

**IOWA**

Chemical and Biochemical  
Engineering

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**GRADUATE STUDENT  
HANDBOOK**  
(Updated Spring 2025)

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## **I. INTRODUCTION**

Chemical Engineering is a branch of engineering that uses principles of physics, chemistry, biology, mathematics, and economics to efficiently use, produce, design, transport, and transform energy and materials. The Chemical and Biochemical Engineering Department at the University of Iowa (UI) provides a stimulating academic community where students engage in a highly personalized learning and research environment. Faculty within the department have focused research projects in biological and pharmaceutical systems, clean energy and catalysis, air quality and climate, polymeric and advanced materials, quantum chemical simulation, and remote sensing (<https://engineering.uiowa.edu/cbe/cbe-graduate-program>). Active Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) programs provide students with opportunities to obtain specialized knowledge and expertise through advanced course work in chemical engineering and related disciplines, to engage in interdisciplinary research opportunities, and to impact their communities through service learning. Both the M.S. and Ph.D. programs are designed to equip the student with the skills to pursue a career in industry, academia, or government.

This handbook will inform current and prospective graduate students of the policies, regulations, and procedures of the graduate program in Chemical and Biochemical Engineering. In addition, it provides guidance regarding the academic performance, research excellence, and general standards of conduct expected of students pursuing a M.S. or Ph.D. degree in this department. PLEASE READ THIS HANDBOOK CAREFULLY. Many of your concerns and questions are addressed in this handbook. Students are encouraged to contact the Director of Graduate Studies with any additional questions, concerns, or suggestions.

Since this handbook is concerned primarily with acquainting students with departmental regulations, the general regulations of the Graduate College are not repeated in their entirety in this handbook. Graduate students are expected to independently familiarize themselves with all Graduate College regulations, which can be found in the Graduate College Manual of Rules and Regulations (available online at <https://www.grad.uiowa.edu/manual-of-rules-and-regulations>). The Graduate College manages the enrollment and degree progress for all graduate programs at the University of Iowa. If any of the policies, regulations, or procedures contained in this handbook are found to be in conflict with those of the University or Graduate College, then those of the University or Graduate College will take precedence. Similarly, if any part of these policies, regulations, or procedures are found to be in conflict with Federal, State or municipal laws, or with the constitutions of the United States or the State of Iowa, then those parts shall be automatically void.

Both the University of Iowa and the Department of Chemical and Biochemical Engineering admit, train, and graduate students without regard to race, color, religion, age, disability, sex, associational preferences or national origin.

## **II. GRADUATE PROGRAMS AND DEGREES**

The graduate program in the Department of Chemical and Biochemical Engineering provides qualified students with deeper and broader training than is possible at the B.S. level. The department offers graduate training toward both the M.S. and Ph.D. degrees. M.S. degree tracks include a 5-year combined undergraduate plus Master's program (called U2G for undergraduate

to graduate), a non-thesis Master's program, and thesis Master's program. All graduate students, regardless of their degree objective, are expected to be competent in the core areas of chemical engineering. Students obtain more specialized knowledge and expertise through advanced course work in chemical engineering and related disciplines. Excellence in research is expected of both Ph.D. and M.S. thesis students. In collaboration with faculty members, students develop comprehensive plans of study based on their background and career objectives.

### **III. ADMISSIONS**

Admission to the Department of Chemical and Biochemical Engineering is competitive and is based on an applicant's previous course work, research, and/or industrial experience. Our admissions committee will look for evidence that an applicant has demonstrated qualities of successful Ph.D. or Masters students such as creativity, self-initiative, dedication, and perseverance. Our typical incoming class size is 5-8 graduate students, with a total graduate student body of about 30-35 students.

The general admission standards outlined below are intended to maintain the quality of the graduate program and to ensure that the student is properly prepared to successfully complete their program in a timely fashion. Specific admission standards may be waived by the faculty when other evidence of competence is compelling. These standards are minimum standards and that meeting these standards does not ensure admission to the program. Admitted students typically exceed these standards.

- Applicants must have earned a four-year baccalaureate (B.S. or B.E.) degree in Chemical Engineering or a related science or engineering discipline, such as chemistry, biochemistry, biological engineering, environmental science, atmospheric science, materials science, mathematics, and physics. An M.S. degree is NOT a prerequisite for admission to our PhD program or for PhD degree conferral.
- Applicants to the Ph.D., non-thesis M.S., and thesis M.S. graduate programs are expected to have a minimum cumulative grade point average of 3.00/4.00 from the undergraduate degree.
- Applicants to the undergraduate-to-graduate (U2G) program are expected to have a minimum cumulative grade point average of 3.25/4.00 with a B.S. degree in Chemical Engineering or a related science or engineering discipline from the University of Iowa.
- International applicants are required to submit English proficiency scores, unless they are eligible for a waiver based on U.S. citizenship or earning a Bachelor's, Master's, or Ph.D. in the U.S. or one of the countries listed on the following website:

<https://grad.admissions.uiowa.edu/graduate-programs/english-requirements-admission-graduate-college>

Students whose native language is not English will be required to submit TOEFL or IELTS scores. The minimum requirement for the TOEFL iBT is a total score of 81 and for the IELTS is an overall score of 7 with no subscore less than 6. An on-campus English

Proficiency Evaluation will be administered by the University upon arrival in Iowa City unless you submit a TOEFL overall score of 100 or higher. Students are not allowed to register until the evaluation has been taken.

- Conditional admission to the M.S. program may be granted to students with demonstrated ability, but who do not meet the requirements for regular admission. For students admitted with conditional status, regular status must be attained within two academic terms. A conditional admission will carry a written statement of deficiencies and the specific actions required to remove the conditions. The student is responsible for taking the steps needed to remove the conditions.

All applicants must make an official application, using the university's online forms and procedures, and following the directions from the Office of Admissions. Visit the Grad Admissions site for more information about our graduate admissions process at the University of Iowa and to apply for graduate admission: <https://grad.admissions.uiowa.edu/apply>. Applications must include the following for review:

- Three recommendation letters. These evaluation letters should be completed by persons who are well acquainted with the applicant and their ability to undertake graduate work in chemical engineering. They are often written by full-time faculty or work supervisors. At least one should be from a faculty member at the last school attended as a full-time student, unless you have been out of school for more than five years.
- A Statement of Purpose. Your Statement of Purpose gives you an opportunity to distinguish yourself beyond grades and test scores. Please keep your Statement of Purpose to 2 pages or less. You may choose to write about previous experiences, your personal and professional goals: Why graduate school? What might you do after graduate school? What inspires you? What drives you? For all applications: Why our program? What will make you successful in our program? For PhD applications: Why is a research life a good fit for you? Have you ever written a proposal to do independent research, such as a National Science Foundation fellowship application? How will your experience help the public or society? Is there something else about you that you think is important for us to know? It is not necessary to address each of these issues; we want you to decide how you want to present yourself. The graduate admissions committee members read this essay with interest and care because, along with the letters of recommendation, it offers us further insight into who you are as a distinct individual. Your statement of purpose should be a well-structured essay that effectively communicates the information above while demonstrating your writing ability.

While the department will consider applications at any time, first consideration is given to students who have their application folders (online application, test scores, transcripts, letters of recommendation, and statement of purpose) completed by January 15 for fall admissions. Students seeking admission to the spring semester should have their admission folder completed by October 1.

The Director of Graduate Admissions (DGA) is responsible for overseeing the graduate recruiting activities and the graduate admissions procedures in the department. The DGA serves as the point of initial contact between prospective graduate students and the department, and maintains a file of each qualified applicant. The DGA, in consultation with the graduate admission committee, the Department Executive Officer (DEO, chair or head of the department), and other faculty as appropriate screens the applicants and ultimately determines the applicants to be extended offers of admission. While individual Chemical and Biochemical Engineering faculty members do not admit applicants directly to their research groups, applicants are encouraged to contact faculty about interest in their research programs.

#### **IV. FINANCIAL ASSISTANCE**

Full financial support is available to admitted Ph.D. and M.S. thesis students in the form of teaching assistantships, research assistantships, and fellowships. The department ensures five years of support for all full-time Ph.D. and up to two years of support for all full-time M.S. thesis students that are making normal progress toward the degree, exhibit satisfactory performance in all duties, and maintain appropriate profession conduct. Students admitted to the non-thesis M.S. or U2G programs are not guaranteed department financial support.

##### **A. Sources of Support**

The Department of Chemical and Biochemical Engineering provides graduate assistantships (GAs) for all full-time Ph.D. and M.S. thesis students that are making sufficient progress in the program. GAs are the primary sources of financial aid available through the Department. The funds available for GAs are primarily through sponsored research contracts and grants obtained by faculty members. GAs usually take the form of graduate research assistantships (GRAs), but also include graduate teaching assistantships (GTAs) or a combination of the two. The Department recognizes primarily two levels of assistantship activities — 1/4-time and 1/2-time. One 1/2-time assignments require about 20 hours per week and 1/4-time about 10 hours per week of work over the term of the appointment. It is the policy of the department to provide full financial aid (1/2-time appointment) to eligible students so that they may devote their energy and attention to the research and coursework necessary for obtaining an education and completing the degree requirements. Other funds may be provided to the department by the College of Engineering or the Graduate College. Students are encouraged to apply for internal and external graduate fellowships.

As the graduate assistantship provides an important educational opportunity for students to obtain experience in teaching and research, all candidates for Ph.D. and M.S. thesis are required to complete both teaching and research assistantships during the course of their graduate studies. A minimum of one teaching assistantship and one professional development experience that aligns with the student's career objectives are required prior to graduation. All incoming Ph.D. and M.S. with thesis students serve as GTAs during their first semester in residence.

Summer support for students is typically provided from external funds. In general, there are no departmental funds for summer support, though occasionally GTA appointments may be available. Students who are not registered for classes during the summer session will need to have FICA (Social Security and Medicare) tax taken from their paychecks during the summer months

(June and July, 7.65% withheld). Students should consult with their faculty advisors on matters regarding summer support (at least one month before the end of the spring semester).

The University provides health and dental insurance benefits at a reduced rate specified in the COGS contract (<https://www.grad.uiowa.edu/graduate-assistant-employment>). Tuition support (100%) and mandatory fees support (50%) is also provided to graduate assistants who are funded ¼-time or more. Students receive a slightly increased stipend to off-set the 50% of the mandatory fees they pay out of pocket. An additional one-time fee are incurred by first year graduate students through the University Records and Documents Fee (<https://registrar.uiowa.edu/university-records-and-documents-fee>). Several additional fees are incurred by international students: a yearly International Student Fee, a one-time fee for the English Proficiency Exam, and a one-time Grad/Professional Student orientation/program matriculation fee (<https://international.uiowa.edu/iss/current/financial/expenses>). The department will pay for the one-time international student matriculation fee and the reoccurring international student fee.

There are additional terms and conditions of employment and financial aid available at: <https://www.grad.uiowa.edu/graduate-assistant-employment>. Students should also contact the Student Financial Aid Office in the University Capital Center for information on other sources of financial aid available through the University. Potentially uses sources of information are:

- 1) Office of Graduate Student Financial Support:  
<https://financialaid.uiowa.edu/graduate>
- 2) Office of Student Financial Aid: <https://financialaid.uiowa.edu/new>

## **B. Eligibility for Support**

It is the policy of the Department to provide or arrange financial assistance for each graduate student who is meeting departmental expectations. Non-thesis M.S. and U2G students are not guaranteed financial aid.

The University requires all first-time GTAs whose first language is not English to be tested to assess their English speaking and comprehension skills and general suitability for teaching undergraduates before they are assigned assistantship responsibilities. The Spoken Proficiency of English in the Classroom (SPEC) test is given in the weeks prior to registration, each semester and summer session, by the ESL (English as a Second Language) Programs Office in the University Capitol Center (<https://esl.uiowa.edu/programs/teaching-assistant-preparation-english>). Students are given detailed information and instructions about the tests and are able to ask questions when they register to take the tests.

Full-time graduate students with outside employment are often unable to devote the necessary time and effort to their research and course work. This may result in unnecessary delays in completing the requirements for the degree and loss of funding. A registered student interested in working part-time off campus should first speak to their research advisor(s) about the nature of the proposed work. The advisor must be assured that the work will not compromise the time that the students is expected to devote to research and coursework, and that the outside work does not compromise or infringe upon patent or intellectual property rights or create a conflict of

interest. Regulations of outside agencies that provide funding to specific students, as well as those governing visas for international students, must be observed at all times. Students can, with approval from their research advisor and the Department, complete a co-op or internship during their degree program.

### **C. Assistantship Responsibilities**

#### *Research Assistantship Activities*

Each student in the Ph.D. or M.S. with thesis graduate programs will participate in research activities during each semester in residence. Research assistantship activities are intended to give the student direct and continuing experience in the actual research process from formulation of the study through collection and analysis of data and preparation of a scholarly paper, which is often part of an externally sponsored research project. The research performed under a research assistantship may or may not be related to the student's thesis work. Students are expected to meet regularly with their research advisor(s) to plan and discuss the research project and results. Since thesis/dissertation research activities are concerned with matters of originality, creativity and excellence, they are not subject to the hours per week guidelines of the general assistantship requirements.

#### *Teaching Assistantship Activities*

Each Ph.D. and M.S. with thesis graduate student in the department is expected to serve as a teaching assistant at least one different time during their graduate studies. Non-thesis M.S. students may serve as a Teaching Assistant if approved by the department. Every effort is made to arrange T.A. assignments with due regard for other responsibilities the student may have. Since T.A. assignments directly affect the education of students, it is necessary that all duties be carried out in a timely and effective manner. All first-time teaching assistants whose first language is not English must be evaluated for certification. Under the certification process, teaching assistantship interaction with students may be restricted based on testing results. Teaching assistants should track their weekly hours to ensure they are working, on average, the correct number of hours; they should alert their faculty instructor if they are unable to complete the assigned work in the allotted time.

### **D. Assignment**

The awarding of financial support is made by the Department at the beginning of each semester. Specific assistantship assignments are made each semester. For teaching assistantships, the T.A. will be notified as early as possible, in writing, of the course(s), the instructor in charge, beginning and ending date of the teaching appointment and the duties to be carried out. For research assistantships involving research not related to the student's thesis work, the R.A. will be notified as early as possible, in writing, of the project(s), the research director, the beginning and ending date of the research appointment and the duties to be carried out. For research assistantships involving thesis/dissertation work, the graduate student is supervised by their faculty advisor until the completion of all degree requirements.

In the assignment of financial support, due consideration is given to the interests and capabilities of the students. However, it is necessary to weigh this against the needs of the Department and

the requirements of the various funding agencies which support departmental research activities. The Department makes assignments according to the following procedures:

- 1) The DEO presents a list of students eligible for financial support and a list of appointments available to the faculty for consideration.
- 2) Faculty members with external research support inform the DEO of the student(s) to be supported from their research grants.
- 3) The remaining students are assigned to department teaching and research activities. The faculty consider the following when making this determination: progress toward the degree objective, past performance as a T.A. or R.A. and service to the department.

Inadequate progress toward the degree or substandard performance on previous assignments will result in reduction or elimination of financial support. The student will not be eligible for support until they are able to perform at the required level of performance for one full semester.

To comply with the Immigration Reform and Control Act of 1986, the Department and the University must verify the citizenship status or employment authorization of all persons hired after November 6, 1986. Each student employed by the department must present documents that verify their identity and eligibility for employment. A departmental authority must physically examine the documents and verify their authenticity and that they relate to the individual to be employed. A list of acceptable documentation to complete the I-9 form can be found here:

<https://hr.uiowa.edu/sites/hr.uiowa.edu/files/2019-03/I-9%20Form%20List%20of%20Acceptable%20Documents.pdf>

#### **E. Renewal and Termination**

Within a single year, appointments to assistantships or traineeships are for a fixed period, usually one academic semester or academic year. Renewal of an appointment for a subsequent period is based on the evaluation of the faculty advisor and the collective judgment of the faculty concerning the student progress and professional conduct. It is emphasized that all renewals are contingent on the continued availability of state, federal, and project funds for student support.

A graduate student on an assistantship or traineeship may be dismissed during the term of that appointment due to loss of student status. A graduate student may be dismissed from an assistantship or traineeship appointment during the term of the appointment, without necessarily losing student status, for 1) any reason sufficient to dismiss a faculty member during the term of an appointment (see University Operations Manual, Section 20:290 Ethics; Section 20:267 Unfitness; and Appendix 720.9.1 Uniform Rules of Personal Conduct<sup>1</sup>), or 2) failure to follow or implement properly any adequately reasonable instructions of the supervisor when such

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<sup>1</sup> See for example [Section II Community Policies](#) (chapters on sexual harassment, consensual relationships between instructors and students, violence, drug use, harassment, use of information technology resources, and research), as well as Section III Human Resource Policies (Standards and Ethics; Time Off and Scheduling).

instructions are within the proper scope of the supervisor. Termination of an appointment for either of these two reasons is described in Section 20:230 of the University Operations Manual.

Students may be dismissed from the University of Iowa Graduate College for inadequate academic performance. Quoting from the Graduate College Manual of Rules and Regulations:

**Master of Science Students:** “A non-doctoral departmental (master's, professional improvement, certificate) student, except one on conditional status, shall be placed on academic probation if, after completing 9 semester hours of graded (A, B, C, D, F) graduate work at The University of Iowa, the student's UI Cumulative GPA falls below 2.75. A student regains good academic standing when their UI Cumulative GPA returns to 2.75, or greater. If, after completing 9 more semester hours of graded (A, B, C, D, F) graduate work at the University, the student's UI Cumulative GPA remains below 2.75, the student will be denied permission to re-register within any Graduate College degree program.”

**Doctoral Students:** “A doctoral student on regular status shall be placed on academic probation if, after completing 9 semester hours of graded (A, B, C, D, F) graduate work at The University of Iowa, the student's UI Cumulative GPA falls below 3.00. A student regains good academic standing when their UI Cumulative GPA returns to 3.00. If, after completing 9 more semester hours of graded (A, B, C, D, F) graduate work at this University, the student's UI Cumulative GPA remains below 3.00, the student will be dropped from the degree program and denied permission to re-register within any Graduate College doctoral degree program.”

If the Department believes there to be extenuating circumstances for a particular student, the Director of Graduate Studies may request a waiver from the Graduate College. When it can be shown that a particular student is uniquely disadvantaged by the probation policy, the Graduate College may grant an additional semester on probation.

#### **F. Absences and Vacation**

Unlike undergraduate students, Ph.D. and M.S. with thesis graduate students have research and/or teaching duties on a continuous basis including those periods when classes are not in session (e.g., winter and spring break). Graduate students receiving financial support must observe normal University business hours. At the very least, this means assistantship duties should be carried out during Monday through Friday, 9 a.m. to 5 p.m. Students must discuss the possibility of alternative working hours with the research advisor or faculty instructor in charge. The research director or faculty instructor should be notified of absences due to illness or family emergency as soon as possible. Graduate students should behave professionally, notifying colleagues and supervisors in advance of planned absences. Students absent for extended periods without approval will become ineligible for departmental financial aid. Graduate students may take paid leave or vacation, with the agreement of the faculty advisor. Typical guidelines are as follows: 1) two weeks of paid leave for academic year appointments, and 2) three weeks of paid leave for fiscal year appointments. Typically, such vacation should be taken between academic semesters or during breaks, and must be approved by the student's faculty advisor. Students cannot accumulate vacation from year to year.

## **G. Tax Status**

The University is required by federal regulation to withhold income tax from money paid from University sources and from project grants. The University will provide an annual W-2 form showing the amount withheld. The tax status of these payments, in whole or in part, is subject to interpretation of the Internal Revenue Service Code. Each individual taxpayer bears the responsibility of filing an income tax report according to the individual's situation and applicable status.

Certain fellowships do not have any federal or state income tax withholding, but may still be taxable income. In these cases, the student is required to make quarterly estimated income tax payments to the Internal Revenue Service and to the State of Iowa. Forms and instructions to make the payments can be found here:

<https://hr.uiowa.edu/pay/payroll-services/tax-information/fellowship-payment-rules>

## **H. Collective Bargaining Agreement**

The terms and conditions of employment, including but not limited to wages and benefits, in a GA position are governed by a collective bargaining agreement between the Board of Regents, State of Iowa and UE Local 896/COGS, the union representing graduate teaching assistants and research assistants at the University of Iowa. Copies of this collective bargaining agreement will be provided upon your appointment and may be viewed from the University web site: <http://hr.uiowa.edu/bargaining/cogs>.

## **V. REQUIREMENTS AND EXPECTATIONS FOR DEGREE**

### **A. General Overview**

Each student is required to satisfy the general requirements of the Graduate College for the degree that the student is seeking. To ensure basic competence in chemical engineering, all graduate students must complete the chemical engineering core curriculum (described in section VI.B) and other course requirements described in sections VI.C and VI.D. All Ph.D. and M.S. thesis students are required to be teaching assistants at least once during their residency so that they can learn the skills needed to train and educate others, an important distinction between the undergraduate and graduate degrees. All graduate students are expected to identify and carry out service to the department, college, university, research/professional community, or public.

Each graduate student must give an annual update to their faculty advisor and the Director of Graduate Studies as described in the Individual Development Plans section and must periodically report progress to a faculty examining committee. Students who are “not meeting expectations” are required to give an update to their faculty advisors and the Director of Graduate Studies on a semester-by-semester basis. Students who do not give the required updates are subject to the withholding of research credit and/or reduction/termination of financial aid.

Other degree specific requirements are detailed below.

### **B. Core Curriculum**

The core curriculum includes one course, from a departmentally approved list, in each of the core chemical engineering branches of transport processes, chemical thermodynamics, chemical

reaction kinetics, technical communication, and, for students entering the program beginning Fall 2020 or later, data science.

Approved courses include:

Transport Phenomena

CBE:5115 Transport Phenomena

Alternates approved on a case-by-case basis, and may include:

BME:5430 Biotransport

ME:5143 Computational Fluid & Thermal Engineering

CBE:6145 Diffusive Transport

Other courses approved on a case-by-case basis

Chemical Thermodynamics

CBE:5110 Intermediate Thermodynamics

Alternates approved on a case-by-case basis, and may include:

5000 / Thermal Physics Course

Other courses approved on a case-by-case basis

Chemical Reaction Kinetics

CBE:5315 Polymer Chemistry + Undergrad Chemical Reaction Engineering

CBE:3205 Introduction to Biochemical Eng + Undergrad Chemical Reaction Engineering

CBE:5425 Atmospheric Chemistry & Physics + Undergrad Chemical Reaction Engineering

Alternates may be approved on a case-by-case basis

Technical Communication

CBE:5105 Intro to Lit Review and Proposal Writing (for MS thesis and PhD)

CBE:5104 Intro to Lit Review and Technical Writing (for MS non-thesis and U2G)

Data Science (for students entering in Fall 2020 and later)

CBE:5120 Data Science in Chemical and Engineering Systems

Other courses approved on a case-by-case basis

### **C. Other General Course Requirements**

All graduate students are required to enroll in and complete the College of Engineering one-semester seminar course “Engineering Ethics” (ENGR:7270) – to be taken during their first semester. Also, all graduate students are required to complete the online scholarly integrity course: Collaborative Instructional Training Initiative (CITI).

Other training courses such as safety courses, emergency preparedness, sexual harassment prevention, and FERPA training may be required. These requirements change from year to year, and students will be informed by Departmental staff or faculty of the appropriate requirements.

All Ph.D. and M.S. thesis graduate students must enroll in and pass Graduate Seminar (CBE:5000) every semester that they are in residence (enrollment is not required in the summer sessions). Students failing to attend seminar will receive a failing grade for the course. All non-thesis M.S. students are required to enroll in and pass Graduate Professional Development seminar (CBE:5100) in each of their final two semesters. Students unable to attend a seminar due to conference attendance, other approved professional experiences, or illness will be given the opportunity to make up those seminars (contact the seminar instructor for details). Exceptions

to the requirement of seminar attendance must be approved in writing by department faculty (i.e., at a faculty meeting) on a case-by-case basis.

Continuous registration and associated tuition payment are required during all regular semesters. Students generally register for full-time registration (9 s.h.) during regular semesters, although 12-15 s.h. is recommended, for the first two years in the program. No registration is required during the summer, although students with Fellowships may have special registration requirements. Furthermore, a degree cannot be granted during a semester (or during a summer) where the student is not registered appropriately. Students may, with the consultation of their advisor, register for 1-15 s.h. in any given semester. Planning is required so that graduation requirements, such as 30 s.h. or 72 s.h. of approved credit, are met during the semester of anticipated graduation. Filing of "short hours" forms are required if a student registers for less than full-time (students will be contacted the department administrator each semester to complete the form). International Students are required to submit "short hours" forms to both immigration and registrar offices. If a student fails to register, then the student may not be readmitted to candidacy until the student has received the appropriate approval and submitted the necessary application.

Credits that were earned more than 10 years prior to graduation are ineligible to count toward degree requirements, unless there is documentation as to how the knowledge and skills associated with those credits have been kept up to date through professional practice, continuing education, etc. The documentation should be prepared by the student, and approval by the CBE Director of Graduate Studies and the Graduate College is required.

#### **D. Course Requirements for Applicants with B.S. not in Chemical Engineering**

Students with degrees in other scientific disciplines are expected to attain a proficiency in specified core areas of chemical engineering equivalent to entering graduate students who hold a B.S./B.E. degree in chemical engineering. The background of each student admitted to the program with a degree not in chemical engineering will be reviewed by the faculty. The Director of Graduate Studies will specify in writing any remedial courses that will be required of the student. Examples of core undergraduate courses include:

##### Mathematics

- Calculus (MATH:1550, MATH:1560 or equivalent)
- Differential Equations (MATH:2560 MATH:3600 or equivalent)
- Matrix Algebra (MATH:2550, MATH:2700 or equivalent, recommended)

##### Chemistry

- General (CHEM:1110, CHEM:1120, or equivalent)
- Organic (CHEM:2210, CHEM:2220, CHEM:2410 or equivalent)
- Advanced Chemistry (Analytical Chemistry, Biochemistry, or Physical Chemistry)

##### Chemical Engineering

- Process Calculations (CBE:2105 or equivalent)
- Chemical Engineering Thermodynamics (CBE:3105 or equivalent)
- Fluid Flow (CBE:3109)
- Heat & Mass Transfer (CBE:3113)
- Separations (CBE:3117)
- Chemical Reaction Engineering (CBE:3120 or equivalent)

Approval of the Director of Graduate Studies is required to grant credit toward graduate requirements, and is given on a case-by-case basis. Introductory undergraduate courses are not appropriate for meeting the graduate program requirements (see definitions).

The Graduate College requires that students be registered in the final session in which the degree is awarded. In addition, Ph.D. candidates are required to be registered in each semester (summers excluded) after passing the comprehensive examination until the degree is awarded.

#### **E. English Proficiency Requirement**

An on-campus English Proficiency Evaluation will be administered by the University upon arrival in Iowa City, unless the student submits a TOEFL overall score of 100 or higher. The Graduate College requires students to take and pass recommended course work in English usage at The University of Iowa designed especially for international students. Students not meeting the English proficiency requirement are required to satisfactorily complete any course(s) specified as a result of the evaluation, with graduate students required to register for at least one English as a Second Language course during their first semester. Students who fail to take a required ESL course during their first semester will not be allowed to register for the following session.

#### **F. Graduate Seminar Presentation**

All Ph.D. and M.S. thesis graduate students must present a seminar in CBE:5000.

#### **G. Professional Development Experience**

Professional growth extends beyond the curriculum and the research laboratory. Graduate professionals must be able to identify and lead educational and research enterprises which advance the scope and impact of the discipline. Important skills include building professional networks, developing a comprehensive outlook for identifying emerging directions in the field, the ability to explain scientific and engineering principles to a variety of audiences, *etc.*

- Internship
- Second TA experience
- Teacher training
- Substantial (at least one day) workshop focused on development as a professional (looking beyond the student experience)
- Organizer of a session at a national conference
- Organizer of a local conference
- Other approved experience

A student's professional development experience must be developed in consultation with their research mentor and approved by the DGS. Professional development experiences will be tracked as part of the annual progress evaluation.

#### **H. Service Expectation**

The hallmarks of a Ph.D. – the ability to carry out research, and knowledge from advanced coursework – are necessary but insufficient for a satisfying professional career. The ability to integrate technical talents with the needs of the world is an important component of professional

success. Furthermore, many of our graduates will go on to roles where they will need to choose how to fulfill service commitments within their professional lives, when to say yes and no to service commitments, how to link service to broader impacts, and how to assess broader impacts. The service expectation is intended to provide a structured means of improving our Ph.D. graduates' skills in these related areas.

This component consists of two complementary parts: One part explicitly links the student's research to service, and the second part links the student to the more general support activities of their academic and professional community.

The first service component will be realized by a chapter in the student's comprehensive proposal on the Broader Impacts of the research, discussing the impact of the research itself and highlighting ways in which the research will provide outreach opportunities. The chapter in the comprehensive proposal is expected, like the rest of the proposal, to be prospective and prompt the student to incorporate Broader Impacts into their professional activities. It will be the responsibility of each faculty member to ensure the quality of this chapter in any comprehensive proposal they sign.

The second component will be realized by each student identifying approximately 10 hours of appropriate service in their individual development plan, and then carrying it out during the semester. Documentation must be provided by students on the ICON site and should include a description of the event and a photograph of the student carrying out the service.

Traditionally, CBE service has been student initiated and highly variable from student-to-student. Activities have included:

- help with graduate student recruiting visits
- staffing recruiting tables at regional or national meetings
- assistance with selecting and hosting visiting speakers
- participating in the CBE peer mentoring program
- serving on CBE committees
- traveling to give recruiting talks
- designing and delivering K-12 STEM outreach (i.e. classroom demonstrations, short courses, day camps, judging science fairs)
- organizing CBE graduate student social events (volleyball night, picnics, etc.)
- assisting with URM recruiting and mentoring
- assisting with community outreach through MESA tutoring
- getting involved with college or University organization (COGS, Graduate Student Senate, WISE, SWE, Sustainability groups, etc.).
- service activities at national organizations such as AIChE, ACS, AAAR, SWE, or the IUCRC photopolymerization center – organizing sessions at meetings, conferences, special issues of journals, etc.
- community service to disadvantaged groups through outside organizations such as churches or social justice organizations.

We will encourage continuation and expansion of these service activities into the broad categories listed below:

- service that mainly benefits the department and its graduate students
- service that mainly benefits the College and/or University
- service or outreach that reaches disadvantaged, underserved, and/or underrepresented communities
- service that grows the student by forcing growth and skill development in uncomfortable or new areas
- service that is likely to lead to career networking opportunities
- service learning, which is the development of technical and research skills through application of skills to solve real world problems for stakeholders such as local and state government, professional societies, community groups, and non-profits.

Students are encouraged to be creative and bold in identifying service and outreach opportunities that are synergistic with their research and career goals.

## **I. Master of Science Degree**

### *General Requirements for the M.S. Degree*

There are two options available, a thesis option and a non-thesis option. The requirements which must be satisfied are:

#### **MS without Thesis**

1. The Master of Science program without thesis requires a minimum of 30 s.h. in approved graduate courses, plus 3 s.h. of required seminars (or 33 s.h. total). In addition, non-thesis M.S. students will be required to complete the five core courses with a GPA for those courses exceeding 3.25/4.00. All graduate students must take the 1sh Engineering Ethics ENGR:7270 course.
2. All students must maintain a cumulative grade-point average of at least 3.00/4.00 in order to graduate.
3. Pass a final examination with the standing graduate examination committee prior to graduation. The examination includes questions about the student experience and their future plans.

Graduate students in the non-thesis M.S. option may petition for entry into the thesis M.S. program or the Ph.D. program by requesting a change of status through the Graduate College. The request will be reviewed by the Graduate Admissions Committee in the Chemical and Biochemical Engineering department. If the Committee approves the request, then it will be forwarded to the full faculty for final approval. Assignment to research advisors will be handled as if the student were a new graduate student.

#### **MS Thesis**

1. The Master of Science program with thesis requires a minimum of 30 s.h. in approved graduate courses, plus 3–5 s.h. of required seminars (or 33-35 s.h. total). In addition, M.S. students will be required to complete the five core courses with a GPA for those courses exceeding 3.25/4.00. Students who pursue the thesis option may earn up to 6 s.h. in CBE:5999 MS Thesis

Research: Chemical and Biochemical Engineering. All graduate students must take the 1st Engineering Ethics ENGR:7270 course.

2. Complete at least one teaching assistantship as well as one professional development experience.
3. Present at CBE:5000 graduate seminar.
4. Successful completion of a MS thesis and thesis defense.
5. All students must maintain a cumulative grade-point average of at least 3.00/4.00 in order to graduate.

#### *M.S. Examining Committee*

The M.S. examining committee for the master's degree consists of at least three faculty members. For U2G and non-thesis M.S. students, this committee is the standing graduate examination committee. For these students, the examination include questions about the student experience and their future plans. M.S. thesis students select committee members in consultation with their research advisor. The thesis committee plays an important role in advising the student in their graduate studies. It is therefore important that thesis committees be selected carefully. At least two of the faculty members must be full members of the UI Graduate Faculty (defined as faculty members appointed to tenure-track or tenured faculty lines). The committee must include at least two faculty members who have primary appointments in CBE. In all cases, the names of the faculty members that serve on the committee are forwarded to the Graduate Program Specialist in the CBE department, who will forward the recommendation onto the Dean of the Graduate College. The Dean of the Graduate College formally appoints the student's committee.

#### *M.S. Thesis*

During the performance of M.S. research, the goal is to accomplish research which is publishable in a peer-reviewed scientific journal. The student must follow all Graduate College requirements with respect to preparation of the thesis and the Graduate College thesis deadlines (<https://www.grad.uiowa.edu/academics/thesis-and-dissertation>).

The content of the thesis provides the rationale for the proposed research, and presents relevant methodology, results, and conclusions. The thesis is submitted to the committee members at least two weeks prior to the oral examination.

#### *M.S. Thesis Defense*

The Master's Thesis Defense is an oral exam during which the student defends the purpose, methods, and results of the thesis research. It is scheduled by the student in consultation with the advisor and committee members. Either an inadequate oral defense of the work or inadequate research may result in a failure of the defense. The thesis defense may be repeated once, and the committee should offer additional guidance in regard to the inadequacies to be addressed. The maximum length of the closed-door evaluation by faculty members is two hours.

If the thesis defense receives a passing evaluation, the student must make any corrections and modifications to the thesis required by the examining committee and obtain committee member acceptance of the changes prior to final submission to the Graduate College. The Graduate College will obtain electronic verification of the thesis from each member of the examining committee.

#### *M.S. Thesis Deadlines*

Deadlines are decided by the Graduate College for the final submissions of the thesis. These deadlines are posted every semester at the following website: <https://grad.uiowa.edu/academics/deadlines>.

### **J. Doctor of Philosophy Degree**

#### *General Requirements for the Ph.D. Degree*

A minimum of 72 semester hours of approved graduate credit is required for the Ph.D. degree. Of the 72 semester hours, at least 30 semester hours must be in approved graduate-level course work. One semester hour seminars (such as CBE:5000) may not be used to meet the 30 s.h. coursework requirement, but may be used to meet the 72 s.h. overall graduation requirement. Introductory undergraduate courses (see definitions) may not be used to satisfy the 72 s.h. requirement. The Ph.D. student must have an overall minimum graduate grade point average of 3.25/4.00 in order to graduate.

The Ph.D. degree is primarily a research degree conferred upon students who have demonstrated proficiency in their chosen field of research. It is expected that the Ph.D. dissertation research represent an original and significant contribution to the body of knowledge in the field. Publication of at least one paper as first author, with the research advisor as a co-author, in a peer-reviewed journal, in addition to presentation of their research in a departmental seminar are requirements of graduation.

Each Ph.D. student must pass the qualifying requirement, pass the comprehensive examination, submit an acceptable Ph.D. dissertation, and pass the final oral examination. The Ph.D. candidate is reminded that these are minimum requirements. The faculty advisor and/or examining committee may impose in writing other requirements such as the completion of additional course work or the acquisition of specific skills. The actual amount of course work required is determined with the advice and consent of the faculty advisor.

Each Ph.D student must complete one teaching assistantship, one professional development experience (Section G), and fulfill the service requirement (Section H).

#### *Ph.D. Qualifying Requirement*

All students on a Ph.D. track must pass the Ph.D. qualifying requirement. The purpose of this qualifier is to determine the student's proficiency at graduate-level coursework in chemical engineering. The requirement is satisfied with a GPA of 3.50 or higher in the core curriculum.

For students with a B.S./B.E. in chemical engineering, the qualifying requirement must be completed within the first four semesters. For students with a B.S./B.E. degree in a non-chemical engineering major, an additional two semesters are granted to complete the qualifying

requirement. For students entering the program with an M.S. in chemical engineering, the qualifying requirement may be completed earlier.

Students who do not achieve a 3.50 or higher GPA in the core curriculum may petition to complete the qualifying requirement by an alternative method acceptable to the research advisor, the Ph.D. examination committee, and the departmental graduate faculty. The alternative qualifier must be completed within 6 months of completion of the core courses. Completion of the qualifier in a timely manner is required for eligibility for financial aid.

#### *Master's Degree En Route*

Students on the Ph.D. track without a prior master's degree in chemical engineering may to obtain an *en route* non-thesis M.S. by fulfilling the following requirements described in the Section I. Note that the *en route* M.S. degree must be obtained in a different semester than the Ph.D. degree.

#### *Ph.D. Comprehensive Examination*

Each Ph.D. student will complete a comprehensive oral exam within three years of entering the program. Under unusual circumstances, requests for extension of this deadline can be made to the Director of Graduate Studies and approved by the department faculty. The objective of the comprehensive examination is the same across all graduate programs, and is to “intended to be an inclusive evaluation of the candidate's mastery of the major and related fields of study, including the tools of research in which competence has been certified. The comprehensive examination is not a deferred qualifying examination. It is intended to evaluate a candidate's mastery of the subject at or near the end of the candidate's formal preparation and prior to the completion of the dissertation.”

The comprehensive examination consists of two parts: the development of a written research proposal and an oral defense of the proposal before a faculty committee. The research topic of the proposal, agreed upon by the graduate student and advisor, will normally be the student's intended dissertation project. The written proposal should contain the plan of study, preliminary results, and a discussion of the broader impacts and opportunities for outreach associated with the research (see proposal format and length of each section in the Appendix B). The student may receive guidance from their advisor and other colleagues while writing the proposal. The student must submit the written research proposal to each member of the faculty committee at least two week prior to the scheduled oral examination. The oral examination should include a presentation by the student (typically a 25-30 min presentation that is open to the public), followed by an evaluation of research progress by the faculty committee. The maximum length of the closed-door evaluation by faculty members is two hours.

It is recommended that students invite committee members onto their committee and begin scheduling their examination at least two months prior to the proposed exam timeframe. Generally, students should give a two-week timeframe from which the faculty members can choose dates and times that fit their schedules.

The Comprehensive Exam Committee will consist of the research mentor(s), at least 2 other faculty members who hold an appointment in the CBE department, and at least one faculty member who holds an appointment outside the CBE department. At least four of the faculty

members must be full-members of the Graduate Faculty, and at least three must be members of the University of Iowa tenure-track faculty. Instructional- and clinical-track faculty can be included on the committee as a member. The names of the proposed committee members must be submitted to the department's Graduate Program Specialist who will forward the formal Request for Comprehensive Examination Committee to the Graduate College.

A request to the Graduate College can be made for the non-CBE member to be replaced by a recognized scholar of professorial rank from another academic institution. A complete and current copy of the person's CV, and the reason the candidate would be a valuable member of student committees, must also be sent to the Graduate College. Graduate College approval is not automatic. Students that would like to use this option must inform the CBE Graduate Program Specialist in time so that the proper paperwork can be submitted, and the Grad College's approval or denial of the request determined prior to the examination.

Upon completion of the oral comprehensive examination, students will be assigned a grade of satisfactory, reservations, or unsatisfactory by each committee member. Students will be informed of the results at the end of the examination.

A vote of "Reservations" is used when a faculty member feels that the deficiencies displayed by the student were modest, and can be readily rectified. In the event of a report of two or more "Reservations", a report will be generated stating in writing the concerns of the committee and the specific courses, procedures or other requirements to be satisfied by the student. The examining committee will also specify in writing the time by which these requirements must be satisfied by the student. If the student satisfies the required actions in the specified period of time, the comprehensive examination will be recorded as satisfactory.

Two or more unsatisfactory votes will make the committee report unsatisfactory. In the case of a report of unsatisfactory, the committee may grant the candidate permission to attempt a reexamination not sooner than four months after the original oral comprehensive examination. The comprehensive examination may be repeated once at the discretion of the examining committee.

### *Ph.D. Dissertation*

The Ph.D. dissertation should be a document describing the experiments, analyses, results, and conclusions which are of sufficient novelty that they are publishable or already published as the candidate's work in the peer-reviewed scientific literature. A copy of the dissertation must be delivered to each committee member at least two weeks prior to the defense.

The student must comply with Graduate College guidelines regarding the preparation of the dissertation and must meet Graduate College dissertation deadlines. Thesis costs are the responsibility of the student, including associated costs such as copying. Students should refer to the Graduate College Thesis Manual for formatting templates and specifics on Graduate College regulations and resources for the preparation of doctoral dissertations (<https://www.grad.uiowa.edu/academics/thesis-and-dissertation>).

### *Ph.D. Dissertation Committee*

Ph.D. students select committee members in consultation with their research advisor. In general, the Comprehensive Examination Committee will also serve as the Final Examination (Dissertation Defense) Committee. While the foregoing is not strictly required, it is highly advisable when possible. The thesis committee plays an important role in advising the student in their graduate studies. It is therefore important that thesis committee members be selected carefully.

The names of the proposed committee members must be submitted to the CBE Graduate Program Specialist, who will forward a formal Request for Final Examination. The proposed members of the Dissertation Defense Committee and the title of the dissertation must be submitted to the CBE Graduate Program Specialist at least four weeks prior to the defense.

### *Final Examination*

The final examination is administered by the candidate's committee and consists of an oral presentation by the candidate of their dissertation work (typically a 35-45 min presentation that is open to the public), followed by a question and answer period by the general audience (open-door) and then by the faculty committee (closed-door). The final examination includes a critical inquiry into the purpose, methods, results, and conclusions of the research, as well as an intensive examination in areas of knowledge directly related to the investigation. The maximum length of the closed-door evaluation by faculty members is two hours.

The final examination may not be held until the academic session after the academic session during which the comprehensive examination was passed. Usually, the final examination is held much later. However, a student must pass the final examination no later than five years after passing the comprehensive examination and no later than four years after entry into the graduate program with an external M.S. Failure to meet this deadline indicates that the student is failing to make appropriate progress in the program, which may lead to reduction/termination of financial aid or dismissal from the program. Please note that additional requirements for normal progress (which may be stricter than those above) are contained in the "Departmental and College Policies" section of the handbook.

The final examination should be scheduled as early in the semester of graduation as possible in order to provide as much time to make the required corrections and additions to the thesis or dissertation that are required by the examining committee. In general, the final examination should be scheduled no later than two weeks before the final deposit deadline.

The report of the final examination must be presented to the Graduate College no later than 48 hours after the examination. Reporting to the Graduate College is handled by the CBE Graduate Program Specialist. The final examination may be evaluated as "satisfactory" or "unsatisfactory". Two or more "unsatisfactory" votes constitute a failure. The final examination may be repeated only once at the discretion of the examining committee.

If the student receives a passing evaluation ("satisfactory") of their final examination, the student must make any corrections and modifications to the dissertation which are required by the Dissertation Defense Committee. The student should make every attempt to ensure that the

corrections are acceptable to the committee members. The dissertation can then be submitted to the Graduate College to meet the final deposit requirement. The committee members will be requested by the Graduate College to sign off on the final document.

Deadlines are decided by the Graduate College for the final submission of the dissertation to the Graduate College. These deadlines are posted every semester at the following website: <https://grad.uiowa.edu/academics/deadlines>.

## **K. Graduation**

At the beginning of the semester in which a student expects to receive the M.S. or Ph.D. degree, they must review their academic record and progress on the dissertation with their advisor. If all work on the dissertation is likely to be completed by the end of the semester, the student will complete the application for graduation in MyUI and work with the CBE Graduate Program Specialist on the necessary information to provide to the Graduate College.

Graduating students must complete a Departmental Graduation Checklist with their faculty advisor at least three days before the semester commencement exercises. Failure to submit a Graduation Checklist will result in a hold placed on your graduation records.

## **VI. ADVISING, MENTORING, AND PLANNING**

### **A. Faculty and Research Advisors**

#### *Faculty Advisor*

Each graduate student will be assigned an academic advisor when they first enter the graduate program. For non-thesis M.S. and U2G students, an academic advisor will be assigned by the Director of Graduate Studies. For Ph.D. and M.S. thesis students, the Director of Graduate Studies will serve as the temporary academic advisor. After thesis students have selected their research advisor, the research advisor will normally become the academic advisor. An academic advisor guides a student in selecting courses that will both satisfy the requirements to earn a degree and, if applicable, provide the foundation for the research that the student will undertake.

What an academic advisor can do for you:

- Provide information about various fields of study related to your career and/or research interests;
- Provide information about career, research, and service opportunities;
- Provide advice if you have academic difficulty;
- Write letters of reference for you if you have made an effort to develop a collegial relationship with your advisor.

#### *Research Advisor*

The research advisor serves as a teacher and mentor to the graduate student. It is through this close sharing of responsibilities and common goals that the graduate student learns to become an independent investigator. The research advisor will also provide continuous evaluation of the performance and progress of their advisees.

Within the first month or so of joining the program, new graduate students are required to discuss their research interests and objectives with faculty members. Graduate students should take time to talk to potential advisors, as well as students and postdocs of potential advisors, about projects available in the laboratory, advising/mentoring styles, mentor expectations, where recent graduates are working, etc. At the end of this period, each student will inform the Director of Graduate Studies of their top three choices for their faculty advisor. Final assignment of the student to a faculty advisor is based on the mutual interests of the student and the faculty, current research commitments, and departmental obligations. The Department Executive Officer (DEO), in consultation with the faculty, is responsible for making the assignment of each graduate student's research advisor.

### **B. Peer Mentoring Program**

The Department maintains a peer mentoring program for all first-year graduate students. Mentors are solicited from the 2nd year and more senior (3<sup>rd</sup> or 4<sup>th</sup> year) graduate students each summer and paired with new graduate students that are joining the program. Each peer mentor is expected to contact the incoming student during the summer to help the incoming student integrate into the Iowa City community and CBE department quickly and successfully, as well as throughout the first year of classes. The objective is to enrich the first-year experience for incoming graduate students, though peer mentor-mentee pairs often continue to meet beyond the first year.

Some duties of mentors include:

- Initiate contact with your assigned new student(s) through e-mails messages;
- Contact your assigned student(s) at least once a week or once every other week to check in, answer questions, invite them to meet with you, etc. Many students have questions about transportation and housing that are best answered by peers (summer and fall semester);
- Contact your assigned student(s) as needed to offer support and check-in (spring semester);
- Offer to meet face-to-face or virtually to talk about the transition to graduate school.

Benefits of mentoring include:

- The opportunity to make a positive difference in the lives of new graduate students;
- Develop your interpersonal skills, communication skills, and ethical standards;
- Meet new people;
- Provide service to your University and academic program; receive many thanks from your students, their families, and faculty.

### **C. Faculty Mentoring Program**

The Department maintains a faculty mentoring program for all M.S. thesis and Ph.D. students. Faculty mentors provide a separate element of support for graduate students, beyond the research advisor. Students are paired with a faculty mentor early in the first semester, with a letter sent via email to each mentor and mentee by the CBE Academic Program Specialist. Either the faculty mentor or the mentee can be the first to initiate contact and request a first mentor-mentee

meeting. As a best practice, weekly meetings with your mentor are recommended for the first 10 weeks of the semester, followed by monthly meetings for the remainder of the first year. After the first year, meetings are recommended on an as needed basis.

Some roles that mentors are suitable for:

- Encourage students to go to conferences to present their research and network, discuss in general options for getting funding and how to pick the best meetings, how to prepare, and whether to present posters or oral presentations;
- Share teaching strategies;
- Tell students what you like about a career in academia;
- Share personal career experiences, successes, failures;
- Discuss political situations you encounter and how you manage the issue;
- Understand that no two women and no two people of any race or ethnicity are the same;
- Include students in social activities;
- Discuss integration into lab and research;
- Discuss integration into classes and community;
- Discuss unwritten rules that may exist in the Department, College, University or academic discipline.

#### **D. Alumni Mentoring Program**

The Alumni Mentoring Program seeks to connect University of Iowa Department of Chemical and Biochemical Engineering (CBE) graduate students with alumni. This connection will provide students with opportunities to interact with chemical engineering professionals, enhance their career readiness skills, including networking, resume and cover letter development, and gain insight into professional life outside of academia. The objective of this mentoring program is to help transition students from graduate school to a successful professional career, including both industry and government sectors. Mentors and mentees will apply to be a part of the program and will be matched based upon mentor expertise and student interests and goals. After the initial application, mentors and mentees will remain in the program unless they decide to opt out.

#### **E. Annual Meeting with Faculty Committee**

There are several “examination committees” put in place during a graduate student’s tenure at the university, typically for evaluation of critical milestones (e.g. comprehensive exam, final exam, thesis defense). But these committees also play an important role in advising the student throughout their graduate studies. It is therefore critical that graduate students keep their current faculty committee informed of their progress and any major setbacks that occur during the degree.

Each graduate student is required to meet at least annually with a faculty committee. Progress reports serve as part of the student record that is reviewed at annual committee meetings. Students not meeting expectations should have meetings each semester until good standing is reestablished. Two types of committees exist: (1) the standing graduate examination committee, which consists of the Director of Graduate Studies, Director of Graduate Admissions, and up to two additional members appointed by the DEO; (2) the specific dissertation committee(s) formed by M.S. thesis students (in their 2<sup>nd</sup> semester) and Ph.D. students (in their 3<sup>rd</sup> semester). Non-thesis M.S. and U2G students meet with the standing examination committee. M.S. thesis

students should always meet with their dissertation committee due to the compressed nature of the M.S. thesis timeframe. Ph.D. students meet with the standing graduate examination committee in the first year, but should then meet with the dissertation committee thereafter.

Annual meetings should be completed by the Friday of the 10th week of the semester. This applies to both spring and fall semesters. This is necessary to prevent end-of-semester scheduling conflicts and to allow committees time to approve degrees where appropriate. Where scheduling conflicts prevent a meeting with a full committee, a meeting with a partial committee is permitted, although a written report of the meeting should be circulated to all members of the committee by the research mentor or faculty advisor. For example, participation of the external committee member is not expected on an annual basis. Separate annual meetings are not required in years with comprehensive examinations or thesis defense examinations.

#### **F. Review of Progress by the Faculty**

Each fall, the Director of Graduate Studies will lead a faculty evaluation of progress of each student, and a determination of whether students are meeting departmental expectations. The faculty will base their decision on the academic record, the semester progress reports, performance in carrying out the responsibilities of a research or teaching assistantship, evaluations from faculty members, and an evaluation by the faculty/research advisor. In addition, the faculty will determine the level of financial support to be provided (continued, increased, reduced or eliminated), whether the student should be placed on or removed from probation, or in some cases, be terminated from the program. This evaluation will also document progress toward fulfilling the requirements of the degree objective. A student who disagrees with the evaluation may submit a letter stating the reasons why the student disagrees. This letter will be attached to the evaluation and will become a part of the student's file.

#### **G. Individual Development Plans**

Individual Development Plans (IDPs) provide a planning process that identifies both professional development needs and career objectives. Furthermore, the IDPs serve as a communication tool between individuals and their mentors. It is not a performance evaluation tool.

##### *Goals*

Help individuals identify:

- Long-term career options they wish to pursue and the necessary tools to meet these goals;
- Short-term needs for improving current performance.

##### *Basic Steps*

1. Conduct a self-assessment.
2. Survey opportunities with mentor.
3. Write an IDP, share IDP with mentor and revise.
4. Implement the plan and revise the IDP as needed (at least annually).

##### *Documentation and Deadlines*

Each graduate student must complete an IDP annually using the appropriate IDP form available on the "CBE Graduate Student Progress and Development" ICON site. The process begins during

winter break. Each graduate students will receive an email outlining the process from the DGS or CBE academic specialist. Each student must complete the IDP process by April 15th of each year, unless otherwise communicated. Upon completion of the IDP annual review, both the student and mentor keep copies, and the student submits the completed form (including mentor comments) to the appropriate ICON dropbox.

## VII. DEPARTMENTAL AND COLLEGE POLICIES

### A. Satisfactory Performance

Satisfactory performance in the program requires all of the following:

1. Satisfactory Academic Standing:

Students may be dismissed from the University of Iowa Graduate College for inadequate academic performance. Quoting from the Graduate College Manual of Rules and Regulations:

**Master of Science Students:** “A non-doctoral departmental (master's, professional improvement, certificate) student, except one on conditional status, shall be placed on academic probation if, after completing 9 semester hours of graded (A, B, C, D, F) graduate work at The University of Iowa, the student's UI Cumulative GPA falls below 2.75. A student regains good academic standing when their UI Cumulative GPA returns to 2.75, or greater. If, after completing 9 more semester hours of graded (A, B, C, D, F) graduate work at the University, the student's UI Cumulative GPA remains below 2.75, the student will be denied permission to re-register within any Graduate College degree program.”

**Doctoral Students:** “A doctoral student on regular status shall be placed on academic probation if, after completing 9 semester hours of graded (A, B, C, D, F) graduate work at The University of Iowa, the student's UI Cumulative GPA falls below 3.00. A student regains good academic standing when their UI Cumulative GPA returns to 3.00. If, after completing 9 more semester hours of graded (A, B, C, D, F) graduate work at this University, the student's UI Cumulative GPA remains below 3.00, the student will be dropped from the degree program and denied permission to re-register within any Graduate College doctoral degree program.”

*NOTE:* If the Department believes there to be extenuating circumstances for a particular student, the Director of Graduate Studies may request a waiver from the Graduate College. When it can be shown that a particular student is uniquely disadvantaged by the probation policy, the Graduate College may grant an additional semester on probation.

2. Good to excellent performance in research productivity toward the thesis or dissertation (based on the written evaluation of the faculty advisor(s) and/or research director in the annual evaluation).

3. Good to excellent performance in teaching assistantship activities (based on the evaluation of the professor in charge).

4. Attendance in departmental seminars as described in the “Requirements and Expectations for Degree” section of the handbook.

## **B. Grading System**

### *Grades*

Courses carry letter grades. Grades carrying advanced-degree credit are A+, A, A-, B+, B, B-, C+, C, C- and S (satisfactory).

### *Incompletes*

Students who receive a grade of “I” (incomplete) must remove that grade in accordance with the deadlines posted by the Graduate College or the grade will automatically be converted to an “F”. (<https://www.grad.uiowa.edu/manual-part-1-section-vi-marking-system#1.6.D>)

### *Audits*

A student may audit a course with the permission of his or her faculty advisor and the course instructor. No academic credit is given for an audited course, but a grade of “R” (registered) is recorded on the student’s transcript. Requirements for the audit will be set by the course instructor. Tuition is charged for classes audited.

## **C. Normal Progress**

The length of time required to complete a degree program will vary depending on a variety of considerations such as previous degree(s) awarded, background, conditional or regular admission, full or part-time status, degree objective and plan of study. The rate of progress normally expected is such that a resident full-time student would complete an M.S. program in one to three calendar years after the B.S. and the Ph.D. program in four to six calendar years after the B.S. The timelines for “normal progress” for each degree objective are provided in Appendix C.

## **D. Appropriate Professional Conduct**

The faculty members of the Department of Chemical and Biochemical Engineering expect the conduct of students in programs delivered by the department to be consistent with that of a working professional. Faculty members are expected to uphold the integrity of the program and ensure that all aspects of the academic program are administered impartially. Therefore, academic misconduct will not be tolerated.

All acts of dishonesty in any academic work constitute academic misconduct. Student academic misconduct includes behavior involving plagiarism, cheating, fabrication of data, falsification of records or official documents, intentional misuse of equipment or materials, and aiding and abetting the perpetration of such acts. The preparation of reports, papers, and examinations assigned on an individual basis must represent each student’s own effort and reference sources and citations must be clearly stated. The use of assistance from other students or aids of any kind during a written examination, except when the use of books or notes has been approved by the instructor, is a violation of the academic conduct standard. Students must abide by all academic misconduct policies set forth in course syllabi.

Relevant standards include the course materials in Department, College and University ethics classes and trainings, departmental expectations of academic honesty, the Code of Student Life, University Operations Manual, and the Code of Ethics of the American Institute of Chemical Engineers (see Appendix). Useful discussions on plagiarism, and how to avoid it, can be found at the following website: <https://www.northwestern.edu/provost/policies-procedures/academic-integrity/>

The university, Graduate College, and department consider breaches of integrity to be serious offenses. Therefore, all instances of academic misconduct will be documented and recorded in the student's file. Sanctions for academic misconduct are within the purview of the course instructor, academic/research advisor, and full faculty of the department. Alleged violations of this provision will be investigated by the department faculty. If a violation of professional conduct is substantiated, then the department faculty will determine any punitive or corrective action at a closed session of a departmental faculty meeting. Sanctions may include: reduction in the student's grade for the assignment, quiz, exam or course, including assignment of the grade of F in the course, disciplinary probation, suspension from the department, or expulsion from the university.

#### **E. Scholarly Record Keeping**

The department requires that all graduate students conducting research to maintain scholarly records in accordance within their discipline's norms. All scholarly records are the property of the University of Iowa and should remain in the faculty advisor's possession upon student graduation.

##### *Laboratory Notebooks*

Students must maintain laboratory notebooks, or equivalent records, using best practices appropriate to their discipline (e.g., as taught in the technical communication core course). Any laboratory-specific or advisor-specific record keeping norms or policies must be adhered to.

Record keeping procedures should keep in mind the goals of notebooks: (a) to prove what you did and when you did it, for intellectual property disputes, as well as misconduct investigations; (b) to transmit information to coworkers, including after your graduation; (c) to assist you in remembering your experiments and protocols for future experiments and publications; and (d) to analyze and troubleshoot problems.

##### *Electronic Research Records*

Electronic records of research (instrument output files, computer codes, analysis scripts, electronic lab notebook systems) should be maintained according to laboratory-specific record keeping norms, advisor recommendations, and grant/contract data management plans. Data management plans typically specify backup procedures and frequencies, file formats, quality assurance procedures, storage location and indexing procedures, and rules or restrictions for access.

##### *Computers*

Computers that store research data, publication files, etc. need to be managed appropriately, whether they are (a) maintained by the College or University, (b) owned and maintained by the laboratory group, or (c) personal computers such as laptops. Files and devices should be

appropriately secured and backed up. The department encourages lab groups to develop group- and project-specific policies in conjunction with college and university IT staff.

## **F. Registration**

### *Registration Procedure*

To register for classes, you will need to get registration permission from your faculty advisor each semester. You can register at or after the time assigned to you. On-line computer registration information is provided on MyUI at:

<https://myui.uiowa.edu/my-ui/courses/dashboard.page>.

### *Transfer Credits*

Students may request the use of graduate credits earned at another institution. A transfer means the student may substitute a course taken at another institution for a required course. To request transfer credits, students should talk to the Director of Graduate Studies. Students may be requested to submit a course syllabus for evaluation. Transfer credits from other colleges and universities are also evaluated by the Office of Graduate Admissions. The program cannot approve transfer hours from other institutions unless Graduate Admissions awards graduate credit hours.

## **G. Assignment of Office/Lab**

Each semester the DEO will assign office and laboratory space to graduate students. Priority for office and laboratory space will be given to students performing thesis research, to teaching assistantships who must meet with students, and full-time graduate students. Due to space limitations, office space cannot be guaranteed to all graduate students.

## **H. Keys and Departmental Security**

Keys (or electronic access) to student offices, laboratories, common areas and entrances may be obtained from the CBE department administrator or academic program specialist. Students that need access to resources or buildings administered by other colleges (e.g. Chemistry building, CMRF, Biochem Stores, Public Health building) need to contact the administrator in the respective office for that department or facility to obtain access. Students will only be issued keys for which they are specifically authorized. The keys must be returned when requested by the department or when the student no longer requires access. In any case, all keys issued to the student must be returned when all degree requirements are completed.

Each student and faculty member is responsible for all keys issued to them. When issued a key, students will sign a form saying they agree that the department has a right to charge their UBill \$50 if a key is lost.

Since departmental security depends on key control, it is necessary to re-key all affected locks and issue new keys when a key is lost, stolen or not returned. This is a very expensive process costing up to several hundred dollars for some locks. Do not lend your keys out or leave them unattended. Return keys you no longer need as soon as possible. Try not to flush them down the toilet (they are not recoverable). Graduation applications, registration and other paperwork may be canceled for failure to pay outstanding bills to the department.

The theft of laboratory and personal items is common. Do not keep valuables in your desk. Keep your keys with you at all times. Lock your doors and windows when leaving your laboratory. Do not block open locked doors. Do not let unauthorized persons into the building after hours. Anyone who belongs in the building after hours should have a key.

If you do lose your keys, contact the department administrator immediately.

### **I. Purchasing Supplies and Services**

Purchasing procedures differ depending on where vendor and the cost. Please check with a departmental staff member prior to purchasing goods, or services, including travel tickets, hotel reservations, and conference registrations.

For routine lab supply purchases, send an e-mail or quote to [chemical-engineering@uiowa.edu](mailto:chemical-engineering@uiowa.edu) who will coordinate with the appropriate University Shared Services contact (<https://university-shared-services.fo.uiowa.edu/uss-contacts-college-engineering>). Purchasing request forms can be found under the resources and form section of our website. Information required for purchase request includes:

- 1) Link to website (if applicable)
- 2) account to charge
- 3) justification for purchase
- 4) vendor
- 5) item number
- 6) item name/description
- 7) price
- 8) quantity

Shipping will be standard delivery unless you note a need for expedited delivery. You can also create an eBuy shopping cart through ePro and send it to the Department Administrator. Please include the justification/purpose for purchase, and account to charge.

Major equipment costing more than \$5,000 will require a review and potential bids. This process can be time consuming and usually takes several months to complete. Students should plan their research accordingly.

### **J. Purchasing/Renting Gas and Gas Cylinders for Research**

Gas for experiments is purchased through a contract with Praxair. Email the department administrator and ask if there is an existing account for a particular lab or project. If an account does not exist, work with the department administrator and he/she will set one up for you. If an account exists, email the department administrator with the type of gas needed, size of cylinder, serial number, lab location, your phone number so you can be contacted when cylinders arrive, and the account that will pay for the gas and cylinder rental. The gas cylinders will be delivered to the laboratory. The gas is purchased; however, the gas cylinders are rented. Projects will be charged a monthly rental fee for each cylinder ordered until the cylinder is returned to Praxair. These fees can add up quickly and students are requested to return cylinders as soon as they are no longer needed. Email the department administrator to have the empty cylinders picked up. All gas cylinders should be stored, transported and used according to University safety policies and training courses.

## **K. Student Complaints Concerning Faculty Actions**

If a dispute arises between a student and a faculty member or between a student and their program, there may be confusion as the best way for the student to seek resolution of the problem. In part, this is because the procedure to be employed is dependent upon the nature of the problem. The Graduate College Academic Grievance Procedure (<https://grad.uiowa.edu/academics/manual/academic-grievance-procedure>) presents a convenient summary of the route to be applied for the problem at hand. Both informal and formal procedures are discussed in the document.

If the specific case of a complaint involves sexual harassment, different procedures apply. The university policy on sexual harassment and consensual relationships in the instructional context can be found at <https://opsmanual.uiowa.edu/community-policies/sexual-harassment-and-sexual-misconduct>. More information is available at <https://ocrc.uiowa.edu>.

The Office of the University Ombudsperson, Third Floor Jefferson Building, 129 E. Washington Street, 335-3608, responds to problems and disputes brought forward by all members of the university community - students, staff, and faculty. All conversations with people in the Ombuds Office are confidential. Individuals in that office will, through discussion, help students to determine if they have a legitimate complaint and, if so, the best procedure for resolving the complaint.

Students are encouraged to make full use of the counseling services available through the university (<https://counseling.uiowa.edu/>). These cover the full range of academic, personal, financial, health or marital difficulties. Such discussion will usually be informal and confidential.

## **L. Changing Advisors**

A change in advisor-student relationship may be requested by either the student or the faculty member. Changing this relationship, while possible, may create numerous difficulties for the student as well as for the advisor. The department may be unable to provide alternative financial support for students previously supported by their faculty advisor or unable to find another faculty member willing to act as their faculty advisor. In addition, the faculty member may be unable to fulfill their research obligations. As a result, changes in advisor are not taken lightly and cannot be automatically approved.

Should a difficulty arise in the advisor-student relationship which cannot be resolved privately, the Director of Graduate Studies and the DEO may be able to assist the parties in reaching a mutually acceptable agreement. If the problem cannot be resolved after consultation with the Director of Graduate Studies and the DEO, then a change of advisor may be formally requested by one or both parties. A change of advisor must be approved by the student, the student's advisor, and the DEO. In the event that either the student or the former advisor refuses approval, a departmental faculty meeting will be held to discuss the change. The approval of the department faculty is required before the change of advisor is approved. In either case, the student can petition the department (by writing a letter to the DEO requesting to present their case at the departmental faculty meeting).

A change of advisor may be permitted only when the following conditions have been met:

- A change in advisor is in the best interests of the student, the faculty advisor and the department.
- The Department Executive Officer has been consulted.
- The student is able to find a new faculty advisor in the department or has taken steps to transfer out of the department. Generally, a change of advisor will require the student to change research projects and often lead to the delay of graduation. Publication or presentation of the research work conducted before the change of advisor should seek approval from both the student and the student's original advisor.

A change of advisor will not be permitted if an M.S. candidate has less than one full semester remaining in their program. A Ph.D. candidate must have at least three full semesters remaining before completing degree requirements.

The student and/or faculty advisor should submit their request for change of advisor, in writing, to the DEO, giving their reasons for making this request. The DEO will bring this request to the department faculty for their approval before the request is approved.

### **M. Leave of Absence**

A Leave of Absence (LOA) is a temporary cessation of study and may be granted for up to one year for medical reasons and other emergencies. LOA allows graduate students in good academic standing to postpone their studies for a defined period of time in the event of unavoidable circumstances (e.g., documented medical reasons, active military duty, etc.). Supporting documentation must be submitted with a LOA letter to the Director of Graduate Studies. All LOAs are reviewed and granted on a case by case basis. Financial hardship is not an approved LOA.

A graduate student who wishes to request a LOA will submit to the Director of Graduate Studies a letter requesting the Leave of Absence. The LOA is first approved by the department and then submitted to the Graduate College for approval. An official Leave of Absence begins only after the student receives a letter formally approving the LOA and stating the expectations for how the student will rejoin the program at the end of the absence. Students that are post-comprehensive are expected to maintain continuous registration until graduation, including time on LOA.

Students who have been absent for less than one year from the University of Iowa are not required to be re-admitted. Students should contact the UI Service Center to have a registration day and time set up. Students absent from The University of Iowa 12 months or more need to apply for re-entry through the Office of Admissions. International students need to contact International Student and Scholar Services, regardless of the length of their absence, to ensure they have the appropriate immigration documentation to return.

### **VIII. ADDITIONAL RESOURCES**

There are considerable support systems at the University of Iowa to assist students, especially in times of stress or crisis. A master list of resources can be found at: <https://dos.uiowa.edu/resource-guide/master-resource-list>.

Key contact information is:

- Emergency 911, or 319-335-5022 (University of Iowa Public Safety)
- If you're not sure where to start, call Student Care and Assistance at the Office of the Dean of Students, 319-335-1162, [dos-assistance@uiowa.edu](mailto:dos-assistance@uiowa.edu)
- The resources available include the Threat Assessment & Care Team, University Counseling Service, Student Health & Wellness, Sexual Misconduct Response Coordinator, Women's Resource and Action Center, Rape Victim Advocacy Program, Office of the Ombudsperson, Domestic Violence Intervention Program, Graduate College, Student Legal Services, International Student and Scholar Services, Student Disability Services, Office of Civil Rights Compliance, Associate of Campus Ministers, Johnson County Crisis Center 24-hour Hotline, UI Health Care 24-hour Nurseline, and National Suicide Prevention 24-hour Lifeline. Consult a web search engine to find phone numbers and office locations. Many of these offer confidential and/or 24-hour support.

### **A. Computing**

As a graduate student in the department you also have access to all ETC (Engineering Technology Center) resources (<https://engineering.uiowa.edu/etc>). This includes access to software (for immediate download, use via the virtual desktop, or purchase), computers and laptops, research drives, consultants, and more. Access to super computers, parallel processors and other high-speed computing resources is available. Online training may be required to access these resources.

Students must use computing resources ethically and legally. It is a violation of University policy to access, read, copy or use the computer programs, files, tapes or other material without the knowledge and consent of the owner. Violation of this policy is considered the equivalent of theft. In addition, students must observe the copyright protection afforded commercial software and are not permitted to make illegal (or "bootleg") copies of copyrighted software.

### **B. Shops**

There are a number of shops on campus available to repair and construct graduate research apparatus. These shops charge users for labor and materials. A university MFK is required and must be requested prior to obtaining services. Please work closely with your advisor to select facilities for construction and repair of apparatus.

Available resources on campus currently include:

- Engineering Technology Center - <https://engineering.uiowa.edu/etc>
  - Poster printing service
  - Machine Shop
  - Electronics Shop
  - Computer service
  - Numerous 3D printers and 3D scanning, prototyping services
- Engineering Library Tool Library - <https://www.lib.uiowa.edu/eng/tool-library/>
  - Cameras, thermal cameras, 3D scanners, various hand tools, sensors and meters, balances, circuits, calculators, iPads and laptops,

- College of Liberal Arts and Sciences Glass Shop -  
<https://clas.uiowa.edu/shops/glass-blowing>

### **C. Libraries**

The Engineering Library (2100 SC) should be considered a valuable asset to graduate researchers. The Engineering library (<https://www.lib.uiowa.edu/eng/>), and other libraries on campus have valuable short courses on searching literature and databases, citation and reference management, and data management. Researchers are encouraged to meet with the Engineering Library staff to discuss their research and discover relevant resources.

The University of Iowa has a decentralized library system. Most of the chemistry and chemical engineering literature is accessible on the web. Loan policies vary by library; however, graduate students typically may check out books for one semester. All material is subject to recall.

### **D. Printers and Copy Machines**

Printers and copy machines are available for use in individual research spaces, engineering computer laboratories, and the various libraries on campus. Use of the department copy machine and printers (including color printing) is limited to that needed to discharge the responsibilities of a teaching or research assistantship.

### **E. Use of Teaching Equipment for Graduate Research**

In general, it is the policy of this department that equipment of the instructional laboratories may not be used for graduate study. Limited short-term or occasional use for graduate research may be approved by the lab course instructors or the DEO. The equipment must remain in the instructional laboratory, and such usage must not interfere with the instructional use of the equipment. The research advisor must certify in writing that use of the equipment is essential to the research project and that the advisor and student will be responsible for repairing any damage to the instruments that arise from their use. The research advisor must also agree to pay for supplies and incidental items used by their students while using instructional equipment.

The users must be trained to use the equipment properly and safely. Any equipment problems must be reported immediately to the lab course instructor or the DEO. Arrangements for repairs due to damage or wear from non-instructional use must be made immediately from non-departmental funds. For use of the instruments after hours, room access may be granted with the permission of the lab course instructor or DEO. Any violation of these policies may result in the loss of instructional equipment use privileges.

In extraordinary circumstances, instructional equipment may be loaned to faculty advisors for research purposes for a limited time (typically four weeks or less). A written request must be submitted to the lab course instructor or DEO. Approval will be granted only if undergraduate teaching will not be impaired and the faculty advisor has taken steps to purchase the needed equipment. In no case will teaching equipment be loaned for more than one semester.

### **F. Safety and Hazardous Materials**

All chemicals in the laboratory should be considered potentially hazardous. Safety Data Sheets (SDS) are available online for most of the chemicals used in your laboratory. The SDS contains information regarding the potential chemical, physiological, mechanical and other hazards

associated with the chemical. Every laboratory must maintain a Chemical Inventory of all chemicals available in the laboratory, as well as the SDSs for those chemicals. Check with your faculty advisor, the department office or the Environmental Health and Safety Office in order to see the SDS of interest to you. Laboratory instructors are responsible for providing SDS on all chemicals used in the course to the graduate T.A.'s. The T.A.'s are then responsible for making them available to the laboratory students before they start the lab.

Each experimental laboratory must have at least one person designated and trained to dispose of hazardous waste and in maintaining the Chemical Inventory.

The PI of each laboratory is responsible for initial and annual training of all students and staff working in the lab. Typical training requires online training in Lab Chemical Safety, Chemical Fume Hoods, Chemical Storage Safety, PPE (Personal Protective Equipment) Awareness for Labs, Spill Preparedness Response, Hazardous Waste Management for Labs, and lab specific training in the Chemical Hygiene Plan / Lab Chemical Safety which covers access to SDSs, training and Standard Operating Procedural requirements for the specific lab, evacuation routes, and PPE requirements for the lab. Initial and annual training, such as in compressed gasses, laser safety, biological safety, blood borne pathogens, ionizing radiation, respirator use, nanomaterials, or other topics may be appropriate (<https://ehs.research.uiowa.edu/safety-training-course-guide-what-course-should-i-take>). Information on how to register for a course is available at <https://ehs.research.uiowa.edu/ehs-safety-training-information>.

Please see a senior member of the lab or faculty member if you are unsure of a safe procedure, or of the training and training documentation requirements for your research.

## **IX. EMERGENCY PROCEDURES**

Please consult lab specific safety policies/procedures and the University of Iowa appropriate procedures and policies, such as the University Laboratory Chemical Hygiene Plan.

But, in summary, in the event of fire, major chemical hazard, or other event that could impact those in the building, you should activate the fire alarm, evacuate the building, and call 911. Fire extinguishers, fire alarms, eyewash fountains and emergency showers are in all laboratory areas. Note the location of these devices near your office or laboratory.

For all emergency situations where immediate assistance is required (major chemical spill, serious injury, police, fire or ambulance) call 911.

For other emergencies call Public Safety (335-5022), e.g. break-ins or illegal entry to labs, personal injuries, theft, or other crimes.

For building emergencies call Facilities Maintenance Work Control Center (335-5071) and Departmental or Building administrators. After working hours, call the Facilities Management emergency number, 335-5071, or Public Safety, 335-5022. Examples of building emergencies include loss of electricity, lack of fume hood ventilation, leak in gas, steam or water lines, elevator problems, heating/AC problems, storm damage, and snow removal.

In emergency calls, state your location, the nature of the trouble and the assistance you are requesting. Finally, you should report all problems and emergency situations to your faculty advisor and to the DEO as soon as possible.

If you are injured while at the University, it is important to get proper medical treatment and to alert your supervisor of the injury. You may be provided no-cost treatment at a University-approved clinic, and you will likely be asked to participate in an accident investigation to help prevent accident reoccurrence.

The supervisor in charge of the space where the incident occurred must file a First Report of Injury within 24 hours of the incident, following chapter on Accidents in the University Operations Manual. The form is available through HR Employee Self-Service. Contact the Environmental Health & Safety for assistance if needed.

## X. TERMS AND DEFINITIONS

*1/4-Time and 1/2-Time Appointments* – financial aid is provided up to 1/2-time to eligible students. The Department recognizes primarily two levels of financial aid in the form of assistantships – 1/4-time and 1/2-time. One 1/2-time assignments require about 20 hours per week and 1/4-time about 10 hours per week of work.

*Core Course GPA* – the average (on a 4-point scale) of grades in courses on the approved core course list, with the exception of Chemical Reaction Engineering CBE:3120. If multiple core courses are taken within a subject area or if courses are repeated, the Department faculty reserve the right to determine which courses are included in the average. Core courses not taken at the University of Iowa are typically not included in the GPA calculation, although they may be included at the discretion of the faculty.

*DEO (Departmental Executive Officer)* - the academic administrator the Chemical and Biochemical Engineering department.

*DGA (Director of Graduate Admissions)* - recruits and serves as the first point of contact for prospective graduate students, submits admission recommendations to the Graduate College.

*DGS (Director of Graduate Studies)* - an advocate for graduate students and graduate student success. The DGS advises incoming students, coordinates the research advisor selection process, monitors and tracks student progress, and is a point of contact for graduate program questions.

*Full time registration* – Nine semester hours in a regular semester constitutes full-time registration for graduate students.

*Full time student status* – Graduate students enrolled in 9 or more s.h. per semester during fall and spring semesters, 5 or more s.h. during summer session, hold full time status. Students may qualify for a reduced course load and be considered "Full-Time Equivalent" if they have completed or will complete all course work during the current semester and are making normal progress on a required thesis/dissertation or are taking the comprehensive examination in that semester.

*Good standing* – a student status as defined by the Manual of Rules and Regulations of the Graduate College. Standing with respect to the Graduate College is determined by GPA.

*GPA in approved graduate courses* – the average (on a 4-point scale) of grades in technical courses used to satisfy the chemical engineering coursework requirement, excluding seminars, grades in independent research, and ESL courses.

*In residence* - the student is making demands on departmental or University facilities and resources (i.e., using faculty time, office space, laboratory space, computer resources, shop facilities, etc.). "In residence" status is based on use of University resources and not on whether the student is living in the Iowa City area. Students working remotely or completing research off site can be in residence.

*Introductory undergraduate courses* – Introductory undergraduate courses are not appropriate for graduate credit. Courses with numbering 052:0XX level (old pre-2013 numbering system) or CBE:0XXX, CBE:1XXX, and CBE2XXX (new numbering system) are defined as introductory undergraduate courses and are not appropriate for CBE graduate credit. Technically relevant courses with numbering CBE:3XXX or higher that are not introductory may count toward graduate credit.

*Meeting expectations* – a student status within the Department of Chemical and Biochemical Engineering achieved by students who simultaneously meet three criteria: "satisfactory performance", "normal progress", and "appropriate professional conduct". The terms "satisfactory performance", "normal progress", and "appropriate professional conduct" are defined in the section IX of this document.

*Not meeting expectations* – a student status within the Department of Chemical and Biochemical Engineering, applied to any student failing to meet one or more criteria from the following list: "satisfactory performance", "normal progress", and "appropriate professional conduct".

*Probation* – a student status as defined by the Manual of Rules and Regulations of the Graduate College. Students not in good standing with respect to the Graduate College are on probation.

*Service* – Service meeting the Departmental Graduate Student Service Expectation is broadly defined, and many activities can qualify. Service may include activities that support the CBE department, CBE graduate student recruitment, CBE department graduate students, the College of Engineering, or the University of Iowa, STEM education, scientific and engineering professions, or the state, cities, and citizens of Iowa. Outreach or service to disadvantaged, underserved, and/or underrepresented communities also meets the expectation. Service to professional organization is valued, as is service learning where special technical projects are undertaken for appropriate outside clients.

*Standing Graduate Examination Committee* – consists of the DGS, DGA, and one or two additional members appointed by the DEO. The standing graduate examination committee is the examination committee for non-thesis M.S. students, and for students who have not yet formed their thesis committee. All first-year students meet with the committee to report on their progress in the department (courses, TA-ship, research, service) and to discuss any issues that may have arisen during the first year.

## **XI. APPENDICES**

### **A. AIChE Code of Ethics**

<https://www.aiche.org/about/governance/policies/code-ethics>

## B. Ph.D. Comprehensive Proposal Format

**Cover Sheet.** Includes distinct project title (maximum of 80 characters), name, etc.

**Project Summary.** Maximum of 250 words. This should be page 1 of the proposal, with this and each succeeding page number centered at the bottom of the page.

**Research Plan.** This section is a maximum of 25 pages. It can be single spaced, but must have 1" margins on all sides and a font size of at least 12 (Times New Roman preferred). This limit includes all figures and tables, but not the "Literature Cited" or "Biographical Sketch" sections. The research plan should answer the following questions. What do you intend to do? Why is the work important? What has already been done? How are you going to do the work? This plan should be hypothesis- or needs-driven. This section should contain the following subsections:

**Specific Aims.** Should have two to three specific aims. It is recommended that this section be limited to one page.

**Background and Significance.** Review of relevant literature and justification of research (i.e., why is the work important?).

**Preliminary Results.**

**Research Design and Methods.** This section should be related back to the specific aims, i.e., the first four subsections given below should be written for each specific aim.

**Experimental Design.** This section should briefly discuss the strategy behind the experiments that will be conducted to address the specific aim in question.

**Expected Results.** What results do you expect to obtain?

**Potential Problems.** What potential problems could arise by following the proposed plan, i.e., what could go wrong? Should briefly discuss alternative approaches for those cases where potential problems could arise.

**Methods.** This section includes the methods that will be used, written in a format similar to the methods section of journal articles. For established methods you should give a brief overview of the methods and cite literature references that can be consulted for additional details.

**Broader Impacts and Service/Outreach Plan.** This section should address how the proposed research activities will advance scientific knowledge and benefit society. In addition, it should address specific plans to satisfy the CBE service requirement.

**Proposed Time Table** (i.e., "Gantt Chart").

**Literature Cited.** This should include complete references (including journal article titles) and be given alphabetically based on the first author's last name.

**Biographical Sketch.** A biographical sketch is required and should be completed as follows (2-page limit):

- Complete Contact Information.
- Education and Training. List all post-secondary educational and training experiences.
- Professional Experience. List positions (including co-ops and internships) directly relevant to research.
- Publications. List your publications that are relevant to the proposed project.
- Presentations. Provide information about your conference presentations that are relevant to the proposed project.
- Honors and Awards. List all your relevant honors and awards.

## C. Normal Progress of M.S. and Ph.D. Students

### Normal Progress of M.S. Students in CBE

	Courses / TAships	Minimum Research Expectations (Thesis Students)	Other	
Year 1	1 <sup>st</sup> semester (Fall)	<ul style="list-style-type: none"> <li><input type="checkbox"/> 2-3 Courses + Ethics Seminar (10 s.h.) - CBE Data Science; Kinetics or breadth requirement; Elective(s); Engineering Ethics †</li> <li><input type="checkbox"/> Thesis students: CBE:5000 Grad Seminar (1 s.h.)</li> <li><input type="checkbox"/> ESL course if required (3 s.h.)</li> <li><input type="checkbox"/> Thesis students: 1<sup>st</sup> teaching assistantship (two required for graduation)</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Discuss project with research advisor and begin literature search on project</li> <li><input type="checkbox"/> Lab safety training</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Meet with peer and faculty mentors</li> <li><input type="checkbox"/> Annual evaluations are completed and sent to mentors and students</li> <li><input type="checkbox"/> Thesis students: 10 service hrs</li> </ul>
	2 <sup>nd</sup> semester (Spring)	<ul style="list-style-type: none"> <li><input type="checkbox"/> 2-3 Courses (9 s.h.) - Literature Review and Proposal Writing; Grad Thermo or Transport; Kinetics or breadth requirement or Elective(s) †</li> <li><input type="checkbox"/> Thesis students: CBE:5000 Grad Seminar (1 s.h.)</li> <li><input type="checkbox"/> ESL course if required (3 s.h.)</li> <li><input type="checkbox"/> Thesis students: 2<sup>nd</sup> teaching assistantship</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Draft research proposal (in Lit Review class)</li> <li><input type="checkbox"/> Frequent meetings with research advisor</li> <li><input type="checkbox"/> Form dissertation committee (3 members), fill out form and give to staff in CBE office</li> <li><input type="checkbox"/> Present preliminary plan of study to thesis committee</li> <li><input type="checkbox"/> Research</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Review annual evaluation, provide updates if needed</li> <li><input type="checkbox"/> Complete online IDP surveys and reflection</li> <li><input type="checkbox"/> Meet w/ standing grad committee to review progress</li> <li><input type="checkbox"/> Thesis students: 10 service hrs</li> </ul>
Year 2	3 <sup>rd</sup> semester (Fall)	<ul style="list-style-type: none"> <li><input type="checkbox"/> 2-3 Courses + seminar (7 s.h.) - Kinetics or breadth requirement or Elective(s) or Research Credit; CBE:5000 or CBE:5100 Grad Seminar †</li> <li><input type="checkbox"/> ESL course if required (3 s.h.)</li> <li><input type="checkbox"/> Thesis students: Research credit (3 s.h.)</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Frequent meetings with research advisor</li> <li><input type="checkbox"/> Research</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Annual evaluations are completed and sent to mentors and students</li> <li><input type="checkbox"/> Thesis students: 10 service hrs</li> </ul>
	4 <sup>th</sup> semester (Spring)	<ul style="list-style-type: none"> <li><input type="checkbox"/> 2-3 Courses + seminar (7 s.h.) - - Grad Thermo or Transport; Elective or Research Credit; Grad Seminar †</li> <li><input type="checkbox"/> Thesis students: Research credit (3 s.h.)</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Write dissertation and defend thesis</li> <li><input type="checkbox"/> Research</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Review annual evaluation, provide updates if needed</li> <li><input type="checkbox"/> Students write individual development plan</li> <li><input type="checkbox"/> Meet with research advisor to discuss progress</li> <li><input type="checkbox"/> Thesis students: 10 service hrs</li> <li><input type="checkbox"/> Non-thesis students: Final examination with standing grad committee</li> </ul>

† 30 s.h. of graduate-level coursework required for graduation (does not include seminars, research credit, or ESL courses); U2G students can cross-credit up to 4 courses (12 s.h.) from B.S. degree if enrolled in the Graduate College during the semesters the courses are taken; registration in CBE:5000 Grad Seminar is required for thesis students every semester in residence; registration in CBE:5100 Grad Professional Seminar is required for non-thesis students twice before graduation; Registering for 9 s.h. provides full-time status

## Normal Progress of Ph.D. Students in CBE

	Courses / TAships	Minimum Research Expectations	Other	
Year 1	1 <sup>st</sup> semester (Fall)	<ul style="list-style-type: none"> <li><input type="checkbox"/> 3 Courses + seminars (11 s.h.) - CBE Data Science; Kinetics or breadth requirement; Elective(s); Engineering Ethics and Grad Seminars ‡</li> <li><input type="checkbox"/> ESL course if required (3 s.h.)</li> <li><input type="checkbox"/> 1<sup>st</sup> teaching assistantship (two required for graduation)</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Advisor selection process</li> <li><input type="checkbox"/> Discuss project with research advisor and begin literature search on project</li> <li><input type="checkbox"/> Lab safety training</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Meet with peer and faculty mentors</li> <li><input type="checkbox"/> Annual evaluations are completed and sent to mentors and students</li> <li><input type="checkbox"/> 10 service hrs</li> </ul>
	2 <sup>nd</sup> semester (Spring)	<ul style="list-style-type: none"> <li><input type="checkbox"/> 3 Courses + seminar (10 s.h.) - Literature Review and Proposal Writing; Grad Thermo or Transport; Kinetics or breadth requirement or Elective(s); Grad Seminar ‡</li> <li><input type="checkbox"/> ESL course if required (3 s.h.)</li> <li><input type="checkbox"/> Research credit (2-5 s.h.)</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Draft research proposal (in Lit Review class)</li> <li><input type="checkbox"/> Frequent meetings with research advisor</li> <li><input type="checkbox"/> Research</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Review annual evaluation, provide updates if needed</li> <li><input type="checkbox"/> Complete online IDP surveys and reflection</li> <li><input type="checkbox"/> Meet w/ standing grad committee to review progress</li> <li><input type="checkbox"/> 10 service hrs</li> </ul>
Year 2	3 <sup>rd</sup> semester (Fall)	<ul style="list-style-type: none"> <li><input type="checkbox"/> 2 Courses + seminar (7 s.h.) - Kinetics or breadth requirement or Elective(s); Grad Seminar ‡</li> <li><input type="checkbox"/> ESL course if required (3 s.h.)</li> <li><input type="checkbox"/> Research credit (5-8 s.h.)</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Qualifier completion expected for students with prior M.S. degree *</li> <li><input type="checkbox"/> Form dissertation committee, fill out form and give to staff in CBE office</li> <li><input type="checkbox"/> Research</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Annual evaluations are completed and sent to mentors and students</li> <li><input type="checkbox"/> 10 service hrs</li> </ul>
	4 <sup>th</sup> semester (Spring)	<ul style="list-style-type: none"> <li><input type="checkbox"/> 2 Courses + seminar (7 s.h.) - - Grad Thermo or Transport; Elective; Grad Seminar ‡</li> <li><input type="checkbox"/> Research credit (2-8 s.h.)</li> <li><input type="checkbox"/> Qualifier completion expected for students with ChE B.S.*</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Comprehensive examination completion expected for students with prior M.S. degree; All other Ph.D. students should meet with dissertation committee</li> <li><input type="checkbox"/> Research</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Review annual evaluation, provide updates if needed</li> <li><input type="checkbox"/> Students write individual development plan</li> <li><input type="checkbox"/> Meet with research advisor to discuss progress</li> <li><input type="checkbox"/> 10 service hrs</li> </ul>
Year 3	5 <sup>th</sup> semester (Fall)	<ul style="list-style-type: none"> <li><input type="checkbox"/> Grad Seminar (1 s.h.)</li> <li><input type="checkbox"/> Research credit (8-14 s.h.) ‡</li> <li><input type="checkbox"/> Alternative qualifier for students with ChE B.S. completed, if needed</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Comprehensive examination completion expected for students with ChE B.S. in 3<sup>rd</sup> year of program</li> <li><input type="checkbox"/> Research</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Annual evaluations are completed and sent to mentors and students</li> <li><input type="checkbox"/> 10 service hrs</li> </ul>
	6 <sup>th</sup> semester (Spring)	<ul style="list-style-type: none"> <li><input type="checkbox"/> Grad Seminar (1 s.h.)</li> <li><input type="checkbox"/> Research credit (up to 14 s.h. as needed) ‡</li> <li><input type="checkbox"/> Qualifier completion expected for students with non-ChE B.S.*</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Comprehensive examination completion expected for students with non-ChE B.S.; All other Ph.D. students should meet with dissertation committee</li> <li><input type="checkbox"/> Expectation of second author paper</li> <li><input type="checkbox"/> Research</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Review annual evaluation, provide updates if needed</li> <li><input type="checkbox"/> Students write individual development plan</li> <li><input type="checkbox"/> Meet with research advisor to discuss progress</li> <li><input type="checkbox"/> 10 service hrs</li> </ul>

\* 3.50/4.0 GPA or higher in 4 (start date before Fall 2020) or 5 (start date after Fall 2020) core courses; If qualifier is not passed via the GPA requirement, student may petition for an alternative qualifier to be completed within 6 mo of completing core courses; consult with research advisor on format for alternative qualifier

‡ 30 s.h. of graduate-level coursework required for graduation (does not include seminars, research credit, or ESL courses); 72 s.h. of approved graduate credit required for graduation (does not include ESL courses); registration in CBE:5000 Grad Seminar is required every semester in residence; Registering for 12-15 s.h. each semester during the first two years is recommended, 9 s.h. provides full-time status

## Normal Progress of Ph.D. Students in CBE

	Courses / TAships	Minimum Research Expectations	Other
Year 4 7 <sup>th</sup> semester (Fall)	<ul style="list-style-type: none"> <li><input type="checkbox"/> Grad Seminar (1 s.h.)<sup>‡</sup></li> <li><input type="checkbox"/> Alternative qualifier for students with non-ChE B.S. completed, if needed</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Research presentation in graduate seminar (or spring)</li> <li><input type="checkbox"/> Research</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Annual evaluations are completed and sent to mentors and students</li> <li><input type="checkbox"/> 10 service hrs</li> </ul>
8 <sup>th</sup> semester (Spring)	<ul style="list-style-type: none"> <li><input type="checkbox"/> Grad Seminar (1 s.h.)<sup>‡</sup></li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Research presentation in graduate seminar (or fall)</li> <li><input type="checkbox"/> Meet with dissertation committee</li> <li><input type="checkbox"/> Publication of 1<sup>st</sup> author paper</li> <li><input type="checkbox"/> Research</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Review annual evaluation, provide updates if needed</li> <li><input type="checkbox"/> Students write individual development plan</li> <li><input type="checkbox"/> Meet with research advisor to discuss progress</li> <li><input type="checkbox"/> 10 service hrs</li> </ul>
Year 5 9 <sup>th</sup> semester (Fall)	<ul style="list-style-type: none"> <li><input type="checkbox"/> Grad Seminar (1 s.h.)<sup>‡</sup></li> <li><input type="checkbox"/> Complete final TAship if not already done</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Additional publications</li> <li><input type="checkbox"/> Research</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Annual evaluations are completed and sent to mentors and students</li> <li><input type="checkbox"/> 10 service hrs</li> </ul>
10 <sup>th</sup> semester (Spring)	<ul style="list-style-type: none"> <li><input type="checkbox"/> Grad Seminar (1 s.h.)<sup>‡</sup></li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Write dissertation and defend thesis</li> <li><input type="checkbox"/> Research</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Review annual evaluation, provide updates if needed</li> <li><input type="checkbox"/> Students write individual development plan</li> <li><input type="checkbox"/> Meet with research advisor to discuss progress</li> <li><input type="checkbox"/> 10 service hrs</li> </ul>

\* 3.50/4.0 GPA or higher in 4 (start date before Fall 2020) or 5 (start date after Fall 2020) core courses; If qualifier is not passed via the GPA requirement, student may petition for an alternative qualifier to be completed within 6 mo of completing core courses; consult with research advisor on format for alternative qualifier

‡ 30 s.h. of graduate-level coursework required for graduation (does not include seminars, research credit, or ESL courses); 72 s.h. of approved graduate credit required for graduation (does not include ESL courses); registration in CBE:5000 Grad Seminar is required every semester in residence; Registering for 12-15 s.h. each semester during the first two years is recommended, 9 s.h. provides full-time status