



Chemical & Biological Engineering

UNIVERSITY OF COLORADO **BOULDER**

ADVISING HANDBOOK FOR GRADUATE STUDIES IN:

Biological Engineering
BIEN-PHD

V.5

Updated: AY25-26

Department of Chemical and Biological Engineering
3415 Colorado Avenue, 596 UCB, Boulder, Colorado 80309
t: 303-735-1975
e: chbegrad@colorado.edu
w: www.colorado.edu/chbe

Table of Contents

| | | |
|---------|---|----|
| 1 | INTRODUCTION | 4 |
| 2 | ADMISSION REQUIREMENTS | 4 |
| 2.1 | General Admission Requirements | 4 |
| 2.2 | Classification of Students | 4 |
| 2.2.1 | Regular Degree Student | 4 |
| 2.2.1.1 | Regular Degree Student Admitted Off-cycle with Direct Admission | 5 |
| 2.2.1.2 | M.D./PhD PROGRAM | 5 |
| 2.2.2 | Provisional Degree Student | 5 |
| 3 | GENERAL INFORMATION | 5 |
| 3.1 | Full-time Status | 5 |
| 3.2 | Grades and Quality of Work | 6 |
| 3.3 | Time Limit for the Completion of a PhD Degree | 6 |
| 3.4 | Transfer Credits | 7 |
| 3.5 | In-State Residency | 7 |
| 3.6 | Graduate School Grievance Process and Procedures | 7 |
| 4 | DOCTOR OF PHILOSOPHY DEGREE | 8 |
| 4.1 | PhD Minimum Registration Requirements | 8 |
| 4.2 | Research, M.S. Degree, and PhD Studies | 8 |
| 4.2.1 | M.S. Bypass | 8 |
| 4.2.2 | Selecting a Research Project and an Advisor | 8 |
| 4.2.2.1 | Faculty Advisors from Outside the Department | 9 |
| 4.2.3 | Research Advisor and Committee | 9 |
| 4.2.4 | Changing Advisors | 9 |
| 4.3 | Course Requirements and Course of Study | 9 |
| 4.3.1 | Biological Engineering Course Requirements | 10 |
| 4.3.1.1 | Additional Coursework | 10 |
| 4.3.2 | Independent Study | 10 |
| 4.3.3 | Industry Internship | 11 |
| 4.3.4 | Academic Performance | 11 |
| 4.4 | Registration Requirements | 11 |
| 4.4.1 | Registration - Pre-Comprehensive Exam (“pre-Comp”) | 11 |
| 4.4.2 | Registration - Comprehensive Examination Semester | 12 |
| 4.4.3 | Registration - Post-Comprehensive Examination (“post-Comp”) | 12 |
| 4.5 | PhD Degree Funding Limits | 12 |
| 4.6 | Teaching Assistantships | 12 |
| 4.6.1 | TA Assignments | 13 |
| 4.6.2 | Graduate TA | 13 |
| 4.6.3 | Advanced TA (ATA) | 13 |

| | | |
|--------|--|----|
| 4.7 | Annual Evaluation Process | 14 |
| 4.8 | Preliminary Examination | 14 |
| 4.8.1 | Objective | 15 |
| 4.8.2 | Timing..... | 15 |
| 4.8.3 | Outcome..... | 15 |
| 4.8.4 | Written Component..... | 15 |
| 4.8.5 | Authorship..... | 15 |
| 4.8.6 | Oral Component..... | 16 |
| 4.8.7 | Question and Answer Component..... | 16 |
| 4.8.8 | Audience..... | 16 |
| 4.8.9 | Request to Delay Preliminary Examination | 16 |
| 4.8.10 | Preliminary Examination Re-take | 17 |
| 4.9 | Committee Meetings..... | 17 |
| 4.9.1 | Scheduling | 17 |
| 4.9.2 | Format and Approach..... | 17 |
| 4.9.3 | Committee Meeting Facilitator | 17 |
| 4.9.4 | Student-Committee and Advisor-Committee Discussion | 17 |
| 4.9.5 | Feedback | 18 |
| 4.9.6 | Paperwork | 18 |
| 4.10 | Expectations and Guidance for Advancement to Comprehensive Examination and PhD Defense | 18 |
| 4.11 | Comprehensive Examination and Admission to Candidacy..... | 18 |
| 4.12 | Dissertation and Final Examination | 19 |
| 4.12.1 | Dissertation Examination Committee..... | 19 |
| 4.12.2 | Final Oral Examination | 19 |
| 4.12.3 | Dissertation Submission to the Graduate School..... | 19 |
| 5 | Graduate Student Appointments, Leave, and Professional Expectations..... | 19 |
| 5.1 | Ethics and Honor Code..... | 19 |
| 5.2 | Financial Support | 19 |
| 5.3 | Supplemental Funding for Multi-year Fellowship Students | 20 |
| 5.4 | Graduate Student Pregnancy & Parenting-related Policy..... | 20 |
| 5.5 | Professional Expectations | 20 |
| 5.6 | Advisor-Advisee Interaction | 21 |
| 5.7 | Work from Home..... | 21 |
| 5.8 | Undertaking Research at Another Facility Off Campus | 21 |
| 5.9 | Medical Leave..... | 21 |
| 5.10 | Mental Health and Campus Support..... | 22 |
| 5.11 | Leave of Absence (LOA)..... | 22 |
| 5.12 | Termination (Dismissal)..... | 22 |
| 5.13 | Records and Petitions..... | 23 |

| | | |
|------|----------------------------|----|
| 5.14 | PhD Final Check List | 23 |
| | APPENDIX A | 24 |
| | APPENDIX B | 26 |

1 INTRODUCTION

The Graduate School of the University of Colorado Boulder offers advanced instruction leading to the following degrees in the Department of Chemical and Biological Engineering:

- Doctor of Philosophy (Ph.D.) in Chemical Engineering
- Master of Science (M.S.) in Chemical Engineering
- Doctor of Philosophy (Ph.D.) in Biological Engineering

This guide is intended for graduate students in [Biological Engineering](#) and supplements the information contained in the [Graduate School Rules](#). The Department and its students are subject to all minimum requirements of the Graduate School. However, in some areas, the Department has opted to give more specific requirements than the Graduate School. In these instances, students should follow the regulations and guidance provided herein. If any questions arise, please contact the Graduate Program Administrator or the Associate Chair for Graduate Education for advisement.

Graduate students in Biological Engineering should become familiar with the contents of this guide, the general rules of the [Graduate School](#), and the [University of Colorado Boulder](#). Ultimately, it is your responsibility as a student to know and fulfill the requirements to secure your intended degree.

This guide may be corrected or updated at any time.

2 ADMISSION REQUIREMENTS

2.1 General Admission Requirements

General criteria for admission to the graduate program are:

- A Baccalaureate degree from a college or University of recognized standing, equivalent to the degree given at this university, or college work comparable to that required for such a degree, at least 96 semester hours of which must be acceptable toward a Baccalaureate degree at this University;
- have an undergraduate grade point average (GPA) of at least 3.00/4.00;
- demonstrated ability to pursue advanced study and research attested by previous scholastic record;
- adequate preparation to enter graduate study and pursue research in the chosen field.
- All supported graduate students in the Department are admitted to the Ph.D. degree. Those without previously attaining a master's degree in Biological Engineering can receive an M.S. degree (Plan I or Plan II) while completing a Ph.D. degree

2.2 Classification of Students

Depending on the degree to which the applicants satisfy the requirements, admission may be offered as either a Regular Degree Student or as a Provisional Degree Student.

2.2.1 Regular Degree Student

A student can be admitted as a Regular Degree Student if, in addition to fulfilling requirement (a) in section 2.1, the overall graduate GPA is at least 3.00 (b) in section 2.1 or if at least nine semester hours of relevant graduate work with a 3.00 GPA or above have been completed the student may be admitted as a regular degree student upon recommendation of the Department of Chemical and Biological Engineering.

Privileges: the regular degree student may take courses, for which the appropriate specific prerequisites are met, on any of the four campuses of the University of Colorado.

Restrictions: Regular degree students must maintain a 3.0 GPA for all work taken, whether it is to be applied toward the advanced degree or not. If the student fails to maintain this standard of academic performance, they may be dismissed from the academic program after receiving warning from the Department or Graduate School.

2.2.1.1 Regular Degree Student Admitted Off-cycle with Direct Admission

The Department typically admits students only for Fall admission. However, in special circumstances, the Department may choose to admit a student off-cycle (e.g., in the Spring or Summer). If this student meets the qualifications specified in Section 2.2.1, this student will be considered a Regular Degree Student with the associated privileges and restrictions detailed above.

Additional Restriction: Students admitted off-cycle may be “directly admitted” into a PhD advisor’s laboratory. These students will not participate in conventional research placement activities in the Fall semester. The student’s acceptance is contingent on the advisor’s commitment to support the student for the duration of their studies in the Department. The Department has no responsibility to support these students if they leave the original advisors laboratory.

2.2.1.2 M.D./PhD PROGRAM

The Department of Chemical and Biological Engineering facilitates the PhD component of the M.D./PhD program administered by the University of Colorado Anschutz Medical Campus [“Medical Scientist Training Program” \(MSTP\)](#). Admission to the program is handled by MSTP. M.D./PhD students admitted into the BIEN degree program should also familiarize themselves with the memorandum of understanding (MOU) between the Department and the MSTP program regarding preliminary examination, committee meeting frequency, and other unique aspects of this degree program.

2.2.2 Provisional Degree Student

If a student does not satisfy the requirements for a regular degree student, but in the opinion of the faculty in the Department of Chemical and Biological Engineering, they merit a trial in graduate work, the student may be admitted as a Provisional Degree Student.

Ordinarily, a student admitted as a provisional student will not be eligible for a change of status from Provisional to Regular Degree Student until the completion of at least 12 hours of graduate work with a minimum overall GPA average of 3.00. At the time of admission to Provisional Degree status, the student will be informed by the Department, in writing, of the performance expected before the Department will recommend admission as a regular degree student. A student may not remain at Provisional Degree status for more than 18 hours. By that time the Department must decide whether to recommend admission to regular degree status or not.

Privileges: A student pursuing a Provisional Degree has all the privileges of a Regular Degree student regarding the taking of courses and working toward an advanced degree.

Restrictions: A Provisional Degree student is required to maintain a 3.0 GPA on all coursework, whether it is to be applied toward the advanced degree sought or not. If the student fails to maintain this level of performance, they may be removed from the academic program. A Provisional Degree student is not eligible for fellowship or scholarship support from the Graduate School and usually is not considered for teaching or research assistantships by the Department.

3 GENERAL INFORMATION

The following sections contain general information that is applicable to students pursuing both master’s and Doctoral degrees.

3.1 Full-time Status

For purposes of deciding full-time registration status, a student must meet one of the following criteria:

Doctoral students

- Minimum of 5 credits of graduate level coursework prior to passing the comprehensive exam

- Less than 5 credits of graduate level coursework plus 1 Doctor Thesis prior to passing the comprehensive exam
- At least 1 Doctor Thesis hour prior to passing the comprehensive exam
- A minimum of 5 Doctor Thesis hours after passing the comprehensive exam

Students must have full-time status during the semester in which they take their comprehensive exam or defend their thesis (including summer). In addition, students must be considered full-time in each semester used to meet Graduate School Residence requirements.

3.2 Grades and Quality of Work

GPA: A student is required to maintain at least a GPA of 3.0 in all work attempted while enrolled in the Graduate School. A student must have at least a 3.0 overall average GPA to receive a graduate degree.

Grades Below B:

- A student who receives a C, D, or F in a course may repeat that course once, upon written recommendation by the Department Chair/Associate Chair of Graduate Education and with approval by the Dean of the Graduate School, provided the course has not been previously applied toward a degree. The grade received in a repeated course substitutes for the original grade and only the later grade is used in the Graduate School's manual calculation of the GPA. However, all grades received appear on the student's transcript and are calculated in the official overall GPA.
- Courses in which grades below B- (2.7) are received are not accepted for Doctoral degrees.
- Courses in which grades below B- (2.7) are received are not accepted for Master's degrees.
- Courses taken toward the fulfillment of requirements for graduate degrees may not be taken as pass/fail unless other guidance is provided by the University or Graduate School (e.g., as in the case of the COVID-19 pandemic).
- Grades received in courses transferred from another institution and/or grades earned while a student was classified as a non-degree student are not included in the calculation of GPA.
- Graduate students may not register for more than 15 credits during any one semester.
- Students whose cumulative GPA falls below a 3.0 at any time during their graduate studies will be placed on academic warning and may be dismissed from their program.

Academic Standing and Dismissal: See Section 5 of the [Graduate School Rules](#), which details specifics of academic standing and dismissal.

3.3 Time Limit for the Completion of a PhD Degree

PhD Degree Time Limit: Doctoral students have six full years from the origination of coursework at the University of Colorado to complete all requirements with the Graduate School. For example, students that began their PhD studies in August of 2022 must complete their PhD by August of 2028. At or before this point, students should have completed all coursework and examinations (Preliminary, Comprehensive), as well as submitted their dissertation. Students who fail to complete the degree in this period may be dismissed from the program.

To continue the completion of a PhD beyond the 6th complete year, the student must file a petition to request an extension of the time limit with the Dean of the Graduate School and the Department Chair. Such petitions must be endorsed by the student's principal advisor and Associate Chair of Graduate Studies. A time extension of up to one year may be granted. This six-year period is applicable regardless of when the student passes the Preliminary or Comprehensive Examination. Taking or retaking the Preliminary or Comprehensive Examination does not entitle a student to add additional time to complete the degree.

Students who need to leave the University for a period of time may apply for a leave of absence for up to one year. Doctoral students who are required to maintain continuous registration may take a leave of absence for parental leave (see also Section 5.5), and may petition for an exception to take a leave of absence in the case of other extenuating circumstances (see also Section 5.12). A leave of absence does not extend the student's time limit but may be used as a reason when applying for an extension, should that become necessary.

Note: although a student has up to six complete years to complete their PhD degree, as defined in the offer letter at admission, the Department commits to only 5 complete years of financial support. Financial support in a student's 6th year is considered on a case by case basis contingent to funds availability. (See Section 4.5)

3.4 Transfer Credits

Please refer to Section 3 of the [Graduate School Rules](#) regarding transfer credits.

Resident graduate work of high quality completed in a recognized graduate school elsewhere and coming within the time limit may be accepted up to a maximum of twenty-one (21) semester hours for the PhD degree, provided it is recommended by the Department of Chemical and Biological Engineering and approved by the Dean of the Graduate School. Such credits will be transferred to the Graduate School only after the student has established a satisfactory record in residence here for at least one semester and has completed at least six credit hours at CU.

PhD: Coursework previously applied toward a master's degree may be transferred for the PhD degree.

Transferred credit will not reduce the residence requirements at the University but may reduce the amount of coursework to be completed. Students should initiate a request for transfer of credit by the beginning of the semester prior to that in which the PhD degree is expected.

3.5 In-State Residency

The University of Colorado Boulder has a large difference between the cost of resident and non-resident tuition. It is possible for students that are U.S. Citizens or permanent residents that come to CU from out-of-state to acquire resident status after one calendar year. To begin the one-year waiting period, the student must establish as many connections with the State of Colorado as possible in the individual circumstances. Examples include being physically present in the state with the intent to make your permanent home in Colorado; payment of Colorado state income tax; application to the state for a Colorado driver's license or Colorado identification card; registration of a motor vehicle in the State of Colorado; registration to vote in Colorado.

These connections should be established as soon as possible, ideally within 30 days after moving to the state. Eligibility for a change to resident status is determined from a written petition with documentation. For further information regarding residency, petition deadlines, required workshop, and the required paperwork, please visit the [Tuition Classification Office](#).

3.6 Graduate School Grievance Process and Procedures

The Graduate School Grievance Process and Procedure ("the Grievance P&P" or "P&P") establishes and describes the process through which graduate students can communicate concerns related to academic issues or academic conflicts, with the goal of ensuring that the student filing a grievance is better able to achieve academic success. This is a non-adversarial, non-judicial process. The rules of evidence, and any other rules that typically govern a criminal or civil court, are not applicable to the Grievance Procedure.

Matters Covered. Grievances covered by the Grievance P&P include problems related to academic issues, such as arbitrary, inconsistent, or capricious actions taken against a graduate student; deviations from stated grading and examination policies as they appear on syllabi, on assignments, or in departmental guidelines for graduate study; failure to provide in writing reasons behind termination or dismissal, either from the program or from employment or other support; unfair treatment related to graduate student appointments; unfairness in the application of graduate requirements or regulations; and in general any actions taken by a program that relate to graduate students and that hinder the student's ability to make normal progress toward the degree. Individuals named in a grievance must be teaching or research faculty directly involved in the student's program of study. In those instances where a graduate student has a complaint against faculty in a campus research institute, a national laboratory, or in a setting governed by a federal grant whether on or off campus, the student's home academic department (the unit awarding the degree) is responsible for helping to identify a resolution. Nothing in this document is intended to create an appeal right to an employment termination decision or otherwise undermine at-will appointments.

Matters Not Covered. The following issues *do not* fall under the jurisdiction of the Graduate School Grievance P&P:

1. **Grade appeals** must be filed in accordance with the grade appeal procedures of the school or college in which the degree-granting unit is housed. Although the Grievance P&P does not cover appeals based on the academic (content-specific) grounds on which a grade was assigned, as noted above, the Grievance P&P does cover deviations from stated grading and examination policies as they appear on syllabi, on assignments, or in departmental guidelines for graduate study.

2. **Academic decisions rendered by a program that can be properly judged only by specialists with content-area expertise** will not be considered. Such decisions may include dismissal from a graduate program based on failure to maintain the requisite GPA; dismissal from a graduate program based on two failed attempts at comprehensive or final examinations; and denial of admission to candidacy based on the graduate program's rules for qualification.
3. **Allegations of sexual misconduct, protected class discrimination or harassment, or retaliation and/or conflict of interest in cases of amorous relationship** will be reported to the [Office of Institutional Equity and Compliance \(OIEC\)](#) and are not under the jurisdiction of the Graduate School Grievance P&P.
4. Allegations of **research misconduct, including unfair treatment in assigning joint authorship**, should be filed with the Standing Committee on [Research Misconduct \(SCRM\)](#).
5. **Allegations of unprofessional conduct on the part of teaching or research faculty** should be reported to the supervising administrator of the faculty member, as addressed in the Academic Affairs Policy *Professional Rights and Duties of Faculty Members and Roles and Professional Responsibilities of Department Chairs*.
6. **Issues of Student Conduct** which fall under the jurisdiction of the [Office of Student Conduct and Conflict Resolution \(OSCCR\)](#) shall be covered by related policies and processes.
7. Any other allegations or issues that **fall under the scope of a separate, specialized process outside of graduate programs and the Graduate School**.

The Graduate School Grievance Process and Procedures can be found on the Graduate School website: <https://www.colorado.edu/graduateschool/graduate-school-policies-procedures>.

4 DOCTOR OF PHILOSOPHY DEGREE

4.1 PhD Minimum Registration Requirements

The minimum registration requirement for doctoral students is full-time registration for six semesters of graduate degree credit beyond the attainment of an acceptable bachelor's degree. Two semesters of minimum registration credit may be allowed for a master's degree from another accredited institution; however, at least four semesters of minimum registration credit, two of which must be consecutive in one academic year, must be earned for work completed at CU Boulder.

4.2 Research, M.S. Degree, and PhD Studies

Each student entering the graduate program without a master's degree must demonstrate research ability prior to continuing to the PhD degree. The first step to proceeding to a PhD degree is the successful completion of the preliminary examination.

4.2.1 M.S. Bypass

A student can secure an M.S. and can opt to bypass the M.S. thesis with their advisor's approval. To bypass the M.S. thesis, a student must complete two tasks.

- 1) After successfully passing the preliminary examination, the student should present their research in a Department-hosted poster session, held around August 1, approximately 24 months after the student initiated their studies. This event will provide the student ample opportunity to share their research with fellow graduate students, faculty, and staff. The student's advisor will have final approval authority as to whether the student has adequately met this requirement. If a student has a professional conflict with this event (e.g., a conference or experimental trip) they will need to work with their advisor and the Associate Chair of Graduate Education to replace this experience with an equivalent alternative.
- 2) The student shall schedule their first committee meeting between 24-28 months (e.g., Fall of 3rd year) of the initiation of studies.

4.2.2 Selecting a Research Project and an Advisor

During the Fall semester, research advisors will announce the availability of projects. Typically, these projects will be summarized in overview presentations given by each faculty. First year students are then given several weeks to meet with potential advisors, learn more about the projects, and decide on their preferences. Students will be assigned to a lab by reaching an agreement with a faculty member to work in their research group. Agreements between students and advisors may be finalized during the "Advisor Selection Window". An Advisor agreement is finalized by the student emailing the

Graduate Program Administrator (chbegrad@colorado.edu) listing the preferred advisor's name(s). The Graduate Program Administrator will subsequently confirm the agreement with the Faculty Advisor, followed by approval from the Associate Chair of Graduate Education, and the Department Chair.

It is extremely important that students with a potential interest in a particular project contact the advisor and meet with them to talk about the project and the specific considerations relating to an Advisors selection process. Generally, an interested student will follow-up with additional meetings as they narrow down their choices. If a student does not meet with an advisor or does not express interest, the advisor may take that as an indication of lack of enthusiasm, which may sway him or her against accepting that student as an advisee.

IMPORTANT: The ability to undertake and complete impactful research is a principal requisite to attain the PhD degree. This research must be undertaken with the supervision of a faculty member. It is the student's responsibility to choose a topic and find a faculty member who will act as Research Advisor within the first semester.

If a student cannot identify a suitable topic and advisor, they should petition the Associate Chair of Graduate Education to request additional time to arrange an advisor. The Associate Chair will assess the student's academic performance and level of effort in securing a PhD advisor, in deciding whether to give an extension. If the student performance and effort in securing placement do not merit an extension, as an at will employee, the department may not financially support the student into a second semester.

4.2.2.1 Faculty Advisors from Outside the Department

In rare circumstances, graduate students in the program can be advised by a faculty member in another Department. If you are considering a faculty advisor from another Department, you should first discuss this with the Associate Chair of Graduate Education. If an agreement is reached with the support of the outside advisor and the Associate Chair, the student must then facilitate the preparation of a Memorandum of Understanding (MOU). Contact the Graduate Program Administrator (chbegrad@colorado.edu) for the MOU and additional paperwork.

4.2.3 Research Advisor and Committee

After the completion of the Preliminary Examination (Section 4.7), with input from their advisor, the student should form their Dissertation Committee. PhD Committees consist of at least **five members**. At least three of these members should be regular faculty members from the Department of Chemical and Biological Engineering. At least one member (the outside committee member) must be a regular faculty member in a different department at the University of Colorado. The fifth committee member may be a regular faculty member at the University Colorado, a person from industry or a government laboratory with relevant technical training, or a faculty member from another institution. Students must meet with their committee once each calendar year to review their research progress.

The advisor will serve as Chair of the Dissertation Committee. The student and advisor will designate one of the Committee Members as Facilitator of the committee meetings, as defined in Section 4.8.3.

4.2.4 Changing Advisors

In rare instances a student may desire or need to change their research advisor. This should only be considered as a last resort.

Procedurally, the student is strongly encouraged to discuss their situation with the Graduate Program Administrator and the Associate Chair of Graduate Education. Depending on the reasoning for making a switch, the Associate Chair for Graduate Education will decide whether to support and facilitate a change in advisors. Factors that will be considered include academic performance and research progress. If a student opts to change their research advisor but cannot find an advisor to supervise their PhD thesis they will be dismissed from the program.

4.3 Course Requirements and Course of Study

The student should consult with the Graduate Program Administrator and if needed, the Associate Chair for Graduate Education, to devise an initial course of study which typically consists of the core classes for the associated degree.

Thereafter, the student will coordinate and secure approval for subsequent coursework registration with their PhD advisor. If a student, with department approval, does not identify an advisor during their first semester, the student should continue to work with the Graduate Program Administrator to plan their coursework with approval from the Associate Chair of Graduate Education.

A degree plan may include the courses previously applied toward the Master's degree, which should be so indicated, and total at least 30 semester hours of 5000-level or above courses, not including pass/fail courses (unless University guidance is changed, e.g. COVID-19 pandemic).

NOTE: all courses must be taught by faculty who are members of the Graduate School. Contact the ChBE Graduate Administrator to verify the instructor's Faculty appointment to the Graduate School for classes taken outside the Department.

The Associate Chair of Graduate Education, with consultation from the Graduate Program Administrator, advisor, and committee members, will evaluate the merits of curriculum taught outside the Department to count toward the degree the student is pursuing. This decision will be communicated to the student in advance of registration.

4.3.1 Biological Engineering Course Requirements

The following courses are required for the PhD degree:

- GRAD 5000: Responsible Conduct of Research (required) [1 credit]
- CHEN 5150: Biomolecular Kinetics, Transport, and Thermodynamics (CORE) [3 credits]
- CHEN 5160: Systems Analysis of Cells and Tissues (CORE) [3 credits]

PhD Students must complete all courses, with grades of B- or better.

Students will register for GRAD 5000: Responsible Conduct of Research (RCR) within the first three semesters of their graduate program. GRAD 5000 is currently offered only in the Fall semester.

The Department has a seminar series during the academic year (Fall and Spring semesters). Seminars are typically scheduled on Tuesdays and Thursdays from 2:45-3:45 PM and will be advertised to the Department via email. First year graduate students are expected to attend at least 75% (each semester) of the seminars.

Registration for credit in the summer should be kept to a minimum to limit unnecessary tuition payments. Students registering for extra courses not required for the degree program must have explicit approval of their advisor(s). The Department (advisor) will only pay tuition costs for courses required for the degree.

4.3.1.1 Additional Coursework

For students matriculating to our program from other disciplines (Chemistry, Biology, Biomedical Engineering, Materials Science and Engineering), the Associate Chair for Graduate Education may decide (with consultation from faculty peers) that a student should undertake additional preparation, either as a registered student or audit, as a prerequisite to take the CORE BIEN graduate courses.

4.3.2 Independent Study

The Department encourages students to consider taking Independent Study (CHEN 5840) during the first semester of graduate study. Independent Study agreements are made with a department faculty member. Nearly always this faculty member is someone that the student is considering as a potential advisor. A student should complete an average of 3-4 hours of effort per week per credit hour. This equates to 9-12 hours a week of experimental or computational research for a 3 credit registration.

To ensure equality in the communication of Independent Study opportunities (which are often closely tied to potential PhD projects in an advisor's laboratory), the Graduate Program Administrator will collate one-slide summaries of either a laboratory's research which in some instances may specify potential Independent Study topics (in late July) and disseminate them as a pdf to incoming students. The slide inputs will be prepared by Faculty members interested in taking Independent Study students. Preceding this and thereafter, incoming students are encouraged to look at the breadth of laboratories and available projects and reach out to faculty members with projects that interest them.

During new graduate student orientation, the Associate Chair of Graduate Education and the Graduate Program Administrator will schedule a series of short presentations (approximately 15 minutes) from faculty that are “taking” students for PhD projects. These presentations will expand on the one slide summaries and place the project opportunities in a broader context.

While students and faculty may come to a handshake agreement to undertake an Independent Study at any time, the registration will not be formalized until the 1st day of the Fall Semester.

Students are strongly encouraged to embrace the diversity of research projects available from our large and excellent faculty.

Faculty are encouraged to widely consider as many students as possible before coming to a handshake or formal agreement for accepting a student for an Independent Study. Faculty are strongly encouraged to refrain from recruiting students in advance of students arriving on campus.

Rotations – students interested in classical rotations may sign up for 1 credit Independent Studies with as many as three faculty. These rotations would be commensurate with a 1/3rd semester effort (e.g., 5-6 weeks).

4.3.3 Industry Internship

In rare instances, with the support of their PhD advisor(s), a student may opt to undertake an internship in an outside organization (industry, government, non-profit) to gain curricular practical training. Often, such experiences can be an informal arrangement managed by the advisor and student, with consultation of the Graduate Program Administrator and the Associate Chair for Graduate Education.

Starting in AY23-24, the Department will formalize the opportunity to secure credit for an Industrial Internship (CHEN 5930), which is often needed to enable international students to participate in Industrial Internships. Participation in this class requires an internship agreement between the student and the employment (industry) partner, detailing the academic goals of the internship experience. Instructor participation will include facilitation of mid-term and final assessment of student performance as well as additional educational opportunities during the internship period.

The student must complete an application and secure approval BEFORE the internship takes place. The application will require students to specify details of their desired internship; specify and justify the specific academic goals of the internship; specify a contact at the company who will ensure the academic components of the internship are delivered; and specify a ChBE faculty member who has agreed to review the report generated by the student at the end of the internship. It is that faculty member who will ultimately provide the student with a grade for this class.

The student should ensure in advance, in discussion with their advisor (and potentially, industrial partner) how tuition, fees, and stipend will be paid.

4.3.4 Academic Performance

Students are expected to compete with distinction all work in the formal courses that apply toward the degree and achieve a GPA of 3.0 or better. A course grade below B- will not be counted toward the minimum requirements for the PhD degree, but it will be considered in the overall GPA.

4.4 Registration Requirements

All graduate students must be registered for enough credits each fall and spring semester to reach full time status. Students should only register during the summer semester if they are taking their Comprehensive Exam or defending their dissertation. In the process of securing a PhD in the Department there are effectively three statuses, defined by the Comprehensive Examination: “pre-Comp”, “Comp Exam Semester”, and “post-Comp”.

4.4.1 Registration - Pre-Comprehensive Exam (“pre-Comp”)

Students must register for a minimum of 5 course hours or 1-3 thesis hours. If the student is registered for less than 5 course hours, they MUST also register for 1 thesis hour to be full time. Students can register for a maximum of 15 credit hours each semester preceding the student taking their Comprehensive Examination.

A student should have at least 10 thesis hours before or during the semester you take your comprehensive exam.

4.4.2 Registration - Comprehensive Examination Semester

In the semester in which a student will take their Comprehensive Examination, they must be enrolled in at least 1-3 thesis hours up to a maximum of 10 thesis hours. Students must be registered for thesis hours during the semester in which the Comprehensive Exam is completed (Fall, Spring, or Summer).

4.4.3 Registration - Post-Comprehensive Examination (“post-Comp”)

Students must be enrolled in a minimum of 5 thesis hours with a maximum of 10 thesis hours during this period. Students must be registered for at least 5 thesis hours during the semester in which the final defense is completed (Fall, Spring, or Summer). Once the student has confirmed a defense date, the Graduate Program Administrator will review the student's transcript to determine if any thesis hours need to be retroactively added to previous semesters. The goal is to reach and not exceed the required 30 thesis hours, to limit unnecessary tuition expenses.

Additional Information:

- Thesis hours from a previous semester can be dropped but tuition payments will NOT be refunded.
- Courses taken in a previous semester CANNOT be transferred to another semester in order to fulfill thesis hour requirements.
- Additional thesis hours can be added to a previous semester at a later date in order to more accurately reflect course efforts. If thesis hours are retroactively allotted to a previous semester, the total hours of the semester may NOT exceed the maximum hours permitted for full time status. Please be advised: when retroactively adding thesis hours, additional tuition and fees will subsequently be charged by the Provost and Bursar's Office.
- **ADDITIONAL, retroactively added thesis hours for international students will result in FULL out-of-state tuition not being covered by a previous semester RA/TA waiver. This additional out-of-state tuition will be the responsibility of the graduate student or the faculty advisor.**
- Thesis credit hours will be listed as “I.P.” (in progress) on the student's transcript before the dissertation defense. Once the student has defended their dissertation, the Faculty Advisor will submit a final grade (A, B, or C) for all thesis credits on the student's transcript.
- Students should expect the Department (advisor) to register for the minimum necessary credits. In some cases, this may fall short of credit amounts required to access on campus facilities such as the gym. In these instances, students can secure access through community membership.

4.5 PhD Degree Funding Limits

Progress of each PhD student will be consistently reviewed after the 1st semester and yearly thereafter. While the Department commits to financially support up to 5 full years of a PhD degree, it is contingent on student performance and progress towards successful completion of the degree. Continued funding will only be granted for satisfactory progress in research, coursework, and teaching assistance.

Funding after the completion of 5 years of graduate study is not guaranteed. Students should discuss with their advisor whether they will be able to continue to financially support them beyond a 5th year, if necessary.

It should be emphasized that it is the professional interests of a student to complete their degree in this reasonable period of time. As detailed in Section 4.3, the Graduate School allocates six years to complete a PhD.

4.6 Teaching Assistantships

PhD students are generally required to complete two teaching assistantships (TA) during their PhD career in the Department. The Graduate TA will occur during the Fall or Spring semester of their first year. The student will complete an Advanced TA (ATA) during the third year of their PhD. If students are directly admitted and supported in their first semester by an advisor, it is the Advisor's choice as to whether they undertake a TA or not. As detailed in Section 5.3, if a student is self-supported during their first semester, they can choose to not TA. However, if the student that is self-

supported by a Fellowship that merits a supplement the student will not receive a \$725/mo supplement from the Department in their first semester.

All students, regardless of financial support, must complete an ATA.

4.6.1 TA Assignments

TA and ATA assignments will be made by the Graduate Chair, Undergraduate Chair, and Graduate Program Administrator. Student and faculty inputs will be considered but placement cannot be guaranteed.

4.6.2 Graduate TA

The expected workload is an average of 10-12 hours/week. This can vary during the semester, due to the time constraints of the course. It is recommended that the instructor and TA discuss specific expectations at the beginning of the semester and that regular follow-up conversations are held to confirm that the expectations are reasonable and/or being met.

Any of the following is appropriate for a first-year graduate student TAs:

- Grading homework assignments and exams in a timely manner
- Making up homework solutions
- Attending class
- Holding office hours
- Running a recitation
- Taking and critiquing exams
- Proctoring exams
- Keeping the grade book, including clicker grades, reading quiz grades, H.W. grades, and exam grades
- Adding information to Canvas
- Grading final exams (taking into consideration the first-year graduate student's final exam schedule)

The following should NOT be expected of first year graduate student TAs:

- Giving class
- Writing exam problems
- Grading exams without faculty member guidance
- Assigning final grades (Note: TA's assigned to classes in the Department of Chemistry may need to assign recitation grades for their students)

If a student fails to satisfactorily accomplish these pedagogical responsibilities, an instructor may "fail" the student from completing the department TA requirement. If a student is failed and believes that they have met the required level of effort, the student should document this in writing and appeal to the Graduate Chair of Graduate Studies and Department Chair. If it is collectively decided that the student did fall short of these expectations the student may be asked to complete another TA assignment or dismissed from the program.

4.6.3 Advanced TA (ATA)

The Advanced Teaching Assistantship (ATA) is part of the educational and training program for PhD students and provides them with supervised experience in teaching, communications, mentoring and leadership. While the expected commitment may average of 10-12 hours/week, it can vary during the semester due to the flow of the course. An ATA is not a grader – grading homework should be a small (if any) part of their activities. It is recommended that the supervising instructor and ATA meet at or before the beginning of the semester to discuss how the experience can best be structured to meet the educational/training goals of the ATA and the mentoring and feedback to be provided by the instructor, with regular follow-up conversations held to confirm that the goals are being met and if any adjustments are needed.

Example activities for an Advanced TA may include

- Preparing and delivering lectures with feedback from the instructor
- Writing homework problems and solutions, with review by the instructor

- Writing, reviewing, and grading exam problems, with oversight by the instructor
- Attending class and assisting students during breakout sessions
- Holding office hours for individual students or groups of students
- Running a recitation (either formal or informal), with observation from the mentor
- Supervising teaching and course assistants, with guidance from the mentor
- Proctoring exams
- Keeping the grade book, including grades for clickers, homework, quizzes and exams
- Adding information to Canvas or Gradescope

Advanced TAs should teach (lecture, recitation, lab) a total of approximately one week-equivalent of classes (e.g., 2-4 classes for a 50-minute class or 2-3 classes for a 75-minute class), the majority of which should be attended by the supervising faculty member (who is to provide feedback and constructive comments). In addition, Advanced TAs should contribute problems to at least one exam during the semester. Advanced TAs should not assign final grades but can offer comments when asked by the instructor.

If a student fails to satisfactorily accomplish these pedagogical responsibilities, an instructor may “fail” the student from completing the department ATA requirement. If a student is failed and believes that they have met the required level of effort, the student should document their in writing and appeal to the Graduate Chair of Graduate Studies and Department Chair. If it is collectively decided that the student did fall short of these expectations, the student may be asked to complete another ATA assignment or dismissed from the program.

Students with advisors from outside the Department should ensure that their advisors know about and understand that all students, regardless of funding source, must undertake the ATA professional development experience.

4.7 Annual Evaluation Process

Per [Policy of the Graduate School](#), a formalized Annual Evaluation must be conducted for each graduate student annually with their advisor. The evaluation form will be distributed in the Fall term by the Graduate Coordinator and contains sections to be completed by both student and advisor. The form documents general progression through milestones and provides a forum for qualitative reflection on progress and contributions. The result of the evaluation is summarized with a rating of either Satisfactory or Unsatisfactory.

The Evaluation must be completed during the academic year and is generally done with timing parallel to fall committee meetings or exams. However, the Evaluation is a campus requirement and is decoupled from Program assessments such as the Preliminary or Comprehensive exams. Performance on those exams, as well as overall research progress, will nonetheless be reflected and influence the outcome of the Annual Evaluation.

A rating of Unsatisfactory leads to initiation of an [Academic Recovery Plan \(ARP\)](#). This plan is developed in agreement between student and advisor and must allow a period of at least one semester to return to good standing. An additional evaluation will be performed at the end of the ARP period. A second Unsatisfactory rating at that time is grounds for dismissal from the Program (see also Section 5.12: Termination/Dismissal).

Students should be aware that maintaining enrollment in the Program is distinct from being mentored or funded by a specific advisor. Consequently, an advisor is not required to wait until an Annual Evaluation to give notice of Unsatisfactory progress, define an improvement period, and in the unfortunate case of continued poor performance terminate an advising relationship. For additional information, see Section 5.12: Termination/Dismissal

4.8 Preliminary Examination

All students must take and pass a “Preliminary Examination” to move forward in their PhD studies. This examination consists of an oral and written component to be completed in the third semester.

4.8.1 Objective

To assess the research skills of a student (appropriate to their academic level) via examination of their thesis research topic. Special emphasis will be given to the following evaluated criteria:

- Knowledge of the scientific basis of experimental and/or theoretical approaches employed by the student
- Depth and breadth of knowledge of the relevant literature
- Demonstration of progress appropriate for the specific project
- Presentation of the specific research plan and overall project significance
- Exhibit appropriate written and oral communication skills for all of the above

4.8.2 Timing

Each student in the PhD program will take the examination for the first time during the third semester.

4.8.3 Outcome

Only two outcomes are possible: pass or fail. A majority committee vote will be required to pass. Students will be informed of the examination results the day following the completion of the final exam in the topical area. If a student fails their first attempt, then s/he will have an opportunity to retake the exam during the following semester. For a re-taken examination, at least one committee member from the failed examination must be present. Improvement between examinations will be utilized as an additional factor in the voting, including student responses to specific feedback from the original examination. Two successive failures will result in the student leaving the ChBE graduate PhD program. A terminal master's degree would be the highest possible degree.

Following the examination, the committee will prepare a report discussing the student's performance. The Chair will send the report directly to the Department Graduate Advisor. The report will then be sent to the student and their faculty advisor(s).

4.8.4 Written Component

The written component of the exam is a six-page typed report (12-point font, single spaced, one-inch margins, single-sided) including figures that describes the student's research project, as well as the following:

- Hypothesis and/or objective statement (0.5 page)
- Significance (0.5 page)
- Background and related, relevant literature (1.5 ± 0.5 pages)
- Methods (1.5 ± 0.5 pages)
- Progress to date (1.5 ± 0.5 pages)
- Research plan (0.5 page)

The reference list should be placed *after* six pages of text and figures. A PDF of the written report must be electronically submitted one week prior to the oral exam date (by 5:00 pm) to the Department's Graduate Program Assistant (GPA) (chbegrad@colorado.edu). **DO NOT** submit the preliminary exam report directly to your committee members.

Additional suggestions for the written component:

- Use spelling and grammar check
- Follow directions
- Be prepared to answer questions on any information contained within your paper.
- Make sure to provide citations appropriately.; citations and/or quotations are required for figures as well as language not generated by the student
- Know your target audience

4.8.5 Authorship

The student is the sole author of the report; everything which is not the student's own creative work must be appropriately referenced. Inclusion of uncited text and figures will be considered plagiarism and subject to the Honor Code.

The written report should be prepared without feedback from the student's advisor or fellow graduate students, though the advisor can discuss an "outline" with the student (i.e., agree on important topics

to cover) prior to the report being written. The advisor may discuss the final report with the student prior to the oral exam, but only after the written report has been submitted to the GPA.

4.8.6 Oral Component

The oral component of the exam consists of a 20-minute presentation (maximum time limit will be upheld), followed by 30 minutes of questioning by the examination committee. The structure/content of the presentation should be analogous to that of the written report. Questions will follow from material presented in the written report and oral presentation. Students should be prepared to answer questions on any technical aspect of their research topic. Students are also expected to have an understanding of the related literature.

The student is permitted and encouraged to practice their oral presentation prior to the exam, with input from the advisor and research group. The student's advisor(s) may not be present at the exam.

Additional suggestions for the oral component:

- State the objective of the overall project and specific aims of the student's project.
- Be able to explain the rationale behind the project and approach chosen.
- Use problem statements to demonstrate the significance of not only the overall objective but also the specific approaches/tools being developed and/or applied.
- Explain why specific techniques were chosen and what alternative were considered and why eliminated.
- Describe future plans and include some examples of how the plans might be accomplished as well as the advantages and disadvantages of any proposed approaches and relevant alternatives.
- Be prepared to explain all information presented in your slides (equations, constants, tools, etc.).
- Know your target audience.

4.8.7 Question and Answer Component

The student's ability to answer relevant questions will also be a substantial part of the overall grade. The primary goal of the question-and-answer session is to explore the depth of the student's understanding of the issues outlined under the written and oral component guidelines listed above. Students should be able to answer questions of "Why" and "How" for the overall objectives and specific approaches employed. Students are encouraged to make it clear to the committee when they do not know the answer to a question and to explain why this is so (i.e., that subject area is tangential to my research focus, that subject is something I will explore in the future but is not as large of a priority for my current efforts, etc.). Students are allowed to prepare additional "back-up" slides that contain information to help answer anticipated questions.

4.8.8 Audience

Both written and oral components should be targeted at an audience with a broad engineering background (rather than to an expert in research field being pursued), as members of the exam committee (Chemical and Biological Engineering Faculty) are likely to have various areas of expertise.

The examination committee is made up of three ChBE Faculty members. One faculty will serve the role of Chair. Where possible, all three faculty will have at least tangential knowledge of the student's field of research. The student's faculty member is not allowed to be one of the committee members. Instead, the advisor will submit a form in which they can rate the student and add any comments that the committee may wish to take under consideration. This form will be due to the Department's Graduate Advisor one week before the preliminary exam. This report will NOT become part of the student's record and will not be shared with the student. The committee is chosen by the Department and its members will be communicated to the student two or three weeks before the exam date. The examination committee members are subject to change at any time.

The committee will be selected based on topical area (e.g., catalysis and energy, nanomaterials and nanotechnology, biological engineering, soft materials, computational science and engineering).

4.8.9 Request to Delay Preliminary Examination

In rare instances, a student may need to delay their first preliminary examination from the 3rd to the 4th semester.

Procedurally, a student should first consult with their PhD advisor on whether they would support a delay. Next, if the advisor supports a delay, the advisor should send a written communication to the Associate Chair for Graduate Education and the Graduate Program Administrator outlining their support and request for a delay. Thereafter, the student should communicate as openly as they are comfortable to the Associate Chair and the Graduate Program Administrator to inform them of contributing factors to delayed performance.

The Associate Chair for Graduate Education, in consultation with the Department Chair, will ultimately decide whether to grant an extension or not.

4.8.10 Preliminary Examination Re-take

If a student fails their first examination, they should carefully consider the written feedback from their committee. Often, students find it helpful to meet with committee members to get a better grasp of the feedback. Depending on the noted deficiencies, the student should hastily effort to address these concerns in advance of a re-take, often scheduled in February of the 4th semester.

4.9 Committee Meetings

Students will form a Dissertation Committee and hold yearly meetings between the Preliminary Examination and Comprehensive Examination.

4.9.1 Scheduling

Students should form and hold a committee meeting with their Dissertation Committee after successfully passing their Preliminary Examination by the completion of their 5th semester in the program and annually thereafter unless superseded by Comps or Defense in the scheduled semester. Typically, for a Fall admission this would place the first committee meeting in the Fall semester of a student's 3rd year.

4.9.2 Format and Approach

In consultation with their PhD advisor, the student should schedule their Committee Meeting accommodating the scheduling constraints of their 5 committee members. Often, it is difficult to find a common time that works for all. A best practice is to schedule this meeting up to 2 months in advance. If a student is unable to find a common time or a faculty member has a last-minute conflict that prevents their participation, the student should meet separately with this committee member to update them on the work undertaken and solicit their input.

Generally, it is recommended that students schedule committee meetings for at least 60 minutes and as much as 90 minutes (if merited). The student should prepare approximately 30 minutes of presented content (for a 60 minute meeting) and expect extensive discussion.

4.9.3 Committee Meeting Facilitator

The student shall consult with their advisor and together, they shall select a Meeting Facilitator that will facilitate the meeting and discussion.

4.9.4 Student-Committee and Advisor-Committee Discussion

The Advisor will start the meeting and introduce the student. At this time, the student will be asked to leave the room, and the advisor and committee will talk for up to 5 minutes on the student's progress, strengths, and concerns. Thereafter, the student will be called back into the meeting room, and the advisor will be asked to leave. If a committee member has a Conflict of Interest with the advisor, they should also leave the room, to ensure the student feels comfortable to openly share any concerns. The student should be prepared to discuss any issues with their interaction with their advisor or other concerns for up to 5 minutes.

If a student raises issues of significant concern, with the student's approval, the Meeting Facilitator will consult with the Associate Chair of Graduate Education on next steps to address the matter.

4.9.5 Feedback

After the presentation, the student will again be asked to leave the room. The committee members will discuss the progress and subject mastery of the student. The advisor will note the strengths and weaknesses noted by the committee and relay these inputs to the student after the meeting.

Committee Members that have concerns or hesitations about the viability of a student proceeding to secure the PhD degree should note these concerns to the Advisor and Meeting Facilitator.

4.9.6 Paperwork

The student shall work with the Graduate Program Administrator to route the Committee Meeting form to Committee Members after the meeting via Docusign to secure signatures.

4.10 Expectations and Guidance for Advancement to Comprehensive Examination and PhD Defense

It is generally accepted that PhD Dissertation in the Department should be composed of at least three first authored, peer reviewed publications. This is not a hard and fast metric but shared here to communicate the general expectation of the faculty. A student should consult with their advisor both before and after joining a laboratory to gain an understanding of their advisors expectations.

The student shall have made significant progress preceding scheduling of the Comprehensive Examination, such that in the duration of their remaining time they will satisfactorily produce the level of results expected by their advisor and peer faculty members.

A PhD defense should be scheduled no less than 6-9 months after a student passes their Comprehensive Examination.

4.11 Comprehensive Examination and Admission to Candidacy

Students must apply for admission to candidacy for the PhD degree at least two weeks before the student's scheduled Comprehensive Examination. The necessary forms can be obtained from the Department's Graduate Program Administrator. The student must be registered for the semester (including summer) in which the examination is to take place.

A written proposal, not to exceed 15 pages (1.5 line spacing), must be distributed to the student's faculty committee two weeks before the exam. Either a PDF file or a paper version should be submitted, depending on which format each committee member prefers. The paper copy should be double-sided to save paper. The comprehensive examination committee shall consist of five members as described in section 4.2.3. The comprehensive exam is closed to the public.

The proposal is limited to 15 pages and should include:

- Discussion of the state of the project
- Details of the proposed study
- Progress to date
- Financial budget estimate for the time remaining
- Time estimates for completion of the research and dissertation
- Complete consideration of safety aspects of experiments

The student is expected to deliver a summary of the research proposal, taking about 40 minutes, after which the student will be questioned by the Examination Committee. The student should plan a 90-120 minute examination period. The student must be able to demonstrate through knowledge of the fundamentals and application of the research field, define an original research problem and show the scientific and engineering basis for a creative, intelligent solution to the proposed research problem. To pass, the student must receive a majority passing vote of the Examination Committee. The comprehensive examination may be attempted a maximum of two separate times. A second examination should only be attempted if the initial examination results in an unsatisfactory decision.

The comprehensive examination can result in one of three decisions.

- **Satisfactory** – student passes the comprehensive examination and moves onto candidacy
- **Conditions placed** – student has neither passed nor failed the examination. The Examination Committee will make a list of conditions that must be met by the student in a set period of time. Once the student has met those

conditions and the Advisor and Facilitator of the Dissertation Committee agrees, then the student will pass the comprehensive examination and moves onto candidacy.

- **Unsatisfactory** – the student fails the comprehensive examination and will need to retake the exam the following semester.

The student shall have earned a least four semesters of residence and shall have passed the comprehensive examination before being admitted to candidacy for the degree.

4.12 Dissertation and Final Examination

A dissertation based upon the research work done with consulting advice from the student's research committee should be finished and submitted electronically as a PDF file for inspection by the Dissertation Committee at least two weeks before the student takes their final examination. The dissertation must be formatted per guidance of the Graduate School of the University of Colorado ([Format Requirements](#)).

A student who fails the final examination on their first attempt may attempt it one additional time upon recommendation of their committee. More than one dissenting vote constitutes failure of the final examination.

4.12.1 Dissertation Examination Committee

This will be the same committee the student used for their comprehensive examination. The Dissertation Examination Committee shall consist of five faculty members as described in section 4.2.3. In rare circumstances (such as a sabbatical or other matter that would prevent participation), a student may replace a member with consent of their advisor and committee.

4.12.2 Final Oral Examination

The final examination is an oral defense of the student's dissertation followed by a Q&A period. It is customary that the student first take Q&A from the general audience. Thereafter, all attendees are dismissed but the Dissertation Examination Committee. The student should plan for an examination that could take up to 120 minutes.

4.12.3 Dissertation Submission to the Graduate School

An electronic copy of an acceptable PhD thesis, along with the Thesis Approval Form (TAF) must be uploaded to the Graduate School by the posted deadline for the semester in which the degree is to be conferred. The specific thesis requirements and submission process can be found on the [Graduate School website](#). In addition to the thesis and TAF, the student must also complete the Survey of Earned Doctorates (SED). This form/survey can be found online at the [National Science Foundation website](#).

In addition to the electronic copy submitted to the Department and Graduate School, each graduate must submit one hardcopy of their thesis to the Department for binding. The physical copy will be given to the student's faculty advisor for record keeping.

5 Graduate Student Appointments, Leave, and Professional Expectations

5.1 Ethics and Honor Code

Students must adhere to the highest codes of personal and professional ethics. Students who do not adhere to written guidelines regarding academic honesty or academic or research ethics may be dealt with according to the policies for academic dishonesty, academic ethics, or research misconduct as published in the appropriate Graduate School and University policy documents. Students found guilty of misconduct in any of these areas may have sanctions imposed or may be dismissed from CU Boulder.

5.2 Financial Support

Admitted PhD students will receive an offer letter detailing the financial support to be expected. Each semester, PhD students, on assistantships, will receive a tuition waiver, mandatory fee waiver, and coverage of approximately 90% of their student health insurance. The student is responsible for the remaining health insurance premium. If a student secures a university, college, department or other type of one-time financial benefit, this benefit will be applied to the student's academic bill and pay any outstanding fees. The remaining benefit (after fees) will then direct deposit into the student account on record.

5.3 Supplemental Funding for Multi-year Fellowship Students

To facilitate the professional development of our students, we encourage students to apply for external fellowships. To reward and incentivize these efforts, advisors in the Department of Chemical and Biological Engineering will supplement students who apply for and receive competitive, multi-year fellowships with financial support over and above the standard monthly graduate stipend and benefits of the Department. Examples of fellowships that merit supplemental funding include NSF GRF, NIH, NDSEG, NASA, Hertz, or Ford fellowships. Fellowships outside these will be considered by the Associate Chair of Graduate Education on a case-by-case basis and factor in the selectivity, competitiveness, evaluation criteria, and level of effort required to secure the fellowship. The student will receive a \$725/month stipend supplement from their advisor, contingent to the availability of funds.

In the case when a student secures a national fellowship, such as an NIH F30 or an NSF GRF, that pays a stipend below the departmental stipend the department recommends that the student's advisor should cover the difference so that the total in pay is equal the department stipend. Again, contingent on funds, but wherever possible, the student's advisor should also extend the \$725/month supplement to students in this category, again recognizing their efforts in securing their own fellowship support that is a benefit to themselves, reduces their advisors costs, and benefits the department.

In the case that students are matriculating to the Department after securing a national, multi-year fellowship – the Department will provide resources as defined in the offer letter before the student moves into a laboratory. For the second and following semesters, the student shall receive this \$725 supplement from their PhD advisor.

A student that matriculates to the Department and is immediately supported by the fellowship (e.g., they don't defer or place fellowship in reserve) can choose to opt out of TA'ing in the 1st or 2nd semester. If the student opts out of TA'ing, they may lose the equivalent (in the offer letter) of the \$725/month supplement from the department during the 1st semester of their graduate students.

Note: if a student fails to retain a fellowship or the duration of the fellowship is completed before graduation, the student will no longer receive the \$725 supplement to maximize the use of research funds to support the full stipend and tuition of the student.

5.4 Graduate Student Pregnancy & Parenting-related Policy

Title IX of the Education Amendments of 1972 states that, "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving federal financial assistance." The University of Colorado Boulder is committed to providing its graduate students who may become pregnant, are pregnant, who gave birth, or who are parents with the same access to school programs and educational opportunities that other students have access to. It is the policy of the University of Colorado Boulder to support to the greatest extent possible, and in a manner consistent with the effective and efficient operation of the university, graduate students with a need for Academic Adjustment and/or Paid Parental Leave for Students on Appointment due to childbirth or adoption.

Additional information on this policy can be found on the [Graduate School Website](#).

5.5 Professional Expectations

The full calendar year appointment is meant to be the equivalent of a full-time position working toward the degree. Thus, the appointment continues directly through all University break periods (Winter Break, Spring Break, and Pre- and Post-Summer Break). The Department expects students making progress toward the degree (either doing coursework or pursuing research) at all times.

Students can take the equivalent of two week's (10 working days) vacation per year with pay (in addition to University Holidays). Any time off must be coordinated and approved by the student's faculty advisor. If a student is unable to sustain this level of effort they may take leave-without-pay.

For 1st year PhD students in their 1st semester, students should not take leave/vacation time during the semester outside of university breaks (Fall, Winter break).

Students should coordinate any vacation plans during Winter break (Dec-Jan) with their selected advisor.

Point of emphasis: graduate students that are TA's or ATA's should not take leave before the completion of the semester (including grading final examinations, projects) and assisting faculty with grade submission. The TA or ATA should consult with their faculty instructor on any leave requests.

5.6 Advisor-Advisee Interaction

Each faculty member in the department has a distinct style and approach to advising. Prior to selecting a project and an advisor, the student should inquire with both the advisor themselves, personnel in their laboratory, and other students in the department to assure that the advising style matches the needs of the student.

An advisor is expected to push students to achieve ambitious research and realize project goals. Students should expect to receive constructive criticism from their advisors throughout their time in the Department.

However, if a student feels that they are mistreated or if they need advice on how to (re-)develop a healthy rapport and interaction with their advisor, students should consult with the Graduate Program Administrator (see also Section 3.6).

5.7 Work from Home

Graduate Students should expect to work full time in person in a laboratory environment. Certain research groups (e.g., those that are computational) tend to allow for an appreciable amount of remote participation.

The Department has no "Work from Home" (WFH) policy and defers to each advisors policies and preferences. Students interested in undertaking aspects of their PhD degree while remote should dialog with their advisor and define expectations and deliverables. Given the nature of research and the benefits of pursuing it within proximity of peers and your advisor, it is entirely appropriate for a research advisor to prohibit or strongly limit WFH for graduate students.

If at any time students are found to be abusing remote work options and fall short of performance expectations, the advisor can and should revoke WFH privileges.

5.8 Undertaking Research at Another Facility Off Campus

Given the Department's relationships and proximity to national laboratories, it is common for students to complete a significant amount of their research at another facility – such as the National Renewable Energy Laboratory. Further, our students have undertaken extended research campaigns in other academic laboratories or national characterization facilities.

Department students should understand they are representatives of the University of Colorado and the Department and adhere to policies and procedures of the laboratory they are visiting.

If a student, through their actions, loses access to a facility that prevents their successful completion of PhD research, they may be dismissed from the program.

If a student, subject to factors outside their control (such as the COVID-19 pandemic), are limited or prevented from accessing necessary outside facilities to undertake their planned research, they should immediately work with their advisor to develop a new plan to undertake research and complete it within the timeframe limits established by the Graduate School.

5.9 Medical Leave

CU's Family and Medical Leave Insurance Program (FAMLI) program will provide all eligible employees a portion of their weekly salary for up to 12 weeks of leave to care for themselves or a family member, with an additional four weeks leave for complications during pregnancy or childbirth. FAMLI works with the federal Family and Medical Leave Act (FMLA) as well as CU's Parental Leave policies. A leave team has been established to assist employees navigate all leave programs for which they are eligible (including other state leave programs). More information is available on the [FAMLI, FML and Parental Leave](#) webpage, including a full list of eligible circumstances and details on benefit payment.

If a student intends to take Medical Leave, they should consult with their advisor as well as the Graduate Program Administrator and Associate Chair of Graduate Education at the same time they are working with the CU Benefits team. Details of the intended leave should be communicated to the level of necessity in writing, most critically the start and estimated end dates of the leave should be established. The advisor should reply to all key parties with a short statement acknowledging the leave. The Associate Chair of Graduate Education will consult with the Department Chair and the student's advisor on what accommodations to make regarding the student's academic program and teaching and/or research duties.

If a student needs to take family/medical leave of less than five days, such as for a short illness or to attend a funeral, they should inform their advisor and take the leave from the 10 days of paid personal leave or make alternative arrangements approved by the advisor. If the total of personal and family/medical leaves exceeds 15 days in any academic year (15 Aug – 14 Aug), then the leave request policy described above is to be used or the leave is to be without pay.

If a student needs to take more family/medical leave than allowable by the cumulative limit of 12 weeks, it will be as leave without pay. The student should follow the procedures above for requesting leave, and follow university procedures for requesting a [Leave of Absence](#) (if needed).

5.10 Mental Health and Campus Support

Graduate study is a long and difficult journey. We encourage any student that needs help or assistance with navigating this journey to reach out to the Graduate Program Administrator, who can help provide guidance and assist with resources.

Students should know that the campus provides extensive support for student health and well-being. Contact information for these services is listed here:

- Counseling and Psychiatric Services (CAPS) – 303-492-2277 (24/7 phone support)
- Office of Victim Assistance – 303-492-8855 (24/7 phone support)
- Student Conduct and Conflict Resolution – 303-492-5550
- Student Support and Case Management – 303-492-7348
- Medical Services – 303-492-5101 (24/7 nurse line)
- CU Boulder Police Department – 303-492-6666 (non-emergency line)

Additional resources can be found online at https://www.colorado.edu/resources#safety_amp_crisis_support-4225.

5.11 Leave of Absence (LOA)

The Leave of Absence Program provides an opportunity for students to take a leave from the university for a semester or a year without losing their place in their current college or school. Returning to the same research group is not guaranteed. The following guidelines are used to determine eligibility: graduate students must have a minimum 3.0 GPA and Doctoral candidates who have passed their comprehensive examinations and concurrent degree students (BAM – Bachelor's accelerated Master's program) are not eligible for LOA.

The application for a LOA can be found on the [Registrar's website](#). LOA students are guaranteed a place in their current college or school and major, provided that registration and deposit deadlines are followed.

If a student is not going to be registered for a semester, the Chair of the Department of Chemical and Biological Engineering must be informed in writing, and the student is required to complete Department checkout sheet.

5.12 Termination (Dismissal)

If a student is not making satisfactory progress, an advisor may notify the student and initiate an [Academic Recovery Plan \(ARP\)](#). This may often coincide with the Annual Evaluation Process (Section **Error! Reference source not found.**), but

it can occur at any time. The student will then have at least the standard semester timeline to meet the conditions of the ARP.

Procedurally, ahead of the ARP, the student's advisor or supervisor is encouraged to notify the student in writing that they are considering withdrawing from an advisor arrangement and document the reasons. Whenever possible, this notice should be preceded by conversation and prior documentation about performance shortfalls as well as corrective action. If the advisor opts to give written notice and initiate an ARP, the advisor is encouraged to copy the Associate Chair of Graduate Education and the Graduate Program Administrator on this correspondence. This communication should detail the performance concerns, the corrective action(s) which must be taken, and the timeframe in which a final decision will be made regarding the advising arrangement.

If conditions of an ARP are not met, the advisor may opt to no longer advise the student, allow access to their laboratories, and terminate their involvement in a funded research project prior to completing the M.S. or PhD degree. An advisor has no responsibility to support the student through the completion of an M.S. It is recommended the advisor provides up to two weeks of continued financial support to allow a student complete their efforts. Referencing Graduate School guidance, students should "recognize that failure to perform their job responsibilities in a satisfactory manner may constitute cause for disciplinary action or dismissal."

If the student wishes to remain in the program and continue their PhD studies the student should contact the Associate Chair of Graduate Education. The Associate Chair of Graduate Education can consult with the student on the process of identifying another advisor. Ultimately, it is the student's responsibility to identify and secure placement with an advisor. If the student cannot identify an advisor that will allow them to continue their PhD studies that can be completed in the time limits defined hereto, they may need to leave the program (ultimately, a Graduate School decision). Further information on termination and grievance procedures is provided in the Graduate School Rules.

Finally, as defined by the state of Colorado and stated in payroll offer letters: "State of Colorado law specifically provides that you be an employee-at-will in this position and that the following paragraph be included verbatim in this letter of offer; the provisions of this paragraph shall supersede and control any conflicting provisions of any University policy or employee handbook: *Your employment contract is subject to termination by either party to such contract at any time during its term, and you shall be deemed to be an employee-at-will. No compensation, whether as a buy-out of the remaining term of the contract, as liquidated damages, or as any other form of remuneration, shall be owed or paid to you upon or after termination of such contract except for compensation that was earned prior to the date of termination.*"

5.13 Records and Petitions

All graduate student records are kept in the Chemical and Biological Engineering Graduate Program Administrator's office.

Deviations from the general rules and procedures listed in this booklet or in the graduate catalog may be made only by a properly executed petition to the Chair of the Department of Chemical and Biological Engineering.

5.14 PhD Final Check List

The final PhD Check List (Appendix A) describes the sequence of events leading up to the conferment of the PhD degree. Ultimately, it is the student's responsibility to complete these requirements on the time schedule detailed hereto.

APPENDIX A

Department of Chemical and Biological Engineering PhD Final Exam Checklist

- **IMPORTANT:** Check Graduate School deadlines prior to semester start
- The following forms must be submitted to ChBE department for approval unless stated otherwise.
- Students must be registered during the semester in which the comprehensive exam is passed (this includes the Summer term).

PRE- Defense Requirements

- **Application for Diploma/Title of Dissertation** (*See Grad School deadlines*)
 - Students must [apply online to graduate](#) through [buff portal](#) on the “apply for graduation” card in order to have the degree awarded. This notifies the Graduate School and your department that you intend to graduate and it provides necessary information to the Registrar's Office for ordering and shipping diplomas. If you do not complete requirements for the graduation, you indicate on the online application, you must apply online to graduate for the new graduation date. You must apply to graduate online whether or not you plan to attend the ceremony.
 - Detailed instructions for applying to graduate can be found at <http://www.colorado.edu/registrar/students/graduation/apply>. PhD students must enter their **dissertation title** as part of the online graduation application. This title will appear in the commencement program and on your transcript. You may update the title through your portal until the deadline to cancel/update.
- **Confirm Committee Members and Defense Date with Graduate Coordinator** (*At least 3 weeks prior to exam*)
 - Email Dom (devangel@colorado.edu) the list of your committee members and your defense date/time
- **Submit Dissertation Defense Information Form** (*to devangel@colorado.edu 2 weeks prior to exam*)
- **Doctoral Final Examination Form** (*complete at least 2 weeks prior to exam*)
GOTO: <https://www.colorado.edu/graduateschool/content/doctoral-final-examination-form>

At least **two weeks before** your defense or exam, complete the landing page with your name, program, and the names and colorado.edu e-mail addresses of the committee chair and the other committee members. Click “submit.”

On the form, add the date of your examination/defense and student ID number. Read and acknowledge the information on the form and select “finish” to route the form through the following process:

1. The form will be sent to the Graduate School for review of your committee.
2. Following Graduate School committee approval, the form will be routed to your program for review in advance of the exam.
3. After the exam/defense has been conducted, work with your graduate program assistant to route the form to your committee members.
4. Committee members will receive the form simultaneously and all members must sign the form. More than one dissenting vote disqualifies the candidate in the final examination.
5. When all members have signed and the form is complete, you will receive a pdf version of the form with signatures via e-mail. The form will also be forwarded to your program, committee members, and to the Graduate School.

- **Submit Dissertation** (*To your thesis committee at least 2 weeks prior to exam*)

Defense

- **Successfully Defend Thesis**

POST – Defense Requirements

- **Final Grade Card** (*Submitted by ChBE, NO graduate student action required*)
- **Thesis Approval Form (TAF)** (*Uploaded with electronic copy of your thesis to Grad School – <https://www.colorado.edu/graduateschool/content/thesis-approval-form>*)
- **Final Copy of Dissertation** (*Electronic copy to Grad School – See Grad School deadlines/rules*)
- **Survey of Earned Doctorates (SED)** (*See Grad School deadlines*): This form can be filled out online at [National Science Foundation](#).

AFTER – Graduate School Requirements Met

- **Final Copy of Dissertation**
 - Provide one hardcopy of your thesis to Dom for your advisor. The Department will send the hardcopy to be bound and then give it your advisor.
- **Complete Departmental Check-Out Sheet** (attached)

Updated January 2024

APPENDIX B

Preliminary Exam Evaluation Form

(The 3 P's)

PREPARATION

- Understanding of relevant Chemical and Biological Engineering concepts
- Technical quality of the written report
- Writing style, grammar, spelling, clarity, correctness, format, etc.
- Technical quality of the oral presentation!
- Clarity, enthusiasm, visual aids, etc.
- Presentation and understanding of the relevant Scientific/engineering background
- Presentation and understanding of the significance of and rationale for the project

PLAN (FOR RESEARCH)

- Presentation and understanding of hypotheses and/or objectives
- Can the student clearly explain and answer questions related to how the objectives will be achieved and how the hypotheses will be tested?
- Can the student explain and answer questions related to the rationale for the hypotheses and objectives?
- Presentation and understanding of a detailed research plan
- Are the methods appropriate, described well, and understood at an appropriate level?
- Are experiments described in adequate detail?
- Will the results of the experiments meet the objectives?
- Are appropriate control experiments described?

PROGRESS

- Amount of progress/results
- Has the student made appropriate progress given the constraints of the particular project?
- Presentation and understanding of preliminary results
- Are results presented appropriately, with realistic uncertainties?
- Are the results valid?
- Do they relate to the objectives?
- Are interpretations of the results valid?

Students MUST be proficient in ALL 3P's to pass the Ph.D. preliminary exam.