Welcome to the
Chemistry Major (BA)
in the College of Physical and Mathematical Sciences

College Advisement Center
Website: https://science.byu.edu/advisement
Email: science.math.advisement@byu.edu
Phone: 801-422-2674
Office: N-181ESC

Chemistry and Biochemistry Department
Website: chem.byu.edu
Phone: 801-422-3667
Office: C-100 BNSN

Department Advisement– Sue Mortensen*
Email: suemort@chem.byu.edu
Phone: 801-422-6269
Office: C-104 BNSN

Internship Coordinator – Richard Watt
Email: rwatt@chem.byu.edu
Phone: 801-422-1923
Office: E-210 BNSN

University Career Services – Anna Kennington
Website: careers.byu.edu (Handshake--see flyer in packet)
Email: anna.kennington@byu.edu
Phone: 801-422-5944, or 801-422-2674 (schedule appointment)
Office: C-106 BNSN

STEM Alliance--Connect with STEM employers, mentors, and clubs: stemalliance.byu.edu

Clubs

YChem: Walter Paxton, E111 BNSN, paxton@chem.byu.edu; 422-4917
Women in Chemistry: Kara Stowers, C309 BNSN, kstowers@chem.byu.edu, 801-422-0835
Cougs v Cancer: Cristy Welsh, E-181 BNSN, sccr@chem.byu.edu. 801-422-3913

*Please visit Sue Mortensen in the Chemistry and Biochemistry Department 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

Resources for Graduation Planning

- Flow Charts and Major Academic Plans (MAPs) can be found here: https://science.byu.edu/advisement/flowcharts.
- 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 first page of this packet.

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-100 BNSN, 801-422-3667, https://www.chem.byu.edu/
  - Computer Science: 3361 TMCB, 801-422-3027, csoffice@cs.byu.edu
  - Geological Sciences: S-389 ESC, 801-422-3918, geology@byu.edu
  - Mathematics: 275 TMCB, 801-422-2061, office@mathematics.byu.edu
  - Mathematics Education: 167 TMCB, 801-422-1735, office@mathed.byu.edu
  - Physics and Astronomy: 167 TMCB, 801-422-1735, office@mathed.byu.edu
  - Statistics: 2152 WVB, 801-422-4505, statsec@stat.byu.edu

Prepare Early for a Career

- Check out University Career Services in 2590 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).
  - 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 Job Search Class). Class is held for 1 hour per week for eight non-consecutive weeks throughout the semester.
## University Core and Graduation Requirements

### University Core Requirements:

<table>
<thead>
<tr>
<th>Requirements</th>
<th>#Classes</th>
<th>Hours</th>
<th>Classes</th>
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<tr>
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<tr>
<td>Teachings and Doctrine of The Book of Mormon</td>
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<tr>
<td>Jesus Christ and the Everlasting Gospel</td>
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<td>REL A 250</td>
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<td>American Heritage</td>
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<tr>
<td>Global and Cultural Awareness</td>
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<td>3.0</td>
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<td><strong>Skills</strong></td>
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<td>Languages of Learning (Math or Language)</td>
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<tr>
<td>Civilization 2</td>
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<tr>
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<tr>
<td>Letters</td>
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<td>CHEM 111* and PHSCS 121*</td>
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<tr>
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<td>Variable</td>
<td>Variable</td>
<td>personal choice</td>
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<tr>
<td>*These classes fill both University Core and Program Requirements (21-22 hours overlap)</td>
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</tbody>
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### Graduation Requirements:

- Minimum residence hours required: 30.0
- Minimum hours needed to graduate: 120.0

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### Suggested Sequence of Courses

#### FRESHMAN YEAR

**1st Semester**
- First-year Writing or A HTG 100 (FWSpSu)
- Biological Science* 3.0
- CHEM 112* 3.0
- MATH 111 4.0
- Religion Cornerstone course 2.0
- Total Hours 16-17.0

*There is no major-specific biology course required for the major; just the G.E. biological science requirement. CELL 120, BIO 130, and MM BIO 121 are recommended options. **With department approval, CHEM 105 may be substituted for CHEM 111.

**2nd Semester**
- First-year Writing or A HTG 100 3.0
- CHEM 112* (W) 3.0
- CHEM 113* (FW) 2.0
- CHEM 201 (FW) 0.5
- MATH 113 (FWSpSu) 4.0
- Religion Cornerstone course 2.0
- Total Hours 14.5

*With department approval, CHEM 106 may be substituted for CHEM 112; CHEM 107 for CHEM 113.

#### SOPHOMORE YEAR

**3rd Semester**
- CHEM 227 (FW) 4.0
- STAT 201 (FW) or MATH 213 & 215 (FW) 3.0
- PHSCS 121 (FWSp) 3.0
- Religion Cornerstone course 2.0
- Total Hours 15.0

*CHEM 351 may substitute for CHEM 351M.

**4th Semester**
- CHEM 352M* (W) 3.0
- CHEM 354* (FWSp) and/or CHEM 384 (W) 2.0
- PHSCS 123 (FWSp) 3.0
- CHEM 381* (W) 3.0
- CHEM 497R (FWSpSu) or open electives 1.0
- Religion Cornerstone course 2.0
- Total Hours 14.0

*CHEM 352 may substitute for CHEM 352M; CHEM 353 may substitute for CHEM 354.

**With department approval, CHEM 481 may substitute for CHEM 381M.**

#### JUNIOR YEAR

**5th Semester**
- CHEM 462 (F) or elective 3.0
- CHEM 463 (W) or CHEM 497R (FWSpSu) or elective 3.0
- PHSCS 220 (FWSpSu) 3.0
- Civilization 1 3.0
- Social Science 3.0
- Global and Cultural Awareness 3.0
- Total Hours 16.0

**6th Semester**
- CHEM 391 (FW) 3.0
- CHEM 463 (W) or CHEM 468 (W) 3.0
- CHEM 464 & 465 (W) or CHEM 497R and/or elective 2.0
- Arts or Letters 3.0
- Civilization 2 3.0
- Religion Elective 2.0
- Total Hours 18.0

#### SENIOR YEAR

**5th Semester**
- CHEM 584 (F) or open elective 3.0
- CHEM 497R (FWSpSu) and other Requirement 4 6.0
- Religion elective 2.0
- Global and Cultural Awareness 3.0
- Total Hours 14.0

**6th Semester**
- CHEM 495 (FW) 3.0
- Requirement 4 or open elective 2.0
- Arts or Letters 3.0
- Religion elective 2.0
- CHEM 498R (FWSpSu) and open elective 6.0
- Total Hours 14.0

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### BA in Chemistry (692827) MAP Sheet

Physical and Mathematical Sciences, Chemistry and Biochemistry
For students entering the degree program during the 2022-2023 curricular year.
## REQUISITION 1
Complete 9 courses
- CHEM 111 - Principles of Chemistry 1 4.0
- CHEM 112 - Principles of Chemistry 2 3.0
- CHEM 113 - Introductory General Chemistry Laboratory 2.0
- CHEM 201 - Chemical Handling and Safe Laboratory Practices 0.5
- CHEM 227 - Principles of Chemical Analysis 4.0
- CHEM 351M - Organic Chemistry 1 - Majors 3.0
- CHEM 352M - Organic Chemistry 2 - Majors 3.0
- CHEM 391M - Technical Writing Using Chemical Literature 3.0
- CHEM 495 - Senior Seminar 1.0

**Note:** With departmental approval, Chem 110 can be taken for Chem 111, and Chem 106 for Chem 112; and Chem 107 for Chem 113.

## REQUISITION 2
Complete 1 option

### 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 35A - Organic Chemistry Laboratory - Majors 2.0v
- CHEM 381M - Fundamentals of Biochemistry 3.0
- CHEM 384M - Biochemistry Methods 1.0
- CHEM 468 - Biophysical Chemistry 3.0
- CHEM 584 - Advanced Biochemistry Methods 1 3.0
- STAT 201 - Statistics for Engineers and Scientists 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 358 - Organic Chemistry Laboratory - Majors 2.0v
- CHEM 381M - Fundamentals of Biochemistry 3.0
- CHEM 384 - Biochemistry Methods 1.0
- CHEM 468 - Biophysical Chemistry 3.0
- CHEM 584 - Advanced Biochemistry Methods 1 3.0
- STAT 201 - Statistics for Engineers and Scientists 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:** CHEM 314 MAY SUBSTITUTE FOR CHEM 460.
- CHEM 354 - Organic Chemistry Laboratory - Majors 2.0v
- CHEM 460 - Mathematics for Physical Chemistry 1.0

## REQUIREMENT 3
Complete 5 courses
- MATH 112 - Calculus 1 4.0
- MATH 113 - Calculus 2 4.0
- PHYSCS 121 - Introduction to Newtonian Mechanics 3.0
- PHYSCS 123 - Introduction to Waves, Optics, and Thermodynamics 3.0
- PHYSCS 220 - Introduction to Electricity and Magnetism 3.0

## REQUIREMENT 4
Complete 3.0 hours from the following course(s)
- CHEM 355 - Organic Chemistry Laboratory 2 - Nonmajors 2.0
- CHEM 384 - Biochemistry Methods 1.0
- CHEM 552 - Advanced Organic Chemistry 1.0
- CHEM 463 - Physical Chemistry 2 3.0
- CHEM 462 - Physical Chemistry 1 3.0
- CHEM 461 - Advanced Inorganic Chemistry 3.0
- CHEM 498R - Capstone Experience in Chemistry/Biochemistry 2.0

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: Math 211 and 215; Chem 460; Physcs 225.

## REGISTRATION ADVICE
We want to assist students in their academic pursuit toward an undergraduate degree. Students are encouraged to complete an average of 15 credit hours each semester or 30 credit hours each year, which could include spring and/or summer terms. Taking fewer credits substantially increases the number of semesters to graduate.

New students should attend the chemistry and biochemistry session during New Student Orientation, where they can meet with a faculty advisor and review their planned registration.

Transfer or mid-year incoming students should meet with an advisor prior to the add/drop deadline of their first semester, usually after the first week of class.
<table>
<thead>
<tr>
<th>BA in Chemistry (692827)</th>
<th>2022-2023</th>
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</thead>
</table>

The department recommends a review of progress and planned registration with a faculty advisor in the semester when 30, 60, and 90 hours are completed. However, academic advisement is available to all majors at any point in their academic career. Contact the department advisement office to schedule an appointment with a faculty advisor: in person C104 BNSN; by phone 801-422-6269; by email suemort@chem.byu.edu or coffice@chem.byu.edu

MENTORED RESEARCH/EXPERIENTIAL LEARNING

We strongly encourage our majors to participate in mentored learning and receive credit toward completing their major requirements. Approximately 80% of our faculty conduct independent, externally funded research and invite undergraduates to participate in on-campus mentored learning opportunities. Students initiate contact with a faculty whose research interests them. Upon acceptance to participate in a research lab, students enroll in a series of mentored research courses (CHEM 297R, 497R) throughout their academic career, culminating in a capstone research experience (CHEM 498R). Contact the department advisement center for additional information: 801-422-6269; C104 BNSN; suemort@chem.byu.edu or coffice@chem.byu.edu.

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.

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

ADVISEMENT CENTER INFORMATION

Physical and Mathematical Sciences College Advisement Center
Brigham Young University
N-181 ESC
Provo, UT 84602
Telephone: (801) 422-2674
BYU Chemistry BA
Requirements / Prerequisites
2022-2023 Academic Year

Major (57.5 Hours)
3. Complete the following: Math 112, Math 113, Phscs 121, Phscs 123, Phscs 220.

Note: Elective courses may 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 Online Job Board

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 >>> 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

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!

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 (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
Possible Careers with a Chemistry major
(Not a comprehensive list)

<table>
<thead>
<tr>
<th>Agricultural engineer</th>
<th>Pathologist*</th>
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<tbody>
<tr>
<td>Agricultural research</td>
<td>Pediatric dentist*</td>
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<tr>
<td>Agronomist*</td>
<td>Pediatrician*</td>
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<tr>
<td>Biotechnologist</td>
<td>Perfusionist</td>
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<td>Chemical safety engineer</td>
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<td>Zoologist*</td>
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<tr>
<td>Lab Researcher</td>
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*Usually requires a graduate degree

Companies that have hired our graduates
Neutraceutical, International        Schlumberger
IBC Advanced Technologies            MoxTek
NuSkin                                Millenniata
Intel                                 ThermoFisher Scientific
NIH                                   Beyond Labz