life to the structure of rocks and minerals.

Chemistry and biochemistry provide an essential foundation for the medical sciences, engineering (especially chemical engineering), electronics, energy, environmental sciences, materials science, pharmacy, and virtually all manufacturing processes.

Chemistry and biochemistry are active branches of science that are vital to human existence. Inasmuch as the field embraces all aspects of the material world, it is subdivided into five areas of interest. Examples of these diverse areas include the regulation of protein synthesis, cellular signal transduction at the molecular level and proteomics (biochemistry), design and synthesis of medicinal compounds, catalysts and polymers (organic chemistry), design and synthesis of new molecular structures and materials (inorganic chemistry), spectroscopic study of energy transfer and molecular structures (physical chemistry), and analysis of medicinal compounds, biological materials, and contaminants or trace elements found in the environment (analytical chemistry).

Chemistry and biochemistry involve far more than test tubes and beakers. They include sophisticated methodologies such as recombinant DNA technology, working with a variety of instruments such as mass spectrometers, calorimeters, chromatographs, ultracentrifuges, lasers, X-ray diffractometers, electron microscopes and nuclear magnetic resonance spectrometers, all of which are used by undergraduate chemistry and biochemistry students at BYU. Computers also play an important role in these disciplines, with applications ranging from simulation of molecules

and their interactions to the collection and analysis of data. The chemistry and biochemistry curricula are both rigorous and intellectually rewarding.

CAREER OPPORTUNITIES

Graduates in chemistry and biochemistry obtain positions in education and many different industries, performing analysis, synthesis, characterization, observation, and modeling. Those who work hard, are creative, and have intellectual curiosity are in particular demand. The discipline also provides an excellent preprofessional course of study for those interested in medicine, dentistry, law, and business.

MAP DISCLAIMER

While every reasonable effort is made to ensure accuracy, there are some student populations that could have exceptions to listed requirements. Please refer to the university catalog and your college advisement center/department for complete guidelines.

DEPARTMENT INFORMATION

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ADVISEMENT CENTER INFORMATION

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