

General College Guidelines

1. Assistantships

1.1. Teaching Assistantships

1.1.1. Responsibilities

The main responsibility of Teaching Assistants is to assist the primary instructor of the course. Activities may include: holding office hours, grading papers or exams, conducting lab sessions, assisting in studio courses and providing supplemental instruction. Standard half-time Teaching Assistants are expected to work 16-20 hours per week during the term of appointment. Quarter-time Teaching Assistants are expected to work 8-10 hours per week. In order to be eligible for a Teaching Assistantship, graduate students need to be enrolled in at least 6 SCH's during the long semester or 3 SCH's during the summer semesters. In addition, TA's need to be in good academic standing with a GPA of at least 3.0.

Examples of main responsibilities	<ul style="list-style-type: none">• hold office hours• grade papers or exams• conduct or assist with lab sessions• assist in studio courses• provide supplemental instruction
Standard half-time TA work expectations during appointed term	16-20 hrs/week
Quarter-time TA work expectations during appointed term	8-10 hrs/week
SCH enrollment requirement	<ul style="list-style-type: none">• at least 6 SCH's during the long semester (Fall or Spring)• 3 SCH's during the summer semesters
GPA requirement	good academic standing with a GPA of at least 3.0

1.1.2. Appointment Process

Graduate Students may apply for Teaching Assistantships by filling out the forms available from the Department Secretary. Students should be sure to include their resume with their application.

1.1.3. Assessment

Each Semester Teaching Assistants will be evaluated by their supervising faculty member.

1.1.4. Compensation

Half-time Teaching Assistants are paid a rate of at least \$3000 per semester and are given in-state tuition waivers. Half-time Teaching Assistants are also eligible to enroll in the university's group medical insurance program. Quarter-time Teaching Assistants are paid a rate of at least \$1500 per semester and are not eligible for in-state tuition waivers or enrollment in the university's group medical insurance program. Teaching Assistants may be paid more based on their assigned responsibilities.

1.2. Research Assistantships

1.2.1. Responsibilities

The primary responsibility of a Research Assistant (RA) is to assist a faculty member in conducting their research. Eligibility requirements are the same as those for teaching assistants.

1.2.2. Appointment Process

Research Assistants are funded through the sponsoring faculty member's grants. These may be internal grants provided by the college or external grants provided by other agencies. The application process for an RA is similar to that of a TA except that the process often starts with a conversation between the student and faculty member. The application is available from the Department Secretary and online at <https://www.uhcl.edu/science-engineering/documents/cse-ra-application.pdf>.

1.2.3. Assessment

Research Assistants are evaluated by the sponsoring faculty member each semester.

1.2.4. Compensation

Research Assistants are paid a rate of at least \$3000 per semester and are given in-state tuition waiver. Research Assistants are also eligible to enroll in the university's group medical insurance program.

2. Candidate Plan of Studies and working with your Faculty Advisor

2.1. Purpose of CPS

The purpose of the Candidate Plan of Study (CPS) is to track each student's progress towards degree completion. It spells out the specific requirements needed to complete the degree and can only be changed by the mutual consent of both the student and advisor. The official CPS is kept in the CSE Dean's office but students are encouraged to keep their own copy. The process of creating a CPS typically starts a few months after a student arrives on campus. Creating the document begins with a meeting between the student and their faculty advisor. They will fill out a CPS worksheet where it will be determined when the student will take what classes and which capstone option will be selected.

2.2. Scheduling Appointments with your Faculty Advisor

Every graduate student is assigned a faculty advisor when they are admitted to the program. The name of the faculty advisor, along with their email address, is listed on each student's admission letter. Students are responsible for arranging initial appointments with their faculty advisor. Students can talk to any full-time faculty member about any program-related issues, but their faculty advisor is their main point of contact with respect to their degree progress. If needed, a student can change their faculty advisor by filling out a request form in the Dean's office.

2.3. Questions to ask your advisor

During your first meeting with meeting with your advisor, you may want to discuss issues such as: long-term career goals, areas of research interest, preparation for Doctoral programs or the work-force, time constraints in completing the degree, financial constraints, any issues making attendance difficult, disability status, etc... You are not obligated to work on a research project or thesis with your faculty advisor.

The most important decision in CPS process is whether you will do an MS thesis or choose instead the extended coursework option (and capstone course). The decision should be based

on your long-term goals including plans for pursuing a PhD and your interest in and aptitude for research. Your advisor will assist you in making that decision.

3. Research Opportunities

3.1. Purpose of research at UHCL

As UHCL is considered a Teaching University, the primary purpose of research is for the educational enhancement of our students. As such, faculty see student involvement in research as a learning opportunity and should be encouraging and supportive. Any results such as the publishing of articles or the awarding of grants is considered secondary to student learning outcomes.

3.2. On-Campus vs Off-campus research

Because of our proximity to NASA and high-tech industry, there are often opportunities for students to pursue research off-campus. For the purposes of thesis and non-thesis work this is not distinguished from on-campus research. Students should however make sure their Faculty Advisor and the Program Chair are aware of any research they are involved in that does not involve a full-time UHCL faculty member.

3.3. Finding Research Opportunities

Research opportunities are often passed on by UHCL Faculty Members, Members of our Advisory Board, the UHCL Career Services office, and sometimes by student organizations. If a student is interested in off-campus research opportunities, they should let their faculty advisor and their Program Chair know.

4. Dispute Resolution

4.1. Informal Resolution with Instructor

In the interest of the program, we take dispute resolution very seriously. Whenever possible, it is preferable that students resolve any issues with their instructor directly. This is best done during the faculty member's office hours or before/after class when the discussion can be done privately. It is advisable that after such a conversation, either the student or faculty member follows up with a clarifying email as to what was discussed and what resolution, if any, was reached.

4.2. Escalating Issues to the Chair

If a student is unsuccessful in resolving an issue with the instructor, the next step is to escalate that dispute to the Program Chair. The student should arrange to meet with the Program Chair or send him or her an email stating the issue. UHCL has a strict no-retaliation policy so students should never worry about reporting an issue with a faculty member. Issues brought up to other faculty members, such as faculty advisors, will be sent to the Program Chair for resolution as if the student reported them directly to the Program Chair. The Chair's duty is then to investigate the issue, listen to all sides and develop a resolution. If the Program Chair cannot resolve the issue, he or she may go to the Department Chair or other members of the College Administration for help.

4.3. Escalating Issues to Dean/Associate Dean

Beyond the Program, issues must be written in order to be considered by the Dean/Associate Dean. This may take the form of an email and the student is again protected by a no-retaliation policy. Before sending a complaint to the Department Chair, Associate Dean or Dean, please be sure to try working within the Program to solve the issue first.

4.4. Escalating Issues beyond the CSE Dean's Office

In extreme cases, issues may need to be escalated to the Provost or President. In these situations, the issue must be in writing and the Program/College should have had the opportunity to address the issue. In cases where the upper administration receives a student complaint, they rarely investigate it if the college was unaware of the complaint. Normal policy requires ending the complaint to the program, department or college where it originated and not reviewing the issue until it has been investigated at those levels.

5. Co-ops and Internships

5.1. Finding an Internship or Co-op

UHCL has made a conscious decision to centralize all internship information into one office, the Office of Strategic Partnerships. This office maintains a database of all internship information and vets each company before they can hire UHCL students as interns. This makes it straightforward for students to identify potential internships and know they are with reputable organizations.

5.2. Application Process

Once a student identifies an internship, they will need to get an offer letter from the organization and fill out the appropriate UHCL internship documentation. The Office of Strategic Partnerships is available to help with the process. In addition, students need to meet basic GPA and residency requirements in order to qualify. The application process generally takes a few weeks so students should be sure to start early.

5.3. Assessment of Experience

Each internship will have a UHCL faculty member as instructor of record as well as a supervisor on the internship. Both the student and supervisor will need to fill out a survey of the experience in order to assess the student and the internship site. Some programs also require that students complete an oral and/or written report after returning from their internship. If there is a problem at any time during the internship, the student should let the faculty instructor of record know immediately. In addition, if the internship is outside of the United States, it should be registered with the study abroad program.

6. Independent Studies

6.1. Purpose of Independent Studies

Independent studies are often used in emergency situations or whenever teaching a regular course is impractical. Independent study courses should have a syllabus, assessments and learning objectives like traditional courses. UHCL faculty are working to ensure that we teach as few independent study courses as possible although we will teach them as necessary.

6.2. What can and can't be used for independent studies

In some situations, a student may need a course to graduate but that course will not be offered in its regular rotation for several semesters. In that situation, an independent study may be used. Independent studies may also be used if a regularly scheduled course does not make due to low enrollment. Independent studies are not meant to be used for research experiences or for elective courses. They are also not meant to be used for courses which would be offered under normal rotation during the next semester.

6.3. Application Process

All Independent Study courses must be approved by the faculty member teaching them, the Program Chair, Department Chair and Associate Dean of the College. This process starts with filling out an independent study form with the instructor and the instructor providing some justification of the independent study to the Program Chair.

7. Other Issues

7.1. Sexual Misconduct

This is one of the least fun but most necessary topics in any university manual. Sexual Misconduct is defined as unwelcome sexual advances, requests for sexual favors and other verbal or physical conduct of a sexual nature. Every university has a specific policy on dealing with sexual misconduct, which should outline the rights and process for every party involved in a sexual misconduct dispute. Graduate students should be aware of this policy because 1) as students, they could be the victim of sexual misconduct 2) as teaching assistants, they could be accused of sexual misconduct. Sexual misconduct is not limited to male-female interactions or even interactions between teachers and students. In order to avoid false allegations, it is recommended that teachers should never have closed-door private meetings with students and should not have official course related meetings off-campus. Be sure to familiarize yourself with the university's policies concerning sexual misconduct. <https://www.uhcl.edu/policies/title-ix/>

7.2. Campus Services outside of the Program

Beyond your academic Program, UHCL offers a wealth of services that are designed specifically to help students become as successful as possible. Whether you need help with your writing or to prepare for a job interview, please be sure to look towards these resources. Most are found in the Division of Student Affairs at <https://www.uhcl.edu/student-affairs/>.

Chemistry Program Specific Items

1. Degree Plans

a. Staying on schedule

Students are ultimately responsible for monitoring their progress towards degree. Faculty are often only aware that a student is behind schedule in extreme cases. While full-time students typically graduate in 2 years, part-time students can take over 3 years. Students should be careful to monitor their time to degree as classes effectively expire after 5 years and then require administrative approval to count towards the degree.

2. Standard MS Degree

The Standard MS in Chemistry Degree consists of 36 total credit. All core requirements and chemistry electives must be completed with a grade of C or better. The goal of this Program is to expand their knowledge beyond what one would see in a typical Chemistry Bachelor's degree program, and also to provide them with extensive research experience. Students have a choice to pursue the MS degree through either an Extended Course Work option or a Thesis option.

Extended Course Work option. 6 hours of the two Research courses (CHEM 6837 and CHEM 6838), 15 hours of core requirements, and 15 hours of approved electives.

Thesis option. 6 hours in the two Research courses (CHEM 6837 and CHEM 6838), 15 hours of core requirements, 9 hours of approved electives, and a minimum of 6 hours of Master's Thesis Research (CHEM 6939).

We highly recommend taking Research Project I and Seminar (CHEM6837) in the very first semester of the graduate school and Research Project II and Seminar (CHEM6838) in the second semester. Then, a candidate is ready to make a choice, to either pursue the extended course work option (and plan for 15 hours of electives) or a thesis option, and continue with 6 hours (or more, if necessary) of Master's Thesis research.

For your convenience, both courses (CHEM6837 and CHEM6838) are planned to be offered every long semester.

Additionally, we offer **specialization in Petrochemical & Process Chemistry** to both Thesis and non-Thesis option, as long as students complete Advanced Instrumental Analysis

CHEM5332, Advanced Polymer Chemistry CHEM5635, and Principles of Chemical Engineering CHEM5132 with a grade of C or higher.

3. Assigned Foundation Courses and Waivers.

a. Purpose of Assigned Foundation Courses

During the admissions process, students are often assigned foundation courses if they have some deficiencies in their undergraduate background, to bring them up to speed for a rigor of a graduate class. Do your best to take the foundation courses first, before taking the content graduate courses. If you believe that you were assigned these foundation courses in error, it is possible to have the requirements waived.

b. How to get a Foundation Course Waived

Foundation courses may be waived by the Chemistry Program Chair. The process of receiving a waiver typically consists of the student sending a request to the Chair on the grounds of previous coursework taken or demonstrated experience. The Chair may then contact Program Faculty who are experts in the content area of the Foundational Course for their advice, request additional information such as syllabi of courses taken, or arrange for a test-out of the material to be done.

4. Core Courses

CHEM 5235 - Chemical Kinetics. This course provides a thorough study of modern chemical kinetics and reaction dynamics. The topics include classical analyses of reaction mechanisms (steady-state approximation, etc.); catalysis; transition-state theory; classical and quantum estimation of rate constants; and various modern experimental methods of determining reaction dynamics and mechanisms.

CHEM 5636 - Advanced Analytical Chemistry. All MS Chemistry students take this one-semester lecture course – frequently, during their first semester at UHCL. Based on the prerequisite knowledge of instrumental analysis at undergraduate level, this course engages students into advanced discussion of selected instrumental analytical techniques – such as optical (UV-Vis, fluorescence, circular dichroism, IR, Raman) spectroscopy, chromatography (GC, HPLC), mass spectrometry and hyphenated techniques, and materials characterization techniques. Lectures are supplemented with interactive discussions of pertinent journal articles, and practical applications of instrumental analysis are emphasized.

CHEM 5335 – Advanced Inorganic Chemistry. About 90% of Ph.D. level chemistry departments require at least one semester of advanced inorganic chemistry before taking discipline specific courses in chemistry. The course is a comprehensive study of the theory, structure and bonding of compounds in inorganic, and coordination chemistry.

CHEM 5337 - Physical Organic Chemistry. This course might be the only course relating to Organic Chemistry offered to graduate students in many top universities. Students in this course will be taught to deeply think how organic reactions take place, be able to rationalize the unusual products detected and predict potential products for given reactions under a particular condition. These skills will be built gradually through the discussion on chemical bonds, electronic effects, stereochemistry and their impacts on key reaction intermediates, such as carbocations, carbanions, carbenes, carbenoids, and radicals, as well as organometallics. Also, a unique type of reaction, i.e., pericyclic reaction, that does not involve reaction intermediates but form products of stereospecificity will be covered, along with basic principles of photochemistry. This course has been developed based on a variety of sources, but students may consult the following two textbooks, they are: a) Perspectives on Structure and Mechanism in Organic Chemistry, By Felix A. Carroll; b) Advanced Organic Chemistry: Part A, Structure and Mechanisms; Part B, Reactions and Synthesis, Francis A. Carey and Richard J. Sundberg.

CHEM 5637 - Modern Spectroscopy. This course is a required core course for all Chemistry MS majors. The aim of the course is four-fold: first, to provide a thorough grounding in the theory of the four most important spectroscopic techniques, namely infra-red and ultra-violet spectroscopy, nuclear magnetic resonance, and mass spectrometry; second, to provide a thorough grounding in the use of these four techniques to identify unknown molecules from their spectra; thirdly, to provide an understanding of the two major advances – Fourier transform technology and lasers – that have revolutionized modern spectroscopy in recent decades; fourthly, to introduce some more exotic types of modern spectroscopy that have benefited from these advances, such as Raman spectroscopy and other applications of lasers.

5. Electives

There are traditionally two reasons for taking an elective course in chemistry: 1) to broaden the knowledge base of students and 2) to prepare students for advanced work within a specific sub-discipline. Because the UHCL Chemistry Program does not offer a PhD in Chemistry and has a limited capacity to offer large numbers of elective courses, we focus on the first reason. Electives within the Chemistry Program are offered on a semi-regular schedule although the choice of electives may depend on Program resources and student interest. If you need help choosing an elective course or want to know which electives are being offered on what schedule,

please feel free to reach out to your faculty advisor, Program Chair, or any other member of the faculty. **Never** enroll in an elective course before having it first be approved by your faculty advisor and your CPS be updated. With the permission of your faculty advisor, it is also possible to take higher level non-CHEM course as electives or 4-level CHEM courses (as long as they haven't been assigned to you as Foundation Courses).

CHEM 5132 - Principles of Chemical Engineering. This is probably the only course in our program to provide students with basic and essential principles commonly practiced in the field of chemical engineering. This course is designed based on the book by Stefaan J.R. Simons, "*Concepts of Chemical Engineering 4 Chemists*," to fit the needs of students in general, and particularly with emphases on mass and energy balances, thermodynamics & kinetics of chemical reactions, fluid flow, heat transfer, mass transfer, scale-up, working with solid materials, process control, economic appraisal of large projects, hazard studies and risk assessment, and current cutting-edge knowledge on 3D and 4D printings. In addition, practices on actual calculations will be conducted during lectures.

CHEM 5635 - Advanced Polymer Chemistry. Chemistry 5635 is an advanced course in chemistry program recommended by the American Chemical Society. The course materials are primarily developed based on "Organic and Physical Chemistry of Polymers" by Yves Gnanou & Michel Fontanille. The subject matter to be covered includes a) identification of repeating units within a polymer and polymer nomenclature, b) difference between small molecules and polymers, particularly the molecular weights of polymers, c) principles, limitations, and advantages of important methods to determine the molecular weights of polymers; d) the impact of polymer configuration and conformation on physical and chemical properties of polymers, e) polymerization methods: condensation polymerization, radical chain polymerization, ionic chain polymerization, copolymerization, ring-opening polymerization, metal-catalyzed polymerization.

CHEM 5133 – Spectroscopic Identification of Organic Compounds. This is an elective course but very useful for students who are interested in working on analytical spectroscopic instruments related projects for industry. The focus of this course is to systematically practice the spectroscopic theories by working on structures of molecules and understanding the IR, UV-VIS, NMR and MS techniques and spectra in the determination of structures.

CHEM 5633 - Astrobiochemistry I. The study of the origin and evolution of life on Earth and the search for life beyond Earth is often referred to as "astrobiology", but many prefer the term "astrobiochemistry", because chemistry is central both to an understanding of life on Earth and to the methods used to search for extra-terrestrial life. Astrobiochemistry I is about the *origins* of life on Earth, while Astrobiochemistry II is about the *search* for life beyond on Earth. Astrobiochemistry I is a pre-requisite for Astrobiochemistry II, but Astrobiochemistry I can also be taken as a stand-alone course. Astrobiochemistry I aims to provide a fun overview of the

deepest questions in science, namely what's the world made of and how did it all get here; it also aims to broaden chemistry majors' knowledge to encompass all areas of science from fundamental physics through chemistry to biology, with an appreciation of multidisciplinary areas ranging from astrochemistry/astrophysics through geochemistry/geophysics to biochemistry/biophysics and the human sciences, and, most especially, an appreciation of chemistry as the "central science". Topics include particle physics, the four forces of nature, relativity, the Big Bang origin of the Universe, history of the Universe, origin of the chemical elements in stars, origin of the solar system, origin and history of the Earth, origin and evolution of life on Earth, origin of sex, human origins, origin of language, art, agriculture and science, and origin of death, cancer, viruses and plagues.

CHEM 5634 - Astrobiochemistry II. This course is about the search for life in the Universe. Astrobiochemistry I is a *required* pre-requisite: we need a good understanding of the origin and evolution of the solar system and life on Earth before we can go looking for life on other planets beyond Earth. Topics include the requirements for life (energy sources, chemicals and type of planetary environment needed), the search for life within our own solar system (including possibilities for finding life on Mars and the moons of the giant planets, and pre-biotic chemistry on comets), the search for life on planets round other stars (including recent discoveries of Earth-like planets), SETI (the Search for Extra-Terrestrial Intelligence), and the methods used to detect life on other planets, which are mainly chemical and spectroscopic, highlighting the central role of the chemist in the search for extra-terrestrial life.

CHEM 5639 - Symmetry in Chemistry. Symmetry in Chemistry is an elective course that many students have found very helpful for a better understanding of the Group Theory aspects of the Advanced Inorganic Chemistry course. It aims to provide a working knowledge of elementary applications of group theory in inorganic, organic, and physical chemistry. Topics include symmetry elements, point groups, use of character tables, direct product tables, and descent in symmetry tables; and applications include transition metal complexes in inorganic chemistry, the Woodward-Hoffman rules and Huckel theory in organic chemistry, and spectroscopic selection rules in physical chemistry.

CHEM 5336 - Organometallic Chemistry. Organometallic Chemistry is a discipline that has grown largely since 1960s, which has greatly impacted on our fundamental understanding on the behavior of atoms and molecules, as well as our practical operations in both manufacturing and laboratory settings. There are many examples of chemical transformations used in the manufacture of important chemicals that would be very difficult or even impossible without implementation of organometallic catalysts. The importance of Organometallic Chemistry has also been demonstrated in the number of Noble Prize winners in the last four decades. Topics to be covered may include: a) structure and bonding in transition metals, b) ligands commonly encountered in organometallic chemistry, c) characterization of organometallic compounds, d)

metal-centered chemical reactions and reactions taking place on ligands, and e) applications of organometallic compounds in organic synthesis.

CHEM5134 - Synthetic Organic Chemistry. This course focuses on understanding reactivities of organic functional groups as well practical aspects of common transformations: ionic and radical reactions, transition metal-mediated transformations, and pericyclic processes. Students will be introduced to the concept of retrosynthesis. To be successful in this course, students are expected to have a solid foundation in undergraduate Organic Chemistry material.

6. Thesis Option - More Details.

The Thesis option can be chosen after students complete their Research Project II & Seminar course (CHEM6838).

The Thesis option is a traditional thesis which requires a committee of three faculty and a formal defense. Program policy states that at least 2 of the thesis committee members should be full-time members of the program. Students signed up for the Thesis option should provide a progress report to their committee every long semester they are enrolled in thesis until they graduate. These progress reports may be used to evaluate whether or not the student is making significant progress or if they should consider switching to the non-thesis option. While the thesis option allows students to get more deeply involved in research, there is no guarantee that a student can complete a thesis within a specified amount of time. An additional semester or two may be required in order to graduate, depending on the substance of your thesis. In the unfortunate event that a thesis project does not go successfully, it is possible to switch to the Extended Course Work option. In that case, the previously taken Thesis courses get converted to the electives' status.

In the defending semester, applicant must notify a Program Chair of their intent to graduate. On a competitive basis, we are planning to award successfully graduating students (thesis defense) with a Zeon Graduate Award, that goes toward students' tuition.

7. Choosing the best option (Thesis or Extended Work option) for you

Many chemistry departments offer both thesis and non-thesis options for completing the master's degree while the Ph.D. can only be completed with a thesis. The non-thesis option usually consists of a research project that may be as

simple as assisting a faculty member with his or her work, but can lead to a publishable article. We find that the non-thesis option works better for part-time students. Thesis work tends to be much more involved and the time commitment is more than most part-time students can handle. The advantage of the thesis is that it has a higher “value” and can offer advantages when applying for jobs or Ph.D. school. The thesis also gives the student time to become much more focused on a specific research interest.

Students should choose a research project based on their interests, abilities, time restrictions, and faculty availability. It is recommended to meet with faculty in the first year of the Graduate Program (during the Research Project I and Seminar course), find out their research interests, project availability, and mentoring style. Feel free to email faculty (emails are listed on the UHCL website) to set up appointments with them.

There are options to do research with non-Chemistry UHCL faculty as well, as long as there is a significant chemistry component involved and your Faculty Advisor’s Approval.

8. Other Issues

a. When should I register for classes?

Students should register for classes as soon as possible. Because graduate courses in chemistry tend to be small, most students think that there is no harm to wait until the last minute (or even after the class starts) to register. The counterpoint to this is that because graduate chemistry courses tend to be small, they are more likely to be cancelled because of low enrollment. Don’t forget that education is a business and universities can’t justify offering a class with less than 5 (for graduate classes) students. If you cannot register for a class until late in the registration process for any reason, we recommend you email the professor to declare your intent to register. You don’t want to be that one person who caused the class to be cancelled. Also, if you are thinking about delaying registration because you are waiting for a financial aid or fellowship check, be sure to check the university’s policy on tuition payments. While most students think they have to pay as soon as they register, the fact is, most universities like UHCL have a census date when you are officially dropped for lack of payment. This tends to be about 12 days into the semester and is the real deadline for making a tuition payment.

b. How much time should I devote to studies?

The time required to be successful in a graduate-level chemistry course depends on many variables. A student's level of preparation, their ability to focus on the course, their level of maturity, and their ability to work in groups, all factor into how much time a student will need to spend on a course. A typical graduate-level chemistry course at UHCL requires about 10-15 hours per week for a well-prepared student.

A full-time student should expect to spend about 30-45 hours per week on his or her courses. A part-time student, who works full-time, should only take 1 or 2 courses per semester. We sometimes see students who work full-time and attempt to take 3 courses. These students are rarely successful. Online courses will require about the same time commitment. Although there is a significant amount of time required for these courses, most students have the freedom to choose when to devote time to their studies. Because of this, graduate school requires excellent time-management skills. We recommend using your online calendar to schedule time devoted to research and study in addition to class time.

Student research should take about the same amount of time per Semester Credit Hour (SCH) as face-to-face courses. A typical independent study or thesis could take anywhere from 10-20 hours per week depending on how many credits you register for. Thesis work, whether for a Bachelors, Masters or Ph.D. typically requires more time and focus than students think. Before considering a thesis, try to imagine how many hours you think the project will require per week and multiply that by two or three. If you cannot devote that much time, you may want to reconsider the project.

c. Should I attend Full-time or Part-time?

Most universities don't provide a part-time option. UHCL, however, does give this option so we feel confident in discussing it. Traditional chemistry graduate students may devote over 60 hours per week to study, teaching and research. This allows students to become fully immersed in their subject, which has a net positive impact on learning.

We feel that part-time students bring a lot to the table. They tend to have more practical work experience and tend to be more organized with their time. When deciding whether to pursue graduate education full-time or part-time, one must weigh several items: time to complete the degree, economic situation, chance of success and career goals. Full-time students complete degrees in fewer semesters and have a better chance of getting good grades. However, not all students can go to

school full-time. Many part-time students have families and have already made significant progress in their careers. They can't afford to go to school full-time from a practical standpoint.

Ultimately, this decision comes down to time. To attend graduate school part-time, especially in chemistry, often means spreading a 2-year degree over 3 years. The State of Texas limits the time to complete a Ph.D. to 10 years after the completion of the first required course, therefore part-time students often need to work harder to finish their degree before time runs out. Not only do part-time students take fewer classes and miss out on many valuable opportunities such as teaching undergrads, they also often have to work full-time outside of the university. For them, time management is even more critical.

d. Chemistry Student Groups

One of the valuable resources for a new graduate student is a Chemistry Club. Even though it currently has no national affiliation, it can provide a much-needed social outlet as well as valuable career advice. If you wish, you may become a part of a local Houston chapter of American Chemical Society (requires fees). Finally, you are welcome to join a group chat with other fellow Chemistry graduate students. Contact Chemistry Program Chair to get access to the current chat using the free app GroupMe.

9. Advanced Lab Facilities

Chemistry Program houses multiple pieces of equipment, ready to be used for high quality research. For some of this equipment, we have dedicated personnel (may or may not be the faculty member you're doing research with) who will provide you with an appropriate training. Faculty member who guides you in research will let you know of who to contact, depending on the project you're working on. The list of available equipment includes:

- JEOL 500 MHz NMR spectrometer (fitted with HFX Royal probe and autosampler). *Analysis of organic molecules (liquid phase), helps establish structure and conformation of molecules, analyzes purity of samples.*
- Agilent LC-MS single quad. *Analytical equipment, separates and analyzes complicated mixtures of polar compounds, identifies them by their Mass Spectrum.*
- Agilent GC-MS system consisting of 7890A GC and 5975C mass-selective detector (also equipped with μ ECD detector). *Analyzes complicated mixtures of small molecules, identifies them by their Mass Spectrum, relative amounts, uses their differences in volatility.*

- Thermo iCAP ICP-OES. *Elemental analysis technique that uses the emission spectra of a sample to identify, and quantify the elements present. Samples are introduced into the plasma in a process that desolvates, ionises, and excites them.*
- XRD Powder diffractometer. *Provides information on structure of powder and microcrystalline samples.*
- Mercury analyzer. *This equipment can be used to detect mercury levels in solids, liquids, or gases for environmental and safety reasons.*
- Beckman preparative ultracentrifuge. *The ultracentrifuge is a centrifuge optimized for spinning a rotor at very high speeds, capable of generating acceleration as high as 1 000 000 g. It finds important uses in molecular biology, biochemistry, and polymer science. Preparative rotors are used in biology for pelleting of fine particulate fractions, such as cellular organelles (mitochondria, microsomes, ribosomes) and viruses. They can also be used for gradient separations, in which the tubes are filled from top to bottom with an increasing concentration of a dense substance in solution.*
- Perkin-Elmer Frontier IR spectrometer. *Infrared spectroscopy is a simple and reliable technique widely used in both organic and inorganic chemistry, in research and industry. It is used in quality control, dynamic measurement, and monitoring applications. It is also used in forensic analysis in both criminal and civil cases, for example, in identifying polymer degradation. IR-spectroscopy has been successfully used in analysis and identification of pigments in paintings, food industry to measure the concentration of various compounds in different food products.*
- Agilent Cary Eclipse fluorescence spectrophotometer. *This technique excites the electrons in molecules of certain compounds and causes them to emit light. Fluorescence spectroscopy is used in, among others, biochemical, medical, and chemical research fields for analyzing organic compounds.*
- Labconco freeze dryer. *Freeze drying is a low temperature dehydration process which involves freezing the product, lowering pressure, then removing the ice by sublimation.*
- Thermo DXR2 Raman Spectrometer. *Allows to characterize primarily non-polar molecules and materials, study polymorphs, secondary structure of proteins, etc.*

10. CSE Science and Mathematics Colloquium

An important and but often overlooked part of any chemistry department is the Colloquium Series. The Colloquium is probably the easiest part of a chemistry graduate student's education; you simply need to show up and occasionally ask questions. The value of the colloquium is that it: 1) introduces students to potential career options, 2) it teaches students how to give talks by watching others, 3) it gives students a chance to meet researchers who may not be at their university and 4) it gives students a chance to ask questions about cutting edge research.