



GUIDELINES FOR DOCTORAL STUDENTS IN CHEMICAL ENGINEERING

**GRADUATE STUDIES COMMITTEE
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Chemical Engineering Department
University of Puerto Rico at Mayaguez

PREFACE

The most important departmental guidelines and policies related to the Doctoral Program in Chemical Engineering of the University of Puerto Rico (UPR), Mayagüez, PR, are presented in this handbook.¹ In addition, the UPRM's Office of Graduate Studies provides general information concerning institutional policies (<http://grad.uprm.edu>). The Graduate Program Coordinator, the President of the Graduate Committee, and the secretary assigned to the Graduate Program are valuable sources of information and support for graduate students. Finally, academic policy for graduate students within the Department is the responsibility of the Graduate Studies Committee and its implementation lies on the Graduate Program Coordinator and the Department Chairman. For campus-wide policies, students may contact the Office of Graduate Studies.

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¹ The guidelines presented herein have been prepared in accordance with Certification 97-21 of the UPRM academic senate and the "Proposal to Establish a Doctoral Degree Program in Chemical Engineering at the UPRM". The Graduate Studies Committee gratefully acknowledges the assistance of the graduate program of the Massachusetts Institute of Technology for their assistance in preparing these guidelines.

² The Graduate Studies Committee would like to acknowledge the work of Dr. Carlos Rinaldi, former committee member and chairman, for the development of these guidelines. Dr. Rinaldi's initiative developed the very first draft of these guidelines, among many other significant contributions to our program. We also recognize the collaboration of the director of the Office of Graduate Studies, Dr. José Mari-Mutt, who works with us to harmonize these rules with the University regulations.

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PART I. ACADEMIC REGULATIONS

COURSE REQUIREMENTS

The Doctor of Philosophy degree in Chemical Engineering at the UPRM requires an intense program of study and research. As such, the Department requires a minimum of 58 credits to complete the degree, which are divided as follows: 18 credits in chemical engineering core subjects; 1 credit in doctoral seminar, 18 credits in doctoral dissertation, 12 credits in non-core chemical engineering subjects, and 9 credits in non-chemical engineering subjects. A maximum of 6 credits in advanced undergraduate (i.e., 5000-level) courses is allowed, which **should be approved within the first 30 credits** of coursework. At least 60% of all courses must be approved at the UPRM.

The discipline of Chemical Engineering covers many diverse areas and, therefore, the Department provides graduate-level subjects to cover those of most relevance. The philosophy of the Department is to encourage students to develop an in-depth understanding of the fundamental concepts of Chemical Engineering and, at the same time, broaden their perspective by sampling other, more specialized subjects. To this end, the following **six subjects** have been designated as **core**: (i) Mathematical Methods in Chemical Engineering (InQu 6001); (ii) Numerical Methods in Chemical Engineering (InQu 6002); (iii) Reactor Design (InQu 6005); (iv) Advanced Transport Phenomena (InQu 6016); (v) Advanced Thermodynamics (InQu 6019) and (vi) Catalysis (InQu 6025). It is expected that doctoral students will complete these six core subjects within the first two years of their tenure at the UPRM. The list of core subjects will be periodically reviewed to accommodate modern developments in the discipline.

In addition to these core courses, doctoral students must enroll each semester in Doctoral Seminar (InQu 8099) and, upon approval of the Doctoral Qualifying Examination (see page 16), in Doctoral Dissertation (InQu 8999). Under special circumstances, a student may be allowed not to enroll in InQu 8099 if he/she is enrolled in a similar course elsewhere. A maximum of 18 credits of Doctoral Dissertation (InQu 8999) may be applied to the fulfillment of doctoral credit requirements (see below).

To ensure the student's academic and professional development, the Department requires a minimum of 12 credits (typically four courses) in **non-core chemical engineering subjects** and a minimum of 9 credits (typically three courses) in **other departments or disciplines**, which

should be related to the student's thesis research. These courses should be selected by the student in consultation with his/her thesis advisor. A Plan of Study Form must be submitted to the Registrar Office after being approved by the Doctoral Program Coordinator, by the stipulated deadlines during the student's second semester of enrollment. A copy of such Form must be sent to the Office of Graduate Studies.

EXPECTED GRADES IN DEPARTMENTAL COURSES

UPRM's regulations require all graduate students to maintain a graduate GPA of 3.0 or higher. A student is placed on probation if his/her GPA drops below 3.0 or receives a non-satisfactory grade (NS) in thesis research. The student is dismissed from the graduate program if he/she is placed on probation three times. Chemical engineering doctoral students are expected to receive a grade of "B" or higher in any course taken to satisfy a Departmental Requirement. Failure to fulfill this expectation may result in denial of subsequent financial support. Withdrawing courses ("W") is strongly discouraged; such action should be taken after consultation with the thesis advisor and the Graduate Program Coordinator.

APPROVAL OF COURSES TAKEN PRIOR TO JOINING THE UPRM'S PHD PROGRAM

Students who have received a BS, MS, or ME degree from the UPRM within five years of the time of admission into the PhD program may qualify for approval of up to 24 credits towards the PhD degree. Students who have approved graduate courses from another recognized institution offering programs comparable to those of the College of Engineering at UPRM, or students transferring from such a program, may qualify for approval of up to 21 credits towards the PhD degree; core courses approved at other institutions will not be approved. Courses approved more than ten years prior to enrollment, at UPRM or elsewhere, will not be approved. Three criteria will be used by the Graduate Committee to approve courses: (a) if the course taken elsewhere is considered equivalent to a UPRM course it will be approved as equivalent or validated; (b) if a course is not equivalent to any course offered at UPRM, but its contents are deemed to be of an appropriate level and relevance to chemical engineering, then the course will be accredited; (c) courses will not be approved if the requirement of 60% course residence is not fulfilled.

Written requests for approvals of courses taken prior to enrollment in the PhD program must be submitted to the Graduate Program Coordinator within the first two semesters of enrollment in the program. The request must include the following: (i) Petition letter from the student with approval of the thesis advisor, (ii) Course syllabus signed by the course professor, department chair, or higher authority at the institution where the course was taken, (iii) Official transcript showing the grade obtained in the course, and (iv) UPRM equivalent course code and title, if applicable. Final decisions will be made by the Graduate Studies Committee on the basis of academic performance and course contents. A grade of A is required in advanced undergraduate courses (5000-level), whereas a grade of B or higher is required in graduate coursework (6000-level or higher). In keeping with residency requirements applicable at the UPRM, no less than 60% of all courses (*i.e.*, 8 out of a minimum of 14 courses not including thesis research) must be approved at the UPRM.

SELECTION OF THESIS ADVISOR(S)

Each graduate student is associated with a research advisor who plays an important role in the student's academic and research programs. First-year doctoral students are required to go through the process described herein. To help in this process, the Graduate Program Coordinator's Office has prepared a form that will be given to all first-year students. Every new student is required to meet with at least five Chemical Engineering faculty members to discuss possible research topics; each faculty member should sign the form. Then, each student has to select three research projects by the date specified in the form, and prioritize them according to the instructions in the form. **Failure to comply with this requirement in a timely manner may result in loss of institutional funding.** Students and potential advisors are reminded that the thesis advisor is ultimately responsible for securing funds to support the graduate student during his/her tenure at the UPRM, hence this should be an important point during discussions of potential thesis topics. The Director of the Department, in consultation with the Graduate Studies Committee, will make every effort to grant each student one of his/her choices within funding and space limitations. Students will be notified of their thesis advisor(s) assignments by the end of their first semester. **Students and potential advisors cannot reach agreements without the consent of the Graduate Studies Committee and the Department Director.**

Prior to registration (Fall and Spring semesters), the student's course selection must first be approved by the thesis advisor before the Graduate Program Coordinator authorizes registration. Advisor approval should also be obtained for any subsequent courses add/drop actions during the term (no additional authorization by the Graduate Program Coordinator is required).

Occasionally, a research project does not proceed according to the expectations of the student, the research advisor(s), or both. Early recognition of the possibility of switching the research topic and/or thesis advisor(s) is an important factor in successfully managing this situation. Any student contemplating a change of thesis advisor(s) should contact the Graduate Program Coordinator for consultation and assistance. Students must be aware that in most cases a change in thesis advisor, after the oral examination has been approved, will not be granted. However, in the improbable case that such change is approved, the student must present a new doctoral proposal subjected to the conditions given by the Graduate Program Coordinator in consultation with the Office of Graduate Studies.

THESIS COMMITTEE (STUDENT'S COMMITTEE)

Once a Thesis Advisor has been assigned to the student, the two will work together to choose a Thesis Committee with the necessary skills and background to assist the student in developing his/her dissertation research. The committee should consist of no less than four members, at least half of which must be from the Department of Chemical Engineering at UPRM. Any committee member external to the UPR system should have an adjunct appointment in the Department according to university regulations. The selection of the committee members must then be informed to the Graduate Program Coordinator and included in the student's plan of study.

DOCTORAL QUALIFYING EXAMINATION

Purpose and General Information

The purpose of the doctoral qualifying examination is to assess at an early stage if he/she possesses the necessary intellectual skills and knowledge to earn the degree of doctor of philosophy in Chemical Engineering. This assessment is based on the student's performance in four written subject examinations. The exam is prepared by faculty members and overseen by the Qualifying Exam Coordinator, who is a member of the Graduate Committee.

The qualifying examination is offered before each semester whenever there are at least two students to take it. New students must take the qualifying exam before the beginning of the second semester of full admission into the doctoral program, unless an extension is granted by the Graduate Studies Committee. Failure to take the examination within this period will count as a failed attempt, except in the case of extenuating circumstances. According to UPRM's regulations, students have two opportunities to pass the exam.

Format

The doctoral qualifying examination consists of four, two-hour subject examinations on the topics of: (i) thermodynamics; (ii) momentum and energy transport; (iii) mass transport; and (iv) chemical kinetics and reactor design. Problems included are at the undergraduate level. The four subject examinations are offered in two non-consecutive days, one day apart. Each exam is prepared and graded anonymously by a member of the department faculty. This is a double-blind test, where the student does not know the evaluator's identity and vice versa.

Subject examinations are closed-book. A handout containing standard formulas of the topics examined will be provided. The handout may include more formulas than are actually needed to complete the solution of each problem. No other material will be allowed during the exam unless provided by the examination proctor. Calculators are allowed. Examinee questions will not be answered during the examination. Well written and organized solutions are expected from each examinee.

Assessment of Grades

The result of the qualifying examination is determined as follows:

1. Each subject exam evaluator submits a written assessment of the student's performance in the examination, including the evaluator's opinion regarding the student's command of the fundamentals of chemical engineering in the specific area tested. The evaluator must recommend either favorably or unfavorably on the student passing the specific area or areas graded by the evaluator.
2. The Qualifying Exam Coordinator will tabulate the results of the individual exams without identifying individual student's identities and present them to the Graduate Committee. The results of the examinations will be then compared and evaluated and a consensus vote will be made to decide on each candidate passing or failing the

Qualifying Examination. If a student fails the exam and feels that additional information is needed, he/she may request a meeting with the Graduate Program Coordinator.

3. The Graduate Studies Committee will inform the Director of the Department of the results of the examination, who will in turn inform the students and the Office of Graduate Studies no later than two weeks after the qualifying examination.

A student who has passed the examination will be allowed to register in InQu 8999 – Doctoral Dissertation. This student is henceforth regarded as a doctoral degree candidate in the Department of Chemical Engineering at UPRM.

A student who has failed the qualifying examination the first time may retake it a second and final time within one semester of the first attempt. According to UPRM regulations, a second failure will result in the student's dismissal from the UPRM graduate programs. If the student does not hold a Master's degree in Chemical Engineering, the student will be given the choice of transferring to the Master of Science or Master of Engineering programs offered at the UPRM. If none of these options is elected, the student will be suspended from the Chemical Engineering graduate program. After one year of suspension, the student may apply for a second and final admission the same program or to another UPRM graduate program.

THESIS PROPOSAL

The Department requires doctoral candidates to prepare, submit, and defend a written Thesis Proposal **before registering for doctoral dissertation for a third time**. This constitutes an absolute maximum and students are strongly encouraged to prepare and submit their Thesis Proposal within one year of passing the qualifying examination. The Thesis Proposal consists of a written exposition of the planned research followed by an oral presentation. The purpose of the Thesis Proposal is to obtain important feedback early on in the development of the thesis research. Since the Thesis Proposal counts as the Preliminary Examination in the Chemical Engineering Doctoral Program, it also provides the opportunity to evaluate the student's overall progress. The written portion must be submitted to the student's committee and to the Graduate Program Coordinator at least **four weeks prior** to the oral presentation. Failure to complete the Thesis Proposal and the oral presentation within the above-mentioned deadline will constitute unsatisfactory progress toward the doctoral degree

(which may be recorded as such if the student is currently enrolled in InQu 8999 – Doctoral Dissertation), and can result in denial of institutional funding.

Scheduling meetings with faculty can be difficult at certain times during the academic year. It is therefore **strongly recommended** that students do not leave the oral presentation of the Thesis Proposal to the very end of the allowable period (i.e., too close to the deadline specified above). It is the student's responsibility to schedule a room and any audiovisual equipment that he/she may need for his/her presentation. It is also the student's responsibility to provide the thesis advisor(s) with a Report of Thesis Proposal Presentation Form, which can be obtained in the Doctoral Program Coordinator's Office.

Although the exact format of the Thesis Proposal is determined by the student and his/her research advisor(s), students are encouraged to follow the guidelines provided by the Office of Graduate Studies (<http://grad.uprm.edu/normastesis.htm>). The following outline can be used as a guide:

- I. **Cover Page.** Provides the thesis title, name(s) of the student, the thesis advisor(s), and members of the student's committee, and date of submission.
- II. **Goal and Specific Aims.** Clearly states the overall goal and specific tasks to be accomplished (not to exceed one page).
- III. **Background and Rationale.** Presents a rationale for conducting the proposed studies. Reviews all key publications in the chosen field, and shows their relation to the proposed studies. This section should be used by the proponent to highlight the scientific contribution of his/her project to the field of Chemical Engineering.
- IV. **Project Plan and Methodology.** Discusses the planned research with particular emphasis on expected difficulties and challenges. Indicates how the experimental and/or theoretical results will serve to meet the proposed objectives. Multiple strategies to accomplish the main tasks should be indicated.
- V. **Safety.** Notes any safety issues related to the use of chemicals, biohazards, and laboratory procedures that are part of the planned research.
- VI. **Time Schedule.** Delineates the expected schedule for completion of the thesis' main milestones.

VII. **Literature Citations.** Lists all references following the style of any major journal in the field of Chemical Engineering.

VIII. **Appendices.** This section is optional.

Thesis Proposals, including literature citations, figures, tables, and appendices **should not exceed 40 pages**. Brevity and clarity of presentation will be appreciated by the thesis committee. The Thesis Proposal is a statement of the intended plans for the research program and not a summary of the student's past or current accomplishments.

The oral presentation of the Thesis Proposal should be conducted as follows:

1. **General Dispositions**

- a. The oral presentation of the Thesis Proposal will be held during the regular academic period, will be open only to the members of the academic community, and will be publicly and broadly announced through the Graduate Program Coordinator's Office to the Department and the UPRM community **at least two weeks prior to the oral presentation**. It is the student's responsibility to arrange the time and date with all members of his/her committee.
- b. The student's committee, presided by the thesis advisor, will evaluate the oral presentation.
- c. The thesis advisor is responsible for advising the student on all details regarding the written and oral portions of the Thesis Proposal.

2. **Oral Presentation**

- a. Open Forum (open to the academic community):
 - i. The thesis advisor will introduce the student to the audience and ask him/her to provide a biographical sketch.
 - ii. The thesis advisor will provide the student's committee with copies of the student's academic record.
 - iii. The student will present a clear and concise exposition of his/her Thesis Proposal (30 minutes is suggested).
 - iv. Having concluded the oral presentation, a question-and-answer period open to the audience will follow (30 minutes maximum is suggested).

- b. Closed Forum (only members of the student's committee and the student may be present):
- i. A second question-and-answer period will be held (30-60 minutes is suggested). Questions during this period should focus on the proposed research presented and/or on general chemical engineering aspects applicable to the proposed research.
 - ii. The Student's committee will deliberate privately and confidentially on the results of the Thesis Proposal. Approval of the Thesis Proposal requires a majority vote by the student's committee.
 - iii. The thesis advisor will inform the student of the results at the conclusion of the closed forum deliberations.
 - iv. If successful, the student, in consultation with the thesis advisor, will present a report summarizing the suggestions and/or corrections made to the Thesis Proposal. This report must be submitted to the Graduate Program Coordinator, no later than two weeks after the oral presentation, who will inform the Office of Graduate Studies.
 - v. If the student fails, he/she may try a second attempt no later than one semester after the first. A second failure will result in dismissal from the doctoral program. During this semester, the student may be allowed to enroll in InQu 8999. A letter from the Graduate Program Coordinator to the Office of Graduate Studies should be issued on this regard.

After the thesis proposal has been approved, and only then, the student may submit his/her proposal to the Office of Graduate Studies to fulfill their requirements. Then, the Director of Graduate Studies will appoint his/her Representative to the student's committee.

THESIS COMMITTEE MEETINGS

Purpose and Types of Thesis Committee Meetings

In the PhD program, the Department of Chemical Engineering requires **at least one student's committee meeting in each two-semester period following the presentation of the Thesis Proposal**, and more frequent meetings are encouraged whenever significant input from the

Committee is required. Each thesis committee meeting should focus on the student's education and research progress, with emphasis on achievements and problems encountered. These meetings are opportunities for the student to receive advice and counsel from the members of his/her Committee. As a student progresses in his research, however, these meetings should focus on the eventual completion of the student's doctoral dissertation. As such, three types of student committee meetings have been defined and described below.

A. Regular Thesis Committee Meeting

The first student committee meeting following the approval of the Thesis Proposal, referred to as the **Regular Thesis Committee Meeting**, should be scheduled by the student **within two semesters** of the approval of the Thesis Proposal. This meeting is an opportunity for the student to discuss his/her progress on the proposed research, as well as to discuss with the committee the feasibility of the intended research.

B. Plan-to-Finish Thesis Committee Meeting

Within two semesters of the regular thesis committee meeting, the next **thesis** committee meeting, referred to as the **Plan-to-Finish Thesis Committee Meeting**, should be scheduled by the student. At this meeting, the **thesis** committee should evaluate a **Written, Plan-to-Finish Report** prepared by the student. The Written Plan-to-Finish Report should be a concise summary (not to exceed five pages) reevaluating the research plan proposed by the student in the original Thesis Proposal, including discussing and justifying any needed modifications to the original research plan. The report should also discuss the remaining tasks (experiments, computations, analysis, literature review, and writing) that are needed to bring the doctoral thesis project to a successful completion. A realistic timeline for the completion of these tasks should also be included. The written Plan-to-Finish Report should not constrain the intellectual inquiry of students and thesis advisor(s). On the contrary, it is subjected to revision if significant opportunities or setbacks arise in the course of the remaining thesis research.

C. Thesis Student Committee Meeting

Within two semesters of the Plan-to-Finish student committee meeting, the student should schedule the Final Thesis Committee Meeting. For this meeting, the student should prepare a **Written Final Progress Report** summarizing the main results obtained in the doctoral research and justifying why they are sufficient for completion of the doctoral thesis. At the final

student committee meeting, the committee should agree that the work carried out by the student, as reflected in the Written Final Progress Report and the student's oral presentation, constitutes a high-quality research study suitable for presentation to the faculty in the **Final Thesis Defense** (see pages 14-16). A suggested timeline for completion of the doctoral program, including student's committee meetings, is presented in Figure 1.

For those students who **have not had** a student committee meeting in **two semesters**, a Form recording the date of the last student committee meeting will be attached to their regular Registration material every semester. The Form will indicate that the student should have a student committee meeting **within three months** following Registration Day. The Form will also indicate that failure to comply with this requirement will constitute Unsatisfactory Progress toward the doctoral degree, and may result in denial of future Registration and/or assistantships. The Form should be signed by the student and by the thesis advisor(s) to indicate that this important requirement is clearly understood.

Format of Student's Committee Meetings

For a Written Progress Report to be most useful, in addition to summarizing the progress made by the student since the last committee meeting, it should clearly state the problems and challenges encountered by the student in his/her research, including unsuccessful attempts made to resolve them and a discussion of future approaches to be tried. The Written Progress Report **should not exceed five pages**. Students are also encouraged to append copies of the transparencies or slides to be used during the oral presentation at the thesis committee meeting. When appropriate, supporting data and completed manuscripts may also be appended to the Written Progress Report.

Written Progress Reports, including all appended materials, should be sent electronically to each student's committee member at least **one week prior** to the committee meeting. This will enable each member to better prepare for the meeting and, hopefully, lead to more stimulating and constructive discussions during the meeting. Student committee meetings should be attended by the student's committee and by invited guests deemed appropriate by the student's thesis advisor.

The student's committee meetings **should not exceed 90 minutes**, with up to 45 minutes for the student's presentation and 45 minutes for discussions. Following the student's committee meeting, **in consultation** with the thesis advisor(s), the student should prepare a detailed summary

of the thesis committee's evaluation of his/her research to date, as well as indicate any real or potential problems identified. This summary should be attached to the Report of Thesis Committee Form. The student should also append the Written Progress Report to this Form. The Form should be signed by the student, the thesis advisor(s), and all other student committee members. The completed Form, including all appended materials, should then be given by the student to the Graduate Program Coordinator, who will inform the Graduate Studies Committee. After the successful completion of this process, the student and the thesis advisor(s) will receive a letter from the Graduate Program Coordinator indicating that the completion of the student's committee meeting has been recognized by the Graduate Studies Committee and entered into the student's record. The student, the thesis advisor(s), as well as all thesis committee members will receive a copy of this Form, including all appended materials, for future reference.

FINAL THESIS DEFENSE

Following the satisfactory completion of the Final Thesis Committee Meeting, and no earlier than four semesters after defending the Thesis Proposal successfully, doctoral candidates should commence the Thesis Defense process, which will be as follows:

1. An Application for Oral Examination and one copy of the thesis must be electronically submitted to the UPRM Office of Graduate Studies by the date indicated in the official Academic Calendar and at least one month prior to the proposed defense date. In addition, a printed copy must be provided to the Representative from the Office of Graduate Studies. It is the student's responsibility to coordinate with committee members a date, time, and place for the defense. The student should preferably get a written confirmation of the place reservation.
2. At the same time, the student must provide a pdf-copy of the thesis to the members of the Examining Committee: (a) the thesis advisor(s), and (b) every thesis committee member. During the next two weeks, the Examining Committee will review, comment upon, and suggest changes to the thesis document.
3. **Two weeks** before the oral thesis defense, the student should turn in to the Graduate Program Coordinator's Office copies of the Technical Summary. The Technical Summary is a text-only document no longer than two describing the scope and significance of the doctoral thesis. The primary audience is the Chemical Engineering

faculty, who will be interested in a concise description of the thesis research and its most significant findings. The Technical Summary should explain the impact of the Doctoral Thesis on the Chemical Engineering profession and on the advancement of scientific knowledge in the field.

4. Upon receipt of the Technical Summary, the Graduate Program Coordinator's Office will distribute it to the entire Departmental faculty, along with an announcement designed to generate faculty attendance at the Final Thesis Defense.
5. On the day of the oral thesis defense, the student should turn in the following materials to the Graduate Program Coordinator's Office:
 - One extra copy of the Thesis Abstract.
 - Chemical Engineering Department Departure Form.
 - One extra copy of the Thesis Title Page (unsigned).
 - Forwarding Address Form.
 - Survey of Earned Doctorates Form.

The Graduate Program Coordinator's Office will forward the last two items to the Office of Graduate Studies.

6. The Thesis Advisor will preside over the Thesis Defense and will introduce the candidate to the audience. The student should make plans to speak for no more than 45 minutes. The thesis advisor will also be in charge of the open and closed question-and-answer sessions that follow the candidate's presentation and the final confidential deliberations by the examining committee. The thesis presentation and open question-and-answer session are open to the public, but will be followed by a closed session between the candidate and the Thesis Committee. Additional questions may be asked during the closed session, but the total time for the Thesis Defense will not exceed 4 hours.
7. After the closed session with the candidate, the examining committee (student committee members and the Representative of Graduate Studies) will deliberate on the approval/non-approval of the Thesis Defense, with a majority vote required for approval. The result of the Thesis Defense will be notified immediately to the candidate by the thesis advisor. In the case of non-approval, the Examining Committee will make recommendations for a second Thesis Defense whose result will be final.

8. Once the Thesis Defense is successfully completed, the student must assemble the final version of the thesis document within the timeline stipulated by the Examining Committee and the constraints set forth by the Office of Graduate Studies. All thesis materials must be submitted to the Office of Graduate Studies in pdf-format.

UNSATISFACTORY PROGRESS

Students judged to be making unsatisfactory progress toward their degree objectives will be so notified in writing by the thesis advisor(s), the Graduate Program Coordinator, or the Office of Graduate Studies. If sufficient improvement is not made by the end of the following semester, financial support may be cancelled.

Unsatisfactory progress includes not meeting any of the requirements set forth herein, not making sufficient progress in developing a research project leading to the degree of Doctor of Philosophy in Chemical Engineering, inadequate performance in coursework, failure to attend departmental research seminars, failure to have timely thesis committee meetings, etc. The student will be notified why unsatisfactory progress has been assessed and will be given guidelines to improve his/her performance.

Timeline for Completion of Doctoral Program

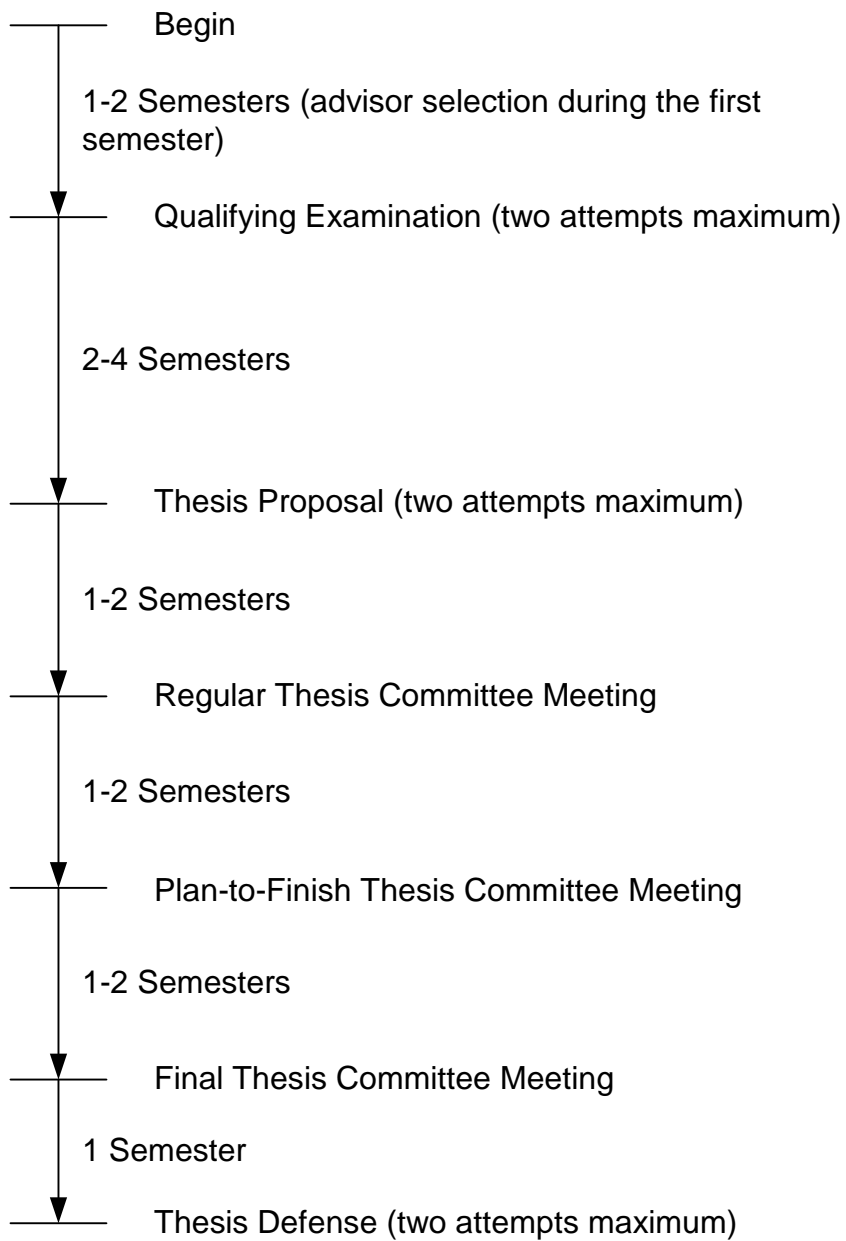


Figure 1. Suggested timeline to complete the PhD program

PART II. FINANCIAL SUPPORT

Graduate students may provide their own financial support or receive financial assistance in the form of fellowships, research assistantships, or teaching assistantships.

FELLOWSHIPS

Fellowships come from the UPRM or from external sources. Examples of external fellowships include: NSF, DOD, NIH, NASA, GEM, Hertz, Kodak, Lucent, Ford Foundation, Sloan Foundation, Merck, and Whitaker Foundation Fellowships. Information about external fellowships is maintained in a binder in the Graduate Program Coordinator's Office. UPRM's Office of Graduate Studies may have a more complete listing of outside fellowships. Internal fellowships are typically limited to first- and second-year doctoral students. Funds for such awards are usually provided by gifts from alumni or donations from industry. Fellowships are awarded on the basis of academic merit, and a high level of performance in coursework and research activities is expected of each recipient.

Recipient of Departmental Fellowships are under no obligation, either real or implied, to the donor of the fellowship, other than to complete his/her program of study and research diligently. Recipients of external fellowships should check with the appropriate coordinating official to determine any existing obligations regarding their fellowships.

The recipient of an institutional or departmental fellowship is allowed two weeks vacation per calendar year, which should be taken in consultation with the thesis advisor. Additional vacation time is allowed only by permission of the thesis advisor(s).

RESEARCH ASSISTANTSHIPS

Research Assistants (RAs) are supported from research contracts or grants, and are supervised by faculty members of the Department. In this case, the Principal Investigator (PI) has a responsibility to the funding organization to conduct research in specific areas covered by the grant. In most cases, an appointment as a RA coincides with the selection of a research topic and a thesis advisor(s). This means that the selected or assigned thesis advisor is the PI or a co-PI of the grant funding the student.

In a few cases, students may be assigned as research assistants to a project where there is an agreement between the student and the thesis advisor(s) that the work will not be used as part

of the thesis. A typical time commitment to this type of research project would be 18 hours per week.

In the case of RAs, an arrangement is made with the thesis advisor(s) to provide project funds for tuition and/or stipend. The thesis advisor(s) will inform the Graduate Program Coordinator's Office each semester of the availability of such funds, so that appointments can be processed. When paid on a 12-month basis, a RA is allowed two weeks vacation per calendar year, which should be taken in consultation with the thesis advisor. Additional vacation time is allowed only by permission of the thesis advisor(s).

TEACHING ASSISTANTSHIPS

Teaching Assistants (TAs) play a central role in the Department's educational program. Service as a TA, which requires working closely with one or more faculty members, is an important and beneficial aspect of the graduate school experience. Each TA is assigned to a specific undergraduate or graduate course. While the exact duties of the TA vary depending on the course and the instructor's teaching methodology, typical duties may include the following:

- Developing and grading problem assignments
- Grading reports and examinations
- Holding regular office hours (6 per week) for individual students and group sessions
- Leading recitation sections and tutorials
- Planning, designing, and supervising laboratory experiments
- Proctoring examinations
- Preparing a course solution book to be archived in the Department
- Attend the classes of the course they are TAing
- Attend orientation and training workshops organized by the Department or by the University

TA assignments are generally made at least one month before the beginning of a semester. In some instances, however, enrollment-driven last-minute TA assignments are necessary. Not all students may be selected for TA appointments. Upon assignment as a TA, the student will be provided with a list of detailed responsibilities, including information on the preparation of a course solution book, by the course instructor(s).

TAs are expected to be available for the **complete academic period** of their assignment. A student working as a full-time TA (6 credit-hours) is expected to devote 18 hours per week to TA duties. Some courses with limited enrollment require only a fractional TA effort, and in those cases, partial TA appointments are made. TAs' stipends are set by the institution and announced each term by the Office of Graduate Studies.

GRADUATE GRADERS

A limited number of positions known as graduate graders may be available to assist in the teaching of some high-enrollment undergraduate courses. Graders are involved in grading homework assignments, photocopying handouts, and preparing audiovisual materials for class. Graders should not be responsible for any activity involving direct contact with students. Graders' stipends are set by the institution and announced each term by the Office of Graduate Studies.

CONSULTATION OR OUTSIDE JOBS

The financial aid provided by the Department for fellowships, RAs, or TAs usually carries a restriction that the student must devote full-time effort to the activities for which he/she is receiving support. Students receiving any research or teaching assistantship through the institution (UPRM) cannot have inside or outside jobs. For any other type of institutional support, the students should consult with their thesis advisor(s) and ask the Graduate Program Coordinator before undertaking any compensated activity, and obtain an approval form from the Director of Graduate Studies.

PART III. ADMINISTRATIVE ASPECTS

KEYS

New students will receive their office assignments during the first few weeks of their first semester (Fall or Spring). Once students have been assigned a thesis advisor, he/she will instruct them on securing an office and/or a laboratory key. The Department Director's Secretary will contact the student when the key form is complete. At that time, the student should pick up the signed key request form from the Department Office, and bring it to the Property Office between 10:00 AM and 2:00 PM to request his/her keys. Under no circumstances are students to be given keys to faculty offices or departmental facilities such as the mailroom, conference room, classrooms, or auditorium.

MACHINE SHOP FACILITIES

A Departmental Machine Shop is available for usage by students and faculty in Chemical Engineering. The machinist² will perform the desired work once a work order is filled out and submitted to the department officers.

LABORATORY SAFETY

The Department has established policies and procedures to make students and employees aware of their responsibilities for safe practices in the laboratory and elsewhere. Although our office work and research activities are diverse, the following requirements apply in all cases:

1. We are all mutually responsible for our own safety and the safety of those who work with us, for us, or around us.
2. The responsibility for the safe conduct of an experiment, or for the safe utilization of laboratory space, rests with the person running the experiment or utilizing the laboratory space at any given time.
3. To the extent that the execution of an experiment is supervised by someone who is not performing the experiment, that supervisor shall satisfy himself/herself that the person

² Currently, Mr. Efrén Gregory (ext. 2552).

who is performing the experiment is both aware and able to follow safe laboratory procedures.

Presentations on laboratory safety should be given by the Departmental Safety Coordinator for one hour during the first session of the Graduate Seminar (InQu 6029/8099) each semester. All graduate students are required to attend this presentation and to sign the attendance log before they begin their laboratory work. The safety seminar format varies; it can be a lecture by the Departmental Safety Coordinator, an invited lecture, or a written examination on the Department of Chemical Engineering Chemical Hygiene Plan.

The importance of lab safety cannot be overemphasized. More specific information on safety-related policies and procedures is available from the Departmental Safety Committee.

COMPLETION OF STUDIES

Each student, upon completion of his/her graduate program, must submit the following materials to the Doctoral Program Coordinator's Office:

1. Forwarding Address Form.
2. Departmental Departure Form - This form requires various approvals, including those of the student's thesis advisor(s) and the Associate Director for Administrative Affairs to ensure that the laboratory and/or office space is left neat and clean, and that no unapproved chemical samples are left behind. In addition, all keys must be returned prior to leaving the UPRM (proper documentation from the Property Office is required).
3. Recruiting Questionnaire. This is useful to the Doctoral Program Coordinator's Office in collecting data about what Chemical Engineering students do after graduating from the UPRM.

The cover page of the thesis must be signed by the thesis examining committee prior to being submitted to the Doctoral Program Coordinator's Office. The title pages and one copy of the thesis will then be delivered by the Doctoral Program Coordinator to the Department Director for final approval and signature. The two copies of the doctoral thesis, along with all other forms, must be turned in to the Doctoral Program Coordinator's Office within the time allotted in the Final Thesis Defense, but no later than the last day of class or the date established by the Office of Graduate Studies for the semester in which the defense is held.