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GRADUATE PROGRAM REQUIREMENTS

for the degree of

Doctor of Philosophy

2017 Fall

A. INTRODUCTION

These guidelines describe the Program requirements for a PhD degree in Chemical Engineering. More detailed general requirements for the various degree program as well as descriptions of courses can be found in the University of Florida Graduate Catalog (<http://graduateschool.ufl.edu/academics/graduate-catalog>). A student is normally regulated by the rules set forth in the catalog published in the academic year of the student's first term. It is the responsibility of the students to know and take appropriate steps to meet all Program requirements in this document and those in the student catalog.

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

1. Completion of at least 90 credits beyond the B.S. with a minimum of 1 year in residence.
2. Completion of at least 24 credits of graduate courses, not including seminar.
3. Registration for graduate seminar (ECH 6926) in each semester of residence, except the first semester.
4. Successful completion of a written and oral QUALIFYING EXAMINATION which includes a written program-of-study proposal.
5. Completion of a written DOCTORAL DISSERTATION and successful defense of the dissertation in a FINAL ORAL EXAMINATION.
6. Service as a *Teaching Assistance* by registering 3-credits of Supervised Teaching ECH 6940 for two semesters with a passing grade, and attend Teaching Assistant Orientation.
<https://teachingcenter.ufl.edu/ta-development/ta-orientation/>
https://teachingcenter.ufl.edu/files/TA_Handbook_2017-18.pdf
7. Present a research seminar to the department on the final results of the doctoral work.

The Ph.D. degree is for those 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.

B. PHD PROGRAM REQUIREMENTS

Course Requirements

Beyond the B.S. degree 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 30 credits of courses acceptable for graduate credit and taken after the Bachelor's Degree are required. These 30 credits must include the three Basis courses that are offered in the Fall semester, a course in either reaction engineering, kinetics or biochemical engineering (or suitable equivalent), as well as at least two more courses in Chemical Engineering. Ph.D. students shall register for Chemical Engineering graduate seminar (ECH 6926) every semester of residence after the first semester; the credits earned cannot be counted toward the 24 required credits. PhD students are also required to take 3 credits of Doctoral Research 7980 in their final term (2 credits if the final term is summer).

Transfer of MS Credits from other Institutions

Students with MS degrees in Chemical Engineering from other institutions may petition to transfer up to 30 credits toward their PhD requirements. Some of these transferred credits may be used to satisfy the requirements on core courses.

Registration Requirements

All PhD students appointed as Graduate Assistants must register for 9 credits in Spring, 9 in Fall and 6 in Summer.

Research

The PhD students must register for Advanced Research ECH 7979 before passing the qualifiers and for Doctoral Research ECH 7980 after passing the qualifiers. PhD students are required to take 3 credits of 7980 in their final term (2 credits if the final term is summer).

Students will be assigned a research advisor during the first semester of study. Before the end of the second semester, PhD students will nominate, with the advice and consent of the research adviser, the members of the Supervisory Committee. The supervisory committee for a doctoral candidate comprises at least four members selected from the Graduate Faculty. At least two members, including the chair, should be from the academic unit recommending the degree.

At least one member serves as external member and should be from a different educational discipline, with no ties to the home academic unit. One regular member may be from the home academic unit or another unit. The supervisory committee should be chosen by the student in consultation with the adviser preferably within the second semester and latest by February 1st, and should be communicated to the Graduate Office (Ms. Shirley Kelly) as soon as chosen.

If a minor is pursued, it must be approved by the minor department and one member of the supervisory committee must be from the minor department. The research adviser is the Chairman or co-Chairman of the Supervisory Committee.

The Supervisory Committee is very important and should be chosen carefully; it assists in preparing and approves the program of study, approves the dissertation research, administers the candidacy examination, periodically reviews progress, and conducts the final oral examination. The Supervisory Committee is responsible for assuring that the completed dissertation is original research and is a contribution to the body of knowledge. The adviser and Supervisory Committee may assist the student in understanding all regulations governing the Ph.D. program, but the student has the ultimate responsibility for being aware of and meeting all requirements.

The Ph.D. candidate, upon completion of other degree requirements, will submit his/her dissertation to the Supervisory Committee and the Graduate School. The dissertation will be examined for at least two weeks by the committee, after which the research will be defended with at least four faculty members present with the candidate. The final oral examination shall be publicly announced and open to the public, although the dissertation committee may conduct a continuation of the examination in private with the candidate after the public presentation is completed. In any case, only the Supervisory Committee and other designated faculty sign the dissertation signature pages.

Qualifying Exam and Advancement to Candidacy

Final acceptance into the Ph.D. program requires successful completion of the QUALIFYING EXAM. Between the oral part of the qualifying examination and the date of the degree there must be at least 2 terms. The purpose of the exam (written and oral proposal) is to assess the student's potential to perform scholarly research at the PhD level. The performance of student in the Qualifying Exam will be evaluated by the Supervisory Committee for:

- 1) Knowledge in Fundamentals of Chemical Engineering particularly related to the Research Area.
- 2) Ability to conduct research

Eligibility for the Qualifying Exam

To be eligible to take the PhD qualify exam, students must:

- 1) Maintain an average GPA of 3.0 in the three core Basis courses (Continuum Basis, Molecular Basis, and Mathematical Basis of Chemical Engineering) and remain in good academic standing. A student who gets less than a B- in a Basis course must retake the course on the next available offering and obtain a B- or better.
- 2) The students must also receive satisfactory grades for research in the semesters prior to the exam. This grade must be assigned by the research adviser, discussed with the student and placed on record in the students file prior to the examination.

Written Exam

The written exam is in the form of a research proposal due **February 1st** of the second year. The proposal should be submitted to the Graduate Office (Ms. Shirley Kelly) by this date. **The proposal should also be submitted to the thesis committee members no-later than 15 days before the oral defense.** The written proposal must outline the area of research and its importance, problem statement, background to the research area, specific tasks that will be performed, preliminary results, and subsequent steps. A number of excellent manuals (consult, for example, references available via 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 (10-point or larger font) pages, including figures and tables is allowed. It 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. The main body of the text would typically consist of the following:

1. **Introduction:** A concise overview of the research area and topic and their importance.
2. **Background:** Literature review and relevant background needed to place the proposed study in the larger context and to highlight the relevance and the novelty of the proposed work.
3. **Problem description:** A description of the specific problem and the objectives of the proposal and the novelty of the proposed work.
4. **Specific tasks:** A description of proposed theoretical and/or experimental work and a list of specific tasks (including feasibility probes) needed to accomplish the proposed objectives.
5. **Preliminary work:** Description of any preliminary work performed by the student and an analysis or discussion of such preliminary work.

6. **Safety Assessment:** Conduct a detailed analysis of their experimental setup to identify possible causes of accidents and to identify steps to avoid the accidents, and also steps to take in case of an accident. The thesis committee will include question on Safety during the examination.
7. **Future tasks:** Details of the subsequent steps planned to achieve the specific objectives of the research.
8. **Concluding remarks:** Closing remarks.
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.

Oral Exam

The student must take the oral exam before **June 1st** of their second year.

The proposal defense will last about 2 hours and will be divided into three parts.

1. In the first part, the committee members will question the student on fundamental issues pertinent to the research area. The committee will evaluate the breadth of knowledge in chemical engineering fundamentals related to the area of research, and ability to think critically. This part should last about 30 minutes.
2. The student will present the proposal in the second part. This part should last about 30 minutes.
3. In the last part, the committee members will question the student on issues directly related to the research proposal. This part should last about 60 min. The committee will evaluate the quality of the proposal and the response to questions about the proposal in order to assess the candidate's oral communication skills, depth of knowledge in research area, ability to think critically, and ability to formulate and defend a research plan.

All members of the committee must take part in the examination. The oral exam may be conducted using video and/or telecommunications. However, the student and chair or co-chair must be in the same physical location. All other members may participate from remote sites via technological means. If a member is unable to attend, a suitable substitute approved by the Department must be appointed. The substitute member should be given sufficient time to read the report and prepare for the exam. A minimum of two weeks is recommended.

Outcomes

Based on the combined performance in the three parts and the evaluation of the written proposal, the supervisory committee will evaluate the overall quality of the proposal, and grade the performance 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	V. Good	Good	Fair	Poor
1. Literature Review					
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 Research Proposal					
9. Knowledge in Fundamental areas related to the Research Topic					
10. Critical Thinking					

Students who successfully pass the oral and written exams have formally entered PhD candidacy. Students who fail the exam may be given the option (on the advice of the supervisory committee) of retaking the exam within 4 months or terminating with an MS degree (with or without thesis depending upon the advice given by the adviser), or an Engineer's degree should the student already have an MS degree.

Important Dates to Remember

February 1	Written proposal due (1 copy to Room 409 CHE—Shirley Kelly) and Ph.D. Committee chosen
Before June 1st	Oral Examination for qualifying exam and advancement to candidacy

Teaching-Assistantship Requirement

To gain valuable teaching and communication experience consistent with of the PhD degree, all PhD candidates are required to serve two semesters as a Teaching Assistant, as part of their graduate requirements. Exceptions will not, ordinarily, be permitted, and TA assignments will be made based on student course preferences in July of each year for the following academic year, students are ultimately responsible for ensuring their TA requirement is met. At the end of the semester, the instructor will issue a Pass/Fail grade for the TA. This grade will not appear on the transcript but the TA assignment will not be counted towards the requirements if the Instructor issues a Fail grade. Students who anticipate graduating within one year but have not yet fulfilled the two-semester TA requirement must notify the Graduate Coordinator.

Progress-Report Requirement

PhD students must provide an update on their dissertation progress to their supervisory committee by the end of Spring semester of the third year and every Spring semester thereafter until graduation (unless graduation in that summer). 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 if necessary. The progress report option is not to exceed ten pages and should include a statement of progress to-date and a plan for future work toward completion. Any completed manuscripts should be appended. To document compliance, students are to have each committee member sign a copy of the attached form, and the signed forms are to be given to the Graduate Program Assistant. Note that during a typical four-year period to graduation, only one progress report will be required in the third year.

Research-Seminar Requirement

Graduate students enrolled in the Ph.D. program are required to present a seminar to an audience comprised of all the graduate students and faculty. The seminar should be scheduled to take place during the last two semesters of the student's residence at UF and should cover selected results from the student's doctoral thesis. The students should provide the Seminar Coordinator with a title and a short abstract for the presentation in advance, and the 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 Chairman or the department's Seminar Coordinator to schedule the time and date of the seminar. At the discretion of the graduate advisor

presentation in the GRACE symposium or at a national or international conference in the last year of the student's residence can be used as a substitute for the seminar. The doctoral degree will not be issued to candidates until the seminar requirement is satisfied.

Dissertation

Each doctoral candidate must prepare and present a dissertation that shows independent investigation and 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. **The student and supervisory committee are responsible for level of quality and scholarship.** Graduate Council requires the Graduate School Editorial Office, as agents of the Dean of the Graduate School, to review theses and dissertations for acceptable format, and to make recommendations as needed. Please consult the Graduate Catalog for **Doctoral dissertation requirements.**

Final Examination

While submitting the dissertation and completing all other work prescribed for the degree, the candidate is given a final oral examination by the supervisory committee, on campus. The oral defense should be scheduled no more than 6 months before degree award. The dissertation must be provided to the committee at least 15 days before the date of the oral defense. Satisfactory performance on this examination and adherence to all Graduate School regulations outlined above complete the requirements for the degree.

Time limitation: All work for the doctorate must be completed within 5 calendar years after the qualifying examination, or this examination must be repeated.

Other Remarks

The minimum requirements for the Ph.D. program can be met in 3 years following the Bachelor's degree and all students are urged to complete their work as expeditiously as possible. If a longer period is required to complete the research project, students are encouraged to consider broadening their education by taking more than the minimum of courses.

C. GENERAL Policies and Requirements

Safety: The Department of Chemical Engineering considers chemical laboratory safety to be both an educational objective and a laboratory imperative. All laboratory personnel (including graduate and undergraduate students, post docs, volunteers, hosted minors, and technicians) are required to take the on-line course EHS861: Chemical Hygiene Plan for Laboratory Staff. Subsequent training, based on the laboratory-specific Chemical Hygiene Program created for your research activities, will be provided by your research director. 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.

Florida State Residency Requirement

For tuition purposes, all eligible 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.

Concurrent Degrees

Graduate students who wish to enroll in a concurrent degree program must obtain the appropriate forms from the graduate school. The graduate coordinator will sign these forms *only after consulting the chair and after the student's graduate 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 folder with the Graduate Program Assistant (Shirley Kelly).

Minor: With the supervisory committee's approval, the student may choose one or more minor fields. Minor work may be completed in any academic unit outside the major if approved for master's or doctoral programs listed in this catalog. The collective grade for courses included in a minor must be B (3.00 truncated) or higher.

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 a qualifying examination. Part of this credit may have been earned in the master's program. If two minors are chosen, each must include at least 8 credits. Competence in the minor is demonstrated by written examination by the minor academic unit, or by the oral qualifying examination.

Minor course work at the doctoral level may include courses in more than one academic unit if the objective of the minor is clearly stated and the combination of courses is approved by the Graduate School (this approval is not required for a minor in one academic unit).

Leave Policy

Personal time shall be with pay for up to five (5) days per semester appointment. Each employee shall be credited with such five (5) days at the beginning of each semester and shall use leave in increments of not less than one (1) day. For example, an employee scheduled to work six (6) hours on Monday and three (3) hours on Tuesday, who is unable to perform assigned duties on these days for any of the reasons described above, would be charged with two (2) days of personal time, regardless of FTE appointment, or number of work hours scheduled. The personal time provided shall not be cumulative.

The specific dates of absence must be pre-approved by the student's advisor by signature on the leave form (appended below), which is to be completed and submitted to Mrs. Shirley Kelly in 409 CHE Bldg. Importantly, the form includes contact information during the student's absence must be provided in the event that an emergency should develop.

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 and could lead to a grade decrease, course failure, and loss of degree status.

Students are expected to maintain high ethical standards in the conduct and reporting of scientific and scholarly research. 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, or plagiarism in proposing, performing, or reviewing research or reporting of results, is a most serious offense that can greatly damage the welfare and reputation of the students, faculty, and the University. For more information regarding Research Misconduct, see <http://www.admin.ufl.edu/DDD/attach06-07/R10101-0704.pdf>

From the UF Student Handbook: “Plagiarism is not tolerated at the University of Florida. Plagiarism in a thesis or 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 and the law, see www.rbs2.com/plag.htm. A briefer discussion and some tips for avoiding it are provided at www.indiana.edu/~wts/pamphlets/plagiarism.shtml.

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LEAVE FORM

STUDENT NAME: _____

UF ID NUMBER: _____

FISCAL YEAR: JULY 1 20 ____ TO JUNE 30 20 ____

LEAVE INFORMATION

DATE OF DEPARTURE _____

DATE OF RETURN _____

TOTAL NUMBER OF BUSINESS DAYS OF ABSENCE _____

CONTACT INFORMATION DURING ABSENCE (PROVIDE A PHONE NUMBER IF AVAILABLE)

SIGNATURES

STUDENT: _____

Signature

Date

ADVISER: _____

Signature

Date

Progress Status Approval Form

Chemical Engineering Graduate Program

*I have reviewed the dissertation progress of _____ and found it
_____ satisfactory.*

_____ unsatisfactory, for the reasons listed below:

*Signed _____ Date _____
Committee Member*
