

Department of Chemistry and Biochemistry

Graduate Student Handbook

Brigham Young University
2023 – 2024 Academic Year

Department of Chemistry and Biochemistry

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Welcome to the Department

We are pleased that you have chosen the Department of Chemistry and Biochemistry at Brigham Young University to pursue your graduate degree. We have an excellent program. You will be well prepared to meet the challenges of your profession and career as you work hard to develop your knowledge and abilities. We are committed to help you be successful in every way and are confident that you can be successful in our program. Our laboratories are equipped with up-to-date instrumentation to help you carry out your research. Experienced faculty and staff members are available to teach, advise and support your efforts.

We expect you to approach your graduate studies in a professional way. Do not consider your graduate stipend as pay for doing a job. Rather, your stipend is designed as a subsidy which will permit you to focus your attention on your graduate work. We ask you not to accept employment outside the department while you are a graduate student here. Our commitment to your education is substantial, and in return we expect a serious commitment from you. The graduate student who looks upon his or her graduate work as an eight-to-five job five days a week greatly underestimates what is required. It is reasonable to expect graduate students to spend many hours in the laboratory. Of course, students on teaching assistantships need to divide their time between teaching and research. The total commitment should be the same, with the hours not required for teaching to be spent in the research laboratory. This means arriving early, working late, and often coming back in the evenings and on Saturdays (but not on Sundays at Brigham Young University). One must use good judgment and plan to spend some time with family and friends, but extended holidays and breaks between semesters are times when much can be accomplished in the laboratory with minimum interruption. In an address given by former BYU Graduate Dean Marilyn Arnold, she stated the following:

“Graduate study at a university is not simply an extension of undergraduate work nor is it merely a group of courses and requirements that cluster into something called a program...graduate study is the doorway, and sometimes the entry hall, into new territories of discovery and truth. It is where students learn that knowledge has power and value in itself, that theoretical research is as precious and necessary as practical research, and that the two are not mutually exclusive.”

The rewards that go with the successful completion of a graduate degree are great and our staff and faculty are committed to helping you achieve your potential.

-Jaron Hansen, Ph.D. Professor and Chair

Introduction

Chemistry and biochemistry are fundamental to our understanding of the physical and biological world. The principles and applications of chemistry and biochemistry are diverse, interesting, and challenging. The graduate programs in the Department of Chemistry and Biochemistry are designed to develop well-educated, independent scientists who will contribute in diverse circumstances where chemical/biochemical knowledge and skills are needed. We are glad to have you as a part of our program and anticipate that your time here will be stimulating, challenging, and rewarding. After completion of the program, students will be:

Productive and Ethical Contributors

Graduates of this program will demonstrate the necessary skills to become productive, ethical, and independent scientists. They will be prepared to further their education through postdoctoral training, enter industry, and/or begin an academic career.

Critical Evaluation of Current Research

Program graduates will understand and critically evaluate current research in their chosen subdiscipline in chemistry. Coursework that builds upon the student's undergraduate education will provide the initial steps to achieve this outcome. Continued critical reading of current literature is essential for reaching this outcome.

Proficiency in Laboratory Techniques

Program graduates will demonstrate proficiency in laboratory techniques necessary to contribute to knowledge in their chosen subdiscipline of chemistry.

Effective Writing, Communication, and Presentation

Program graduates will learn to effectively write scientific manuscripts describing their research and to make oral presentations of their research at scientific meetings.

Research Skills

Program graduates will demonstrate the ability to identify new research opportunities, plan effective strategies for pursuing these opportunities, and conduct research that contributes in a meaningful way to current knowledge in their chosen subdiscipline of chemistry or related areas.

The purpose of the Graduate Handbook is to help students navigate their MS or PhD program as smoothly as possible. We have included brief descriptions of the major stepping-stones leading to completion of the degree and a few stumbling blocks encountered by previous students. Since we intend to revise this handbook periodically, please let the graduate program administrator know if there are any additional topics that should be included or if any of the material is outdated.

Not all of the material in this handbook will be immediately relevant. Nevertheless, students

should read the entire handbook when they begin the program and refer to it frequently during their studies here in the department. Familiarity with the contents of the handbook will also make it easier for department personnel to help when problems arise. Additional information may be obtained from the BYU Graduate Studies Catalog, your Committee Chair, the Graduate Coordinator, or the graduate program administrator.

Department Mission Statement

As a department we strive to integrate undergraduate and graduate education in a manner that provides an exceptional educational experience for our undergraduate students, offers opportunities in research at the cutting edge of our disciplines for our graduate students, and creates an environment conducive to excellence in scholarship and teaching for members of our faculty. We are committed to providing effective, rigorous, learning experiences for all our students, both majors and non-majors, in and out of the classroom. Undergraduates have access to a variety of meaningful research projects in well-equipped and well-funded laboratories under the direction of faculty who are current in their disciplines. In those same laboratories graduate students work with undergraduate students on significant research projects as they prepare themselves to work as independent scientists. Post-doctoral research associates participate with and extend the reach of faculty members in providing mentoring to undergraduate and graduate students. Our research efforts should produce discoveries that move science forward and contribute to society in meaningful ways.

It is our goal to create a department toward which the best LDS undergraduate and graduate students will gravitate because of the high quality of the instruction, the range and quality of the learning opportunities outside the classroom, and the combined faith and scholarly excellence of the faculty.

Expectations

What students can expect from the program

The biochemistry MS degree provides specialized study on an advanced level. The degree includes about one year of coursework beyond the BS degree and a thesis based upon a significant research project. The research will be in areas of biochemical and molecular biological emphasis, such as host pathogen interactions, bioprobes and sensors, signal transduction, or protein structure and function. The added preparation in theory and practice allows the MS biochemist to assume responsibility and supervision beyond that normally given a BS or BA biochemist. The MS degree is adequate preparation for some industry and junior college teaching positions. It is generally not a prerequisite for a PhD degree program.

The chemistry MS degree provides specialized study and research on an advanced level. It includes about one year of course work beyond the bachelor's degree and the development of a significant research project presented in a thesis. The MS student will select one of the four chemistry areas of emphasis, but there is sufficient flexibility in course and committee selection that a program of study can acquire a significant interdisciplinary character. The added preparation in theory and practice allows the chemical scientist to assume responsibility and supervision beyond that normally given with bachelor's level study. The MS degree is adequate preparation for some industry and junior college teaching positions. The master's degree is generally not necessary as a preparatory step for the PhD degree.

The biochemistry PhD degree prepares independent scientists to perform and to supervise creative research in biochemistry and molecular biology. The PhD degree requires some course work, but the emphasis is primarily on original, creative research leading to quality publications in scientific journals and a dissertation. The PhD biochemist is prepared for a wide range of career opportunities that involve independent thinking and supervisory responsibilities in industry, government, or academia.

The chemistry PhD degree prepares a scientist to contribute on the creative front of chemical science. The PhD student will select one of the four chemistry areas of emphasis (i.e., analytical, inorganic, organic, or physical chemistry), but there is sufficient flexibility in course and committee selection that a program of study can acquire a significant interdisciplinary character. Some courses on advanced topics related to the student's professional goals will be taken, but the PhD degree is primarily a research experience that is to be reported in the scientific literature and in a dissertation. The PhD chemist is prepared for a wide range of career choices and will be expected to act with considerable independence and enjoy major responsibilities. A new PhD chemist may seek employment in industry, government agencies, or the university or college setting.

What students can expect from the faculty

Approximately thirty faculty are the foundation of our excellent graduate program. The department occupies the 190,000-square-foot Benson Science Building, which provides comfortable, modern laboratories. Extensive instrumentation is available and constantly being replaced or upgraded to support cutting-edge research.

Faculty expertise spans all the main areas of chemistry (i.e., analytical, biochemistry, inorganic, organic, and physical chemistry). Specific areas of expertise include cancer, catalysis, chromatography & electrophoresis, computational chemistry, kinetics, mass spectrometry & proteomics, material science & nanomaterials, microfluidics, natural product synthesis & medicinal chemistry, spectroscopy, and structural biochemistry & signal transduction.

What is expected of graduate students?

We expect students to be committed to completing their degree in a timely manner. Generally, MS students complete their work in two and one-half years and PhD students complete their work in approximately five and one-half years. With this commitment, students need to prioritize their schedule for adequate study time and work/research hours.

1st-Year Checklist

Checklist

We know that the first year can be overwhelming. Many students are learning lab standards, new terminology, graduate processes, etc. To help alleviate some confusion or frustration, we have outlined by semester a checklist for your first year.

Fall Semester

- ☐ Obtain student id - to utilize the free UTA, you will need your student id
- ☐ Employment contract signed and I-9 complete
- ☐ Set-up direct deposit through myBYU for employment, international students will need to open a bank account in the United States
- ☐ Obtain a key for your temporary student office - Sue Mortensen in C100 can help with this process or the key will be given to you at NSP
- ☐ Read the Graduate Handbook - <https://chembio.byu.edu/graduate-program/current-students>
- ☐ Register for at least 6 credits
- ☐ If proficiency exams were not met, go to <https://chembio.byu.edu/graduate-program/proficiency-exams> to review next steps
- ☐ Lab rotations for biochemistry students (Chem 689R)
- ☐ Chemistry students need to talk to at least 4 professors, in their emphasis area, in regards to the professor's lab space and about being a potential advisor (make sure to have each faculty member sign your [Advisory Chair Selection form](#))
- ☐ Meet with the department chair in early December to go over the [Advisory Chair Selection form](#)
- ☐ Meet with your advisory faculty chair to discuss committee members. Advisory chair then will reach out to the potential committee members to see if they are okay to be on the committee.

Winter Semester

- ☐ Register for at least 6 credits - this includes classes that go towards proficiency exam requirements if extension is given
- ☐ By the third week of the semester, students will need to complete sections 1 and 2 of the [Program of Study form](#) to submit to the graduate program administrator (see advisement and program of study section of the handbook)
- ☐ Present an LP in Chem 692R

Spring/Summer Terms

- ☐ Focus on research
- ☐ Enroll in 1 credit of Chem 697R in both Spring and Summer terms
- ☐ Present first APR in mid-August - see 1st-Year Reviews (APR) pg. 23

Proficiency Exams

Newly admitted Chemistry graduate students (M.S. and Ph.D.) must demonstrate proficiency in general chemistry, their area of emphasis - analytical, biochemistry, inorganic, organic, or physical, and within a breadth course. All graduate students must complete the general chemistry and area of emphasis requirement by the conclusion of their 1st semester. Any graduate student not meeting this requirement may be dismissed from the graduate program.

ACS General Chemistry Exam Requirement:

All graduate students must pass the ACS general chemistry exam by the 60th percentile by the end of the fall semester in their first year.

- For those that pass within the 60th percentile or above will have completed this requirement and will need to focus on passing their area proficiency and/or breadth class.
- For those that do not pass within the 60th percentile, students will be given two more chances at the end of October and the end of November of the fall semester to complete this requirement. Students can audit Chem 105/106 to help with general chemistry material and/or can study on their own.

Proficiency in AREA Requirement:

All graduate students must show adequate proficiency in their area of emphasis by passing their area-specific ACS exam at a level set by the area (each area will decide on their percentage) by the end of the fall semester. These are the score requirements for the academic year 2023-2024. Score requirements are subject to change each academic year.

Area	Passing Score/#of Questions	Percentile
Analytical	30/50	60 th
Biochemistry	30/60	50 th
Inorganic	35/60	55 th
Organic	45/70	83 rd
Physical	35/60	65 th

- Students who pass the area-specific ACS exam will be able to enroll in the graduate-level core courses upon arrival.

Analytical	Biochemistry	Inorganic	Organic	Physical
Chem 521, 523, 629R, 729R	Chem 581, 583, 584, 586, 689R, 789R	Chem 514, 518, 619R	Chem 552, 553, 555, 659R, 759R	Chem 563, 565, 567, 569

- a) Students who do not pass will be enrolled in a preparatory study hour with an assigned TA specific to each area. They will then study and have required check-ins about progress over that semester before retaking the ACS exam at the end of the 1st semester. If the student's area proficiency hasn't improved after the fall semester, they will receive an unsatisfactory rating.

Breadth Requirement:

All graduate students must show adequate proficiency in an area *outside* of their area of emphasis. To complete this requirement, students have two options.

- a) Students who pass an ACS exam outside of their area of emphasis (e.g., a student's area of emphasis is organic and passes an inorganic exam) can use the ACS exam as their breadth requirement.
- b) Students who are unable to pass out-of-area emphasis exams will be required to take a breadth course (this course is in addition to the required core elective courses). This course must be non-area specific (i.e., for those that choose an out-of-area Organic requirement, both organometallics and chemical biology would count as one of these breadth courses). All breadth courses require a B or better.

Example of breadth courses:

Analytical	Biochemistry	Inorganic	Organic	Physical
Chem 521 – Instrumental Analysis; Chem 629R – any topic; Chem 729R – any topic	Chem 689R- Proteomics; BIO 559R- Bioinformatics	Chem 514 – Inorganic Chemistry; Chem 565 – Intro to Quantum; PHSCS 581 - Solid State Physics	Chem 552 – Advanced Organic Chemistry; Chem 659 - Organometallics or Bioorganic Chemistry	PHSCS 581 - Solid; Chem 565 – Intro to Quantum; Chem 629R - Mass Spec; CH EN 536 - Machine Learning & Dynamic Opt

Study Material:

GENERAL CHEMISTRY – FULL YEAR

https://chem.libretexts.org/Bookshelves/General_Chemistry

ANALYTICAL (ONE OR TWO SEMESTERS BEYOND FRESHMAN OR GENERAL CHEMISTRY)

Douglas A. Skoog, F. James Holler, and Stanley R. Crouch, *Principles of Instrumental Analysis*, 6th Edition. Brooks Cole, 2006.

Exam topics can include - aqueous analytical methods, modern instrumental methods and basic principles of instrumentation.

BIOCHEMISTRY (TWO SEMESTERS WITH ORGANIC CHEMISTRY PREREQUISITE)

D.L. Nelson and M.M. Cox, Lehninger - Principles of Biochemistry, Sixth Edition, Worth Publishers, New York, 2013.

Exam topics can include - molecular components of cells, chemical structure and function, enzymes, metabolic transformations, photosynthesis, replication and transcription, and protein synthesis.

INORGANIC (ONE SEMESTER BEYOND A TWO-SEMESTER GENERAL CHEMISTRY COURSE)

D.F. Shriver and P. Atkins, *Inorganic Chemistry*, Fourth Edition, W.H. Freeman and Company, 2006.

Exam topics can include - elemental properties, periodic trends, atomic structure, group theory, molecular orbital, valence bond and crystal field theory, solids, coordination compounds, organometallic chemistry, reaction mechanisms, acids and bases, electrochemistry, and bioinorganic chemistry.

ORGANIC (TWO SEMESTERS)

Smith, *Organic Chemistry*, 4th Edition.

Exam topics can include - molecular structure and bonding, acidity/basicity/pKa, nomenclature of organic compounds, conformations of acyclic and cyclic molecules, stereochemistry of organic compounds, reactions of different organic functional classes, mechanisms of common organic reactions, synthesis of organic compounds, and spectroscopic identification of organic compounds.

PHYSICAL (TWO SEMESTERS)

P. Atkins, *Physical Chemistry*, W.H. Freeman and Company, New York, Eighth Edition, 2006.

Exam topics can include - states of matter, thermodynamics and equilibria, kinetic-molecular theory, quantum mechanics, atomic structure, spectroscopy, and group theory.

DEPARTMENT COPIES:

The Graduate Program Administrative has a few copies of the general chemistry, organic, and physical study guides. Information on the study guides are below:

- TITLE: Preparing for your ACS Examination in General Chemistry: The Official Guide
AUTHORS: Eubanks, Lucy T. and I. Dwaine
<https://acsexamsinstitute.com/general-chemistry---study-guide/>

- TITLE: Preparing for Your ACS Examination in Organic Chemistry : The Official Guide
AUTHOR: Eubanks, I. Dwaine
<https://acsexamsinstitute.com/organic-chemistry---study-guide/>
- TITLE: Preparing for Your ACS Examination in Physical Chemistry : The Official Guide
AUTHOR: Eubanks, I. Dwaine
<https://acsexamsinstitute.com/physical-chemistry---study-guide/>

Additional study materials for each area can be provided by emailing the Graduate Program Administrator.

ACS PRACTICE EXAMS - FOR PURCHASE

The American Chemical Society does not publish study guides for analytical chemistry, biochemistry, or inorganic chemistry exams. All other practice exams and study guides are available online through ACS and can be found [here](#).

Curriculum & Requirement

Course Load Maps

MS Requirements - 30 credits

	Chemistry	Biochemistry
Note:	- Pass ACS General Chemistry and ACS AREA Exam 1st semester of 1st year - Breadth requirement	- Pass ACS General Chemistry and ACS AREA Exam 1st semester of 1st year - Breadth requirement
	PLEASE NOTE: Unless instructed otherwise by their committee, MS students do not have a publication requirement.	
Year 1	<input type="checkbox"/> Courses: 2-5 total elective classes <input type="checkbox"/> -1-2 elective classes 1st semester <input type="checkbox"/> -1-2 elective classes 2nd semester <input type="checkbox"/> CHEM 594R, General Seminar <input type="checkbox"/> CHEM 601, Safety <input type="checkbox"/> CHEM 692R, Current Topics <input type="checkbox"/> CHEM 694 (W) – Scientific Writing <input type="checkbox"/> Annual review <input type="checkbox"/> 3.0 course GPA <input type="checkbox"/> At least 6 cr each in Fall & Winter <input type="checkbox"/> At least 1 cr each in Spring & Summer	<input type="checkbox"/> Courses: 2-5 total elective classes <input type="checkbox"/> -1-2 elective classes 1st semester <input type="checkbox"/> -1-2 elective classes 2nd semester <input type="checkbox"/> CHEM 594R, General Seminar <input type="checkbox"/> CHEM 601, Safety <input type="checkbox"/> CHEM 692R, Current Topics <input type="checkbox"/> CHEM 694 (W) – Scientific Writing <input type="checkbox"/> Annual review <input type="checkbox"/> 3.0 course GPA <input type="checkbox"/> At least 6 cr each in Fall & Winter <input type="checkbox"/> At least 1 cr each in Spring & Summer
Year 2	<input type="checkbox"/> CHEM 692R, Current Topics <input type="checkbox"/> CHEM 594R, General Seminar <input type="checkbox"/> (CHEM 699R Thesis (6 cr) <input type="checkbox"/> Annual review <input type="checkbox"/> 3.0 course GPA <input type="checkbox"/> Good research progress <input type="checkbox"/> At least 2 cr each in Fall & Winter <input type="checkbox"/> At least 1 cr each in Spring & Summer <input type="checkbox"/> <i>Thesis & Defense</i>	<input type="checkbox"/> CHEM 692R, Current Topics <input type="checkbox"/> CHEM 594R, General Seminar <input type="checkbox"/> (CHEM 699R Thesis (6 cr) <input type="checkbox"/> Annual review <input type="checkbox"/> 3.0 course GPA <input type="checkbox"/> Good research progress <input type="checkbox"/> At least 2 cr each in Fall & Winter <input type="checkbox"/> At least 1 cr each in Spring & Summer <input type="checkbox"/> <i>Thesis & Defense</i>

PhD Requirements - 54 credits

	Chemistry	Biochemistry
Note:	Pass ACS General Chemistry and Area ACS Exam	Pass ACS General Chemistry and Area ACS Exam
	PLEASE NOTE: <i>PhD students must have <u>at least one first-author paper submitted to a peer-reviewed journal prior to defense of their dissertation.</u></i>	
Year 1	<input type="checkbox"/> Courses: 4-7 total elective classes <input type="checkbox"/> 1-2 elective classes 1st semester <input type="checkbox"/> 1-2 elective classes 2nd semester <input type="checkbox"/> CHEM 594R, General Seminar <input type="checkbox"/> CHEM 601 (W), Safety <input type="checkbox"/> CHEM 692R, Current Topics <input type="checkbox"/> CHEM 694 (W) – Scientific Writing <input type="checkbox"/> Annual review - August <input type="checkbox"/> 3.0 course GPA <input type="checkbox"/> At least 6 cr each in Fall & Winter <input type="checkbox"/> At least 1 cr each in Spring & Summer	<input type="checkbox"/> Courses: 4-7 total elective classes <input type="checkbox"/> 1-2 elective classes 1st semester <input type="checkbox"/> 1-2 elective classes 2nd semester <input type="checkbox"/> CHEM 594R, General Seminar <input type="checkbox"/> CHEM 601 (W), Safety <input type="checkbox"/> CHEM 692R, Current Topics <input type="checkbox"/> CHEM 694 (W) – Scientific Writing <input type="checkbox"/> Annual review - August <input type="checkbox"/> 3.0 course GPA <input type="checkbox"/> At least 6 cr each in Fall & Winter <input type="checkbox"/> At least 1 cr each in Spring & Summer
Year 2	<input type="checkbox"/> CHEM 594R, General Seminar <input type="checkbox"/> CHEM 692R, Current Topics <input type="checkbox"/> 1-2 elective classes 1st semester <input type="checkbox"/> 1-2 elective classes 2nd semester <input type="checkbox"/> Annual review <input type="checkbox"/> Presentation Requirement <input type="checkbox"/> 3.0 course GPA <input type="checkbox"/> Good research progress <input type="checkbox"/> At least 2 cr each in Fall & Winter <input type="checkbox"/> At least 1 cr each in Spring & Summer	<input type="checkbox"/> CHEM 594R, General Seminar <input type="checkbox"/> CHEM 692R, Current Topics <input type="checkbox"/> 1-2 elective classes 1st semester <input type="checkbox"/> 1-2 elective classes 2nd semester <input type="checkbox"/> Annual review <input type="checkbox"/> Presentation Requirement <input type="checkbox"/> 3.0 course GPA <input type="checkbox"/> Good research progress <input type="checkbox"/> At least 2 cr each in Fall & Winter <input type="checkbox"/> At least 1 cr each in Spring & Summer
Year 3	<input type="checkbox"/> CHEM 594R, General Seminar <input type="checkbox"/> CHEM 692R, Current Topics <input type="checkbox"/> CHEM 697R, Research <input type="checkbox"/> Research Proposal - 3rd Yr Proposal <input type="checkbox"/> Presentation Requirement <input type="checkbox"/> 3.0 course GPA <input type="checkbox"/> Good research progress <input type="checkbox"/> At least 2 cr each in Fall & Winter <input type="checkbox"/> At least 1 cr each in Spring & Summer	<input type="checkbox"/> CHEM 594R, General Seminar <input type="checkbox"/> CHEM 692R, Current Topics <input type="checkbox"/> CHEM 697R, Research <input type="checkbox"/> Research Proposal - 3rd Yr Proposal <input type="checkbox"/> Presentation Requirement <input type="checkbox"/> 3.0 course GPA <input type="checkbox"/> Good research progress <input type="checkbox"/> At least 2 cr each in Fall & Winter <input type="checkbox"/> At least 1 cr each in Spring & Summer
Year 4	<input type="checkbox"/> CHEM 594R, General Seminar <input type="checkbox"/> CHEM 697R <input type="checkbox"/> CHEM 699R Dissertation <input type="checkbox"/> Annual review <input type="checkbox"/> Presentation Requirement <input type="checkbox"/> 3.0 course GPA <input type="checkbox"/> Good research progress <input type="checkbox"/> At least 2 cr each in Fall & Winter <input type="checkbox"/> At least 1 cr each in Spring & Summer	<input type="checkbox"/> CHEM 594R, General Seminar <input type="checkbox"/> CHEM 697R <input type="checkbox"/> CHEM 699R Dissertation <input type="checkbox"/> Annual review <input type="checkbox"/> Presentation Requirement <input type="checkbox"/> 3.0 course GPA <input type="checkbox"/> Good research progress <input type="checkbox"/> At least 2 cr each in Fall & Winter <input type="checkbox"/> At least 1 cr each in Spring & Summer
Year 5+	<input type="checkbox"/> Good research progress <input type="checkbox"/> CHEM 697R - any remaining credits <input type="checkbox"/> CHEM 699R Dissertation <input type="checkbox"/> Publication Requirement <input type="checkbox"/> At least 2 cr each F/W/Su until defense <input type="checkbox"/> Dissertation & Defense	<input type="checkbox"/> Good research progress <input type="checkbox"/> CHEM 697R - any remaining credits <input type="checkbox"/> CHEM 699R Dissertation <input type="checkbox"/> Publication Requirement <input type="checkbox"/> At least 2 cr each F/W/Su until defense <input type="checkbox"/> Dissertation & Defense

Program Requirements

Overall Courses

- PhD: 4-7 elective classes/ MS: 2-5 elective classes in addition to the breadth course:

Elective Classes by Area*

Analytical CHEM 521, 523, 629R (729R)	Biochemistry CHEM 581, 583, 584, 586 (689R, 789R)	Inorganic CHEM 514, 518, 619R	Organic CHEM 552, 553, 555, 659R (759R)	Physical CHEM 565, 567, 563, 569
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*Additional courses may be recommended by the candidate's advisor/committee

- Take 1-2 elective classes during their 1st semester (self-select based on course descriptions & recommendations from temporary advisor)
- Take 1-2 elective classes during their 2nd semester (advisor/committee help select)
- Take breadth course by 1st semester of 2nd year
- **CHEM 601 (Chemical Safety) during 1st yr (Winter)
- **CHEM 694 (Scientific Writing course) during 1st yr (Winter)
- **CHEM 594R (Seminar course) for 7 (PhD) or 3 (MS) semesters (3.5/1.5 total crs)
- **CHEM 692R Current Topics course for 6 (PhD) or 4 (MS) semesters (3/2 total crs)
- **CHEM 697R Graduate Research (variable)
- **CHEM 699R Dissertation 18 (PhD) or Thesis 6 (MS) credits

**Required Courses

CHEM 594R – Seminar course

Attend at least 10 seminars per semester.

For 2 of the 10 seminars, read and write abstract-like summaries for 2-3 articles written by the speaker on the topic of the presentation. These must be turned in prior to the seminar.

Take notes (using the form for the class) during the seminar for which the summaries are written. Turn the notes in immediately following the seminar. Two passing grades are required. If one or both of the summaries fails to meet the necessary standard of writing, additional summaries (as appropriate) will be required. Take notes using the form for

the class on all of the seminars on which the student writes summaries.

CHEM 601 – Safe Chemical Practices

Taken in the Winter semester of the first year.

This class will address University and department safety policies. Chemical hazards, fire safety, and biosafety, including laws. Graduate students who received their undergraduate degree at BYU in chemistry or biochemistry will be exempt from this class and will make up the credit in Chem 697R.

CHEM 692R - Current Topics course (3 credits)

Refer to the [Current Topics webpage](#) for requirements and schedule.

There are six sections of CHEM 692R, each with a different theme:

- Biochemistry
- Synthesis and Chemical Biology
- Catalysis or Functional Materials
- Instrument and Method Development
- Spectroscopy
- Bioanalytics

GS YEAR	FALL 692R	WINTER 692R	Notes:		
1st		LP	1st year students will have an APR towards the end of August		
2nd	LP	APR			
3rd		LP	PROPOSAL DONE BY END OF FALL - if space is open during Fall semester, 3rd-year proposal can be scheduled in Chem 692R		
4th	APR				
5th and above	Graduate student needs to coordinate with committee to schedule APR IF they do not defend their dissertation during the academic year				
LP=Literature Presentation (No committee needed; 2/week can be scheduled if necessary)		PRO=Proposal (entire committee should be present; functions also as APR)		APR=Annual Progress Review (entire committee should be present)	

CHEM 694 – Graduate Writing course

This is taken in the Winter semester of the second year. As part of this course, students

write a full literature review on the topic of their graduate research project. For PhD students, this review is intended to be the foundation for the student's proposal/prospectus which will also be drafted as part of the course. For MS students, the review will be the basis of the introductory chapter of their thesis.

With approval from their committee, students may take this class during the winter of their first year.

Registration of Credits

Because graduate studies is more rigorous than undergraduate studies, students are generally not required to register for more than 8.5 credit hours in a semester or 2 credit hours in a term. In many programs, even that may be too much. Graduate students may not register for more than 22 credit hours in a semester or 11 credit hours in a term.

For our program, students are generally enrolled in 6 credits per semester and 1 credit per term for at least the first year. After that point, students are generally enrolled in 2 credits each semester and 1 credit per term. Students should consult with their committee chair in determining an appropriate and reasonable credit enrollment.

Students should strive to be fully registered each semester as soon as registration becomes available. By doing so, we avoid problems with student contracts, tuition, loan deferment, and visa status.

After the first-day registration opens and a student has not enrolled, the graduate program administrator will enroll students based on their Program of Study (POS). It is the students' responsibility to review their schedule and discuss changes, if any, that need to be made to their schedule with the Graduate Program Manager. Failure to do so can result in unnecessary charges to the student.

Please note, if a student drops a class anytime after the add/drop deadline, the student will be responsible for the pro-rated tuition charges. The tuition scholarship will not cover these costs. If students have any questions regarding this university policy, please speak with the graduate program administrator.

PhD students are required to have two consecutive semesters with 6 credit hours each to obtain residency. Most PhD students will receive residency after the first year. After classes begin, you have 9 days (6 days Spring/Summer) to make changes to your schedule. See the graduate program administrator for help in adding or dropping classes. If you drop a class after the add/drop period, you will receive a "W" on your records and you will be responsible for drop fees/tuition, which can be significant.

Taking classes outside of the program of study:

1. If the course is an undergraduate course but is recommended by a student's advisor because it will enhance their research efforts, a student can fill out a change in

program of study form (see the graduate program administrator) to be added to their program of study as a "skills course." If approved, the tuition can be covered along with other program courses. (Skills courses do not count toward the credit hour requirement.)

2. Graduate students may take one religion course per semester for "no cost/no credit." Students do not register for the course, but complete a [form](#) and submit it to the instructor for consent. The form will need to be returned to the graduate program administrator for submission to Graduate Studies. Written permission from your advisor is not required to take one religion course.
3. If a graduate student wishes to take a course outside their program of study (i.e. language course, exercise, economics), the student will enroll in said course and will be responsible for the tuition cost for the course outside of their program of study. Students are discouraged from taking courses outside of the program of study during the first year.)

Full-Time Status

To be considered full-time for tuition purposes, students who are U.S. citizens or permanent residents must register for at least 8.5 credit hours in both Fall and Winter semesters or at least 4.5 credit hours in a term.

Our program usually does not enroll students in more than 6 credits a semester and 1 credit each term. However, due to the nature of our research program, students have the option to submit a [form](#) to Graduate Studies to request full-time status. This form will need to be submitted each semester and term to be classified as a full-time in the academic system.

Graduate Course Offering

The Department of Chemistry and Biochemistry offers a number of courses on various concepts and specializations. The master's program differs from the PhD program in credits and amount of classes needed. The chart below discusses required, core, and thesis or dissertation classes. Direct any questions about coursework to the Graduate Coordinator or graduate program administrator.

Course Rotation Schedule

Course	Topic	2023-2024**	2024-2025**
514	Inorganic Chemistry	F	F
518	Advanced Inorganic/Laboratory	F	W
521	Instrumental Analysis (Lecture)	F	F
523	Instrumental Analysis/Laboratory	W	W

Course	Topic	2023-2024**	2024-2025**
552	Advanced Organic Chemistry	F	F
553	Advanced Organic Chemistry	W	W
555	Organic Spectroscopic Identification	F	F
561	Chemical Thermodynamics		
563	Reaction Kinetics - on demand		
565	Intro to Quantum Chemistry	W	W
567	Statistical Mechanics	W	W
569	Fundamentals of Spectroscopy -every other year	F	F
571	Polymer and Materials Chemistry	W	
575	X-Ray Diffraction	W	
581	Advanced Biochemical Methodology 1	F	F
583	Advanced Biochemical Methodology 2	W	W
584	Advance Biochemistry Methodology 1	F	F
586	Advance Biochemistry Methodology 2	W	W
596R	Special Topics	W - NMR	
594R	General Seminar	F,W	F,W
601	Chemical Handling and Safe Lab Practices	W	W
619R	Chem Trans Elements	W	
629R	Mass Spectrometric Methods of Analysis		W
629R	Separation Methods of Analysis	W	
629R	Spectroscopic Methods of Analysis		
655	Advanced NMR Techniques	W	
659R	Organometallic Chemistry	W	

659R	Bioorganic Chemistry		W
659R	Natural Products Synthesis	F	
Course	Topic	2023-2024**	2024-2025**
669R	Quantum Chemistry		
*689R	Biochemistry of Cell Function		
*689R	Cellular Signal Transduction		
*689R	Structural Biochemistry (489R OK by petition)		
*689R	Molecular Biology of Cancer		
*689R	Proteomics	F	
*689R	Bioinorganic Chemistry		
692R	Current Topics	F,W	F,W
694	Scientific Writing & Professional Ethics	W	W
697R	Graduate Research	F,W	F,W
699R	Graduate Thesis/Dissertation	F,W	F,W
729R	Selected Topics in Analytical Chemistry		
729R	Experimental Design		
729R	Atmospheric Chemistry		
729R	Microfabrication/Nanofabrication	F	
729R	Microfluidics		
729R	Surface Chemistry and Analysis		
769R	Selected Topics in Physical Chemistry		

**689R courses rotate; please talk with the graduate program administrator*

***Courses offered in this year have not been set and are subject to change*

Credits: Transfer and Time Limits

<https://gradstudies.byu.edu/page/program-study-plan>

Credit taken at other accredited universities in the United States or in Canada may, with departmental approval, be applied toward a graduate degree at BYU under the following conditions:

- Transfer credits must be clearly graduate level.
- The grade for any such course must be B or higher pass/fail credit is non-transferable.
- Home study, correspondence, and extension courses are non-transferable.
- Courses taken before a student begins graduate work at BYU must be approved during a student's first semester of study at BYU.
- Courses taken at another university after the student has begun studies at BYU must be pre-approved by graduate committee members and the graduate coordinator; the proposed credit must be submitted on the Program of Study in AIM.
- Only credit taken within the student's time limit may count towards the degree (8 years for doctoral and 5 years for master's degree).
- Credit cannot have already been applied to another degree.

The number of credits a student may transfer varies according to the number of credit hours required for the BYU graduate program. The maximum number of transfer credits should constitute no more than 25% of the total required for the program, not to exceed 15 credit hours in any program. For example, if senior and/or post-baccalaureate studies credits are used in conjunction with transfer credit, the total may not exceed 15 credit hours.

NOTE: Transfer credits from other universities may be considered for BYU Doctoral Programs as long as they exceed the university minimums (see doctoral degree) and they meet the rules for transfer credit.

Outdated Credit/s and Degree Extensions

Only credit taken within the time limit for each degree may count toward the degree (eight years for doctoral degrees and five years for master's degrees). Departments and colleges may petition to allow credits outdated by more than one year, but by no more than five years, to apply toward a degree. The petition must be accompanied by impressive documentation that the credit/s in question have been updated by courses retaken, by special reading courses, or by examinations in each of the courses. If a master's degree is conferred in 2015, no credit taken before 2010 may apply to the degree, regardless of circumstances.

Departments and colleges may petition for an extension of up to one year by providing reasonable evidence that extenuating circumstances caused an unavoidable delay in the student's progress toward a degree. To petition for an extension of more than one year but no more than five years, the department and student must write up a contract with a detailed timeline to degree completion. This contract must include impressive documentation that any outdated credits have been updated by courses retaken, by special readings courses in the subjects outdated, or by examinations in each of the courses, and it must be signed by the student and all the members of the graduate committee. No credit outdated by more than five years may apply to a current degree, regardless of circumstances.

OTHER REQUIREMENTS

- 1) **Maintain a GPA of 3.0.** We look at two different GPAs.
 - a) The first is the overall GPA for the program of study courses.
 - b) The second GPA is overall courses taken, minus 697R, from the program of study.

If a student's coursework GPA falls below 3.0, it will be drawn to the attention of the student's committee, and the student may be required to retake a course. All retaken courses are paid for by the student. If a student's GPA falls below 3.0, their standing in your graduate program is compromised, results in a marginal or unsatisfactory rating, and could result in the dismissal from the program.

If a student earns a grade below a C- on a program of study course, the student is required to retake the course and earn a grade of at least a C-.

ALL GRADUATE STUDENTS:

Students who fail to fulfill the following requirements need to repair the problem by the next review (in ~ six months) or may have their graduate student status terminated by the department:

- passing proficiency exams
- maintaining a cumulative program coursework GPA of 3.0 (not counting research)
- earning satisfactory ratings at annual and semi-annual progress reviews

At the annual review, if a graduate student receives a rating of "marginal" or "unsatisfactory" (instead of "satisfactory"), Graduate Studies expects another formal review to take place during the following semester rather than a whole year later. If such a rating is given, the committee chair outlines on the annual progress review form what is expected in order to raise the rating before the next review. This prompt review provides continued close supervision for a student who is having difficulty, helps the student maintain a good understanding of the requirement for improvement, and provides an opportunity for timely correction of the sub-standard performance.

The final defense on a student's dissertation or thesis will count for the annual review in the student's last year of their program.

2) **APR Requirements per Year**

For IDP APR paperwork, [click here](#).

BYU Graduate Studies and the Department of Chemistry and Biochemistry require an annual evaluation of each graduate student's progress in the program. This formal progress review is an oral presentation given to members of your graduate committee and other designated faculty in which you should summarize your status in the graduate program. Your committee/evaluating committee is asked to determine if your performance during the past year has been satisfactory, marginal, or unsatisfactory. Graduating students will defend their thesis or dissertation in lieu of an annual review.

Coursework, research, TA performance, and other requirements of your graduate program are reviewed. Students must have an evaluation before the start of the second year of their program. The student's area faculty and faculty advisory chair determine the procedure and scheduling of progress reviews within the area.

1st-Year

Annual progress reviews for first-year grad students are held in August and are not part of the Current Topics course. Schedules will be sent to students prior to the APR.

Each first-year student, in consultation with his or her faculty advisory chair, must prepare a 2-3 page project summary of research conducted during the first year. At least **one week before** the scheduled annual review, the student submits a copy of the summary to each member of his or her faculty advisory committee.

There is no public presentation, meaning no outside visitors, only the committee and student will be in attendance. The student should prepare to present on the 2-3 page project summary for 12-15 minutes. After, *with the committee only*, the students will address IDP for 2-3 minutes.

The presentation should contain the following –

- Slides that cover research progress and the answers to the following questions of the IDP paperwork: Objective 2 Question 1

AND

- A slide that goes over critical aspects of the student's career objective and what activities will be planned in the upcoming year to work towards their career objective, e.g., skills obtained, publications, and presentations (reference Objective 1 Question 1, in the IDP paperwork). **(12-15 minutes for 1st two bullet points)**
- *With Committee Only* - A slide (last slide) addressing the student's progress plans (reference Questions 2-4 of the General Progress review section, Objective 1 Questions 2-3, Objective 2 Question 2 from the IDP paperwork, Objective 3 Questions 1-3, and Objective 4 Question 1), including what their plans are for

passing proficiencies or classes to be on track for Ph.D. candidacy. **(last bullet points - 3 minutes total)**

Each committee is different, and each student should consult with their faculty advisory chair on any additional expectations beyond the 2–3-page project and IDP summary for the review.

The faculty advisor will bring to the meeting the annual progress review form provided by the graduate program administrator. In addition, the student's progress in proficiency exams, first and second-semester grades, and first and second-semester TA assignments and performance will be reviewed after the presentation. The summary and evaluation must be completed by the end of the first year in residence.

2nd, 4th and beyond until thesis or dissertation defense

Each year the student is in the program, beginning in the second year, they will:

- Write a 2-3 page review of their accomplishments since their last annual progress review. This project summary should be an updated and improved version of the document written for their 1st-year review.
- Give the research review and an updated IDP with advisor comments to their committee **one week before** the presentation.
- Give a 15-minute oral presentation outlining what occurred that year and what will occur in the coming year regarding their research. After student questions, class participants will be dismissed, and the defending student *with the committee only* will address the remaining IDP for 2-3 minutes.

The presentation should include the following -

- Slides that cover research and how they met the objectives of the following questions of the IDP paperwork: Objective 2 Question 1.

AND

- One slide goes over key aspects of the student's career objective and what activities the student used to work towards their career objective in the past year. Reference Objective 1 Question 1&4 in the IDP paperwork. **(12-15 minutes for 1st two bullet points)**
- *With Committee Only* - One additional slide should address their plans to continue, on track, for a timely Ph.D. defense (reference Questions 2-4 of the General Progress review section, Objective 1 Question 2—, and Objective 2 Question 2, Objective 3 Questions 1-3, Objective 4 Question 1, and any of the Questions 1-4 from Objective 5 from the IDP paperwork. **(3 minutes)**

The presentation for 2nd and 4th-year students will occur in conjunction with the Current Topics course. The audience is the student committee members and other members of the student's Current Topics section. The faculty advisor will have digital access to the annual progress review form, progress report, and TA reviews, if applicable, provided by the graduate program administrator. The student will bring a copy of the research summary and their IDP to the meeting. Immediately following the class, the student's committee meets with the student individually to provide feedback and direction

At the annual review, if a graduate student receives a rating of "marginal" or "unsatisfactory" (instead of "satisfactory"), Graduate Studies expects another formal review to take place during the following semester rather than a whole year later. If such a rating is given, the committee advisor outlines on the annual progress review form what is expected in order to raise the rating before the next review. This prompt review helps the student maintain a good understanding of the requirement for improvement and provides opportunity for timely correction of the substandard performance.

3rd-Year Research Proposal - also known as Degree Qualifying Exam

Ph.D. students write and orally present a research proposal on the topic of their graduate research that outlines their anticipated research project. The proposal, drafted as part of Chem 694, is typically taken during the second year's winter semester. Students develop and polish the proposal immediately following the class during the summer between their second and third years. The final written proposal should:

- Be well-written, single-spaced, 7-10 pages, excluding references.
- The paper should be in an NSF or NIH grant proposal format.
- Within the 7-10 pages, the proposal **must** contain (may use different ordering and titles that are field appropriate):
 1. Background/introduction,
 2. Hypothesis or research question,
 3. Experimental methods/project design,
 4. Preliminary results/expected results,
 5. Societal impact/merit,
 6. References.
- Contain a one-page project summary and project description with specific aims (2-3 are typical), expected significance, background, research description, and plan of work.
- Have at least one aim of the proposal originating from the student.
- Be distributed to their committee **at least one week** before the oral presentation.

- The student will also send out their IDP, with their proposal, before the presentation. Students should be specific in their 3rd year IDP responses about how the proposal writing process has helped them progress in the program regarding the following aspects: Objective 2 Question 1, Objective 3 Questions 1&2, Objective 5 Question 1&4. Objective 5 Questions 1&4 will specifically pertain to how the student did in independently writing and designing the proposal specifics.

The student will give a 40-minute oral presentation on their proposal in the Fall of their third year. This presentation serves as a candidacy exam. Following the presentation, the student can receive a pass, a pass with qualifications, or a fail. The descriptions of each evaluation are below.

- A pass is a satisfactory evaluation and indicates the student's continuation in the program.
- A qualification indicates that the student must work on the proposal with committee guidance and reconvene with their committee to present their revised proposal. A student with a qualification will receive a marginal rating for that semester.
- If a student receives a fail, they are subject to dismissal from the program and will receive an unsatisfactory for that semester.

With approval from their committee, students may take the Chem 694 class in the winter of their first year, develop and polish the proposal during the summer between their first and second years, and present the proposal during the fall of their second year.

3) Semester/Term Evaluations and Waivers

Departments must evaluate each graduate student's progress at least twice during an academic year (September through August) per Graduate Studies requirements. The department requires that we evaluate each student after Fall, Winter, and Summer semester/term.

Ratings are as follows - (1) Satisfactory, (2) Marginal, or (3) Unsatisfactory.

In order to receive a satisfactory rating, a student must:

- Have a 3.0 overall GPA on program of study courses
- Have a 3.0 program GPA excluding Chem 697R
- Have passed all proficiency exam requirements
- Have satisfactory TA/RA assignments feedback
- Have been productive in lab research
- Received a satisfactory at their APR

- Received a pass at their 3rd-year proposal (Qualification is a marginal rating)

There may be other areas that the faculty advisory chair reviews. Each student should discuss their advisor or committee requirements that may be beyond those mentioned above.

At each evaluation, the graduate student is rated as satisfactory (S), marginal (M), or unsatisfactory (U). Two sequential marginal and unsatisfactory ratings will result in dismissal from the program.

First marginal (M) or unsatisfactory (U) rating:

When a student receives a marginal or unsatisfactory rating for the first time, the student's committee will create a list of detailed expectations with measurable goals connected to the student's IDP that the student will be expected to fulfill during the following semester. The expectations document will be sent to the graduate coordinator to attach to the Marginal/Unsatisfactory Student Acknowledgment form. The student must meet with the graduate coordinator to discuss their rating and expectations. The coordinator will also reiterate the consequences of being assigned another marginal or unsatisfactory rating the following semester.

Subsequent lack of progress given a (U) rating:

If the student does not meet expectations by the end of the following semester, they will receive a second non-satisfactory rating (U). The student will then be given a four-month period (equivalent to a semester or both terms of spring/summer) to

1. defend a MS degree if transition from a PhD (within the 4 months)
2. find employment,
3. solidify an international move, etc.

At the end of the four months, the second non-satisfactory rating will be reported to Graduate Studies, resulting in immediate dismissal from the program.

Students making marginal or unsatisfactory progress are informed via their faculty advisor and/or the graduate coordinator. The student will be asked to meet with the graduate coordinator to go over:

1. What they need to do to make satisfactory progress.
2. When each task needs to be completed.
3. Which faculty member(s) they should contact for more information or support.
4. What will happen if these tasks are not finished by the set deadline.

NOTE: If a student receives a marginal rating in one semester and is not making satisfactory progress in the next semester, the student must be rated as making unsatisfactory progress. In other words, a student may not be rated as making marginal progress in two sequential semesters. Failing to correct marginal progress is

unsatisfactory.

If a student receives a marginal and an unsatisfactory or two unsatisfactory ratings in succession, the university will terminate the student's program.

4) Presentation requirement

Beginning the second year, students must present their work, in an official setting, at least once per year either at the BYU Student Research Conference or at an external conference (oral or poster presentation).

5) Publication requirement

PhD students must have at least one first-author paper submitted to a peer-reviewed journal prior to the defense of their dissertation.

It is important to note that a student's committee may require that the first-author paper not only be submitted but accepted. In addition, a faculty advisory chair and/or committee may require multiple first-authored papers as part of the student's graduation requirements.

While additional papers are strongly encouraged, each student is responsible to communicate with their advisor and committee regarding their specific publication requirements.

Unless instructed otherwise by their committee, MS students do not have a publication requirement.

6) Dissertation, Thesis, & Defense

Information on the thesis or dissertation document:

A written thesis (MS) or dissertation (PhD) is required for graduation. The thesis or dissertation should include an introductory chapter and several chapters describing the student's work. A dissertation/thesis represents the culmination and "crown jewel" of a student's graduate research program. For the thesis or dissertation to be acceptable and to be an original contribution to a student's area of study, students need to be able to think and write critically, to demonstrate research abilities, and can analyze and articulate data in either writings or presentations. Furthermore, the thesis/dissertation should be a well-organized, well-written, comprehensive compilation of the student's work. Students should expend significant effort to arrange and present their experimental work in an understandable and logical manner. This will help students to prepare a formal written presentations for their future career. The dissertation/thesis is taken very seriously by the examination committee.

A dissertation/thesis template can be found [here](#), as well as the department requirements.

Graduate Studies does have a few [template requirements](#). To read more about the requirements, click on the formatting square.

AI Use Policy:

Graduate students and faculty supervisors are expected to meet higher expectations of BYU regarding academic and research integrity in scholarship. The use of generative AI tools must always uphold research integrity and academic rigor with full transparency. This includes transparency between all parties in advance - students and faculty advisors, students and their readers or audience, etc. A transparent description and citation/s are necessary for any use of generative AI tools in creating or assisting scholarly work.

Unauthorized usage of AI tools for scholarly work may be considered an offense of research misconduct and an offense against the Honor Code and the university's Academic Honesty Policy; and in turn could result in an unsatisfactory rating and possible dismissal from the program. Students who plan to use generative AI tools in graduation required documents – such as the thesis/dissertation - must always document clearly, in writing, the planned uses of generative AI and seek approval from their advisor and committee, in advance.

It is of utmost importance that within the graduation documents, the generative AI tools are cited appropriately, and the use described in the research and writing process. The descriptions should not be vague and should have a clear direction of how and why the AI tool was used. For example, a description may explain searching methods, the help of designing, the help of outlining original ideas, the help in paragraph construction of original ideas, editing of the thesis or dissertation, etc.

When the advisor and committee approve the use of generative AI tools, the student must be able to show clearly between their own original contributions versus generative AI contributions. In the end, the student must be able to show that they have made significant *original* contributions to suffice the graduation requirement to a satisfactory standard. This is especially true in order to receive a master's or doctoral level degree.

In addition, it is the responsibility of the advisor and committee to be clear in the evidence needed, from the student, to show original contribution versus the generative AI tool, and how the student will be assessed based on the student's proposed AI use versus the final thesis/dissertation document (or other graduation document). Students must be able to successfully describe and defend any use of generative AI, as well as the contents of the thesis or dissertation during their final oral defense and examination.

Students are legally responsible for the content/output of their final document which may include scholarly printing, etc. All corresponding authors, if associated to the thesis or dissertation, must be aware of the use of the AI tools. If the contents of the thesis or dissertation are produced falsely, including misleading information,

broke privacy laws, etc., the graduate student who initiated AI use is responsible for all legal ramifications of the fabricated document.

A few examples of a citation would include:

1. Text generated by ChatGPT, in response to "Edit for grammar without major rewording." March 31, 2023, OpenAI, <https://chat.openai.com/chat>
2. Paragraph ordering generated by ChatGPT, in response to "Construct these paragraphs in logical order." Topic sentences were then edited for style and content. March 31, 2023, OpenAI, <https://chat.openai.com/chat>

Information on scheduling and the presentation:

Graduate Studies has transitioned to a more online approach (less paperwork). The system can be found at <https://gradprogress.sim.byu.edu/>.

Scheduling the defense

- The student must have applied for graduation before submitting their thesis or dissertation for review to the graduate program administrator
- Committee members **MUST** be given at least one week to read the proposed final thesis or dissertation document before officially scheduling the defense online through the gradprogress system
- Once the committee has read the document, they will approve, through the gradprogress system, that the student is ready to schedule the defense
- The defense is scheduled and approved through the gradprogress system by the graduate program administrator

Defense

- The students will give a 45-60 minute presentation on their thesis or dissertation followed by a question and answer session with their committee

After the defense

- If the student has minor changes and received a pass, the committee will approve the thesis or dissertation at which the student completes the changes and proceeds to the ETD process
- If the student passed with qualifications, the committee members **MUST** receive the revised dissertation or thesis prior to being asked to officially change the defense outcome to a pass in the gradprogress system. Once approved, the student will proceed to the ETD process
- If the student is given a recess, the student will need to address all concerns and resubmit a new document and reschedule the defense
- If the student receives a fail, they will be released from the program

ETD process

A dissertation or thesis is a work which presents the author's research and findings to

fulfill graduation requirements for a doctorate or master's degree. Electronic versions of theses and dissertations are called ETDs. With the graduate student and committee approval, these documents can be available to anyone browsing the internet.

<https://gradprogress.sim.byu.edu/resources>

Once the thesis or dissertation has gone through the final revision, the student will need to upload their pdf onto the gradprogress systems ETD section and fill out the publication details. Once all information is uploaded, the final approval processes will be initiated. The document will need to be approved by 1) graduate studies, 2) the department office, 3) the dean's office, and finally 4) the graduate office. Once the student has received all four approvals, they will need to have one printed copy made of their thesis or dissertation at printandmail.byu.edu. The cost of the printing is the responsibility of the student.

Procedures

Advisement Committee & Program of Study

During the first semester, students in the graduate program will go through a process of selecting a Faculty Advisory Chair. During the first three weeks of the second semester of the first year, students will form their program of study and committee with their Faculty Advisory Chair.

Selection of Area of Specialization

Applicants are admitted to one of two programs: chemistry or biochemistry. This designation is firm and cannot be changed without re-application through the department admissions committee. While biochemistry students will specialize in the area of biochemistry, chemistry students may specialize in analytical, inorganic, organic/biomolecular, or physical chemistry.

Selection of Faculty Advisory Chair

New graduate students should investigate various research areas and discuss possible research projects with several members of the graduate faculty in chemistry and biochemistry. We expect our graduate students to be knowledgeable about the department. Well-informed students can select more intelligently a Faculty Advisory Chair and an area of specialization, and they will also be more aware of the expertise and resources available to them in their graduate work.

The following steps must be completed in order to select a faculty advisory chair:

1. Attend Graduate Orientation hosted by the graduate coordinator. At this meeting, you will be given more information concerning the selection of a faculty advisory chair.
2. Review information about each faculty member in the Department of Chemistry and Biochemistry graduate research program at www.chem.byu.edu/faculty.
3. If you are in the chemistry program, make appointments and talk to a minimum of four faculty members about their past, current, and future research plans. Obtain each faculty members' signatures on the [Advisory Chair Selection Form](#). You are encouraged to talk to more than four faculty members.
4. If you are in the biochemistry program, you will be enrolled in Chem 689R. This class will have planned lab rotations. Biochemistry students will be required to rotate in three labs. At the end of each rotation, each student will need to obtain the assigned faculty member signature on the [Advisory Chair Selection Form](#).
5. Towards the end of Fall semester, students will need to tentatively select two (1st and 2nd choice) faculty advisory chairs and write a paragraph or two on the back of the [Faculty Advisory Chair Selection Form](#) stating their reasons for their preferences.

6. Meet with the department chair in November/December concerning their preferences for a Faculty Advisory Chair. The department chair's administrative assistant will be in contact with each student to set-up an appointment.
7. Upon approval by the department chair, you should meet with your assigned Faculty Advisory Chair to establish a full committee and to prepare a finalized Program of Study. Students will need to turn in the final Program of Study the third week of January.

Advisement Committee

Announcement to beginning students: When students were admitted, they were assigned a temporary Faculty Advisor. This temporary advisor will assist students in the selection of an area of specialization, advise students for the first semester in regards to registration, and continue to advise them until they have finalized the selection of their permanent research Faculty Advisory Chair. The student's permanent chair and committee members will replace this temporary advisor.

Permanent Faculty Advisor: A single committee serves as the student's faculty advisory committee, progress reviews committee, and final examination committee. After consulting with the assigned Faculty Advisory Chair, the student reaches out to each potential committee member to see if they would be willing to serve on their committee. Once the student receives approval from the potential committee member, the student will update and obtain the signature of the new committee member on their finalized Program of Study form.

Faculty Advisory Chairs will serve as the chair of the faculty advisory committee. All committee members must be university-approved graduate faculty. All members of your committee must sign your Program of Study.

For the M.S. Degree

The faculty advisory/examination committee shall have a minimum of THREE graduate faculty members including:

- Your Faculty Advisory Chair
- One department faculty member from the area of your research
- One faculty member outside the area* of your research

For the Ph.D.

The faculty advisory/examination committee shall have a minimum of FOUR graduate faculty members including:

- Your Faculty advisory Chair
- One or two department faculty members from the area of your research
- The remaining faculty member(s) outside the area* of your research

*Generally "outside-of-area" members will be chosen from within the Department of Chemistry and Biochemistry. However, faculty members from another department may be

appointed to provide greater expertise in the area of research.

The Faculty Advisory Chair bears the main responsibility for advising and directing the student. Other committee members can also assist and advise the student concerning course work, degree requirements, the research, and the thesis or dissertation. We would advise all graduate students to keep members of the advisory committee informed of their research progress throughout each year, outside of the APR.

Formulation of a Program of Study

A program of study is a carefully considered research, writing, and course registration outline that helps the student fulfill all degree requirements. It is essential for organized, well-ordered graduate work. The graduate program administrator will give each student a [program of study form](#) at New Student Orientation. The student, with the help of their Faculty Advisory Chair, will compile a list of classes, based on required courses and electives. The student will submit the completed program of study (1st and 2nd section of the form) to the Graduate Program Administrator. The Graduate Program Administrator will enter this information into the gradprogress system, which students can access and view at <https://gradprogress.sim.byu.edu/>.

A note on elective courses: In some instances, a limited number of 300 and 400 level courses can apply to a master's degree. However, lower-division courses (100 and 200 level), Independent Study (correspondence) courses, 300 and 400 level religion courses, and education courses numbered 514R cannot apply toward a graduate degree. No elective courses below a 500 level may be used on the PhD program of study. No undergraduate courses may apply toward a doctoral degree.

Program of Study Change

As a student continues in the program, they may want to modify their study list. In order to make changes, obtain a [Program of Study Change Form](#) at the department website. Students must officially make the changes by filling out this form in order to avoid future confusion and possible problems with graduation. The same steps apply as discussed in the paragraph above. Your committee and the graduate coordinator must approve all deletions and additions. If a student receives an unwanted grade in a program of study class, in order to petition to have the class removed and replaced with another course, the student will need to appeal to the waivers committee.

Degree and Program Changes

Changing Degree Program

Students who wish to change their degree program must follow the procedure below:

To change from the MS to the PhD program or to transfer from the PhD to the MS program, the student must first talk with his/her advisor and discuss the change. If the advisor is in agreement, the student will need to talk with the graduate program administrator. The graduate program administrator will fill out the required form and solicit signatures from the Faculty Advisory Chair and the Graduate Coordinator. The completed form will be sent to Graduate Studies which will in turn update the academic system.

Readmission

Upon department and graduate dean approval to resume graduate study, former graduate students who were dropped for failure to meet the minimum registration requirement or for any other reason, and who wish to resume their graduate studies, must submit an Application to [Resume Graduate Study](#), and pay a \$600-nonrefundable processing fee.

International students will also need to submit new bank statements or sponsor contracts. Students should expect their previous coursework to be reevaluated and their degree requirements to reflect current expectations of the program. Student applications for readmission will only be considered three times per year, in April, August, and December. The graduate faculty, in consultation with the applicant's former thesis or dissertation Committee Chair and the Graduate Coordinator, will make the decision to accept or deny readmission.

Time Limitations

The chemistry and biochemistry MS/PhD program is designed to be completed within two-five years. Graduate Studies stipulates that all master's degrees must be completed within five years and doctoral degrees within eight years of the first semester of enrollment in the program or from the first course taken, whichever comes first. Matriculation in the chemistry and biochemistry MS/PhD program may be terminated at any time for failure to make satisfactory progress toward the degree.

Leave of Absence

Graduate study in chemistry and biochemistry is a full-time job, and extended leaves of absence are not normally part of a graduate program. However, the need occasionally arises for graduate students to take some time off from their responsibilities. This should always be done with the approval of your advisor. It is the student's responsibility to be sure that research and teaching obligations are covered. Leaves for periods of more than a few days may require adjustments to your contract; be sure to discuss this with your advisor and with the business office. See the [Leave Guidelines](#).

Students may request a leave of absence for longer period of time for the following reasons:

- Medical Students must present a letter from a doctor—up to one year at a time
- Military Students must present military orders—up to one year at a time
- Mission Students must present a mission call—up to three years

Students will maintain correspondence with their committee chair. Additionally the original five-year MS or eight-year PhD time limit in which to complete their degree will still apply. If a student needs to take a leave of absence, form [ADV 5](#) will need to be filled out.

Personal Decision to Leave the Program

Students may decide that they no longer wish to continue the MS or PHD program. In order to terminate graduate student status, [form ADV 7](#) will need to be filled out.

Please note that if the student decides to discontinue during the semester, they will be responsible for paying the tuition and any fees incurred for discontinuing. This even applies if the tuition was paid by scholarship. The scholarship money will be returned to the department and the student will be billed for the full tuition amount. The full amount applies if one terminates early in the semester, the middle, or even the last few days. In addition, employment will be terminated the day the discontinuance is filed. The students will not be allowed to work after that date.

Graduation Steps

Before Applying for Graduation

Before applying for graduation, students will need to make sure that they have accomplished the following requirements:

- All but 2.0 credits of program requirements complete
- Enrollment in at least 2.0 credit hours of Chem 697R or 699R final semester of defense
- Tuition paid for 2.0 credits in the final semester in which a student defense is held. If a student graduates in August, they are only required to pay tuition for 2.0 credits in spring term, or 2.0 credits in summer term, or 2.0 credits total over both spring and summer terms
- All program requirements completed
- Program of Study and Committee approved

Applying for Graduation

To apply for graduation, please visit <https://enrollment.byu.edu/registrar/graduation>. It is important to have this step complete before trying to schedule a final defense. The gradprog system will not allow students to schedule their defense until this is complete.

Defense

All participants – students, committee chair, and committee members - must all be in person. Per Graduate Studies policy (see [here](#)), the Department may request accommodations for committee members (not committee chairs or students) under the following circumstances:

- a) A member of the graduate student's committee is employed at another university, and the student has worked in that professor's lab/studio during the graduate program. An accommodation may be requested for the committee member to participate in the defense via video conferencing (Zoom).
- b) A committee member has left the university during the student's program but has continued to work actively with the committee and the student. An accommodation may be requested for the committee member to participate in the defense via video conferencing. Accommodations require the approval of the student's department, the college dean, and the graduate dean.
- c) A pandemic during which remote examination accommodations are allowed with department approval.

More resources and instructions regarding the defense can be found [here](#).

After the Defense

ETD process

A dissertation or thesis is a work which presents the author's research and findings to fulfill

graduation requirements for a doctorate or master's degree. Electronic versions of theses and dissertations are called ETDs. With the graduate student and committee approval, these documents can be available to anyone browsing the internet.

<https://gradprogress.sim.byu.edu/resources>

Once the thesis or dissertation has gone through the final revision, the student will need to upload their pdf onto the gradprogress systems ETD section and fill out the publication details. Once all information is uploaded, the final approval processes will be initiated. The document will need to be approved by 1) graduate studies, 2) the department office, 3) the dean's office, and finally 4) the graduate office.

Survey for PhD Students

Once the document is at the 1st approval stage of the ETD, the PhD graduate student will need to fill out the graduate survey at <https://gradstudies.byu.edu/file/adv-form-14>. The student will need to send the graduate program administrator a confirmation that this has been completed.

Printing of Thesis or Dissertation

Once the student has received all four approvals, they will need to have one printed copy made of their thesis or dissertation at printandmail.byu.edu. The cost for the printing is the responsibility of the student.

Graduate Checkout List

- Please fill out the [Checkout List](#) after graduating BEFORE you leave campus.

Financial Assistance & Health Insurance

Financial Assistance

Assistantship Support

For the 2023-2024 academic school year, the financial assistantship for our MS chemistry and biochemistry graduate students is \$26,390 for a full year of work. For our PhD chemistry and biochemistry graduate students it is \$29,000 for a full year of work. Absences of greater than two weeks may result in decreased compensation.

All graduate students making normal progress toward their degrees are guaranteed teaching or research assistantships for the 4 - 5.5 years normally needed to complete the PhD degree, or for the 2 - 2.5 years needed for the MS degree.

Those students on a teaching assistantship participate in teaching-related assignments which can include working with a professor to teach a course, overseeing student laboratories, grading coursework, or being responsible for a departmental instrument. A majority of students are on teaching assistantships during their first 1-2 years while they themselves are taking classes. Most students are required to have two semesters of teaching responsibilities.

Students working in laboratories may be supported on research assistantships. This provides the same amount of support as a teaching assistantship but is provided to students to carry out their degree-related research. Most research assistantships come from external funding for research provided to a faculty member through a successful grant application. These can provide full financial support or a portion of it, the balance coming from teaching assistantships. A few research assistantships are available to students based on merit. Students often receive research assistantships during spring and summer terms.

These assignments give graduate students experience in scholarship and instruction, which aligns with our department mission and graduate program objectives (<https://chembio.byu.edu/graduate-program>.) Students that elect not to participate in the TA or RA assistantship are not eligible for a department tuition scholarship. Students will be responsible for the tuition cost each semester or term the student is not a TA or RA. For exceptions, contact the Graduate Coordinator.

Tuition Support

All graduate students are provided full tuition for all degree-related coursework at the university required for a Masters (30 hours) or Doctoral (54 hours) degree. Tuition is paid for courses and research credits, from their Program of Study, for as long as the student is making satisfactory progress in his/her degree program.

****By receiving financial support from the department, you are committing your full effort to your assistantship, coursework, and research. It is not acceptable to have any other employment or studies while in this graduate program.**

Personal Decision to Leave the Program

Students may decide that they no longer wish to continue the MS or PhD program. In order to terminate graduate student status, form ADV 7 will need to be filled out. **Please note** that if the student decides to discontinue during the semester, they will be responsible for paying the tuition and any fees incurred for discontinuing. This even applies if the tuition was paid by scholarship. The scholarship money will be returned to the department and the student will be billed for the full tuition amount. The full amount applies if one terminates early in the semester, the middle, or even the last few days. In addition, employment will be terminated the day the discontinuance is filed. The students will not be allowed to work after that date.

Health Insurance

Mandatory Health Insurance

Health insurance is mandatory for all students. Students who do not provide proof of private insurance will be automatically enrolled in the BYU Student Health Plan each semester. Verification of private insurance must be provided at the beginning of each academic year. For more information about BYU's insurance requirements, visit **health.byu.edu** or contact the BYU Student Health Center at (801) 422-2661.

To discuss different insurance plan options and pricing, students will need to contact an insurance broker. We recommend contacting Nick Miller at Miller Insurance Advisors. His contact is nick@millerinsuranceadvisors.com or 801-477-0238.

Student Health Plan

For details about the BYU student health plan, students can access the BYU Student Health Plan Handbook at:

<http://www.dmba.com/nsc/Student/Handbooks.aspx>.

Insurance Coverage After Graduation

Students who graduate and wish to continue coverage under the BYU Student Health Plan may enroll in Extended Coverage if they were enrolled in the Student Health Plan their last semester or term. To learn more about Extended Coverage, consult page 12 in the BYU Student Health Plan Handbook or contact the BYU Student Health Center at (801) 422-2661.

Also, the Alumni Association offers insurance for BYU alumni. Students can reach them at 1-800-922-1245.

Department Resources

MS and PhD Office/Lab

The Department of Chemistry and Biochemistry maintains several offices for graduate students. Students can expect to share the office with other chemistry and/or biochemistry graduate students, but each individual will have their own desk area. All first-year graduate students will be assigned a temporary desk space for Fall semester. After they receive their faculty advisory chair, desk space may change.

Office assignments are generally for the academic year, although we reserve the right to change office assignments as necessary. Once a graduate student has completed the program, we request that the student vacate his or her office one week after graduation. When a student vacates an office, please remove all personal property. Please do not invite or allow unauthorized persons to take up residence in your office, even if a spare desk is available. Only chemistry and biochemistry graduate students should use the offices. Please notify the Graduate Coordinator if unauthorized persons are using the assigned office.

Student Research Conference (SRC)

Student Research Conference, sponsored by the College of Physical and Mathematical Sciences, will be held in March. The conference consists of two 1½-hour sessions. During each block of time there are several presentations sponsored by the departments in the college. Each session consists of six fifteen-minute presentations by students describing their research projects and results. There is also a small cash award for the best presentation in each session.

The Department of Chemistry and Biochemistry does not require graduate students to make a presentation at the Student Research Conference but presentations at the student research conference can count towards their annual presentation requirement. Graduate students generally make a presentation on their thesis/dissertation or another research project. The student's Committee Chair or the Graduate Coordinator can give advice on how to prepare for and make this type of presentation. The department also schedules times for practice sessions to provide suggestions for presenters.

Three Minute Thesis (3MT) Competition

3MT, meaning "Three Minute Thesis," is an annual event that challenges students working on a graduate degree to present their thesis in just three minutes. To make matters more interesting, the students must explain it using language that a non-specialist audience will understand. The judges critique participants on how well they: 1) explain their research; 2) spark the audience's desire to know more; and 3) communicate in language "appropriate to an intelligent but non-specialist audience." Each college on campus holds a preliminary competition, and one student from each college advances to the university-wide final round. Additionally, there will be cash prizes available to all winners of the College of Physical and Mathematical Sciences 3MT competition.

Internships and Employment

Contact:

[Anna Kennington](#)

Career Advancement Manager,
College of Physical and Mathematical Sciences
Email: anna_kennington@byu.edu

Click for more information on:

- [ACS \(American Chemical Society\)](#)
- [Handshake](#)
- [Chemistry Graduate Student Association \(CGSA\)](#)
- [Take a Cougar to Lunch Mentorship](#)
- Resume Review
 1. Meet with Anna Kennington
 2. Read tips on [this page](#) from BYU Career Services.

Universities that have hired our students for post-doctoral positions:

<ul style="list-style-type: none">• Baylor College of Medicine• Brigham Young University• Celgene• EERE Scholar at the National Renewable• Emory University• Harvard University• Johns Hopkins University Medical School• NRC (National Institute of Standards and Technology)• Ohio State University• Pacific Northwest National Laboratory• Texas A&M	<ul style="list-style-type: none">• University of Colorado• University of Illinois• University of Maryland College Park• University of Tennessee• University of Utah• University of Washington• University of Wisconsin - Madison• US EPA• University of Texas - Southwestern• Virginia Bioinformatics Institute• Washington State University• University of British Columbia, Vancouver• University of California Irvine
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National Laboratories that have hired our students:

<ul style="list-style-type: none">• Argonne National Laboratory• Battelle Science & Technology International• Dugway Proving Grounds• Los Alamos National Laboratory• National Institutes of Health	<ul style="list-style-type: none">• Oakridge National Laboratory• Sandia National Laboratories• U.S. Bureau of Mines• U.S. Environmental Protection Agency
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Notable Companies that have hired our students:

<ul style="list-style-type: none"> • 3M • Abbott Laboratories • AbbVie • Advion • Agilent Technologies • Albemarle • American Chemical Society • Ametek • Array BioPharma • ARUP Laboratories • Bayer Pharmaceuticals Corporation • Belcan Corporation • Berry and Associates • Bio-Manginhos • Bio-Rad Laboratories • Brigham Young University • Brigham Young University - Idaho • Bristol-Myers Squibb Company • China Sinda Intellectual Property • Chinese Academy of Sciences • Conoco/Phillips • Corning Incorporated (China) • Cosmas, Inc. • Cubist Pharmaceuticals • Diamond Analytics • Dionex Corporation • Dixie State College • Dow Chemical • DuPont Agricultural Products • DuPont Central Research and Development • Dura Automotive • Dynavax Technologies • Eastman Chemical Company • Eli Lilly • Epic • European Bioinformatic Institute • National Institute for Standards & Technology • National Renewable Energy Lab • Natural Factors • Nature's Sunshine • Nature's Way • Neurocrine Biosciences • Northwest Bioanalytical • Novartis • Nu Skin • OLI Systems • Pacific Northwest National Laboratory • Perkin Elmer • Pfizer 	<ul style="list-style-type: none"> • Evans Analytical Group • ExxonMobil • Focus Light Ltd. • Focused Photonics C Hangzhou Inc • Fresenius Medical Care • Gardiner-Caldwell Communications (England) • GD Searle and Company • Gilead Sciences • Glaxo Smith Kline • HealthTell, Inc. • Huntsman • IBC Advanced Technologies, Inc. • ISIS Pharmaceuticals • IM Flash • Institute of Biomedical Sciences, Taiwan • Intel Corporation • InSilixa • Instructure • Intermountain Healthcare • Irvine Analytical Lab • Jackson Laboratory • Johnson & Johnson • Jiangsu Skyray Instrument Co. • Kalexsyn, Inc. • Kaplan, Inc • Kemin Industries • Kimberly-Clark • Lonza • Merck • Merck Serono (Chile) • Metabolon • Millenniata • Mindwhale • Monsanto • Morton International • Moxtek, Inc. <p>Other Options:</p> <ul style="list-style-type: none"> • Intellectual Property Law • Department of Defense • Biotechnology • Spanish National Cancer Research Centre <ul style="list-style-type: none"> ◦ CNIO-Caja Navarra International Postdoctoral Programme. "Aimed to recruit exceptional and highly-motivated recent PhDs of any nationality to the CNIO."
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<ul style="list-style-type: none"> • Phillips 66 • Physicians Laboratories • Prolexys Pharmaceuticals, Inc. • Proctor & Gamble • Quest Diagnostics Nichols Institute • Regeneron Pharmaceuticals • RESTEK • SAIC-Frederick, Inc. • Samofi-Aventis • Sanford - Burnham Medical Research Institute • Silk Scientific, Inc. • Sloan Kettering Cancer Institute, NYC • Supelco • Swanson and Bratschun • TA Instruments • Tandem Labs • Tetraphase Pharmaceutical • Thermo Fisher Scientific • Torian • Unilever (China) • Utah Valley University • US Synthetic • Valeant Pharmaceuticals • Varian, Inc. • Vertex Pharmaceuticals • Warp Drive Bio • Weber State University • Westminster College • Williams College • WuXi Pharmatech Co., Ltd • Young Living Essential Oils • Zoetic Science • Zhangjian NSB Pharm Research (China) 	<p>Successful candidates have the opportunity of spending two years at the centre developing an ambitious research project."</p> <ul style="list-style-type: none"> ○ Banco Santander Foundation – CNIO Fellowships for Young Researchers Trained in the UK Programme. "Aimed to support highly talented and motivated young scientists who have been trained in the UK and wish to start or continue their postdoctoral training at one of the world's leading comprehensive cancer centres. Successful candidates have the opportunity of spending two years at the centre developing an ambitious research project."
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Awards & Recognition

Department Scholarships

Nominations of students for specific awards are generally submitted by the student's faculty advisor. The award decisions are made by a committee consisting of the graduate coordinator, assistant graduate coordinator, chair and associate chairs, and administrative assistant. All are one-time only awards and may be given in the form of cash or research support.

Name	Recipient	Award
Nicholes-Maw Award	Outstanding entering student	\$1,000-2,000 in addition to regular stipend
Loren C. & Maurine F. Bryner Award	Outstanding scholarship and research achievement	\$1,500 in addition to regular stipend
Garth L. Lee Award	Outstanding overall performance in service, religion, and scholarship	\$2,000 in addition to regular stipend
Albert D. & Jennie R. Swensen Award	Outstanding scholarship and research achievement	\$1,500 in addition to regular stipend
Telford & Frank Woolley Award	Outstanding scholarship and achievement in cancer research	\$1,500 in addition to regular stipend
Alumni Gifts Fellowships	Outstanding scholarship and research achievement	Half stipend for one full year
Stanley & Leona Goates Research Fellowship	Outstanding scholarship and research achievement	Research stipend for Spring-Summer
Charles E. & Margaret P. Maw Research Fellowship	Outstanding scholarship and research achievement	Research stipend for one full year, plus \$2,000

Name	Recipient	Award
Roland K. Robins Research Fellowships	Outstanding scholarship and research achievement	Research stipend for one full year, plus \$1,500
Bradshaw Graduate Fellowship in Organic Chemistry	Outstanding scholarship and achievement in Organic research	Half stipend for one full year
<u>Cancer Research Fellowships</u> (Spring/Summer)	Previous research experience and BYU student status during spring and summer terms required.	\$7,350 graduate and \$6,600 undergraduate fellowships.
Christine Bireley Oliver Fellowship (Annual cancer research)	Must be an advanced graduate student.	Fellowship covers program tuition, medical insurance for self and dependents, and a stipend for one year.

Rules of Conduct

All policies are listed on <https://policy.byu.edu/>

Policies

Brigham Young University Honor Code

Brigham Young University, Brigham Young University-Hawaii, Brigham Young University-Idaho, and LDS Business College exist to provide an education in an atmosphere consistent with the ideals and principles of The Church of Jesus Christ of Latter-day Saints. That atmosphere is created and preserved through commitment to conduct that reflects those ideals and principles. Members of the faculty, administration, staff, and student body at BYU, BYU-H, BYU-I, and LDSBC are selected and retained from among individuals who voluntarily live the principles of the gospel of Jesus Christ. Observance of such is a specific condition of employment and admission. Those individuals who are not members of The Church of Jesus Christ of Latter-day Saints are also expected to maintain the same standards of conduct, except church attendance. All who represent BYU, BYU-H, BYU-I, and LDSBC are to maintain the highest standards of honor, integrity, morality, and consideration of others in personal behavior. By accepting appointment on the faculty, continuing in employment, or continuing class enrollment, individuals evidence their commitment to observe the Honor Code standards approved by the Board of Trustees "at all times and...in all places" (Mosiah 18:9).

We believe in being honest, true, chaste, benevolent, virtuous, and in doing good to all men....If there is anything virtuous, lovely, or of good report or praiseworthy, we seek after these things. (Thirteenth Article of Faith.)

As a matter of personal commitment, the faculty, administration, staff, and students of Brigham Young University, Brigham Young University-Hawaii, BYU-I, and LDS Business College seek to demonstrate in daily living on and off-campus those moral virtues encompassed in the gospel of Jesus Christ, and will:

- Be honest
- Live a chaste and virtuous life
- Obey the law and all campus policies
- Use clean language
- Respect others
- Abstain from alcoholic beverages, tobacco, tea, coffee, and substance abuse
- Participate regularly in church services
- Observe Dress and Grooming Standards
- Encourage others in their commitment to comply with the Honor Code

Specific Policies Embodied in the Honor Code

Specific policies embodied in the Honor Code include (1) the Academic Honesty Policy, (2) the Dress and Grooming Standards, (3) the Residential Living Standards, and (4) the Continuing Student Ecclesiastical Endorsement Requirement. (Refer to institutional policies for more detailed information.)

Academic Honesty Policy

The first injunction of the Honor Code is the call to "be honest." Students come to the university not only to improve their minds, gain knowledge, and develop skills that will assist them in their life's work, but also to build character. "President David O. McKay taught that character is the highest aim of education" (The Aims of a BYU Education, p.6). It is the purpose of the BYU Academic Honesty Policy to assist in fulfilling that aim.

BYU students should seek to be totally honest in their dealings with others. They should complete their own work and be evaluated based upon that work. They should avoid academic dishonesty and misconduct in all its forms, including but not limited to plagiarism, fabrication or falsification, cheating, and other academic misconduct.

Plagiarism

Intentional plagiarism is a form of intellectual theft that violates widely recognized principles of academic integrity as well as the Honor Code. Such plagiarism may subject the student to appropriate disciplinary action administered through the university Honor Code Office, in addition to academic sanctions that may be applied by an instructor. Inadvertent plagiarism, which may not be a violation of the Honor Code, is nevertheless a form of intellectual carelessness that is unacceptable in the academic community. Plagiarism of any kind is completely contrary to the established practices of higher education where all members of the university are expected to acknowledge the original intellectual work of others that is included in their own work. In some cases, plagiarism may also involve violations of copyright law.

Intentional Plagiarism - Intentional plagiarism is the deliberate act of representing the words, ideas, or data of another as one's own without providing proper attribution to the author through quotation, reference, or footnote.

Inadvertent Plagiarism - Inadvertent plagiarism involves the inappropriate, but non-deliberate, use of another's words, ideas, or data without proper attribution. Inadvertent plagiarism usually results from an ignorant failure to follow established rules for documenting sources or from simply not being sufficiently careful in research and writing. Although not a violation of the Honor Code, inadvertent plagiarism is a form of academic misconduct for which an instructor can impose appropriate academic sanctions. Students who are in doubt as to whether they are providing proper attribution have the responsibility to consult with their instructor and obtain guidance.

Examples of plagiarism include:

- *Direct Plagiarism* - The verbatim copying of an original source without acknowledging the source.
- *Paraphrased Plagiarism* - the paraphrasing, without acknowledgement, of ideas from another that the reader might mistake for the author's own.
- *Plagiarism Mosaic* - The borrowing of words, ideas, or data from an original source and blending this original material with one's own without acknowledging the source.
- *Insufficient Acknowledgement* - The partial or incomplete attribution of words, ideas, or data from an original source.
- Plagiarism may occur with respect to unpublished as well as published material. Copying another student's work and submitting it as one's own individual work without proper attribution is a serious form of plagiarism.

Fabrication or Falsification

Fabrication or falsification is a form of dishonesty where a student invents or distorts the origin or content of information used as authority. Examples include:

- Citing a source that does not exist.
- Attributing to a source ideas and information that are not included in the source.
- Citing a source for a proposition that it does not support.
- Citing a source in a bibliography when the source was neither consulted nor cited in the body of the paper.
- Intentionally distorting the meaning or applicability of data.
- Inventing data or statistical results to support conclusions.

Cheating

Cheating is a form of dishonesty where a student attempts to give the appearance of a level of knowledge or skill that the student has not obtained. Examples include:

- Copying from another person's work during an examination or while completing an assignment.
- Allowing someone to copy during an examination or while completing an assignment.
- Using unauthorized materials during an examination or while completing an assignment.
- Collaborating on an examination or assignment without authorization.
- Taking an examination or completing an assignment for another, or permitting another to take an examination or to complete an assignment in place of the student.

Other Academic Misconduct

Academic misconduct includes other academically dishonest, deceitful, or inappropriate acts that are intentionally committed. Examples of such acts include but are not limited to:

- Inappropriately providing or receiving information or academic work so as to gain unfair advantage over others.
- Planning with another to commit any act of academic dishonesty.
- Attempting to gain an unfair academic advantage for oneself or another by bribery or by any act of offering, giving, receiving, or soliciting anything of value to another for such purpose.
- Changing or altering grades or other official educational records.
- Obtaining or providing to another an unadministered test or answers to an unadministered test.
- Breaking and entering into a building or office for the purpose of obtaining an unauthorized test.
- Continuing work on an examination or assignment after the allocated time has elapsed.
- Submitting the same work for more than one class without disclosure and approval.

Faculty are responsible to establish and communicate to students their expectations of behavior with respect to academic honesty and the student's conduct in the course. Responsible instructors will investigate alleged academic dishonesty, determine the facts, and take appropriate action. In a case where academic dishonesty is determined to have occurred, the instructor must notify the Honor Code Office of the incident as a means of encouraging behavior change and discouraging repeated violations. In addition, the instructor shall consult with the Department Chair concerning disciplinary actions to be taken. If the incident of academic dishonesty involves the violation of a public law, such as breaking and entering into an office or stealing an examination, the act should also be reported to appropriate law enforcement officials. If an affected student disagrees with the determination or action and is unable to resolve the matter to the mutual satisfaction of the student and the instructor, the student may have the matter reviewed through the university's Student Academic Grievance Procedure.

Applicable Actions

A wide range of possible actions exists for cases of academic dishonesty. Instructors should take actions that are appropriate under the circumstances and should attempt to reach an understanding with the affected student on the imposition of an appropriate action. In some cases, the department, the college, or the university may also take actions independent of the instructor. Examples of possible actions include but are not limited to the following:

For instructors (in consultation with the department Chair):

- Reprimanding the student orally or in writing.
- Requiring work affected by the academic dishonesty to be redone.
- Administering a lower or failing grade on the affected assignment or test.

- Administering a lower or failing grade for the course (even if the student withdraws from the course).
- Removing the student from the course.

For departments and colleges:

- After consulting with the Honor Code Office, dismissing the student from the program, department, or college.
- Recommending probation, suspension, or dismissal from the university.

For the university:

The university may elect to discipline a student for academic dishonesty in addition to, or independently from, discipline imposed by a faculty member, a department, or a college. University discipline may be administered through the Honor Code Office or through the Dean of Students Office. The Honor Code Office will maintain a record of all violations of this Academic Honesty Policy reported to it by the faculty. The university may elect to place an affected student on probation, or to suspend or dismiss the student, and to place a temporary or permanent notation on the student's permanent academic transcript indicating that he or she was suspended or dismissed due to academic misconduct.

The university may report an incident of academic misconduct to appropriate law enforcement officials and may pursue the prosecution of an affected student if the act in question involves the commission of a crime.

Shared Responsibility Policy Statement

Students are responsible not only to adhere to the Honor Code requirement to be honest but also to assist other students in fulfilling their commitment to be honest.

Faculty Academic Integrity

The substantive standards of academic honesty stated in this policy apply a fortiori to faculty. Indeed, all members of the BYU community are expected to act according to the highest principles of academic integrity.

Dress and Grooming Standards

The dress and grooming of both men and women should always be modest, neat, and clean, consistent with the dignity adherent to representing The Church of Jesus Christ of Latter-day Saints and any of its institutions of higher education.

Modesty and cleanliness are important values that reflect personal dignity and integrity, through which students, staff, and faculty represent the principles and standards of the Church. Members of the BYU community commit themselves to observe the following standards, which reflect the direction of the Board of Trustees and the Church publication *For the Strength of Youth*. The Dress and Grooming Standards are as follows:

Men

A clean and well-cared-for appearance should be maintained. Clothing is inappropriate when it is sleeveless, revealing, or form fitting. Shorts must be knee-length or longer. Hairstyles should be clean and neat, avoiding extreme styles or colors, and trimmed above the collar, leaving the ear uncovered. Sideburns should not extend below the earlobe or onto the cheek. If worn, moustaches should be neatly trimmed and may not extend beyond or below the corners of the mouth. Men are expected to be clean-shaven; beards are not acceptable. Earrings and other body piercing are not acceptable. Shoes should be worn in all public campus areas.

Women

A clean and well-cared-for appearance should be maintained. Clothing is inappropriate when it is sleeveless, strapless, backless, or revealing; has slits above the knee; or is form fitting. Dresses, skirts, and shorts must be knee-length or longer. Hairstyles should be clean and neat, avoiding extremes in styles or colors. Excessive ear piercing (more than one per ear) and all other body piercing are not acceptable. Shoes should be worn in all public campus areas.

Residential Living Standards

As stated in the Honor Code, Brigham Young University is committed to providing a learning atmosphere consistent with the principles of the Church. The university is likewise committed to creating such an atmosphere for students residing on and off campus and between semesters. To achieve this, BYU has established living standards to help students learn some of the high ideals and principles of behavior expected at Brigham Young University. Therefore, the university requires students to adhere to the following applicable standards:

Housing

All single BYU undergraduate students who are not residing with their parents must live in university on-campus or university-contracted, sex-segregated housing unless specifically excused in writing by the Off-Campus Housing Office.

Visiting Hours

Off-Campus Visiting Hours, Wyview Park, and Foreign Language Student Residence

Visitors of the opposite sex are permitted in living rooms and kitchens but not in the bedrooms in off-campus living units, Wyview Park, and the Foreign Language Student Residence. The use of the bathroom areas by members of the opposite sex is not appropriate unless emergency or civility dictates otherwise, and then only if the safety, privacy, and sensitivity of other residents are not jeopardized. Visiting hours may begin after 9:00 a.m. and extend until 12:00 midnight. Friday night visiting hours may extend until 1:30 a.m. Landlords may establish a shorter visiting period if proper notice is given to students.

Guests

All guests of students must comply with the Residential Living Standards while on the premises of university- contracted housing. Students are expected to help their guests and other residents understand and fulfill their responsibility under the Residential Living Standards and the Honor Code. Approval forms must be submitted for all guest requests, and are available from hall advisors and area offices. Approved guests may stay a maximum of three nights.

Maintaining the Standards

Violations of these standards may be reported to the Honor Code Office, 4440 WSC, (801) 422-2847, or the Off- Campus Housing Office, (801) 422-1513.

Continuing Student Ecclesiastical Endorsement

Students are required to be in good Honor Code standing to be admitted to, continue enrollment at, and graduate from BYU. In conjunction with this requirement, all enrolled continuing undergraduate, graduate, intern, and Study Abroad students are required to obtain a Continuing Student Ecclesiastical Endorsement for each new academic year. Students must have their endorsements completed, turned in, and processed by the Honor Code Office before they can register for Fall semester or any semester thereafter. To avoid registration delays, endorsement should be submitted to the Honor Code Office by March 15. Those applying to BYU should use the new-student Admissions Application Part 3 endorsement and submit to Admissions, D-155 ASB.

LDS students may be endorsed only by the bishop of the ward (1) in which they live and (2) that holds their current Church membership record.

Non-LDS students are to be endorsed by (1) the local ecclesiastical leader if the student is an active member of the congregation, (2) the bishop of the LDS ward in which they currently reside, or (3) the nondenominational BYU chaplain.

Former LDS students are not eligible to receive an ecclesiastical endorsement (See Withdrawn or Denied Ecclesiastical Endorsement below).

Requirements

Whether on or off campus or between semesters, all students are expected to abide by the Honor Code, which includes (1) the Academic Honesty Policy, (2) the Dress and Grooming Standards, and (3) the applicable Residential Living Standards. Students are required to be in good Honor Code standing to graduate.

LDS students must fulfill their duty in The Church of Jesus Christ of Latter-day Saints, attend Church meetings, and abide by the rules and standards of the Church on and off campus.

Students who are not members of The Church of Jesus Christ of Latter-day Saints are also expected to maintain the same standards of conduct. They are encouraged to participate in services of their preferred religion. All students must be in good Honor Code standing to graduate, to receive a diploma, and to have the degree posted.

Withdrawn or Denied Ecclesiastical Endorsement

An ecclesiastical leader may withdraw a student's endorsement at any time or may decline to endorse a continuing student if the leader determines that the student is no longer eligible for the endorsement. If an endorsement is withdrawn or if a Continuing Student Ecclesiastical Endorsement is denied, no confessional information is exchanged without authorization from the student. The withdrawal of a student's ecclesiastical endorsement automatically results in the loss of good Honor Code standing. Students who are not in good Honor Code standing must discontinue enrollment. Also, they are not eligible for graduation, even if they have otherwise completed all necessary coursework. Excommunication, disfellowshipment, or disaffiliation from The Church of Jesus Christ of Latter-day Saints automatically results in the withdrawal of the student's ecclesiastical endorsement and the loss of good Honor Code standing. Disaffiliation is defined for purposes of this policy as removal of an individual's name from the official records of the Church.

The decision to withdraw an ecclesiastical endorsement or to deny a Continuing Student Ecclesiastical Endorsement may be appealed through appropriate ecclesiastical leaders only. As a matter of practice, BYU does not intervene in ecclesiastical matters or endorsements. However, a student may petition the Dean of Students Office to allow an exception to the ecclesiastical endorsement requirement. As part of the petition, the student must (i) complete an Application for Exception to Policy (this form may be obtained from the Dean of Students Office); (ii) prepare a written statement outlining the reasons why the university should allow an exception; and (iii) within five business days of receiving notice that the ecclesiastical endorsement has been withdrawn or that a Continuing Student Ecclesiastical Endorsement has been denied, submit the completed application and relevant statements to the Dean of Students Office for consideration.

When considering the petition, the dean of students will determine whether the student

has observed and continues to observe the standards of the Honor Code or has demonstrated other sufficiently compelling grounds to warrant an exception to the university's ecclesiastical endorsement requirement. The dean of students will not review the ecclesiastical leader's decision to withdraw or deny endorsement or the process for reaching that decision. The dean of students and other university officials will not discuss confidential matters with the student's present or former ecclesiastical leaders unless the student voluntarily signs a release allowing that communication. The dean of students may also choose to personally interview the student, who may further explain the circumstances which might justify an exception to the ecclesiastical endorsement requirement. The student bears the burden of persuasion that he or she should be considered to be in good Honor Code standing, notwithstanding the lack of an ecclesiastical endorsement. The dean of students' decision regarding the petition will be reviewed by the vice president of student life if requested by the student. The decision by the vice president of student life is final.

The Admission Policy provides a separate Application for Exception process for applicants who cannot obtain an ecclesiastical endorsement in support of their application for admission to the university.

Conduct

All students shall be required to conduct themselves in a manner consistent with the principles of The Church of Jesus Christ of Latter-day Saints and the BYU Honor Code. Furthermore, all students are required to abstain from possessing, serving, or consuming alcoholic beverages, tobacco, tea, coffee, or harmful drugs. Involvement with gambling; pornographic, erotic, or indecent material; disorderly, obscene, or indecent conduct or expressions; or with other offensive materials, expressions, or conduct or disruption of the peace that, in the sole discretion and judgment of the university, is inconsistent with the principles of the Church and the BYU Honor Code is not permitted in student housing. All guests of students must comply with the Residential Living Standards while on the premises of university-approved housing. All students are required to know the Dress and Grooming Standards and abide by them. (The standards expressed above apply to students at all times whether on or off campus.)

EEO Statement on discrimination and harassment

Title IX of the Education Amendments of 1972 prohibits sex discrimination against any participant in an educational program or activity that receives federal funds. The act is intended to eliminate sex discrimination in education and pertains to admissions, academic and athletic programs, and university-sponsored activities. Title IX also prohibits sexual harassment of students by university employees, other students, and visitors to campus. If you encounter sexual harassment or gender-based discrimination, please talk to your professor or the Graduate Coordinator; contact the Equal Employment Office at 801-422-5895 or 1-888-238-1062 (24-hours) or <http://www.ethicspoint.com>; or contact the Honor Code Office at 801-422-2847.

Sexual Misconduct Policy

Brigham Young University is committed to promoting and maintaining a safe and respectful environment for the campus community. The university will not tolerate sexual harassment, sexual violence, domestic violence, dating violence, or stalking (collectively "Sexual Misconduct") perpetrated by or against any university students, university employees, participants in university programs and activities, or visitors to its campus. This policy prohibits Sexual Misconduct by university employees (which include all faculty, staff, and administrative employees) and students, whether the behavior occurs on or off campus. This policy also prohibits Sexual Misconduct by or against visitors to the university (such as independent contractors, vendors, visiting lecturers, and visiting student-athletes).

The university will take immediate and appropriate steps to stop Sexual Misconduct, prevent its recurrence, and address its effects. Any person who violates this policy may be subject to discipline up to and including termination of employment, suspension, dismissal, and a ban from campus, depending on the circumstances and the severity of the violation and the violator's status as an employee, student, or visitor.

The university will work to prevent Sexual Misconduct and address reports of Sexual Misconduct by

- educating members of the campus community about this policy and applicable laws;
- promptly addressing and resolving reports of Sexual Misconduct in accordance with this policy;
- protecting the rights of all parties involved in a complaint; and
- imposing appropriate discipline against those who have engaged in Sexual Misconduct.

Individuals should seek to resolve incidents of Sexual Misconduct by following the procedures set forth in Section IV of this policy.

The Department of Chemistry has a copy of the entire policy on file in the front office. Students are welcome to stop by the office to read the document or to go to <https://policy.byu.edu/view/index.php?p=155>.

Ownership of Research

Brigham Young University strives to maintain an environment of open inquiry for the pursuit of truth. In connection with your graduate studies and Brigham Young University, you will be given various assignments and opportunities to engage in scholarly work. Both the research for your thesis or dissertation are examples of this type of scholarly work. You may or may not receive direct financial assistance (research assistantships,

scholarships, tuition waivers, etc.) in connection with this work. However, you do receive indirect support for your education; the university and its sponsor, The Church of Jesus Christ of Latter-day Saints, provide approximately two-thirds of the cost of your education. Therefore, Brigham Young University retains all rights (including rights to income from sales or licensing), ownership, and title to any scholarly work you perform in connection with your education here. This includes, but is not limited to, data, formulae, computer programs, projects, reports, research papers, copyrights, process patents and other technical information developed by you to satisfy course requirements or department assignments.

This retention of ownership allows the university to carry out its academic mission, fulfill external obligations, and ensure access to scholarship in the future. You have the right to copyright your project or thesis if you desire.

Confidentiality of Research

As a graduate student, in order to work for the Department of Chemistry you must sign a Nondisclosure Agreement indicating your willingness to respect the confidentiality of certain research or other work you might perform for the department. This agreement is necessary to participate in research or consulting activities at Brigham Young University. You should sign this agreement during the first week of your initial semester or term as a graduate student and turn it in to Amy Royer.

To receive a comprehensive list of all Brigham Young University policy, please go to <https://policy.byu.edu/>.

Department Policy on TA expectation and Research

TA expectations

The Chemistry and Biochemistry Department has a policy that it is unacceptable for TAs to date or show any flirtatious interest in their students. It has been found to invite uncomfortable feelings of favoritism or sexual harassment. TAs who participate in such inappropriate behavior will be disciplined. If you encounter such behavior, you should report it to your advisor or to the graduate student coordinator.

Time Devoted to Research

The number of hours a graduate student devotes to study and research each week (in addition to the time required to fill teaching assistant assignments) is between the student and the advisor, but following are some guidelines that may help you understand the level of commitment that is required for successful graduate work in chemistry or biochemistry. Most who have obtained advanced degrees elsewhere remember doing research 60 or more hours per week during the time they were in graduate school. They remember coming to the lab to do research work during the evenings and on Saturdays. This continues to be the norm in successful chemistry or biochemistry graduate programs. Most of the students from other

schools with whom you are competing for scientific success and ultimately for positions in the job market are making that kind of effort. Of course, the amount a student can accomplish in a given amount of time varies, but in many cases a standard 40-hour work week during graduate school will not be sufficient to make satisfactory progress toward an advanced degree, or to successfully compete for the best jobs. All our graduate students are encouraged to put in the long, hard hours that are necessary for success in research. Even working long hours, you should still find time to have fun and to have a life outside of your graduate work. However, graduate study in chemistry or biochemistry is not a part-time endeavor. The harder you work, and the more productive time you devote to your graduate work, the more you will accomplish and the quicker you will earn your degree. You will find great satisfaction as you work hard and make real contributions to science. Also, a solid letter of recommendation from your advisor is critical to securing quality employment after you graduate.

Generally, your time is not your own. By receiving financial support from the department you are committing your full effort to your assistantship, coursework, and research. It is not acceptable to have any other employment or studies while in this graduate program. Any coursework outside your program of study (other than a free religion course each term) must be approved in writing by your advisor and submitted to the graduate program administrator.