

## **GRADUATE PROGRAM REQUIREMENTS**

for the degree of

## **DOCTOR OF PHILOSOPHY**

*Academic Year 2018 - 2019*

### **Key Personnel:**

Associate Chair for Graduate Studies	<b>Prof. Kirk J. Ziegler</b>	<b>CHESC 261</b>
Master's Program Coordinator	<b>Prof. Yiider Tseng</b>	<b>CHE 223</b>
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## A. SUMMARY

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These guidelines describe the Program requirements for a Ph.D. degree in Chemical Engineering. More details of the general requirements for the degree programs as well as descriptions of courses can be found in the Graduate Catalog (<http://gradcatalog.ufl.edu>). A Ph.D. student is regulated by the rules set forth in the Graduate Catalog published in the academic year of the student's first term. It is the responsibility of the Ph.D. student to know and take appropriate steps to meet all Program requirements in this document and those in the Graduate Catalog.

As detailed below, the Doctor of Philosophy (Ph.D.) program requirements consist of:

1. Completion of at least 90 credits of [coursework](#) beyond the Bachelor of Science degree with a minimum of 1 year in residence, including
  - a. Completion of three core basis courses with a grade of B- or better: *Continuum Basis* (ECH 6270), *Molecular Basis* (ECH 6272), and *Mathematical Basis* (ECH 6847).
  - b. Completion of *Chemical Engineering Kinetics* (ECH 6506) or suitable equivalent.
  - c. Registration for *Graduate Seminar* (ECH 6926) in each semester of residence, except the first semester.
  - d. Completion of 5 credits of *Supervised Teaching* (ECH 6940) with a passing grade.
  - e. Completion of at least 3 credits (2 credits if summer semester) of *Research for Doctoral Dissertation* (ECH 7980) during final term.
  - f. Completion of at least 24 credits of graduate courses, not including *Graduate Seminar*, *Supervised Teaching*, *Advanced Research*, or *Research for Doctoral Dissertation*.
2. Conduct [research](#) in a safe, ethical, and responsible manner and maintain adequate progress towards research objectives.
3. Completion of a written [Research Proposal](#).
4. Successful defense of the Research Proposal in an [Oral Qualifying Exam](#).
5. Present a [Research Seminar](#) to the Chemical Engineering Department on the research work contained in the Doctoral Dissertation.
6. Completion of a written [Doctoral Dissertation](#).
7. Successful defense of the Doctoral Dissertation in a [Final Oral Defense Exam](#).

The Ph.D. degree is for those students who wish to attain mastery of a field of knowledge and demonstrate accomplishment in research. Study for the Ph.D. degree will be open only to those with demonstrated competence in the core areas of Chemical Engineering. Final acceptance into the Ph.D. program requires successful completion of both the Research Proposal and the Oral Qualifying Exam.

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## B. DETAILED DESCRIPTION OF CORE PROGRAM REQUIREMENTS

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### B.1. Academic Honesty and Ethical Conduct in Research

All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. Students are expected to produce their own work in homework, projects, and exams. Unauthorized collaboration in take-home exams, projects, and individual assignments is a serious violation of the University Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) and could lead to a grade decrease, course failure, and loss of degree status. The Honor Code specifies a number of behaviors in detail that are in violation of this code and the possible sanctions. Furthermore, **Ph.D. students are obligated to report any condition that facilitates academic misconduct to appropriate personnel.**

**Ph.D. students are expected to maintain high ethical standards in the conduct and reporting of scientific and scholarly research.** Ph.D. students are responsible for ethical research conduct to the University, to the academic community, to those sponsoring the research, and to the community at large. Research Misconduct, including fabrication or falsification of data, and plagiarism in proposing, performing, reviewing, or reporting of results, is a most serious offense that can greatly damage the welfare and reputation of the students, faculty, and the University. See <http://research.ufl.edu/compliance/research-misconduct.html> for more information regarding Research Misconduct.

From the UF Student Handbook: **“Plagiarism is not tolerated at the University of Florida. Plagiarism in a thesis or [Doctoral Dissertation](#) is punishable by expulsion. If the plagiarism is detected after the degree has been awarded, the degree may be rescinded.”** For a thorough discussion of plagiarism and the applicable laws, see “Plagiarism in Colleges in the USA: legal aspects of plagiarism, academic policy” by Ronald B. Standler (manuscript is available at [www.rbs2.com/plag.htm](http://www.rbs2.com/plag.htm)). Briefly, a Ph.D. student shall not represent all or any portion of the work of another as the student’s own work. Plagiarism includes (but is not limited to):

1. Quoting oral or written materials, whether published or unpublished, without proper attribution.
2. Submitting a document or assignment which in whole or in part is identical or substantially identical to a document or assignment not authored by the student.

Plagiarism is probably understood as stealing someone else’s words as your own. In fact, there are many different kinds of plagiarism. The top 5 types are:

1. Stealing verbatim,
2. Misquoting,
3. Paraphrasing without quoting,
4. Summarizing without quoting, and
5. Duplicating publication.

If Ph.D. students have any questions or concerns regarding Research Misconduct and Plagiarism, they are encouraged to discuss them with their [Research Adviser](#), [Supervisory Committee](#), or the [Associate Chair for Graduate Studies](#).

## B.2. Program Schedule

The minimum requirements for the Ph.D. program can be met in 3 years following a Bachelor of Science degree. However, many Ph.D. students will require up to 5 years to complete all degree requirements.

Final acceptance into the Ph.D. program requires successful completion of both the [Research Proposal](#) and the [Oral Qualifying Exam](#). The purpose of the Research Proposal and the Oral Qualifying Exam is to assess the Ph.D. student's potential to perform scholarly research. The performance of the Ph.D. student in the Oral Qualifying Exam will be evaluated by the [Supervisory Committee](#) for:

1. Knowledge in Fundamentals of Chemical Engineering, particularly related to their research field, and
2. Ability to conduct scholarly research.

All work for the Ph.D. degree must be completed within 5 calendar years *after* the Oral Qualifying Exam. Failure to complete the degree requirements within this timeframe requires the Oral Qualifying Exam to be repeated. There must be at least 2 terms between the Oral Qualifying Exam and the date of the degree. Although the time to complete all Ph.D. degree requirements is dependent on the specific research program and student motivation, **Table 1** shows a common timeline towards graduation. **Table 2** shows the due dates for key milestones during the Ph.D. degree program.

**Table 1:** Common timeline towards graduation for Ph.D. students.

Year	Fall Semester	Spring Semester	Summer Semester
1	<ul style="list-style-type: none"> <li>• <i>Continuum Basis</i> (ECH 6270)</li> <li>• <i>Molecular Basis</i> (ECH 6272)</li> <li>• <i>Mathematical Basis</i> (ECH 6847)</li> </ul> + Select <a href="#">Research Adviser</a>	<ul style="list-style-type: none"> <li>• <i>Graduate Seminar</i> (ECH 6926)</li> <li>• <i>Chemical Engineering Kinetics</i> (ECH 6506)</li> <li>• <i>Elective</i> (Optional)</li> <li>• <i>Advanced Research</i> (ECH 7979)</li> </ul> + Select <a href="#">Supervisory Committee</a>	<ul style="list-style-type: none"> <li>• <i>Advanced Research</i> (ECH 7979)</li> </ul>
2	<ul style="list-style-type: none"> <li>• <i>Graduate Seminar</i> (ECH 6926)</li> <li>• <i>Elective</i> (Optional)</li> <li>• <i>Advanced Research</i> (ECH 7979)</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Graduate Seminar</i> (ECH 6926)</li> <li>• <i>Advanced Research</i> (ECH 7979)</li> </ul> + Submit <a href="#">Research Proposal</a> + Complete <a href="#">Oral Qualifying Exam</a>	<ul style="list-style-type: none"> <li>• <i>Advanced Research</i> (ECH 7979)</li> </ul> + Submit <a href="#">Supervised Teaching</a> preferences
3	<ul style="list-style-type: none"> <li>• <i>Graduate Seminar</i> (ECH 6926)</li> <li>• <i>Supervised Teaching</i> (ECH 6940)</li> <li>• <i>Research for Doctoral Dissertation</i> (ECH 7980)</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Graduate Seminar</i> (ECH 6926)</li> <li>• <i>Supervised Teaching</i> (ECH 6940)</li> <li>• <i>Research for Doctoral Dissertation</i> (ECH 7980)</li> </ul> + Submit <a href="#">Progress Report</a>	<ul style="list-style-type: none"> <li>• <i>Research for Doctoral Dissertation</i> (ECH 7980)</li> </ul>
4	<ul style="list-style-type: none"> <li>• <i>Graduate Seminar</i> (ECH 6926)</li> <li>• <i>Research for Doctoral Dissertation</i> (ECH 7980)</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Graduate Seminar</i> (ECH 6926)</li> <li>• <i>Research for Doctoral Dissertation</i> (ECH 7980)</li> </ul> + Submit <a href="#">Progress Report</a>	<ul style="list-style-type: none"> <li>• <i>Research for Doctoral Dissertation</i> (ECH 7980)</li> </ul>
5	<ul style="list-style-type: none"> <li>• <i>Graduate Seminar</i> (ECH 6926)</li> <li>• <i>Research for Doctoral Dissertation</i> (ECH 7980)</li> </ul> + Present <a href="#">Research Seminar</a>	<ul style="list-style-type: none"> <li>• <i>Graduate Seminar</i> (ECH 6926)</li> <li>• <i>Research for Doctoral Dissertation</i> (ECH 7980)</li> </ul> + Submit <a href="#">Doctoral Dissertation</a> + Complete <a href="#">Final Oral Defense Exam</a>	

**Table 2:** Due dates for Ph.D. milestones.

Ph.D. Milestones		Due Date	Submitted to:
Select <a href="#">Research Adviser</a>		Sept 2018	<a href="#">Graduate Academic Adviser</a> and <a href="#">Associate Chair for Graduate Studies</a>
Select <a href="#">Supervisory Committee</a>		May 2019	<a href="#">Research Adviser</a> and <a href="#">Graduate Academic Adviser</a>
Submit <a href="#">Research Proposal</a>	First draft	Dec 2019	<a href="#">Research Adviser</a>
	First submission	Feb 1, 2020	<a href="#">Research Adviser</a> and <a href="#">Graduate Academic Adviser</a> and <a href="#">Associate Chair for Graduate Studies</a>
	Final submission	2 weeks before <a href="#">Oral Qualifying Exam</a> and by Jun 1, 2020	<a href="#">Research Adviser</a> and <a href="#">Supervisory Committee</a>
Complete <a href="#">Oral Qualifying Exam</a>	Scheduling	At least 1 month in advance	<a href="#">Research Adviser</a> and <a href="#">Supervisory Committee</a>
	Notification	At least 2 weeks in advance	<a href="#">Graduate Academic Adviser</a>
	Final Exam	Jun 1, 2020	<a href="#">Research Adviser</a> and <a href="#">Supervisory Committee</a>
Submit <a href="#">Supervised Teaching</a> preferences		~June 2020	<a href="#">Graduate Academic Adviser</a> and <a href="#">Associate Chair for Graduate Studies</a>
Submit <a href="#">Progress Report</a>		Every May 15 after 2021 until graduation	<a href="#">Research Adviser</a> and <a href="#">Supervisory Committee</a> and <a href="#">Graduate Academic Adviser</a>
Submit <a href="#">Doctoral Dissertation</a>	First draft		<a href="#">Research Adviser</a>
	First submission	Check with Graduate School	<a href="#">Research Adviser</a> and Graduate School Editorial Office
	Exam submission	2 weeks before <a href="#">Final Oral Defense Exam</a> and at least 1 week before Final submission deadline of Graduate School	<a href="#">Research Adviser</a> and <a href="#">Supervisory Committee</a>
	Final submission	before Final submission deadline of Graduate School	Graduate School Editorial Office
Present <a href="#">Research Seminar</a>		During last year of degree	<a href="#">Graduate Academic Adviser</a>
Complete <a href="#">Final Oral Defense Exam</a>	Scheduling	At least 1 month in advance	<a href="#">Research Adviser</a> and <a href="#">Supervisory Committee</a>
	Notification	At least 2 weeks in advance	<a href="#">Graduate Academic Adviser</a>
	Final Exam	At least 1 week before Final submission deadline of Graduate School for <a href="#">Doctoral Dissertation</a>	<a href="#">Research Adviser</a> and <a href="#">Supervisory Committee</a>

### B.3. Coursework Requirements

All Ph.D. students appointed as Graduate Assistants must register for 9 credits in the Spring semester, 9 credits in the Fall semester, and 6 credits in the Summer semester. The Ph.D. degree requires successful completion of a minimum of 90 credits subject to restriction and classifications approved by the department. A minimum of 24 credits of courses acceptable for graduate credit and taken after the Bachelor of Science Degree are required. These 24 credits must include *Continuum Basis* (ECH 6270), *Molecular Basis* (ECH 6272), and *Mathematical Basis* (ECH 6847), which are offered each Fall semester, *Chemical Engineering Kinetics* (ECH 6506) or suitable equivalent, and at least two more graduate electives in Chemical Engineering. Ph.D. students shall register for Chemical Engineering *Graduate Seminar* (ECH 6926) every semester of residence after the first semester; these credits cannot be counted toward the 24 required credits of graduate courses.

Registration for all coursework should be done after consulting with the [Graduate Academic Adviser](#) and your [Research Adviser](#). All students are urged to complete their coursework as expeditiously as possible. After consulting with your Research Adviser, students may consider broadening their education by taking more than the minimum number of courses.

In most semesters, Ph.D. students will register for research courses. Ph.D. students must register for *Advanced Research* (ECH 7979) before passing the [Oral Qualifying Exam](#) and for *Research for Doctoral Dissertation* (ECH 7980) after passing the Oral Qualifying Exam. **Note that Ph.D. students are required to take 3 credits of Doctoral Research (ECH 7980) in their final term (2 credits if the final term is summer).**

To gain valuable teaching and communication experience consistent with the Ph.D. degree, all **Ph.D. students are required to serve as Supervised Teachers** as part of their degree requirements. Ph.D. students will assist instructors in coursework for at least two semesters. Ph.D. students must register for *Supervised Teaching* (ECH 6940) during each semester they assist in the classroom; however, Ph.D. students may not register for more than 5 credits of *Supervised Teaching* during their degree program. Ph.D. students should register for 3 credits their first semester of *Supervised Teaching* and for 2 credits during the second semester. It is expected that Ph.D. students contribute approximately 10 hours per week to the preparation of homework, quizzes, and exams as well as tutoring students enrolled in the course. However, Ph.D. students will discuss their specific roles and responsibilities of the course with the instructor prior to the start of the semester. At the end of the semester, the instructor will issue a Pass/Fail grade for the Supervised Teacher. The Supervised Teaching assignment will not be counted towards the degree requirements if the instructor issues a Fail grade but this grade will not appear on the transcript. **Exceptions to Supervised Teaching will not be permitted.**

The [Associate Chair for Graduate Studies](#) will send a list of available opportunities to Ph.D. students prior to the start of their third year in the degree program. Ph.D. students must return these preferences to the Associate Chair for Graduate Studies before the [due date](#) in **Table 2**. Supervised Teaching assignments will be made by the Associate Chair for Graduate Studies based on Ph.D. student course preferences and the needs of the undergraduate program.

Ph.D. students are ultimately responsible for ensuring that their Supervised Teaching requirement is met prior to graduation. Ph.D. students who anticipate graduating within one year

but have not yet fulfilled the two-semester Supervised Teaching requirement must notify the Associate Chair for Graduate Studies.

#### **B.4. Research Requirement**

The Ph.D. degree plan is primarily a research program. The granting of the degree is based on general proficiency and distinctive achievements of the Ph.D. candidate in their research field. Ph.D. students are expected to demonstrate the ability to conduct independent investigation of research problems and attain mastery of a field of knowledge, as exhibited by the [Doctoral Dissertation](#) and the [Final Oral Defense Exam](#).

Final acceptance into the Ph.D. candidacy program requires successful completion of both the [Research Proposal](#) and the [Oral Qualifying Exam](#). Ph.D. students will be assigned a [Research Adviser](#) during the first semester of the degree plan. The primary role of the Research Adviser is to prepare the Ph.D. student to conduct independent research. Ph.D. students will work closely with their Research Adviser and [Supervisory Committee](#) to attain the scientific and technical skills required to demonstrate mastery of the field for the Ph.D. degree.

**Research Adviser:** During the first semester of the degree plan, Graduate Faculty that have sponsored research projects will present brief introductions to the research to be conducted by a Ph.D. student. Ph.D. students will attend these discussions to learn about the projects and ask questions. Ph.D. students are encouraged to talk further with the faculty and their current Ph.D. students to learn more about the research program. Ph.D. students should meet with at least three different faculty during the selection period so that they can make an informed decision about their preferences for a Research Adviser. The assignment of a Research Adviser to the Ph.D. student will be made by the [Associate Chair for Graduate Studies](#) based on Ph.D. student preferences and the needs of the graduate program.

**Supervisory Committee:** The Supervisory Committee assists the Ph.D. student in selecting coursework appropriate for the field of research, approves the [Research Proposal](#) and the [Oral Qualifying Exam](#) prior to final admittance into candidacy, periodically reviews research progress, approves the [Doctoral Dissertation](#), and conducts the [Final Oral Defense Exam](#). The Supervisory Committee is responsible for assuring that the completed Doctoral Dissertation is original research and is a contribution to the body of knowledge. The [Research Adviser](#) and Supervisory Committee may assist the Ph.D. student in understanding all regulations governing the Ph.D. program, but the Ph.D. student has the ultimate responsibility for being aware of and meeting all requirements.

The Supervisory Committee is very important and should be chosen carefully. Before the end of the second semester of the degree program, Ph.D. students will nominate, with the advice and consent of the Research Adviser, the members of the Supervisory Committee. The Supervisory Committee for a Ph.D. candidate consists of at least four members selected from the Graduate Faculty. At least two members, including the Chair, should be from the Chemical Engineering Department. Typically, the Research Adviser is the Chair of the Supervisory Committee, unless they are not a primary faculty member of the Chemical Engineering Department. At least one member of the Supervisory Committee serves as an external member and should be from a different educational discipline with no ties to the home academic unit. The Supervisory Committee should be communicated to the [Graduate Academic Adviser](#) as soon as chosen.

**Safety:** The Department of Chemical Engineering considers laboratory safety to be both an educational objective and a laboratory imperative. All laboratory personnel (including Ph.D. and undergraduate students, postdoctoral researchers, volunteers, hosted minors, and technicians) are required to take the online course *Chemical Hygiene Plan for Laboratory Staff* (EHS 861). Additional training will be provided by your [Research Adviser](#) based on the laboratory-specific Chemical Hygiene Program created for your research activities. Annual training is required for all employees who generate or manage hazardous waste. Additional one-time or annual training may be required for researchers working in special-risk areas.

**Progress Report Requirement:** Ph.D. students must provide an update on their [Doctoral Dissertation](#) progress to their [Supervisory Committee](#) by the stated [due date](#) in **Table 2** for each Spring semester beginning with their third year in the degree program. A progress report must be submitted every Spring semester thereafter until graduation unless graduating the following Summer semester. The progress update may take the form of either an oral presentation to the committee or a concisely written progress report to committee members followed by individual meetings as necessary. The progress report option is not to exceed 10 pages and should include a statement of progress to-date and a plan for future work toward degree completion. Any completed manuscripts should be appended. To document compliance, Ph.D. students are to have each Supervisory Committee member sign a copy of the Progress Status Approval Form (available from the [Graduate Academic Adviser](#)) and the signed forms are to be given to the [Graduate Academic Adviser](#).

## B.5. Research Proposal

The Research Proposal is a written description of the research work to be conducted by the Ph.D. student. It is to be **written primarily by the Ph.D. student** in consultation with the [Research Adviser](#). After the consent of the Research Adviser, the first draft of the Research Proposal should be submitted to the [Graduate Academic Adviser](#) and the [Associate Chair for Graduate Studies](#) by the stated [due date](#) in **Table 2**. **The Research Proposal should also be submitted to the [Supervisory Committee](#) members no later than 2 weeks before the [Oral Qualifying Exam](#).**

The purpose of the written Research Proposal is to demonstrate that Ph.D. students can identify important research problems, prepare a detailed experimental plan to study the research problem, utilize the tools needed to conduct advanced research to address the research problem, and analyze the results obtained by their research. The Research Proposal must outline the area of research and its importance, a clear problem statement, background to the research area, specific tasks that will be performed, preliminary results, and subsequent steps. A number of excellent manuals (for example, references available via [www.nsf.gov](http://www.nsf.gov)) are available on writing research proposals and may be used as guides in preparing the proposal. A maximum of 15 single-spaced, typed pages, including figures and tables is allowed. A font type of Arial or Times New Roman using a minimum of 11-point should be used for the main text. Captions for tables and figures can use a minimum of a 9-point font. The Research Proposal should include a title, a table of contents, references, and an abstract in addition to the 15 pages of text. A maximum of two appendices, such as submitted papers, detailed derivations, *etc.* could be included in addition to the 15-page proposal. Although there is no set format, the main body of the document often includes the following sections:

1. **Introduction:** A concise overview of the research topic and its importance. (Suggested length: 1 page)
2. **Background:** Literature review and relevant background needed to place the proposed study in the larger context of the field and to highlight the relevance and novelty of the proposed work. (Suggested length: 2 – 3 pages)
3. **Problem description:** A description of the specific problem, objectives of the proposal, and the novelty of the proposed work. (Suggested length: 1 page)
4. **Specific objectives/aims:** A description of proposed theoretical and/or experimental work and a list of specific tasks (including feasibility probes) needed to accomplish the proposed objectives. (Suggested length: 1 page or less)
5. **Preliminary work:** A description of preliminary work performed by the Ph.D. student that supports the feasibility of the proposed work and an analysis or discussion of such preliminary work. (Suggested length: 2 – 4 pages)
6. **Safety Assessment:** A detailed analysis of the experimental setup to identify possible causes of accidents, steps to avoid accidents, and steps to take in case of an accident. The Supervisory Committee will include questions on safety during the Oral Qualifying Exam. (Suggested length: 1 page or less)
7. **Proposed Work:** Details of the subsequent steps planned to achieve the specific objectives of the research. (Suggested length: 3 – 5 pages)
8. **Summary:** A concise statement of the expected outcomes of the proposed research. (Suggested length: 1 page or less)
9. **References:** A list of references cited in the proposal.
10. **Tables & Figures:** Tables and figures used in the proposal should be integrated into the text.

The format of the written Research Proposal is not fixed. The guidelines above must be interpreted as suggestions that may be altered whenever necessary to improve the clarity and legibility of the proposed work. However, Ph.D. students should ensure that any deviations produce a more persuasive and better-structured Research Proposal.

### **B.6. Oral Qualifying Exam**

The Oral Qualifying Exam is a public presentation of the [Research Proposal](#) followed by a private examination of the Ph.D. student by the [Supervisory Committee](#). To be eligible to take the Oral Qualifying Exam, Ph.D. students must:

1. Pass the three core Basis courses (*Continuum Basis*, *Molecular Basis*, and *Mathematical Basis* of Chemical Engineering). A Ph.D. student who receives less than a B- in a Basis course must retake the course on the next available offering and obtain a B- or better.
2. Maintain an overall and major average grade point average (GPA) of 3.0 or greater.
3. Receive a satisfactory grade for research in the semester **prior** to the Oral Qualifying Exam. This grade must be assigned by the [Research Adviser](#), discussed with the Ph.D. student, and placed on record in the student's file prior to the examination.

After receiving consent from the Research Adviser and the [Associate Chair for Graduate Studies](#), the Ph.D. student may schedule the Oral Qualifying Exam. **Ph.D. students are encouraged to plan ahead and schedule the Oral Qualifying Exam at least one month ahead of time.** The

Oral Qualifying Exam shall be publicly announced and the initial presentation by the Ph.D. student will be open to the public.

The Oral Qualifying Exam will last 2 hours or more and will be divided into three parts.

1. In the first part, the Ph.D. student will present the Research Proposal. This part of the exam is public and should last about 30 minutes.
2. The Supervisory Committee will question the Ph.D. student on fundamental issues pertinent to the research area in the second part. The Supervisory Committee will evaluate the Ph.D. student's breadth of knowledge in Chemical Engineering Fundamentals related to the area of research and ability to think critically. This part of the exam should last about 30 minutes.
3. In the last part, the Supervisory Committee will question the Ph.D. student on issues directly related to the Research Proposal. This part of the exam should last about 60 minutes or more. The Supervisory Committee will evaluate the quality of the Research Proposal and the response to questions about the Research Proposal in order to assess the Ph.D. student's oral communication skills, depth of knowledge in their chosen research field, ability to think critically, and ability to formulate and defend a research plan.

All members of the Supervisory Committee must take part in the examination. The Oral Qualifying Exam may be conducted using video and/or telecommunications. However, the Ph.D. student and Chair or Co-Chair must be in the same physical location. All other Supervisory Committee members may participate from remote sites via technological means. If a Supervisory Committee member is unable to attend, a suitable substitute approved by the Department must be appointed. The substitute Supervisory Committee member should be given sufficient time to read the Research Proposal and prepare for the Oral Qualifying Exam. A minimum of two weeks is recommended.

Based on the combined performance in the three parts of the Oral Qualifying Exam and the evaluation of the written Research Proposal, the Supervisory Committee will evaluate the overall quality of the Research Proposal as satisfactory or unsatisfactory, and accordingly award a Pass or a Fail grade. Additionally, each member of the Supervisory Committee will provide feedback to the candidate by completing the following matrix:

	Excellent	Very Good	Good	Fair	Poor
1. Literature review/Ability to identify pertinent problem					
2. Description of the problem and the methods					
3. Research productivity based on preliminary results					
4. Writing skills					
5. Structure of the oral presentation					
6. Quality of slides					
7. Presentation skills					
8. Response to questions on <a href="#">Research Proposal</a>					
9. Fundamental knowledge related to the research topic					
10. Critical thinking					

Ph.D. students who successfully pass both the Oral Qualifying Exam and written Research Proposal have formally entered Ph.D. candidacy. Ph.D. students who fail the Oral Qualifying Exam may be given the option (on the advice of the Supervisory Committee and discretion of the [Associate Chair for Graduate Studies](#)) of retaking the Oral Qualifying Exam within 4 months or terminating with a Master of Science degree (with or without thesis, depending upon the advice given by the Research Adviser) or Master of Engineering degree should the student already have a Master of Science degree. Ph.D. students who have not passed the Oral Qualifying Exam after the second time must terminate with a Master's degree or withdraw from the program.

### **B.7. Research Seminar Requirement**

Ph.D. candidates are required to present a Research Seminar to an audience comprised of chemical engineering graduate students and faculty. The Research Seminar shall be publicly announced and held on campus. The Research Seminar should be scheduled to take place during the last two semesters of the Ph.D. candidate's residence and should cover selected results from the candidate's [Doctoral Dissertation](#). Ph.D. candidates should provide the Seminar Coordinator with a title and a short abstract for the presentation in advance and the Research Seminar presentation should last no more than 30 minutes, including a 10-minute period for questions. **The Ph.D. candidate is responsible for contacting the Department Seminar Coordinator to schedule the time and date of the Research Seminar at least one semester before the desired date.** At the discretion of the [Associate Chair for Graduate Studies](#), presentation in the GRaduate Association of Chemical Engineers (GRACE) symposium or at a national or international conference in the last year of the candidate's residence can be used as a substitute for the Research Seminar. **The Ph.D. degree will not be issued to candidates until the Research Seminar requirement is satisfied.**

### **B.8. Doctoral Dissertation**

Each Ph.D. candidate must prepare and present a Doctoral Dissertation that shows independent investigation that is acceptable in form and content to the [Supervisory Committee](#) and to the Graduate School. The work must be of publishable quality and must be in a form suitable for publication using the Graduate School's format requirements (<http://graduateschool.ufl.edu/about-us/offices/editorial/thesis-and-dissertation/>). It is to be **written primarily by the Ph.D. candidate** in consultation with the [Research Adviser](#). **The Ph.D. candidate and Supervisory Committee are responsible for the level of quality and scholarship.** The Graduate Council requires the Graduate School Editorial Office, as agents of the Dean of the Graduate School, to review the Doctoral Dissertation for acceptable format, and to make recommendations as needed. Please consult the Graduate Catalog for Doctoral Dissertation requirements (<http://gradcatalog.ufl.edu>). **Please note that the Graduate School has strict deadlines when applying for graduation, including the submission of the first draft.** Ph.D. candidates are encouraged to check the timeline (<http://graduateschool.ufl.edu/about-us/offices/editorial/editorial-deadlines/>) for the term in which they anticipate completing their degree requirements.

The Ph.D. candidate, upon completion of other degree requirements and the consent of the Research Adviser, will submit his/her Doctoral Dissertation to the Supervisory Committee and the Graduate School. **The Doctoral Dissertation should be submitted to the Supervisory Committee members no later than 2 weeks before the [Final Oral Defense Exam](#).**

## **B.9. Final Oral Defense Exam**

After submitting the [Doctoral Dissertation](#) to the [Supervisory Committee](#) and completing all other degree requirements contained in this document, the Ph.D. candidate may schedule the Final Oral Defense Exam. The Final Oral Defense Exam should be scheduled no more than 6 months before degree award. The Final Oral Defense Exam shall be publicly announced and held on campus. The Final Oral Defense Exam is a public presentation of the Doctoral Dissertation followed by a private examination of the Ph.D. candidate by the Supervisory Committee.

The Final Oral Defense Exam will last 2 hours or more and will be divided into two parts.

1. The Ph.D. candidate will present the Doctoral Dissertation in the first part. This part of the exam is public and should last about 30 – 45 minutes.
2. In the last part, the Supervisory Committee will question the Ph.D. candidate on issues directly related to the Doctoral Dissertation. This part of the exam should last about 60 minutes or more. The Supervisory Committee will evaluate the quality of the Doctoral Dissertation and the response to questions about the Doctoral Dissertation in order to assess the Ph.D. candidate's oral communication skills, depth of knowledge in their chosen research field, ability to think critically, and ability to formulate and defend their research.

The Final Oral Defense Exam may be conducted using video and/or telecommunications. However, the Ph.D. candidate and Chair or Co-Chair must be in the same physical location. All other Supervisory Committee members may participate from remote sites via technological means. If a Supervisory Committee member is unable to attend, a suitable substitute approved by the Department must be appointed. The substitute Supervisory Committee member should be given sufficient time to read the Doctoral Dissertation and prepare for the Final Oral Defense Exam. A minimum of two weeks is recommended.

Satisfactory performance on this examination and adherence to all Graduate School regulations outlined above complete the requirements for the degree. The Supervisory Committee and other designated faculty sign the Doctoral Dissertation signature pages.

## **C. DETAILED DESCRIPTION OF OTHER PROGRAM REQUIREMENTS**

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### **C.1. Florida State Residency Requirement**

For tuition purposes, all eligible Ph.D. students (i.e., those who receive tuition waivers and who are U.S. citizens, permanent resident aliens, or legal aliens granted indefinite stay by the Immigration and Naturalization Service) must take appropriate actions to become in-state residents by the end of their first year. Failure to do so may result in loss of the tuition waiver.

### **C.2. Concurrent or Minor Degrees**

Ph.D. students who wish to enroll in a concurrent degree program must obtain the appropriate forms from the Graduate School. **The [Associate Chair for Graduate Studies](#) will sign these forms only after consulting the Department Chair and after the student's [Research Adviser](#) has given written approval for the student to enroll in the concurrent degree program.** A copy of all

communications regarding the application for the program will be maintained in the student's graduate records with the [Graduate Academic Adviser](#).

With the [Supervisory Committee](#) approval, Ph.D. students may choose one or more Minor degrees. Minor work may be completed in any academic unit outside the Chemical Engineering degree if approved for Master or Ph.D. programs in the Graduate Catalog (<http://gradcatalog.ufl.edu>). The collective GPA for courses included in a Minor degree must be 3.0 or higher. If a Minor degree is pursued, it must be approved by the minor department and one member of the Supervisory Committee must be from the minor department.

If one minor is chosen, the Supervisory Committee member representing the minor suggests 12 to 24 credits of courses numbered 5000 or higher as preparation for an [Oral Qualifying Exam](#). Part of the credits may have been earned while the student was enrolled in the Master degree program. If two Minor degrees are chosen, each must include at least 8 credits. Competence in the minor is demonstrated by the written examination by the minor academic unit or by the Oral Qualifying Exam, as defined by the established procedures of the minor department. Minor course work at the Ph.D. level may include courses in more than one academic unit if the objective of the Minor degree is clearly stated and the combination of courses is approved by the Graduate School (this approval is not required for a Minor degree in one academic unit).

### **C.3. Transfer of Master of Science Credits from other Institutions**

Students with a Master of Science degree in Chemical Engineering from another institution may petition to transfer credits toward their Ph.D. degree requirements. A maximum of 30 transfer credits are allowed from institutions approved by UF. Some of these transferred credits may be used to satisfy the requirements on core courses. Only graduate-level courses (equivalent to course numbers 5000-7999) with a grade of B or better are eligible for transfer of credit. Credits transferred from other institutions are applied toward the degree requirements but grades earned are not computed in the Ph.D. student's GPA.

Petitions for transfer of credit, including course syllabi and descriptions, should be submitted to the [Graduate Admissions Assistant](#) during the Ph.D. student's first term of enrollment in the Graduate School. The [Ph.D. Recruitment Coordinator](#) will review the petitions to determine which courses have considerable overlap with required [coursework](#) described in the Ph.D. program. Final acceptance of credit transfers requires approval from the [Associate Chair for Graduate Studies](#) and the Dean of the Graduate School.

### **C.4. Leave Policy**

The Department of Chemical Engineering follows the established policies within the Graduate Assistants United (GAU) Collective Bargaining Agreement (CBA) with the University of Florida. More details can be found at <https://hr.ufl.edu/wp-content/uploads/2018/04/2017-2020-GAU-Union-Contract.pdf>.

The specific dates of absence must be pre-approved by the Ph.D. student's [Research Adviser](#) by signature on the Leave Form, which is to be completed and submitted to the [Graduate Academic Adviser](#). The form includes contact information during the Ph.D. student's absence that must be provided in the event that an emergency should develop.