

Welcome to the

# Chemistry Major (BA)

in the College of Computational, Mathematical, and Physical Sciences

## College Advisement Center

Website: <https://science.byu.edu/advisement>  
Email: [science.math.advisement@byu.edu](mailto:science.math.advisement@byu.edu)  
Phone: 801-422-2674  
Office: N-181 ESC

## Chemistry and Biochemistry Department

Website: [chem.byu.edu](http://chem.byu.edu)  
Phone: 801-422-3667  
Office: C-100 BNSN

## Department Advisement – Sue Mortensen\*

Email: [suemort@byu.edu](mailto:suemort@byu.edu)  
Phone: 801-422-6261  
Office: C-104 BNSN

## Internship Coordinator – Richard Watt

Email: [rwatt@chem.byu.edu](mailto:rwatt@chem.byu.edu)  
Phone: 801-422-1923  
Office: C-210 BNSN

## University Career Services – Anna Kennington

Website: [careers.byu.edu](http://careers.byu.edu) (Handshake--see flyer in packet)  
Email: [anna.kennington@byu.edu](mailto:anna.kennington@byu.edu)  
Phone: 801-422-5944  
Office: C-106 BNSN

## Clubs

**YChem:** Walter Paxton, E111 BNSN, [paxton@chem.byu.edu](mailto:paxton@chem.byu.edu); 801-422-4917

**Women in Chemistry:** Pam Van Ry, C209 BNSN, [pam\\_vanry@byu.edu](mailto:pam_vanry@byu.edu), 801-422-1540

**Cougs v Cancer:** Cristy Welsh, MCDB 261, [cancer\\_research@byu.edu](mailto:cancer_research@byu.edu), 801-422-3913

\*Please visit Sue Mortensen in the Chemistry and Biochemistry Department (C104 BNSN) as soon as possible if you have not already done so.

Learning outcomes can be found here: <https://learningoutcomes.byu.edu/Courses/program-courses/692827/Chemistry+BA+/1322>



# Things to Know

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## Resources for Graduation Planning

- Flow Charts and Major Academic Plans (MAPs) can be found here: <https://science.byu.edu/advisement/explore-majors-and-minors>.
- Academic advisors in N-181 ESC will help you understand course sequencing and help you plan classes to efficiently fill requirements. They can also help you with study skills and initial career exploration as well as connecting you with correct resources.
- Plan and register from your plan on MyMAP. Your academic advisor can help you understand how to best utilize this resource.
- Evaluate your current program. Periodically major programs are updated. An academic advisor would be happy to review the differences between the programs with you to help you determine what would be best for you.
- Consider meeting with a faculty advisor in your department. Contact info is found on the first page of this packet.

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## Tutoring Resources and Research

- Volunteer peer tutors are available through Y Serve if you need help with a class. Also, if you excel in a subject, consider serving your fellow students by becoming a tutor. Find out more here: <https://tutoring.byu.edu/>.
- Many departments provide TA Tutorial Labs and research opportunities. Check your department for details:
  - Chemistry and Biochemistry: C-104 BNSN, 801-422-6261, <https://chem.byu.edu/department/faculty/>
  - Computer Science: 3361 TMCB, 801-422-3027, [csoffice@cs.byu.edu](mailto:csoffice@cs.byu.edu)
  - Geological Sciences: S-389 ESC, 801-422-3918, [geology@byu.edu](mailto:geology@byu.edu)
  - Mathematics: 275 TMCB, 801-422-2061, [office@mathematics.byu.edu](mailto:office@mathematics.byu.edu)
  - Mathematics Education: 167 TMCB, 801-422-1735, [office@mathed.byu.edu](mailto:office@mathed.byu.edu)
  - Physics and Astronomy: N-283 ESC, 801-422-4361, [physics\\_office@byu.edu](mailto:physics_office@byu.edu)
  - Statistics: 2152 WVB, 801-422-4505, [statsec@stat.byu.edu](mailto:statsec@stat.byu.edu)

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## Prepare Early for a Career

- Check out Careers & Experiential Learning in 1134 WSC and at <https://ucs.byu.edu/>.
- Consider doing an internship.
  - Attend the STEM and Career Fairs held in fall and winter semesters.
  - Talk to your department about internship opportunities.
  - Use LinkedIn and Handshake (see flyer in this packet) to connect with alumni and apply for jobs/internships. BYU Connect is another great resource for networking ([connect.byu.edu](http://connect.byu.edu)).
  - Talk with the college Career Director who can help you search for internships as well as assist you with many other career related strategies (see first page of this packet).
- Consider taking StDev 317 (Career Strategies) your junior year.
- Consider taking either Chem 502, CS 502, Geol 502, Math 502, PHSCS 502, or STAT 502 (1-credit Networking Class). Class is held for 1 hour each week.

# 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			
<b>University Core Requirements:</b>				<b>FRESHMAN YEAR</b>		<b>JUNIOR YEAR</b>	
<b>Requirements</b>	<b># Classes</b>	<b>Hours</b>	<b>Classes</b>	<u>1st Semester</u>		<u>5th Semester</u>	
<b>Religion Cornerstones</b>				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
<b>BYU Foundations for Student Success</b>				<b>Total Hours:</b>	<b>15.00</b>	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
<b>The Individual and Society</b>				CHEM 112	3.00	<b>Total Hours:</b>	<b>16.00</b>
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
<b>Skills</b>				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*	<b>Total Hours:</b>	<b>14.50</b>	Religion	2.00
Languages of Learning (Math of Language)	1	4.00	MATH 112*	<b>SOPHMORE YEAR</b>		Open Elective	1.00
<b>Arts, Letters and Sciences (Complete 6 of 7)</b>				<u>3rd Semester</u>		<b>Total Hours:</b>	<b>15.00</b>
Civilization 1	1	3.00	from approved list	CHEM 227	4.00	<b>SENIOR YEAR</b>	
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	<b>Total Hours:</b>	<b>15.50</b>	Open Elective	4.00
<b>Core Enrichment: Electives</b>				<u>4th Semester</u>		<b>Total Hours:</b>	<b>15.00</b>
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
<b>Graduation Requirements:</b>				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	<b>Total Hours:</b>	<b>12.00</b>
				PHSCS 220	3.00		
				CHEM 497R (opt U/G Research)	1.00		
				GE Religion Cornerstone Class	2.00		
				<b>Total Hours:</b>	<b>17.00</b>		
*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**

##### **Department of Chemistry and Biochemistry Advisement**

Brigham Young University  
C-104 BNSN  
Provo, UT 84602  
Telephone: (801) 422-6269

#### **ADVISEMENT CENTER INFORMATION**

##### **Computational, Mathematical and Physical Sciences College Advisement Center**

Brigham Young University  
N-181 ESC  
Provo, UT 84602  
Telephone: (801) 422-2674

# BYU

## Chemistry BA

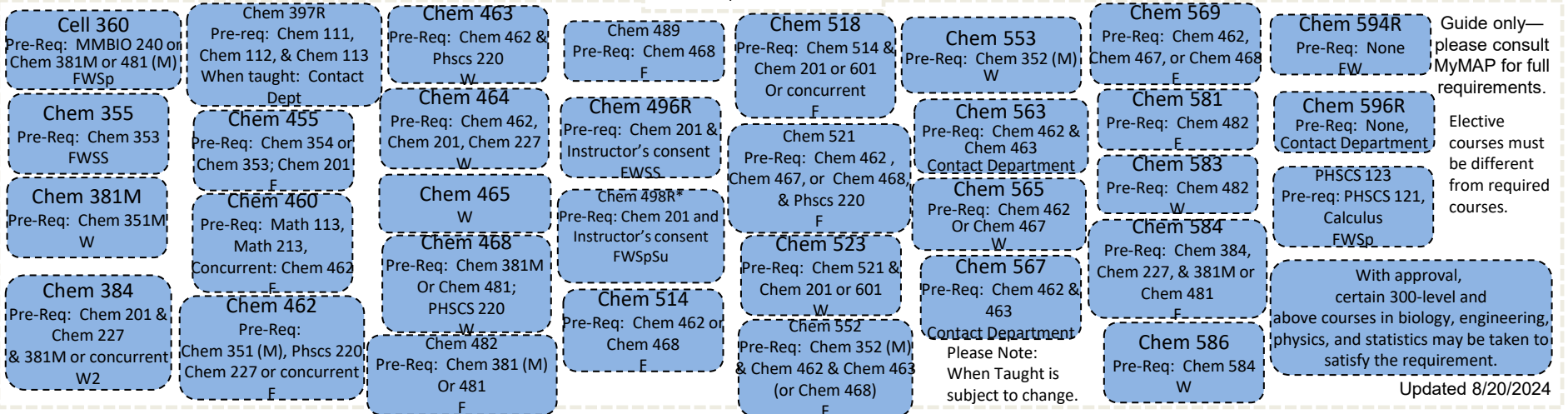
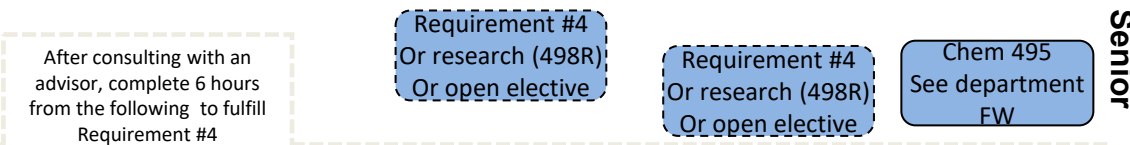
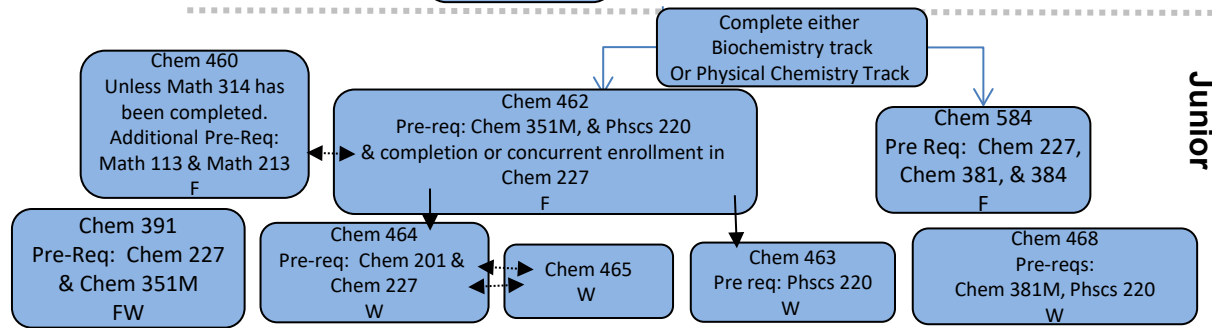
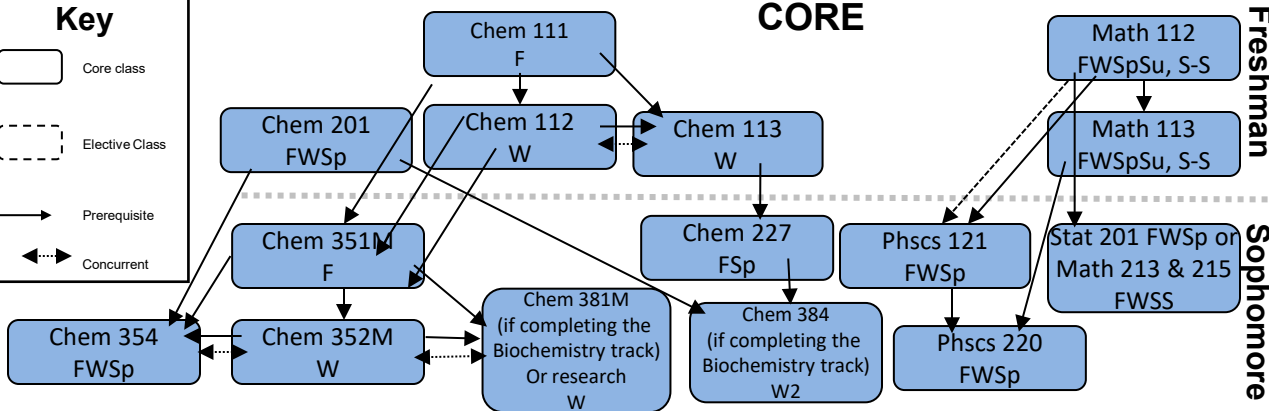
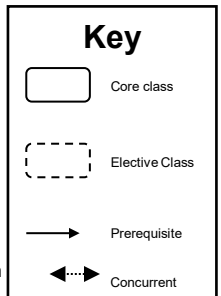
### Requirements / Prerequisites 2024-2025 Academic Year

#### Major (57.5 Hours)

- Complete the following: Chem 111, Chem 112, Chem 113, Chem 201, Chem 227, Chem 351M, Chem 352M, Chem 391, Chem 495.
- Complete Chem 354, Chem 381M, Chem 384, Chem 468, Chem 584, and complete either Stat 201 or Math 213 & 215. Or complete Chem 354, Chem 460, Chem 462, Chem 463, Chem 464, Chem 465, and Math 213 & 215.
- Complete the following: Math 112, Math 113, Phscs 121, Phscs 220
- After consulting with an advisor, complete 6 hours from the following: Cell 360, Chem 355, Chem 381M, Chem 384, Chem 397R, Chem 455, Chem 460, Chem 462, Chem 463, Chem 464, Chem 465, Chem 468, Chem 482, Chem 489, Chem 496R, Chem 498R, Chem 514, Chem 518, Chem 521, Chem 523, Chem 552, Chem 553, Chem 563, Chem 565, Chem 567, Chem 569, Chem 581, Chem 583, Chem 584, Chem 586, Chem 594R, Chem 596R, HONRS 499R, physics 123, or with approval certain 300-level and above courses in biology, engineering, physics, and statistics.

Note: Elective courses must be different than required courses. Chem 355 cannot be taken if Chem 354 was taken for 2 credits. If 354 is taken for 2 credits, one credit may be used for electives.

\*Enrolling in CHEM 497R and 498R gives students an opportunity to be mentored in a faculty's research lab and receive class credit. Enrollment in 497R can be repeated for several successive semesters, usually followed by 498R. Permission is required from the faculty member. Contact the department office for specific details.



## handshake

BYU's own job board. Employers who want to hire BYU graduates or offer internships to current students post job openings to this website and students apply. Just like LinkedIn, employers can view student profiles and students can network as they apply for jobs and internships

**Login to [handshake.byu.edu](https://handshake.byu.edu) >>> BYU Net ID**

*\*you do not need to create an account, just sign in with you BYU information*



## HOW TO MAKE THE MOST OUT OF HANDSHAKE:

### 1. COMPLETE YOUR PROFILE

- Upload your resume and it will auto-fill in your profile
- Completed profiles tailor your Handshake experience
- Information from your transcript is already uploaded
- Fill in the Summary/Bio section
- Fill in your past jobs and experiences, including all the bullet points you use on your resume
- Add a professional headshot and background photo

Remember: every word in your profile will be searchable by students and employers

### 4. EXPLORE FELLOW STUDENTS

- “Students” tab
- Search for fellow BYU students to view their profiles and job positions (Facebook stalking... “networking”)

### 5. ATTEND EVENTS

- The “Events” tab will be your key to attending info sessions, interviews, and Career Fairs
- The “Calendar” tab under “Events” will show you what events are coming soon
- Make sure to save events you are interested in or RSVP so you do not forget to attend
- Spread the word to your friends on social media

### 6. DOWNLOAD HANDSHAKE APP

- Search: “Handshake” not “Handshake Career Services”
- Input your BYU e-mail address: [netID@byu.edu](mailto:netID@byu.edu) (it will forward emails to the e-mail you have on file with BYU)
- Handshake will send you a link via e-mail to enable your account in the app
- Navigate the app to perform all the functions of the website that have been previously mentioned

### 7. VISIT THE CAREER STUDIO

- Freshen up your resume, cover letter, or LinkedIn
- Receive networking help
- Practice interviewing with a mock interview
- Meet with a full-time Career Counselor in your field

### 8. GET A JOB, RING THE BELL

- Once you're hired, stop by the Career Studio to ring our Victory Bell and get a picture for the Victory Board



employers are  
**5X MORE LIKELY**  
to view a profile that has  
at least one job/skill/organization

### 2. APPLY FOR JOBS

- Search for job titles, employers, or skills
- Apply for interesting jobs that meet your skill set

### 3. RESEARCH COMPANIES

- Under the “Jobs” Tab there is an “Employers” Tab
- Search for keywords or locations to find companies that are the right fit for you
- Plan to attend their info sessions on BYU Campus, connect with them at Career Fairs, or set up informational interviews to learn more

Remember: when looking at companies or jobs, Handshake will tell you what other BYU students have worked there. Use this resource to network and discover more information!

# Possible Careers with a Chemistry major

(Not a comprehensive list)

\*Usually requires a graduate degree

Agricultural engineer	Lab safety manager	Physiologist*
Agricultural research	Medical Doctor*	Process chemist
Agronomist*	Medical Physician*	Professor*
Biotechnologist	Microbiologist*	Prosthetist and orthotist*
Chemical hygiene officer	Neurologist*	Quality assurance & control manager
Chemical safety engineer	Nuclear physicist*	Regulatory compliance officer
Chemist	Nurse/Nurse Practitioner*	Respiratory therapist
Dentist*	Orthodontics*	Sanitation engineer
Environmental chemist	Paleontologist*	Surgeon*
Environmental health & safety technician	Patent examiner	Surgical technologist
Forensic scientist	Patent lawyer*	Technical sales & marketing rep
Health physicist*	Peptide chemist*	Toxicologist*
Independent consultant	Perfusionist	Urologist*
Industrial chemist	Pharmacist*	Veterinarian*
Industrial manager	Phlebotomist	Veterinary technician
Internist*	Physiatrist*	Zoologist*
Junior high or high school teacher	Physical therapist*	
Lab Researcher	Physician assistant*	
	Physician executive*	
	Physician scientist*	

For a more comprehensive list, scan here:



## Companies that have hired our graduates

Neutraceutical, International	ThermoFisher Scientific	Northrop Grumman
Schlumberger	NIH	Jacobs
IBC Advanced Technologies	Beyond Labz	Clorox Company
MoxTek	Pfizer	Edwards Life Sciences
NuSkin	Eli Lilly	Octant
Millenniata	Intel	Huntsman Cancer Institute
Intel	Recursion	DOE National Labs