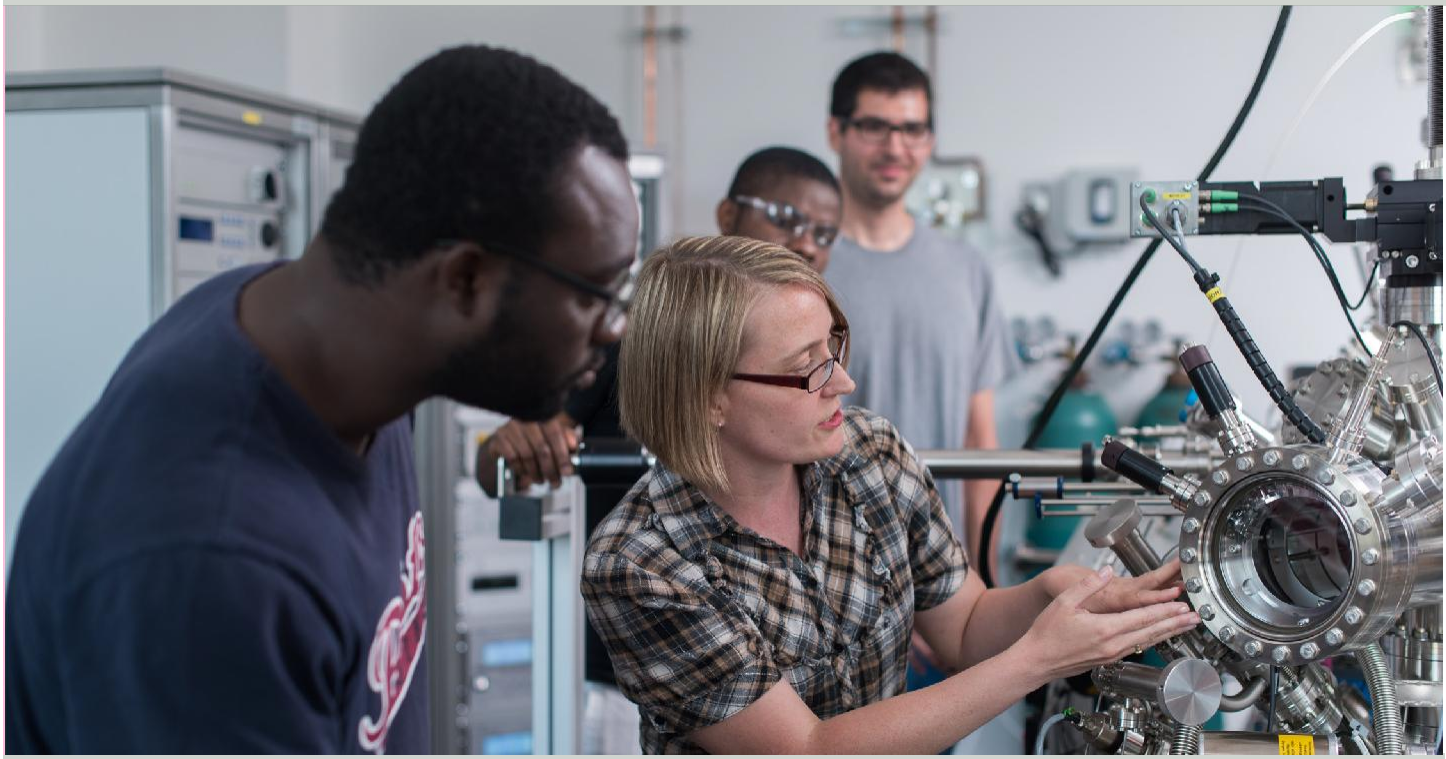
COLLEGE OF ENGINEERING School of Chemical, Biological, and Environmental Engineering



Chemical Engineering 2025-2026 Graduate Handbook

Oregon State University

Contents

NOTE: Official program requirements are available in the OSU catalog. If there is a conflict between what is stated here and what is presented in the catalog, the catalog requirements take precedent.

COURSEWORK REQUIREMENTS

PREREQUISITE COURSEWORK

At a minimum, the following courses must be taken prior to enrollment in the core graduate course curriculum. Your academic advisor should be consulted to ensure the proper pre- and co-requisite path is taken.

Chemical Engineering

Students with a B.S. degree in Chemistry or other non-chemical engineering undergraduate degree must take the following courses prior to enrolling in the CHE core:

Pre-requisite courses (completion required before taking CHE core courses)

- Chemistry including General, Organic, and Physical
- Math through Differential Equations
- One year of Physics
- CHE 331 (4) Transport Phenomena (Fluid Flow)
- CHE 312 (3) Chemical Engineering Thermodynamics
- CHE 332 (4) Transport Phenomena II (Heat Transfer)
- CHE 443 (4) Chemical Reaction Engineering

REQUIRED COURSEWORK

All CHE graduate students (regardless of degree) are required to take the following six CHE core courses:

CHE	514	(4)	Fluid Flow (Winter)
CHE	520	(4)	Mass Transfer (Spring)
CHE	525	(4)	Chemical Engineering Analysis (Fall)
CHE	537	(4)	Thermodynamics (Spring)
CHE	540	(4)	Chemical Reactors I (Winter)
CBEE	507	(3)	Grad Seminar: Professional Development (F/W/Sp - 3 credits)*

School Seminar: All newly-enrolled MS and PhD graduate students are required to take the School seminar course CBEE 507 Professional Development section for the first year (3 credits). These courses are intended to develop your understanding of the profession, to introduce the research activities that take place in this School, and to develop professional skills including literature searching and citations, communication skills, ethics, and navigating graduate school. In year two and beyond, all enrolled MS/PHD students are required to register for CBEE 507 Presentation section, all terms(F/W/Sp).

Additional Requirements for MEng students: MEng students are required to take Ethics, an additional 10 credits of Engineering Coursework, 6 credits of approved electives and a Technical Writing course. Technical writing course should be taken in the final term, but needs to be taken after the ethics course.

Additional coursework considerations for Ph.D. students: Ph.D. students entering the program following an M.S. degree in Chemical Engineering from OSU have no specific course requirements beyond those required by the Graduate School.

For Ph.D. students entering the program following an M.S. in Chemical Engineering (or equivalent M.S. degree) from another institution, waivers for individual courses in the above list will be made on a case by case basis, provided that an equivalent course was taken as part of the M.S. degree. In such instances, students must supply a transcript and course syllabus for the course they believe is a suitable replacement for the required course listed above to the Graduate Programs Coordinator for approval by the Graduate Committee or the Associate School Head.

Publishing Expectations:
Publication of M.S. and Ph.D. level research findings in the peer reviewed literature is vital to the success and reputation of the graduate programs in CBEE. In most cases, this mechanism of dissemination is the most efficient and effective vehicle for communicating our work to relevant stakeholders, particularly other experts in the field. For faculty, publications are of critical importance for career advancement as evaluated through the promotion and tenure process. For students pursuing research and academic careers, publications serve a similar purpose. It is generally on the basis of these widely available, peer-reviewed manuscripts that the quality and impact of one's research endeavors is assessed and potential for future success evaluated. Stated another way, simply completing a M.S. thesis or Ph.D. dissertation is generally not sufficient for attainment of the career goals of students and faculty.

Issues surrounding the publication of peer reviewed manuscripts and completion of M.S. theses and Ph.D. dissertations are intimately intertwined. This fact is recognized by the Graduate School and facilitated by so-called "manuscript-based" theses where theses and dissertations can package several published and/or draft publications into a single document.

In the School of CBEE, publication in peer-reviewed manuscripts is strongly encouraged by all research-based students, especially those pursuing a Ph.D. As outlined above, these expectations are believed to be in the best interests of students, faculty and the School. In general, publishing approximately 3 manuscripts on the basis of a Ph.D. dissertation and 1 manuscript on the basis of M.S. research are viewed as reasonable targets. Specifics of these expectations, including guidelines and timelines, are matters to be arranged between students and their faculty advisors. An important mechanism for formalizing and assessing progress towards these aims is the annual assessment of satisfactory academic progress (see Appendix). This process provides a structure for faculty and students to set goals and expectations regarding publishing and to assess progress towards those goals on a yearly basis. For context, faculty members are evaluated on a similar basis via annual evaluations with the School Head and through mid-tenure, tenure, and promotion processes at the College and University levels.

MASTER'S DEGREE PROGRAMS

The Chemical Engineering program offers two types of master's degrees:

- Master of Engineering (MEng)
- Master of Science (MS)

Each degree requires a minimum of 45 credits to graduate; each with a set of core course requirements totaling 23. Additional credits above 45 may be required depending on the educational background of the student. All students must complete a Program of Study form (see Procedures for getting a Master's degree below) before completing 18 credits. All work must be completed within seven years, including transfer credits, course work, and the thesis/portfolio.

In addition to the formal requirements listed in the Graduate School Catalog (https://catalog.oregonstate.edu/college-departments/graduate-school/), CBEE has policies listed below regarding the course of study for each Master's degree.

As with all policy matters, students have the right to petition for deviation from school policies to the CBEE School Graduate Committee. Such petitions must be made in writing, indicating the policy deviation requested and the reason(s) for the request. The decisions of the CBEE Graduate Committee are final.

Master of Engineering

The MEng degree option provides students the opportunity to pursue advanced-level study without the requirement for a research thesis. A Technical Writing Course with portfolio serves as one's final exam in lieu of a thesis. MEng degrees are intended as terminal degrees, not as preparation for a doctorate, and will emphasize job-related knowledge and skills. Although not required, students wishing to pursue a PhD in the future are advised to pursue an MS degree, not the MEng.

Master of Science

A thesis in the major area is required for the MS degree, and the thesis format is bound by the rules of the Graduate School (https://gradschool.oregonstate.edu/progress/thesis-guide). Nine of the required 45 graded credit hours must be thesis credits; more thesis credits may be taken to fulfill GRA/GTA registration requirements, but only nine credits of thesis can appear/count on the Program of Study.

Minor Option

A minor field of study is optional. If a minor is declared, however, the minor requirement specified by the Graduate School is 15 credits minimum (18 minimum for doctoral). Master's students are expected to take 15 credits or more of minor subject courses if the minor is "integrated" (i.e., it spans two or more schools). The CBEE Graduate Committee may apply suitable courses to such an integrated minor requirement as long as the courses are not in your major area of concentration and they comprise less than one-half of the credits in the minor.

MENG PORTFOLIO (MENG STUDENTS)

The MEng portfolio demonstrates the student's mastery, synthesis, and communication of subject matter knowledge in the context of the student's professional goals. It serves as the culmination of the

MEng program and final examination for the MEng degree. MEng students will assemble their portfolio in their last term of residence as part of the course WR 545 Technical Writing. The final portfolio will be assessed by both the course instructor and the student's academic advisor according to the rubric included in the Appendices. Briefly, the aim of the portfolio is to highlight the following three elements:

a. A statement of the candidate's professional goals for obtaining the MEng degree;
b. An overview of how the MEng coursework, including both major and minor areas, provided the preparation needed to achieve the candidate's professional goals;
c. A highlight of examples from class projects, homework, job search efforts, etc., that illustrate and elaborate on item b.

Additionally, the portfolio should demonstrate attainment of the program's three graduate learning outcomes.

MASTER'S THESIS (MS STUDENTS)

The thesis demonstrates the student's mastery of professional knowledge in a particular subject area of their chosen field. It must present innovative research or a novel application of a known methodology to appropriate problems. A conscientious survey of pertinent literature is a prerequisite to an acceptable thesis. The research topic must be approved by the major professor.

The student cannot schedule a defense exam with the Graduate School until the major professor approves the thesis for distribution to all committee members. Once approved, the student must submit a copy of the thesis to each committee member and complete the Exam Scheduling Form (https://gradschool.oregonstate.edu/forms) with the Graduate School at least two weeks prior to the intended defense date. See your major professor for any other rules regarding thesis defense preparation requirements.

An MS candidate will be subjected to a final oral comprehensive examination, which includes a thesis research presentation and defense and questions on major, minor, and other pertinent academic subjects.

THESIS DEFENSE COMMITTEES (MS STUDENTS)

1. The principal authority over a student's program resides with the student's Master's Committee. This committee is responsible for:
   - assuring that University and School requirements are satisfied and
   - administering the final oral examination.

2. The Committee consists of at least 4 members:
   - the student's major professor;
   - one other CBEE faculty member;
   - the student's minor professor, or if no minor is selected, committee member may be from graduate faculty at-large; and
   - the Graduate Council Representative (GCR).

Note that the composition of a student's Master's Committee MUST be approved by the major professor.

3. The committee is originally formed, with approval from the major professor, at the student's invitation. The Graduate Council Representative is selected from a list generated by the online GCR list generation tool. The GCR is required to attend the final examination (thesis defense). Information on the role and duties of the GCR, and how to choose one (the aforementioned online tool), can be found at the following website:

https://gradschool.oregonstate.edu/progress/graduate-committee#council

PROCEDURES LEADING TO A MASTER'S DEGREE

Below is an outline of the steps required to obtain the Master's degree (with a chart each for MEng and MS, respectively). You should become familiar with the specific and detailed information contained in the Graduate School Catalog, as well as School requirements.

PROCEDURES FOR MENG			
Check Box	**Item #**	**Step**	**Timing**
	1	Be assigned a major professor	In your first term
	2	Submit your Program of Study to Grad School	By the end of second term
	3	Register for WR 545	Final term in residence
	4	Compare Program of Study form and transcripts for consistency	
	5	File Petition to Change Program form, if needed	
	6	Review CBEE Graduate Learning Outcomes rubric used for evaluating final exams	
	7	Confirm submission of your approved Program of Study with Graduate School	
	8	File a Diploma Application	
	9	Fill out Exam Scheduling Form	
	10	Graduate School Survey will be emailed to you.	A month after graduation

PROCEDURES FOR MS STUDENTS			
Check Box	**Item #**	**Step**	**Timing**
	1	Match with a major professor and a general thesis topic	By the end of your second quarter
	2	Appoint Masters Committee with approval of your major professor	By completion of third quarter
	3	Generate Grad Council Rep (GCR) list; and contact those people until you find someone willing to serve as your GCR	
	4	File a Masters Program of Study form	
	5	Read the Thesis Guide on the Grad School's website	Prior to starting your thesis
	6	Notify your major professor and committee of your intended graduation term	AT LEAST 1 term before your intended graduation term
	7	Compare Program of Study and transcripts for consistency	
	8	File Petition to Change Program form if needed.	
	9	Confirm submission of your approved Program of Study with Graduate School	15 weeks prior to final oral examination
	10	File a Diploma Application	
	11	Review CBEE Graduate Learning Outcomes rubric used for evaluating final exams (see Handbook appendix)	
	12	Complete final draft of your thesis, and submit it to your major professor for review and approval	By the start of your last term
	13	Decide on a day and time (at least 2 hours) with all Committee members (faculty & Grad Council Rep)	AT LEAST 2 weeks prior to final oral examination
	14	Reserve a room with CBEE Office Coordinator	
	15	Fill out Exam Scheduling Form	
	16	Submit thesis pretext pages to the Graduate School	
	17	Submit a final draft of the thesis to all committee members (with advisor's approval)	
	18	Submit final oral examination appointment to Graduate Program Coordinator for announcement circulation	
	19	Remind (e-mail) Committee of the final oral examination	2 days prior to final oral examination
	20	Final oral examination	
	21	Print Electronic Thesis and Dissertation Form, obtain signature, and submit final thesis paperwork (See Submission Instructions)	Within 6 weeks of the exam or by the last day of the current term, whichever is first; if you miss the deadline, you may be required to register for an additional 3 credits.
	22	Print copy of thesis for School binding; submit to CBEE Office Coordinator.	
	23	Graduate School Survey will be emailed to you.	A month after graduation

CHE DOCTORAL DEGREE PROGRAM –

The university requirements for the doctorate include the following:

1. at least 108 graduate credits beyond the bachelor's degree;
2. at least 50% of the course work must be graduate stand-alone courses;
3. a presentation of an original dissertation for which a minimum of 36 credit hours of dissertation research (thesis course) has been accumulated;
4. a minimum of one year of residence, continuously, at OSU (i.e., three consecutive quarters as a full time student);
5. passing a preliminary oral examination in the major subject; and
6. successfully defend the dissertation in an oral presentation to a panel of experts.

For other regulations, see the OSU Graduate School Catalog.

In addition, school requirements include

- A minimum of one full-time academic year of regular non-blanket course work (at least 36 credits) must be included on the doctoral program
- No more than 15 credits of blanket-numbered courses, other than thesis, may be included in the minimum 108-credit program

**Coursework completed as part of a Master's degree (MS or MEng) can be transferred for credit towards the doctoral degree with the consent of the student's doctoral committee. Completion of the Transfer Credit Request Form is required if these credits were obtained outside of OSU.

A Ph.D. degree student **without** an OSU M.S. degree in Chemical Engineering must take the following six CHE core courses: **

CHE 514	(4)	Fluid Flow
CHE 520	(4)	Mass Transfer
CHE 525	(4)	Chemical Engineering Analysis
CHE 537	(4)	Thermodynamics
CHE 540	(4)	Chemical Reactors I
CBEE 507	(3)	Grad Seminar: Professional Development (F/W/Sp - 3 credits total)

A Ph.D. candidate without a B.S. degree in Chemical Engineering (or equivalent Engineering degree) must take the courses listed in the Prerequisite section of the manual (p. 2) in addition to the CHE core.

There are five steps to be completed towards a Ph.D. degree:

(1) Approval of graduate program of study
(2) Oral qualifying examination
(3) Preliminary examination
(4) Final oral examination
(5) Thesis submission

DOCTORAL COMMITTEES

1. The principal authority over a student's program resides with the student's Doctoral Committee. This committee is responsible for
   - assuring that University and School requirements are satisfied,
   - monitoring student progress,
   - assigning and approving courses of study,
   - approving dissertation topics and paths-forward, and
   - administering preliminary and final oral examinations.

2. The committee consists of at least 5 members:
   - the student's major professor;
   - two other CBEE faculty members;
   - the student's minor professor, or if no minor is selected, committee member may be from graduate faculty at-large; and
   - one Graduate Council Representative (GCR).

   Note that the composition of a student's Doctoral Committee MUST be approved by the major professor.

3. The committee is originally formed, with approval from the major professor, at the student's invitation. The Graduate Council Representative is selected from a list generated by the online GCR list generation tool. The GCR is a permanent member of the committee and *must* attend all committee meetings, including the preliminary program committee meeting, the oral preliminary exam, and the final examination (dissertation defense). Information on the GCR can be found at

   https://gradschool.oregonstate.edu/current-students/graduate-committee#council

4. The Committee should be appointed after successful completion of the qualifying exam.

MATRICULATION

1. Matriculation (first term of attendance) qualifies the student to:
   a. select a general area of dissertation research, and
   b. identify a major professor.

2. After matriculation, the student must pass a qualifying examination (described below).

QUALIFYING EXAMINATION FOR DOCTORAL STUDENTS

The CHE qualifying oral examination will take place at the end of fall term of a student's second year in the CHE Ph.D. program. Any exceptions or changes to this timing should be discussed with the Graduate Program Coordinator in consultation with the CHE faculty. Once your exam time is set up please notify the Graduate Program Coordinator of the timing.

Each student will receive a research article from the current literature, chosen by their respective research advisor. This examination will consist of written and oral components and evaluation is based on two equally important elements: (1) student critique of that paper, and (2)

the depth of student understanding of the relevant fundamental science.
The oral examination consists of two parts, totaling 80 minutes.

1. An oral presentation of the critique of the paper. Each student is expected to address the following four items in their individual presentation.
    a. Present the scientific content in the article, providing critical evaluation of the hypothesis, assumptions, methods, and conclusions of the authors;
    b. Perform a literature survey relevant to the content of the article that places the assigned article into the context of work in the field;
    c. Connect the content of the assigned article to basic core CHE course material; and
    d. Propose an extension of the core ideas or work to a future application in the field.

Student presentations will be strictly limited to 20 minutes. Students should practice their talk and use of associated equipment so time is used efficiently. The critique need not be negative; you may have an excellent paper to discuss. In your critique, you should demonstrate a depth of thinking about the research strategy and the fundamental chemical, physical, and/or biological concepts that govern the behavior of the system being studied.

2. A question and answer period consisting of questions pertaining to the research field or the specifics of the paper. The questions will probe your depth of thinking about the research strategy and the fundamental chemical, physical, and/or biological concepts that govern the behavior of the system being studied. This section of the exam should not exceed 60 minutes.

The written portion of the exam consists of a <u>two-page written summary</u> of your critique that includes the four elements described in (1).

Preparation for the examination must represent *your individual effort*. However, you may have general discussions with other students and are encouraged to practice your talk in front of other students, for example, at a GSA-organized practice session. You should document any discussions that you have with other students in the form of an "Acknowledgements Section" at the end of your presentation. Please refrain from contacting the authors of your assigned paper and any faculty.

With respect to assessment, students will be scored on the following competences.

1) Ability to present the core scientific content in the assigned article.
2) Ability to think critically about hypothesis, assumptions, methods, and conclusions in the assigned article.
3) Ability to place the assigned article in the context of associated background literature.
4) Ability to connect content in the assigned article to relevant core material in your research area.
5) Ability to propose an extension of the core ideas and/or methods in the assigned article to a future application.
6) Ability to communicate an understanding of the core curriculum related to your research area in response to questions in the Q&A session.
7) Ability to communicate the requested content in a written summary.

Qualifying examinations will be evaluated by the research advisor and two additional members of the CHE faculty.

If the student fails the examination, one additional attempt will be allowed.

CANDIDACY

To advance to candidacy, PhD students must successfully complete the preliminary examination.

PRELIMINARY ORAL EXAMINATION FOR DOCTORAL STUDENTS

Ph.D. students will present their proposed dissertation research to their committee as part of their preliminary exam. The preliminary examination consists of a written research proposal and an oral examination and should ideally take place in the student's second year.

The written component of the preliminary exam is a document describing the student's proposed research and a review of the supporting literature. The originality, scholarly quality, and the technical feasibility of the research proposal will be evaluated. This 'report' style document should contain an introduction, literature review, outline of major hypotheses, discussion of methods that will be used to test the hypotheses, preliminary findings up to the point of the exam, a summary, and a timeline indicating roughly when key elements of the research will be completed. Such a report would likely serve as a basis for the first several chapters of the Ph.D. candidate's dissertation. The document is *limited to ten single-spaced pages (excluding references)* and is due to the committee one week before the oral examination.

The oral examination will be scheduled for ***at least two hours***, and the examination date must be scheduled with the Graduate School ***at least two weeks in advance***.

The oral examination has two components: (i) a formal seminar in which the student presents his/her proposed research and a review of the literature supporting this plan, and (ii) a student and committee discussion session that identifies strengths and weaknesses within the student's preparation and proposal and includes an evaluation of the student's basic understanding of chemical engineering and the minor area(s) (as well as all of the courses that the student has taken at OSU). The oral preliminary examination will be scheduled for a minimum of two hours with the formal seminar to take approximately 30 minutes (or an alternate length of time determined by the student's major professor). All members of the committee are expected to participate in examining the student. No committee member should be allowed to monopolize the examination, and the student must be given an adequate and fair opportunity to respond to the questions.

Students should complete the preliminary exam **by the end of the fall term of the student's third year**. At least one complete academic term must elapse between the time of the preliminary oral examination and the final oral examination. If more than five years elapse between these two examinations, the candidate will be required to take another preliminary oral examination.

FINAL ORAL EXAMINATIONS

After completion of or while concurrently registered for all work required by the program, the student must pass a final oral examination. The final oral examination must be scheduled in the Graduate School **not less than two weeks prior** to the date of the examination. The final oral examination information must be submitted to the Graduate Program Coordinator for announcement in the School of Chemical, Biological, and Environmental Engineering ***no less than two week*s** prior to the examination date.

The thesis defense portion of the final oral examination is open to all interested persons. After the open portion of the exam, the examining committee excludes all other persons and continues with the

examination of the candidate's knowledge of his or her field and the evaluation of the candidate's performance. The oral final examination should be scheduled for three hours with most exams lasting approximately 2-2.5 hr.

The student is expected to display a mastery of knowledge in his/her field and professional maturity as a Chemical Engineer. In the oral examination, the candidate is expected to defend the thesis and show a satisfactory knowledge of his or her field. If more than one negative vote is recorded by the examining committee, the candidate has failed the examination. Only one re-examination is permitted.

The final oral examination must be taken within five years after the oral preliminary examination. If more than five years elapse, the candidate is required to take another oral preliminary examination.

RE-EXAMINATION

The candidate is expected to defend their thesis during the final oral exam and show a satisfactory knowledge of his or her field. If more than one negative vote is recorded by the examining committee, the candidate has failed the examination. **Only one re-examination is permitted**.

DOCTORAL DISSERTATION

All Ph.D. candidates must submit a thesis embodying the results of research and presenting evidence of originality and ability in independent investigation. The thesis must constitute a valid contribution to knowledge in the field of study and must be based on the candidate's own investigation, including one or more of the following elements:

- Contribution to theory,
- Development of new method for scientific investigation,
- Generation of new scientific data which clearly contribute to the development of sciences, and
- Development and/or novel implementation of a numerical model.

The thesis must reflect a mastery of the literature of the subject and be written in scientific format. The preparation of an acceptable thesis will require at least one full-time academic year. The OSU Graduate School's *Thesis Guide: Preparing a Thesis or Dissertation* can be accessed electronically here: https://gradschool.oregonstate.edu/sites/gradschool.oregonstate.edu/files/2021-08/thesisguide2022-v2.pdf.

The results from studies conducted using human subjects without obtaining Institutional Review Board approval shall not be used to satisfy master's thesis or doctoral dissertation requirements. For more information, please send an email to irb@oregonstate.edu or visit the IRB website at http://oregonstate.edu/research/irb/.

When scheduling their final oral examinations, doctoral students are required to submit the pretext pages of their dissertations to the Graduate School **at least two weeks prior to the final oral examination**. Pretext pages include the abstract, copyright (optional), title page, approval page, acknowledgment page, contribution of authors, table of contents, list of figures, tables, appendices, dedication (optional), and preface (optional). It is expected that students will distribute examination copies of their thesis to all committee members, including the Graduate Council representative,

sufficiently early to permit thorough review of the thesis prior to the student's final oral examination.

Within six weeks after the final oral examination or before the first day of the following term, whichever comes first, students must upload one PDF copy of the thesis, without signatures, electronically to ScholarsArchive and submit the signed ETD submission approval form with a copy of the title page to the Graduate School. If final submission requirements are after the initial six-week period, the student may be subject to re-examination. Please refer to the Graduate School's website for complete details (http://gradschool.oregonstate.edu/success/thesis-guide).

Signatures on the ETD submission approval form can be electronic, signed, scanned and emailed or faxed. The thesis will not be accepted for graduate requirements until it has received the approval of the graduate dean, which the thesis editor will obtain.

PROCEDURES LEADING TO THE DOCTORAL DEGREE

Below is a brief list of the steps required to obtain the Ph.D. degree. You should also become familiar with the specific and detailed information contained in the Graduate School Catalog as well as School requirements.

Procedures for PhD Students			
Check Box	**Item #**	**Step**	**Timing**
	1	Identify a Major Professor	End of second term
	2	Establish general area of dissertation research	
	3	Take Oral Qualifying Exam	Beginning of winter of second year
	4	Generate Grad Council Rep (GCR) list and contact those people until you find someone willing to serve as your GCR	By winter term of your second academic year
	5	Schedule doctoral program meeting with all committee members; reserve a room with CBEE Office Coordinator	
	6	Doctoral program meeting: Print GCR Checklist and take to the meeting	
	7	File Doctoral Program of Study	
	8	Schedule the Preliminary Oral Examination with your committee (one hour)	AT LEAST 2 weeks prior to preliminary oral examination
	9	Reserve a room in CBEE with the Office Coordinator for the Preliminary Oral Examination	
	10	Review the PhD Preliminary Oral Examination Scoring Rubric (see Handbook appendix)	
	11	Complete and Submit Exam Scheduling Form	
	12	Complete preliminary oral examination	By the end of fall term of third year
	13	Hold regular meetings with your Committee to keep them updated on your progress	Throughout your degree progression (at least once a year)
	14	Read the Thesis Guide on the Grad School's website	Prior to starting your dissertation

	15	Present Project Poster at Graduate Visit Wkend	Winter Term, Third Year
	16	Compare Doctoral Program of Study form and transcripts for consistency	1 term before your intended graduation term
	17	File Petition to Change Program form if needed.	
	18	Present Research in Graduate Seminar (CBEE 507)	Any Term, Fourth Year
	19	File a Diploma Application	15 weeks prior to final oral examination
	20	Complete final draft of your dissertation and submit it to your major professor for review and approval	By the start of your last term
	21	Schedule the final oral examination w/your committee	AT LEAST 2 weeks prior to final oral examination
	22	Reserve a room with CBEE Office Coordinator	
	23	Review CBEE Scoring Rubric & Graduate Learning Outcomes (see Handbook appendix)	
	24	Complete Exam Scheduling Form	
	25	Submit thesis pretext pages to the Graduate School	
	26	Submit a final draft dissertation to all committee members (with advisor's approval)	
	27	Confirm final oral examination appointment with the Grad School (make sure it's on their calendar!)	1 week after submitting exam scheduling form
	28	Submit final oral examination appointment to Graduate Program Coordinator for announcement circulation	AT LEAST 2 weeks prior to final oral examination
	29	Remind (e-mail) Committee of the final oral examination	2 days prior to final oral examination
	30	Complete final oral examination	(At least one full term must elapse between completion of the preliminary examination and the final examination)
	31	Submit final copies (See Submission Instructions)	Within 6 weeks of the exam or by the first day of the Next term, whichever is first; if you miss the deadline, you will be required to register for an additional 3 credits, no exceptions!
	32	Print copy of dissertation for School binding; submit to CBEE Office Coordinator.	
	33	Graduate School Survey will be emailed to you.	A month after graduation

NOTES ABOUT THE CHECKSHEET –

You should work with your advisor to fill out your Program of Study form *before* you hold your doctoral program meeting because your committee needs to approve the Program of Study before you can

submit it to the Graduate School.

For various reasons, changes often occur in the classes that you plan to take and what you actually need to earn your degree. When you graduate, the Program of Study must be 100% accurate. You should compare the program on file with your transcripts, which can be viewed by logging into Student Online Services. Make corrections by filling out the **Petition to Change the Program of Study form** **at least one term before you plan to defend.** You do not have to revise the above form each time you deviate from your original program; however, you need to **keep your committee informed of any and all changes**, since they are the ones who must approve your Program.

Give yourself and your committee members a lot of time to plan for the defense date. Sometimes committee members will be on **sabbatical leave** during the term in which you plan to defend. You should check with your committee members about such leaves far in advance to better plan, especially if you need to change a committee member for any reason. Note that your GCR *must attend* all meetings and examinations during your degree program.

The **Diploma Application** must be filed no later than week two of the term in which you defend. However, completion of the form a term or two early is OK. If you need to change your end term after you file a Diploma Application, simply fill out the application again.

When you **confirm** your defense **exam date with the Graduate School**, you are making sure your exam is on their calendar. If they are not aware of your defense date, even if you filled out all the paperwork, *you will not be allowed to defend* and will have to reschedule.

Appendices

Oregon State University
School of Chemical, Biological and Environmental Engineering
Student/Advisor Matching Memorandum of Understanding

Student's name:_____ Date:_____

Date entered CBEE graduate program:_____Degree program (check one): M.S. ☐ Ph.D. ☐

Program:_____

Major Professor Name(s):

_____ _____

Please set up a time as Advisor/Student to meet and discuss the following topics areas. This can serve as a template for future assessment discussions:

1. Student and Advisor Responsibilities
2. Initial Expected Sources of Funding
3. Planning Ahead
4. Talking Points for Advisor/Student Relationship

Once all areas have been discussed, please sign the bottom of this form and return to Kimberly Compton at Kimberly.compton@oregonstate.edu.

1. Student and Advisor Responsibilities

A healthy and fruitful relationship helps both the Advisor and the Student and forms the foundation of a career-long beneficial relationship. The set of general guidelines below explaining the expected responsibilities on both parts is intended to help establish such relationships.

Advisor(s) Responsibilities

- The Advisor will maintain a respectful and professional relationship with the Student.
- The Advisor is neither the Student's best friend, nor his opponent – the Advisor's responsibility is to help the Student be successful by providing opportunities and guidance in coursework selection and research. These opportunities include access to a clean, safe, and well-equipped work environment; opportunities for publications and professional presentations; and supplying accurate and objective references for potential employers.
- The Advisor will ensure that coursework and research are up to the high standards of graduate engineering education at OSU and that qualifying, preliminary, and/or final exams are fair. If there are concerns about the quality of the Student's coursework or research, the Advisor will step in to discuss possible options and remedies.
- The Advisor will give high-level direction research work but it is the Student's responsibility to conceive and implement the day-to-day tasks necessary to move the research forward.
- The Advisor does not have an obligation to provide funding to the Student but will strive to provide funding opportunities whenever possible.

Student Responsibilities

- The Student is expected to treat the Advisor with respect and address them formally, be respectful of other students, and help create a positive environment in the research group, the School and the University.
- It is the Student's responsibility to plan the program of study that meets the degree program and University requirements regarding number and types of credits needed for graduation with input from the Advisor. To achieve this, the Student should prepare a draft of the Program of Study (see http://oregonstate.edu/dept/grad_school/forms.php#program) by the end of the Student's first term working with the Advisor and discuss options. It is also the Student's responsibility to be aware of key dates and requirements for qualifying exams, program meetings, preliminary exams, and/or final exams.
- When research funding is offered the Advisor and Student will attempt to reconcile the research topic desires of the student with the needs of the funding source – generally, there is sufficient freedom to tailor the research toward the student's areas of interest. If the Student is unsatisfied with the research topic, it is the Student's responsibility to raise this concern with the Advisor. The Student always has the option of rejecting funding. However, once a commitment is made, the Student is expected to meet targets as deemed reasonable and agreed upon with the Advisor.
- It is the Student's responsibility to stay in contact with the Advisor and ensure the Advisor is current on research progress. For the purpose, the Student should take the initiative to schedule any meetings with the Advisor to discuss research questions or issues.
- The Student is expected to take ownership of the research project and to bring energy, enthusiasm, and innovation to the project. In the end, the thesis must contain many of the Student's ideas and results interpretation. The time spent in the development of the research project should be in addition to any paid professional commitments contracted by the Student (e.g., beyond a GRA or GTA offer, if any).

2. Initial Expected Funding

Please discuss summer funding opportunities as well as AY 24-25.
At the time of signing, the Student is (select one):

- ☐ Self-funded
- ☐ Offered funding at
    - FTE (e.g., 0.40-0.49): _____
    - Source of funding: _____
    - Expected duration of funding: _____

It is mutually understood that renewal of any offer of GRA funding in future terms is at the discretion of the Advisor and contingent on the availability of funds and your initial offer letter. The Advisor will discuss the funding situation with the Student in a timely fashion to enable the Student to make alternative financial arrangements as necessary.

3. Planning Ahead

Please discuss the coming year in terms of academic milestones, competencies, professional and career development, etc. Use the table for formal academic milestones and the space below for other goals. This will help you with discussions and the assessment is then used to take stock and see how things have progressed.

COMPLETION OF MILESTONES	TIMELINE	DATE COMPLETED OR EXPECTED
All Degrees		
Complete of Ethics Requirements (CITI RCR)	First quarter	
Complete laboratory safety training	First quarter	
Draft Program of Study	Second quarter	
M.S. Degree		
Establish Graduate Committee	Third quarter	
Program of Study submitted to the Grad School	By end of year 1	
Schedule final defense	at least 2 weeks before event	
Ph.D. Degree		
Establish Graduate Committee	End of first year	
Qualifying Exam	End of first year (ENVE); End of Fall term of year 2 (CHE)	
Program of Study Meeting / Submit PoS	After passing Qualifying Exam / by end of 5th term	
Preliminary Exam	End of 2nd year or after approval of Program of Study and completion of most of course work	
Schedule final defense	One quarter before event	

1. Short-Term Goals (through the end of the spring term of current academic year):

2. Long Term Goals (duration of your degree):

4. Talking Points for Advisor/Student Relationship

Establishing a strong Advisor/Student relationship is crucial for effective communication, collaboration, and productivity. Here's a checklist of talking points to consider covering. These topics can be discussed and checked back on each year during assessments:

1. **Introduction and Background:**
   - Introductions
   - Discuss past experiences, qualifications, and expertise relevant to the role.

2. **Expectations and Goals:**
   - Clarify the expectations.
   - Discuss the goals and objectives for the team.
   - Align individual goals with the lab objectives.

3. **Communication Preferences:**
   - Share preferred communication channels (email, meetings, etc.).
   - Establish frequency and format of updates and check-ins.
   - Determine how to address urgent matters or concerns.

4. **Work Style and Preferences:**
   - Understand each other's work styles (e.g., collaborative, independent).
   - Discuss preferences for decision-making, problem-solving, and feedback.
   - Identify any specific work rituals or practices that are important.

5. **Role Clarity and Responsibilities:**
   - Clarify any uncertainties or ambiguities regarding roles and duties.
   - Discuss how responsibilities may evolve over time.

6. **Feedback and Performance Management:**
   - Set expectations for feedback.
   - Discuss preferred approaches for giving and receiving feedback.
   - Establish goals for professional development and growth.

7. **Support and Resources:**
   - Identify resources needed to succeed in the role (tools, training, support staff, etc.).
   - Discuss how the faculty advisor can support the grad student’s success.
   - Address any concerns or obstacles that may hinder performance.
   - Address any additional training or safety that needs to be done.

8. **Team Dynamics and Collaboration:**
   - Introduce other team members.
   - Discuss the team's culture, values, and dynamics.

9. **Conflict Resolution and Problem-Solving:**
   - Establish protocols for resolving conflicts or disagreements.
   - Discuss how to address challenges or obstacles that arise.

- Agree on a proactive approach to problem-solving.

10. Feedback Loop and Follow-Up:

- Schedule regular check-ins to review progress and address any issues.
- Encourage open communication and feedback throughout the relationship.
- Agree on how to adjust strategies or approaches based on feedback.

11. Mutual Respect and Trust:

- Emphasize the importance of mutual respect and trust.
- Commit to open, honest, and transparent communication.
- Build rapport and cultivate a positive working relationship.

By filling and signing this form, the Student and Advisor parties agree to work together towards a (select one) MS / PhD degree obtained by the Student.

_____ _____

Student Signature Date

_____ _____

Advisor Signature Date

M.Eng. Degree Curriculum in Chemical Engineering

	Year 1		
	Fall	Winter	Spring
	CBEE 507 Prof. Dev. Seminar 1 cr	CBEE 507 Prof. Dev. Seminar 1 cr	CBEE 507 Prof. Dev. Seminar 1 cr
	CHE 525 CHE Analysis 4 cr	CHE 540 Grad Reaction Engineering 4 cr	CHE 520 Grad Mass Transfer 4 cr
	Grad Engineering Specific 3-4 cr	CHE 514 Grad Fluid Flow 4 cr	CHE 537 Grad Thermo 4 cr
	Grad Engineering Specific 3-4 cr	Ethics BA 550 or EMGT 554 3 credits	Grad Minor or Elective 3-4 cr
	Grad Minor or Elective 3-4 cr	Grad Minor or Elective 3-4 cr	Technical Writing WR 545 3 credits
TOTAL	15	15	**15**

MEng CHE Core (23 cr): CBEE 507(3), CHE 514, CHE 520, CHE 525, CHE 537, CHE 540. Ethics BA 550 or EMGT 554 (3) Technical Writing (3)

Notes:

Grad Minor/Elective **(16 cr)**: Any graduate-level course, typically 4-5 courses, These are the most flexible credits. A minor requires 15 credits

** Slash course 443/543 cannot be taken for graduate credit.

M.Eng. Degree Curriculum in Chemical Engineering for those without Chem Engr undergraduate degree

	Year 1			Year 2		
	Fall	Winter	Spring	Fall	Winter	Spring
	CBEE 507 Prof. Dev. 1 cr	CBEE 507 Prof. Dev. 1 cr	CBEE 507 Prof. Dev. Seminar 1 cr	CHE 525 CHE Analysis 4 cr	CHE 540 Grad Reaction Engineering 4 cr	WR 545 3 cr
	CHE 331 UG Fluids** 3 cr	CHE 312 UG Thermo** 3 cr	CHE 520 Grad Mass Transfer 4 cr			CHE 537 Grad Thermo 4 cr
	CHE 443 UG Reaction Engineering** 4 cr	CHE 332 UG Transport II (Heat Trans) 4 cr	Grad Minor Elective 3-4 cr	Grad Minor Elective 3-4 cr	BA 550 or EMGT 554 3 cr	Grad Engineering Specific 3-4 cr
	Grad Minor or Elective 3-4 cr	CHE 514 Grad Fluid Flow 4 cr	Grad Engineering Specific 3-4 cr	Grad Minor Elective 3-4 cr	One additional elective credits if all courses taken at 3 credits	
TOTAL	11	12	11	10	8	10

Notes: **MEng CHE Core (23 cr): CBEE 507(1), CHE 514, CHE 520, CHE 525, CHE 537, CHE 540, Ethics and Tech Writing**

Engineering Specific (10 cr): Any graduate level course offered by the College of Engineering.

Grad Minor/Elective **(6 cr)**: Any graduate-level course

** Slash course 443/543 cannot be taken for graduate credit.

M.S. Degree Curriculum in Chemical Engineering

	Year 1			Year 2		
	Fall	Winter	Spring	Fall	Winter	Spring
	CBEE 507 Grad Seminar Prof. Dev. 1 cr	CBEE 507 Grad Seminar Prof. Dev. 1 cr	CBEE 507 Grad Seminar Prof. Dev. 1 cr	CBEE 507 Grad Seminar Present. 1 cr	CBEE 507 Grad Seminar Present. 1 cr	CBEE 507 Grad Seminar Presentation 1 cr
	CHE 525 CHE Analysis 4 cr	CHE 540 Grad React. Engr 4 cr	CHE 520 Grad Mass Transfer 4 cr	Grad Minor or Elective 3-4 cr	CHE 503 MS Thesis Variable 1-12 cr	CHE 503 MS Thesis Variable 1-12 cr
	Grad Minor or Elective 3-4 cr	CHE 514 Grad Fluid Flow 4 cr	CHE 537 Grad Thermo 4 cr	CHE 503 MS Thesis Variable 1-12 cr		
	Grad Minor or Elective 3-4 cr	Grad Minor or Elective 3-4 cr	Grad Minor or Elective 3-4 cr			
TOTAL	12	12	12	12	12	12

Notes: **CHE Core (23 cr): CBEE 507 (3), CHE 514 (4), CHE 520 (4), CHE 525 (4), CHE 537 (4), CHE 540 (4)**

CBEE 507 Professional Development Seminar is required for all 3 terms. Students are requested to enroll in CBEE 507 Presentation seminar.

M.S. Thesis (9 cr): variable credits, thesis credits can go over 9 units total to meet GTA/GRA requirements.

Graduate Minor/Elective **(13 cr)**: Any graduate-level course, typically 4-5 courses. These are the most flexible credits. 15 credits are required for a minor.

Year 2: completion time is dependent upon intensity of project.

45 Total Credits required

M.S. Degree Curriculum in Chemical Engineering for those without Chem Engr undergraduate degree

Year 1			Year 2		
Fall	Winter	Spring	Fall	Winter	Spring
CBEE 507 Grad Seminar Prof. Dev. 1 cr	CBEE 507 Grad Seminar Prof. Dev. 1 cr	CBEE 507 Grad Seminar Prof. Dev. 1 cr	CBEE 507 Grad Seminar Presentations 1 cr	CBEE 507 Grad Seminar Presentations 1 cr	CBEE 507 Grad Seminar Presentations 1 cr
CHE 331 UG Fluids** 3 cr	CHE 312 UG Thermo** 3 cr	CHE 520 Grad Mass Transfer 4 cr	CHE 525 CHE Analysis 4 cr	CHE 540 Grad Reaction Engineering 4 cr	CHE 537 Grad Thermo 4 cr
CHE 443 UG Reaction Engineering** 4 cr	CHE 332 UG Transport II (Heat Trans)** 4 cr	Grad Minor or Elective 3-4 cr	Grad Minor or Elective 3-4 cr	Grad Minor or Elective 3-4 cr	CHE 503 MS Thesis Variable 1-12 cr
Grad Minor or Elective 3-4 cr	CHE 514 Grad Fluid Flow 4 cr	Grad Minor or Elective 3-4 cr	CHE 503 MS Thesis 4-5 cr.	CHE 503 MS Thesis 4-5 cr.	
12	12	12	12	12	12

Notes: **CHE Core (23 cr): CBEE 507, CHE 514, CHE 520, CHE 525, CHE 537, CHE 540**

CBEE 507 Seminar: Professional Development, is required for all 3 terms. Students are requested to enroll in CBEE 507 Seminar: Presentations.

M.S. Thesis (9 cr): variable credits, thesis credits can go over 9 units total to meet GTA/GRA requirements.

Grad Minor/Elective **(13 cr)**: Any graduate-level course, typically 4-5 courses. These are your most flexible credits. A Minor requires 15 credits.

Prerequisites for Graduate Core (14 cr): CHE 312, CHE 331, CHE 332 (or CHE 333 offered Spring term), CHE 443

**Slash course 443/543 and 3XX courses cannot be taken for graduate credit.

45 total credits required.

PhD. Degree Curriculum in Chemical Engineering

	Year 1			Year 2			Year 3-6		
	Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring
	CBEE 507 Grad Seminar Prof. Dev. 1 cr	CBEE 507 Grad Seminar Prof. Dev. 1 cr	CBEE 507 Grad Seminar Prof. Dev. 1 cr	CBEE 507 Grad Seminar Present. 1 cr	CBEE 507 Grad Seminar Present. 1 cr	CBEE 507 Grad Seminar Present. 1 cr	CBEE 507 Grad Seminar Present. 1 cr	CBEE 507 Grad Seminar Present. 1 cr	CBEE 507 Grad Seminar Present. 1 cr
	CHE 525 CHE Analysis 4 cr	CHE 540 Grad Reaction Engr 4 cr	CHE 520 Grad Mass Transfer 4 cr	Grad Minor or Elective 3-4 cr	CHE 603 PhD Thesis Variable 1-12 cr	CHE 603 PhD Thesis Variable 1-12 cr	CHE 603 PhD Thesis Variable 1-12 cr	CHE 603 PhD Thesis Variable 1-12 cr	CHE 603 PhD Thesis Variable 1-12 cr
	Grad Minor or Elective 3-4 cr	CHE 514 Grad Fluid Flow 4 cr	CHE 537 Grad Thermo 4 cr	CHE 603 PhD Thesis Variable 1-12 cr					
	Grad Minor or Elective 3-4 cr	Grad Minor or Elective 3-4 cr	Grad Minor or Elective 3-4 cr						
TOTAL	12	12	12	12	12	12	12	12	12

Notes: **CHE Core (21 cr): CBEE 507, CHE 514, CHE 520, CHE 525, CHE 537, CHE 540**

CBEE 507 Seminar is required for all 3 terms. Students are requested to enroll in CBEE 507, Seminar, Presentations, each term.

Ph.D. Thesis (36 cr): variable credits, thesis credits can go over 36 units total to meet GTA/GRA requirements

Graduate Elective (15 cr): Any graduate-level course, typically 4-5 courses, These are the most flexible credits.

Year 3-6: completion time is dependent upon intensity of project and credits are based on funding/coursework

108 Total Credits required

PhD. Degree Curriculum in Chemical Engineering for those without previous Chem Engr degrees

Year 1			Year 2			Year 3-6		
Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring
CBEE 507 Grad Seminar Prof. Dev. 1 cr	CBEE 507 Grad Seminar Prof. Dev. 1 cr	CBEE 507 Grad Seminar Prof. Dev. 1 cr	CBEE 507 Grad Seminar Present. 1 cr	CBEE 507 Grad Seminar Present. 1 cr	CBEE 507 Grad Seminar Present. 1 cr	CBEE 507 Grad Seminar Present. 1 cr	CBEE 507 Grad Seminar Present. 1 cr	CBEE 507 Grad Seminar Present. 1 cr
CHE 331 UG Fluids** 3 cr	CHE 312 UG Thermo** 3 cr	CHE 520 Grad Mass Transfer 4 cr	CHE 525 CHE Analysis 4 cr	CHE 540 Grad Reaction Engr 4 cr	CHE 537 Grad Thermo 4 cr	CHE 603 PhD Thesis Variable 1-12 cr	CHE 603 PhD Thesis Variable 1-12 cr	CHE 603 PhD Thesis Variable 1-12 cr
CHE 443 UG Reaction Engr** 4 cr	CHE 332 UG Transport II (Heat Trans)** 4 cr	Grad Minor or Elective 3-4 cr	Grad Minor or Elective 3-4 cr	Grad Minor or Elective 3-4 cr	CHE 603 PhD Thesis Variable 1-12 cr			
Grad Minor or Elective 3-4 cr	CHE 514 Grad Fluid Flow 4 cr	Grad Minor or Elective 3-4 cr	CHE 603 PhD Thesis 4-5 cr.	CHE 603 PhD Thesis 4-5 cr.				
12	12	12	12	12	12	12	12	12

Notes: **CHE Core (21 cr): CBEE 507, CHE 514, CHE 520, CHE 525, CHE 537, CHE 540**

CBEE 507 Seminar: Professional Development is required for all 3 terms. Students are requested to take CBEE 507 Seminar: Presentations, each term.

Ph.D. Thesis (36 cr): variable credits, thesis credits can go over 36 units total to meet GTA/GRA requirements

Grad Minor/Elective (15 cr): Any graduate-level course, typically 4-5 courses. These are your most flexible credits.
Prerequisites for Graduate Core (14 cr): CHE 312, CHE 331, CHE 332 (or CHE 333 offered Spring term), CHE 443
(**These courses do not count toward the 108 required graduate credits.)

Total credits required: 108 credits

PhD Qualifying Exam GLO

CHE ◯ ENVE ◯

Student Name:_____ Faculty Reviewer:_____ Date: _____

Competence	Poor	Satisfactory	Strong
1) Ability to present the scientific content in the assigned article	Disorganized presentation and poor speaking skills ◯	Adequately organized presentation that has a logical flow and satisfactory speaking skills ◯	Well-organized presentation and strong speaking skills ◯
2) Ability to think critically about hypothesis, assumptions, methods, conclusions in the assigned article	Hypothesis, assumptions, methods, and conclusions are not clearly or incorrectly identified ◯	Hypothesis, assumptions, methods, and conclusions are adequately identified ◯	Hypothesis, assumptions, methods, and conclusions are clearly and correctly identified ◯
3) Ability to place the assigned article in the context of associated background literature	Background literature is presented in a disconnected, disjointed manner or an insufficient knowledge of the background literature is exhibited ◯	Adequate background literature is presented to place the work of the assigned article in context, though some references known to experts in the field may be missing or some knowledge associated with a critical reference presented may be lacking ◯	Complete and clear presentation of the background literature and a demonstrated understanding of how the assigned article fits into the research field ◯
4) Ability to connect content in the assigned article to relevant core material in the student's research area	Science and engineering principles underlying research in the assigned article are not correctly identified ◯	Science and engineering principles underlying research in the assigned article are identified with some minor issues ◯	Science and engineering principles underlying the research in the assigned article are correctly identified ◯
5) Ability to propose an extension of the core ideas and/or methods in the assigned article to a future application	Proposed extension lacks creativity and an understanding of the needs of the field ◯	Proposed extension shows some creativity and some understanding of the needs of the field ◯	Proposed extension demonstrates a high level of creativity and a good understanding of the needs of the field ◯
6) Ability to communicate an understanding of core curriculum in the student's research area in response to questions in the Q&A session	Answers to questions show weakness in depth of knowledge in subject matter and/or poor critical thinking skills ◯	Answers to questions show adequate knowledge in subject area and satisfactory critical thinking skills ◯	Answers to questions show superior knowledge in subject area and well-developed critical thinking skills ◯
7) Ability to communicate the requested content in a written summary	Disorganized and poor writing/grammar ◯	Adequately organized with logical flow and satisfactory writing/grammar ◯	Well-organized and strong writing skills ◯

Pass:_____◯ Conditional Pass:_____◯ Fail: _____◯

Scoring Guide (Rubric) for Graduate Learning Outcome Assessment

PROGRAM: BIOE ◯ CHE ◯ ENVE ◯ **DEGREE: MS ◯ PHD ◯**

TYPE OF EXAM: PRELIMINARY ORAL EXAM ◯ FINAL ORAL EXAM ◯

Candidate Name: _____ Date:_____

Name and Signature of the Examining Committee Member:_____

Criteria	Does Not Pass Exam	Passes Exam	
	Unsatisfactory	Satisfactory	Exemplary
1a. Research Hypothesis and Objectives	Research problem not clearly stated, or statement not carefully considered and hypothesis-driven; Research plan to investigate a solution to the defined problem is not fully considered; measurable technical outcomes not described ◯	Research problem clearly stated and hypotheses behind research activities identified; Research plan to investigate a solution to the defined problem adequately considered; measurable technical outcomes described ◯	Research problem fully considered and hypotheses behind all research questions clearly enunciated with broader impacts in the field identified; Research plan to investigate a solution to the defined problem fully considered; measurable technical outcomes described and significance of likely measurements discussed ◯
1b. Literature Review	Disorganized and/or too brief to adequately explore the topic; widely known technical references clearly missing or not germane to the topic at hand ◯	Logically crafted and adequately explores the topic; some references known to experts in the field may be missing ◯	Fully explores the topic and illustrates the state of the knowledge in the field, may be missing an obscure reference or two ◯
2. Ability to Demonstrate a Creative Solution to the Problem	Proposed concept is well known to be described in technical literature or is impossible/illogical ◯	Proposed work is original and possible but derivative/incremental in nature ◯	Proposed work is original, practical, and high-risk/high-payoff ◯
3. Application of Science and Engineering Fundamentals	Science/Engineering principles underlying Research Hypothesis and Objectives not clearly discussed; major assumptions not stated ◯	Science/Engineering principles underlying Research Hypothesis and Objectives discussed; major assumptions clearly stated ◯	Science/Engineering principles underlying Research Hypothesis and Objectives discussed and major assumptions clearly stated; as appropriate math models and associated predictions developed ◯
4a. Quality of Written Communication	Profuse grammatical errors, poor sentence construction, and/or poor document structuring make it impossible to read through ◯	Adequate document structure, grammar, and writing enable adequate understanding of the material presented ◯	Near publication quality, great reading with minor flaws ◯
4b. Quality of Oral Communication	Disorganized presentation with low-key content; Excessively poor communication skills; Answers to questions show weakness in depth of knowledge in subject matter and/or poor critical thinking skills ◯	Adequately organized presentation where concepts flow logically; Adequate communication skills; Answers show adequate knowledge in subject area and adequate critical thinking skills ◯	Highly engaging conference quality presentation; Excellent communication skills; Answers show superior knowledge in subject area and well-developed critical thinking skills ◯

During the examination process, I did not perceive any lapses in ethical performance and/or reporting of research:

Evaluated Graduate Learning Objectives/Outcomes for PhD, MS, and MEng Programs Chemical Engineering, College of Engineering

<table>
<tr><th>PhD Outcomes</th><th>MS Outcomes</th><th>MEng Outcomes</th></tr>
<tr><td>Outcome 1: Demonstration of Scholarship
The student will be able to identify and conduct original research resulting in a significant contribution to knowledge in the fields spanned by Chemical, Biological and Environmental Engineering. (CBEE) and to effectively communicate this work to a technically literate audience.
Assessment: PhD Thesis and Final Oral Examination (“Defense”).</td><td>Outcome 1: Demonstration of Scholarship
The student will be able to conduct original research and assemble a creative new body of work in the fields spanned by CBEE and to effectively communicate this work to a technically literate audience.
Assessment: MS Thesis and Final Oral Examination.</td><td>Outcome 1: Demonstration of Scholarship
The student will be able to synthesize aspects of core knowledge in the fields spanned by CBEE and to effectively communicate this work to a technically literate audience.
Assessment: MEng Portfolio.</td></tr>
<tr><td>Outcome 2: Mastery of Subject Material
The student will be able to think critically, creatively and to address technical problems in CBEE.
Assessment: PhD Qualifying Examination, satisfactory completion of the graduate program of study, and course summaries written by the instructors.</td><td colspan="2">Outcome 2: Mastery of Subject Material
The student will be able to think critically, creatively and to address technical problems in CBEE.
Assessment: satisfactory completion of the graduate program of study, as well as course summaries written by the instructors.</td></tr>
<tr><td colspan="3">Outcome 3: Ethical Conduct
Students will be educated in ethical and responsible conduct in research and professional activities.
Assessment: satisfactory completion of the graduate seminar (CBEE507) as well as ethical completion of the M.S. Thesis and Final Oral Examination</td></tr>
<tr><td colspan="3"></td></tr>
</table>

CBEE Graduate Degree Programs Graduate
Student Academic Progress

The process for evaluating Academic Progress for graduate students in the School of CBEE **may** include 3 steps (in chronological order through academic year):

1. Graduate Competency List (complete at first assessment, revise as necessary at end of each assessment) - *page 3*
2. Assessment of Graduate Student Academic Progress (due at each assessment) - *page 4-5*
3. Graduate Education Performance Plan (following an unsatisfactory assessment) - *page 6*

Definition of Satisfactory Academic Progress

Satisfactory progress toward completing a graduate degree in CBEE graduate programs requires:

- An annual written assessment showing adequate progress in coursework, development and/or writing of thesis/dissertation as evaluated by the major professor and the rest of the student's graduate committee,
- Maintaining a GPA of 3.00 or higher for all courses taken as a graduate student,
- Successfully passing relevant exams outlined by the Graduate School and the CBEE program,
- Timely* compliance with all Graduate School and programmatic requirements** for committee formation, committee meetings, project proposal, submission of forms and information, participation in seminars, and other activities expected of a student, scholar, and citizen.

**Students who are restricted from full course loads may negotiate a longer time frame in consultation with the Associate School Head for Graduate Programs and their major professor.*

***Students with overdue program materials may have holds placed on their registration by the Graduate School. They may not be eligible for funding opportunities such as the Laurels Block Grant Scholarship, COE Fellowships, and COE School level Awards.*

It is the responsibility of the student to write a self-assessment narrative (attach separate page), arrange to meet with their major professor to review academic progress, and to submit the assessment package to the Graduate Coordinator no later than June 30th each year. The assessment package consists of the self-assessment narrative, any assessments written by committee members, and the signed and completed Assessment of Graduate Student Academic Progress form.

Plan for Assessment of Graduate Student Satisfactory Academic Progress

- Early in their program (e.g., during their third term of enrollment) students should collaborate with their major professor and graduate committee to establish standards and expectations of satisfactory progress for that student's program.
- Student progress will be assessed annually.
- An assessment of student academic progress is made by the student, the student's major professor and, if requested, by other members of the student's graduate committee. Any member of the committee may write an evaluation of student progress for inclusion in the assessment package, but this is optional.
- It is the responsibility of the student to write a self-assessment narrative, arrange to meet with their major professor to review academic progress, and to submit the assessment package to the Graduate Coordinator no later than June 30th each year. The assessment package consists of the self-assessment narrative, any assessments written by committee members, and the signed and completed Assessment of Graduate Student Academic Progress form.

Process:

- Each spring term, every graduate student in a CBEE graduate program will fill out the 'Completion of Milestones' section of the 'Assessment of Graduate Student Academic Progress' form (Pg 4) of this document) and attach a written self-assessment narrative. The student may want to discuss their advisor's expectations for various categories of progress or professional development prior to writing the self-assessment.

  Self-Assessment Narrative:

  The written self-assessment should summarize activities undertaken by the student since the last review and should address:

  - Progress on course work and timeline for courses remaining to be completed,
  - Brief description of the research topic and progress made,
  - Progress on writing the thesis/dissertation,
  - Reflection on goals from the previous year
  - Participation in career and professional development opportunities
  - Goals for the coming year
  - Any other relevant information, including any impediments to progress.
- The student will then schedule a meeting with the major professor to review the student's self-assessment, progress, and accomplishments over the past year. Participation from other graduate committee members may be requested by either the student or the major professor but is not required. If other committee members provide input the student should obtain their signature on the Assessment of Graduate Student Progress form.
- The major professor reviews the student's materials and then fills out and signs the Assessment of Graduate Student Academic Progress form. Although optional, the major professor (or any committee member) is strongly encouraged to document their assessment of the student's progress in writing for inclusion in the assessment. It should be noted that signing the assessment without any written assessment will indicate agreement with the student's written narrative. These written comments may be helpful to document expectations for the coming year. The student signs the form and is responsible for submitting the narrative and the signed and completed Assessment of Graduate Student Academic Progress form to the Graduate Program Coordinator for inclusion in the student's permanent record **by June 30th** each year.
- If the student's progress is unsatisfactory, the student will work with the major professor to develop a Graduate Education Performance Plan (page 6) that contains measurable milestones for assessing student's academic progress over the course of the year. The plan will also be reviewed and signed by the - and filed in the student's permanent record.

CBEE Graduate Degree Programs

1. Graduate Competency List

Disciplinary skills and knowledge
Knowledge of a student's chosen field of study, and closely related fields, including history and trends in major findings, concepts, theories, approaches, and context.

Transdisciplinary/interdisciplinary skills and knowledge (biophysical and social sciences)
Knowledge of the relationship of the student's field/s of study to social and/or biophysical sciences, and approaches for integration and synthesis during research, outreach, and teaching. For social science students, the emphasis is on knowledge of biophysical sciences and how to use them to analyze and interpret information. For biophysical science students, knowledge of social sciences and how to use them to analyze and interpret information.

Communication skills (oral, written, pedagogy, professional)
Ability to write and speak to diverse audiences in an organized and clear fashion about relevant areas of expertise, both disciplinary and inter/transdisciplinary. Ability to modify oral and written communications for specific audiences. Knowledge of contemporary electronic tools for communication, such as for supporting lectures, social media, and blogs.

Critical thinking skills
Ability to evaluate the quality, context, scale, and biases in information, and to synthesize diverse kinds of information, in written and oral forms. Capacity for real-time discussion of biophysical and social systems and their interactions.

Research skills (quantitative, qualitative)
Knowledge sufficient to understand the use of quantitative and qualitative summaries of data as evidence for conclusions and scientific inference. This can include skills and knowledge with statistical, mathematical, graphical, and process models sufficient to plan, implement, analyze, and interpret research.

Research ethics
Knowledge of processes and guidelines for assuring that research is conducted in socially and professionally acceptable and legal ways while minimizing and managing conflicts of interest. Topics of relevance may include conducting general ethics, peer review, bias during data analysis and presentation, plagiarism, animal welfare, treatment of human subjects, collaboration, and authorship.

Policy analysis/interpretation
Knowledge of the laws, regulations, social institutions, and governance processes relevant to the application of a student's disciplinary and/or inter/transdisciplinary areas of study.

Teaching (PhD only)
Knowledge of contemporary, relevant STEM teaching methods, and experience in their application in classrooms, online, and technical/professional environments. Experience in the development of a classroom and/or online course, including development of a course syllabus that includes learning outcomes, lectures, laboratories, student assignments, and evaluation methods.

The **competencies are *not* course requirements**. Rather they can be acquired in a variety of ways. Life experiences, field experiences, extra-curricular activities, and independent study are all examples of how a competency could be met. Students and their advisor should discuss the competency list, mark off those that the student meets, and write up a plan to meet any remaining. **Please write a plan to meet the unmet competencies below:**

CBEE Graduate Degree Programs

2. Assessment of Graduate Student Academic Progress

To be filled out by the student

Student's name:_____ Date:_____

Date entered CBEE graduate program:_____ Degree program (check one): M.S. Ph.D.

Program:_____ Date of expected completion:_____

Maior Professor

_____ _____

Committee Member

_____ _____

_____ _____

_____ _____

Checklist: (Complete those that apply to you; please fill in all dates that are applicable even if it's your best guess)

COMPLETION OF MILESTONES	TIMELINE	DATE COMPLETED OR EXPECTED
M.S. Degree		
Establish Graduate Committee	Spring of year 1	
Program of Study submitted to the Grad School	Spring of year 1	
Schedule final defense	At least 2 weeks before event	
Ph.D. Degree		
Establish Graduate Committee	Fall of year 2	
Qualifying Exam	Fall of year 2 (CHE/ENVE only)	
Program of Study Meeting / Submit PoS	Winter of year 2	
Preliminary Exam	After approval of the Program of Study and completing most of the course work. BIOE - Spring of year 2 CHE - Fall of year 3 ENVE - Year 3	
Schedule final defense	At least one quarter after the preliminary exam and at least two weeks before the event	

Progress form

2. Major Professor Assessment of Progress:

Major professor(s): Please discuss your responses with your student.

YES	NO	QUESTION
		Student is making satisfactory progress in completing their coursework.
		Student is making satisfactory progress in research
		Student is making satisfactory progress in the writing of their thesis/dissertation.
		Student has participated in professional and/or career development opportunities

3. Signatures:

I have reviewed the student's milestones (above) and self-assessment narrative, have completed the 'Major Professor Assessment of Progress' (left), and confirmed that the student understands my responses.

_____ _____

_____ _____

Major Professor Signature(s) Date

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Committee Member Signature(s) (required for year 2 and beyond) Date

I understand my major professor(s)' and committee's assessment of my progress (left). I am now submitting this fully completed form to the Graduate Coordinator with my self-assessment narrative attached.

_____ _____

Student Signature Date

This completed form must be attached to the self-assessment narrative and submitted to the CBEE Graduate Coordinator before June 30th each year.

The student, the major advisor, and the committee members (GCR attendance is optional) should meet to discuss the annual assessment and the student's academic progress:

- **Following an unsatisfactory assessment**
- **If the student or the major advisor requests a meeting.**

Graduate Student Self-Assessment Narrative

The self-assessment conveys progress since the last assessment cycle and should include the following:

7. Progress on coursework and timeline for courses remaining to be completed,
8. Brief description of research topic and progress made,
9. Progress on writing the thesis/dissertation,
10. Reflection on goals from the previous year (if any)
11. Participation in career and professional development opportunities
12. Goals for the coming year
13. Any other relevant information, including any impediments to progress.

CBEE Graduate Degree Programs

3. Graduate Education Performance Plan

This form is intended to monitor a student's performance towards degree completion **resulting from an unsatisfactory review** at an annual assessment. This form should outline mutually agreed-upon (between student and major professor) benchmarks of performance.

Student_____

Major Professor_____

Plan (Identify deficiencies and outline a plan and timeline to remedy them):

Benchmarks (Criteria used to evaluate progress):

Signatures

_____Date_____
Student

_____Date_____
Major Professor

_____Date_____
Associate Head for Graduate Programs