Guide to Graduate Studies

PURDUE UNIVERSITY®

Davidson School of Chemical Engineering

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Introduction

This document summarizes the policies, procedures, and requirements for graduate students in the Davidson School of Chemical Engineering. In particular, it emphasizes policies, procedures, and requirements that are left by the graduate school to the discretion of the school.

The majority of students enrolling in graduate studies in the school pursue the Doctor of Philosophy (Ph.D.) degree. The school also has M.S. with thesis, and M.S. non-thesis, however we do not offer admission directly into these programs. We do offer a Professional M.S. degree program. https://engineering.purdue.edu/ChE/Academics/Graduate/masters.html .

A student must accomplish a number of required tasks to obtain a Ph.D. degree.

These include passing the Ph.D. qualifying procedure (Qual), which consists of a written report on the student's research, an oral defense of the report, and passing core courses. The qual must be taken one academic year after a student joins the school, and the qual is required before a student is admitted into the Ph.D. program.

The student must also pass the preliminary examination, which must be taken by the eighth week of the student's sixth semester and is required before a student is admitted into Ph.D. candidacy. There is a possibility of an extension to the second half of the sixth semester, but would need a written explanation from the student and approval by the DGS (director of graduate studies). Students who need to re-take Prelim will be allowed to re-take exam in the summer (for total of 36 months in the graduate program maximum). After 36 months in the program, student's funding will be discontinued until Prelim is passed.

If a student decides to leave with an M.S., or is required to leave after the qualifier, the time limit will be discussed with the DGS and your advisor, and will be handled on a case-by-case basis. The maximum time allowed will be two-year (24 month), after which time funding will be discontinued.

Along the way, the student must choose a research advisor, form a thesis advisory committee, take courses, maintain a minimum of 3.0 GPA, file a Plan of Study, do research, write a thesis, give oral presentations, prepare reports, publish at least one paper and have another submitted, and serve as a teaching fellow for two semesters.

A timeline of key events in a student's graduate career is summarized in Appendix A. This guide discusses these events in detail and also provides information on vacation policies, safety, and any other issues that might arise while the student works toward the successful completion of his/her thesis dissertation and degree requirements.

1. Graduate Degree Program

The School of Chemical Engineering offers three degrees: Doctor of Philosophy (Ph.D.), Master's Degree with a Research Thesis (M.S. (thesis)), and a coursework-based Master's Degree (M.S. (nonthesis). However, we do not offer admission directly into the MS programs (except for the Professional MS Program).

A. Typical Ph.D. Degree Program

The Ph.D. program is designed to prepare each student to take an active part in the development and growth of the field of chemical engineering at all levels in academia, industry, and various research organizations. All admitted graduate students must demonstrate competence in graduate course work and demonstrate the capability to do independent research. Each student selects a major professor and an advisory committee to assist him/her in planning a program of course work and thesis research. The student takes thirty credits of graduate course work (usually 10 three-credit classes), and the student writes a thesis. The thesis research should be original work that contributes significantly to new knowledge.

In the beginning of the second year of the program, all students go through the Ph.D. qualifying procedure (described in detail in Section 4). They must pass the qual in order to proceed directly to the Ph.D. program.

Beginning with the fourth semester, each student, as part of the degree requirement, will assist in the instructional activities of the department as a Teaching Fellow (TF). The current periodicity is fourth and fifth semester. Advanced students may have the opportunity to participate directly in the planning and presentation of undergraduate courses that are related to their thesis work.

In the first 8 weeks of the sixth semester, students take their Preliminary Examination (Prelim), discussed in section 5. During the prelim, the student presents a plan for his/her research, and the student demonstrates proficiency in the theory and experimental methods needed for completion of the research. Once a student passes the Prelim, he/she is admitted into candidacy. After the student completes the research and writes the thesis, he/she will take the Final Examination, which is a defense of the written thesis.

B. Ph.D. Residence Time

Students entering the Ph.D. program with an undergraduate degree in chemical engineering can expect to take approximately four to five years to complete the degree requirements. Those who arrive with an M.S. in chemical engineering should be able to go through the program in four years. If a student obtains an M.S. on the way to the Ph.D., his/her tenure may be about four to five and a half years. However, if the student joins the program with a B.S. in another discipline, obtaining the Ph.D. may take five years. The aforementioned durations

indicate the desirable timings. The actual timings may be somewhat longer or shorter depending on the nature of the research attempted and the student's academic progress. Financial support by the school is guaranteed only for the amount of time stated in the student's admission letter. Moreover, if the student's tenure runs over a year longer than these times, the financial support may be reviewed by the Head and the Director of Graduate Studies (DGS) of the school. Upon this review and after consultation with the advisor, the support may be reduced or withdrawn. The maximum time for a student to complete the Ph.D. program is seven calendar years from the date of admission. At the beginning of the seventh year, the student will be notified that it is their final year and they will be removed from the program at the end of the year.

C. Ph.D. Course and Research Hour Requirements

COURSE AND RESEARCH CREDIT REQUIREMENTS:

A Ph.D. degree in chemical engineering requires a minimum of ten (10) three-credit graded courses (30 credits of coursework total) and a minimum of 60 credits of ChE 699 (Ph.D. Research).

REQUIRED COURSES:

All students are required to take four "core" courses in chemical engineering (see list below), a safety course CHE 655: Safety in the Chemical Engineering Laboratory (one-credit course), and CHE 600: Approaches to Research in Chemical Engineering (three-credit course) during their first year in the program. They are required to take Seminar (CHE 690—a non-credit course) every semester. They are also required to sign up for the appropriate level of research: CHE 699 (Ph.D. Research).

The four required first-year "core" courses are the following:

•ChE 610 (Advanced Chemical Engineering Thermodynamics)

•ChE 620 (Advanced Transport Phenomena) OR ChE 621 (Advanced Transport Phenomena II)

•ChE 630 (Applied Mathematics for Chemical Engineers) OR ChE697 (Statistical Methods in ChE)

•ChE 660 (Chemical Reaction Engineering)

ChE 610, 620, 630, and 697 (Statistical Methods) are offered every fall semester and ChE 660 is offered every spring semester.

The typical student who comes to Purdue with a B.S. in chemical engineering takes ChE 610, 620, and ChE 630 OR ChE 697 Statistical Methods. In addition, the student usually takes a three-credit hour elective in the first semester along with CHE 655, CHE 690, and CHE 699 PHD Research. Students then take ChE 660, ChE 600, a mix of electives, and CHE 699 PHD Research in their second semester. Exceptions may result because some students may have an unusually

good or inadequate preparation in some or all of the areas covered by the core courses. The exceptions are handled on a case-by-case basis by the student and the Director of Graduate Studies (DGS).

For students who join the program with a B.S. degree in Chemical Engineering, the core course sequence must be completed within the first two semesters of residence. For others, this requirement must be met in three semesters. Thus, the typical student usually takes ChE 660 during the second semester. By this time, all students have been matched with thesis advisors. A student may also take one or more electives during the second semester.

ELECTIVES:

In addition to the four required "core" courses, all students must take six additional courses as electives (to fulfill the requirement of 30 credits of coursework for the Ph.D. degree). The electives are typically a mixture of courses from chemical engineering and other disciplines chosen in consultation student's advisor and sometimes the advisory committee. All electives should be at 500 or 600 level. Some students choose to take their electives during either the first semester of their second year or their second year. Others opt to spread out their remaining course work over their tenure in graduate school. The first option allows the student to focus virtually exclusively on research beyond the third or the fourth semester. The second option allows for the fact that some specialized graduate level courses inside and outside the school may only be offered every two or three years.

NUMBER OF CREDITS STUDENT MUST REGISTER FOR EVERY SEMESTER:

All students must be registered for 18 credits (of combined coursework and research) every fall and spring semester. In the summers, students must be registered for 9 credits of CHE 699 research unless student is doing an internship (see section below on internships). During the final semester of residence (the semester in which the student will graduate), the student may sign up for a reduced course load and may take less research.

REGISTERING FOR RESEARCH (CHE 699 Ph.D. Research):

All students must sign up for ChE 699 (PHD Research).

REGISTRATION PROCEDURE (SIGNED CHE REGISTRATION FORM REQUIRED):

To register for research, students must fill out a ChE Research Registration form. They must list their research for that session, weekly meetings (if applicable), and candidacy (if applicable). All other coursework will go through the scheduling assistant. The student is also responsible for double-checking his/her schedule in Mypurdue to be sure that his/her schedule (including the research hours) is correct. If the student finds a mistake in his/her research hours or weekly meeting, he/she should contact the Graduate Program Administrator immediately to ask for help in correcting the mistake.

GRADE REQUIREMENTS:

All graduate students in the School of Chemical Engineering are required to maintain a minimum of a 3.0 GPA, and they are expected to get "S" (Satisfactory") grades in CHE 699 (Ph.D. Research). See section 7 for more information on grade requirements.

TRANSFER CREDITS:

If a student has a M.S. in Chemical Engineering from another university, he/she may talk to the Director of Graduate Studies and the Graduate Program Administrator about the process for applying for transfer credit. In most cases, the School of Chemical Engineering can accept four classes from the previous institution and count them toward the student's 30 credits of required coursework for the Purdue Ph.D. in ChE. Only two of the four classes may be used to fulfill the core class requirements. So, essentially, a transfer student can transfer in only two core classes and only two electives to count toward their degree. All core courses will need to be approved by the instructor of that course. Electives are approved by the DGS. The syllabus from the MS institution will need to be provided by the student.

PUBLICATIONS REQUIREMENT:

You must have one-1st author peer reviewed publication, and one additional first author journal article submitted (review articles do not count toward this requirement). Documentation of this requirement must be provided to the Graduate Office before scheduling your final defense.

INTERNSHIPS:

You must have passed your qualifier (including all core courses), and be in good academic standing (not on academic probation) in order to go on an internship.

International students must apply for CPT (Curricular Practical Training). You will need to register for the internship course through that department. Please send your offer letter to the grad office. The grad office will send you the internship application. Once completed, the grad office will forward to OPP (Office of Professional Practice), and they will provide information on CPT and registration.

D. Typical M.S. Degree Program with Thesis (PMRI)

The M.S. program is designed to prepare each student to make an effective contribution to engineering research, development, production, design, or management. The program consists of a set of required graduate courses, independent research, and defense of a thesis based on this research. Each student selects a major professor and an advisory committee. They will assist him/her in planning a program of course work and thesis research.

RESIDENCE TIME:

Infrequently, a Ph.D. student may change his/her mind and decide to leave the university with an M.S. degree. In other cases, the Graduate Committee may recommend a M.S. with thesis after qualifier examination. The time table for completing the M.S. thesis is set to be a maximum of 2 years from the students starting date. You must have a GPA of 2.7 (minimum) to graduate with an MS thesis or non-thesis degree.

COURSE AND RESEARCH CREDIT REQUIREMENTS FOR M.S. WITH THESIS DEGREE (INCLUDING PMRI):

For a M.S. with thesis degree, the student must accrue a minimum of 30 credits of a combination of graded coursework and CHE 698 M.S. research hours. A minimum of fifteen hours of graded course work is required for the M.S. with thesis degree. Four of the courses must be core courses in chemical engineering listed below (under MS non-thesis). The additional fifteen hours can be exclusively CHE 698 research or a combination of CHE 698 research and coursework. The thesis research should be original work that contributes to new knowledge but will be of limited scope compared to Ph.D. thesis research. The student will defend her/his thesis at a final defense. Course credits obtained while the student is working toward the M.S. may be used toward the Ph.D. degree. The M.S. (thesis) students should also take the safety course (ChE 655), and seminar (ChE 690). They then take one more three-credit-hour class, plus research and seminar, during their second semester to meet the overall course requirement. With the exception of summer sessions and possibly the semester in which they may be graduating, M.S. students sign up for 18 credit hours each fall and spring semester.

Note Regarding Transfer Credits for the M.S. Degree: A student **may not** use coursework from a M.S. degree from another institution to count toward the total number of required credits for the M.S. thesis or M.S. non-thesis degrees. Only M.S. coursework completed at Purdue can count toward an M.S. degree.

The four core courses for M.S. degree are the following:

•ChE 610 (Advanced Chemical Engineering Thermodynamics)

•ChE 540 (Transport Phenomena) OR ChE 620 (Advanced Transport Phenomena I)

•ChE 697 (Statistical Methods in ChE) OR ChE 630 (Applied Mathematics for Chemical Engineers)

•ChE 543 (Polymer Reaction Engineering) OR ChE 660 (Chemical Reaction Engineering)

COURSE AND CREDIT REQUIREMENTS FOR M.S. NON-THESIS DEGREE:

A M.S. (non-thesis) degree in chemical engineering requires a minimum of thirty (30) credit hours of graded coursework. At least two of these courses must be core courses in chemical engineering (see list below). The remaining electives are typically a mixture of 500 and 600 level

courses from chemical engineering and other disciplines that are chosen by the student after consultation with the student's advisor. The electives may be within a specified concentration. A minimum of fifteen (15) credit hours of coursework (core plus electives) must have a CHE prefix. The time table for completing the M.S. non-thesis is set to be a maximum of 2 years from the students starting date. You must have a GPA of 2.7 (minimum) to graduate with an MS degree.

2. Faculty Advisor Selection Process

Incoming students learn about each faculty member's research during the Graduate Student Symposium poster session, which takes place early in the fall semester (the week before classes begin). In September and October, faculty give formal presentations on their research to all of the first-year graduate students. During this time period, each student is required to arrange individual meetings with faculty members whose research projects they are interested in. Several such meetings may take place between each student and various faculty members.

In addition to meeting with prospective advisors individually, students should consider going to the prospective advisor's group meeting. Students should read some of the faculty member's articles to become familiar with the faculty member's work. Students should also talk to other students in the faculty member's research group to learn more about the research that they do. At the end of a time period specified by the Graduate Office, each student must give a rank-ordered list of five projects/advisors to the grad office (usually by the middle to late October). Based on the students' requests and after consultation with faculty, the DGS then matches each student with a faculty member who will serve as the student's advisor during the student's graduate student career. In most cases, each student is assigned his/her first choice. However, in some instances, several students select the same project; so, a first choice cannot be assigned to all of them. The DGS then works with each student and with faculty to find a good advisor match for each student. Typically, the faculty advisor selection process will be complete by mid-November.

3. Committee Structure

FINAL EXAM (DISSERTATION DEFENSE (PhD) AND PRELIM COMMITTEE:

For the Final Exam (Dissertation Defense) and Prelim, the advisory committee must consist of a **minimum of four faculty members**. Three of the members must be in ChE (and must have full-time, emeritus, or fractional appointment). The committee must be chaired by the student's thesis advisor who must be faculty member with a primary appointment in the School of Chemical Engineering. The student must have one committee member who is outside the School of Chemical Engineering. This member may also co-chair the committee as long as the other co-chair is a faculty member in the School of Chemical Engineering.

FINAL EXAM (MS WITH THESIS):

A minimum of three committee members are required, two of which must be Chemical Engineering faculty (one being the chair-must have an appointment in Chemical Engineering). If co-advised by two CHE faculty members, there must be an additional CHE faculty member added.

The student and his/her major professor(s) will decide whom they would like to have on the student's committee, based in part on potential contributions to the student's research. It is the responsibility of the student to ask each person to serve on his/her committee. Usually, the persons initially selected for the Advisory Committee will be retained on all subsequent committees, but the membership can be changed with the approval of the major professor.

ADVISORY COMMITTEE SELECTION:

The Graduate School strongly advises against appointing members to a student's committee if a potential conflict exists, particularly involving spouses, partners, or financial interests

If a committee member is found to have a conflict of interest that impedes fair and unbiased service, the provost, guided by the Research Integrity Officer (RIO), will appoint a substitute

Types of Conflicts to Disclose:

- **Personal Relationships:** Spouses, partners, or family members serving on the same committee.
- **Financial Interests:** Payments, equity interests, or intellectual property rights.
- **Professional/Outside Activities:** Relationships with foreign entities or other organizations that may create a conflict of commitment.

4. The Ph.D. Qualifier Examination

The purpose of the qual procedure is to ensure that the student is able to effectively summarize the literature in their research area, and propose hypotheses or solutions leading to the generation of new knowledge. The Ph.D. Qualifying Procedure consists of two parts:

1. Student performance in coursework to ensure that the student demonstrates understanding of key chemical engineering principles at the graduate level.

2. Preparation and defense of a written report on their research and an oral presentation of the report.

The written and oral portions of the qual procedure will each be evaluated using five categories. Initially, committee members will evaluate the student's oral presentation prior to group discussions, but are able to change their evaluations after committee deliberation. On

the rubric, more than one “not passing” mark out of the five categories is considered “not passing” for that committee member. If the student receives a not passing evaluation from two of the three committee members, the student does not pass that portion of the qual procedure. Additionally, if a student receives a “not passing mark” in one category from all three committee members that also constitutes “not passing” the qualifier examination (either oral or written). It is possible for the student to pass one portion of the procedure (oral/written) and to fail the other, in which case the student will only redo the portion of the qual that they had failed and will do so in front of a new committee. The new committee will have the feedback from the first attempt. Students will receive feedback from their committee after both the written and oral portions are complete.

COURSEWORK PERFORMANCE:

Students will be evaluated on their first-year coursework performance. Students need to perform at a satisfactory level in coursework during their first year, particularly in the core courses. Students should maintain an overall GPA of 3.0 or higher and a GPA 2.85 or higher in core courses. A student who receives multiple C’s and/or a grade lower than a C in any course may be placed on probation or asked to leave the program. If a student receives two C+’s or below in core courses, the student will be required to terminate with an M.S. degree (it will be up to the student and advisor whether it be thesis or non-thesis). The cumulative GPA must be a minimum of 2.7 to graduate with an MS thesis or non-thesis. If the student is under the required 2.85 GPA in the core courses, they may retake one core course by the end of the first semester of their second year.

WRITTEN RESEARCH REPORT AND ORAL PRESENTATION:

All Ph.D. students beginning with those entering the program in Fall 2016 are required to attempt the Ph.D. Qualifying Procedure (Qual). One year after the student enters the program, the student must submit a written research report and deliver an oral presentation on the research report to the members of the Qualifier Committee. This Qualifier Committee will consist of full-time faculty members from the Davidson School of Chemical Engineering. Here, “full-time faculty” means tenured or tenure-track faculty holding a 50% or more appointment in our School. A subcommittee of three faculty members will be assigned to each student.

DEADLINE FOR THE WRITTEN QUALIFIER REPORT:

The deadline for submission of the written report is September 15th for graduate students who entered the program in the previous fall. The report will be reviewed by three members of the committee assigned, and it will be used as the basis for evaluation along with the student’s performance in oral presentation. The deadline is March 15th for students who entered in the spring semester.

FORMAT AND CONTENT OF WRITTEN QUALIFIER REPORT:

The qualifying written report should be in 12 pt. Times New Roman font, and the report should be a maximum of 10 pages 1.5 line-spaced with one-inch margins. The minimum font for figures and tables is 10 pt. It may NOT contain appendices. The cover page, Table of Contents, Summary, and References do NOT count toward the 10-page maximum; however, all associated data/charts/tables do count towards this page limit. A written report for the examination should have the following structure:

- Summary
- Introduction
- Research Objectives
- Literature Review and Theory
- Research Plan
- Methods and Materials
- Preliminary Results
- Plan for Next 12 Months

If any AI tools are used for the written exams in the graduate program, e.g., qualifying exam, preliminary exam and final dissertation, we require you to submit a statement acknowledging the use of writing tools. Please be prepared to specify the tools and the prompts given upon request so that the work could be checked for authenticity.

The written report should be reviewed by the student's advisor, and suggestions made for changes if needed. The student should submit a copy to their advisor(s) by September 1st (for Fall admissions) or March 1st (for Spring admissions) at the latest such that feedback can be provided prior to submission to the Qualifier Committee.

DATES FOR ORAL PRESENTATIONS:

All students must defend his/her written report and undergo an oral examination on his/her thesis research and the subjects of relevance to his/her research specialty in front of the three members of the Qualifying Committee assigned. All oral examinations will take place on two days (if possible) (usually fall break) in early October (early April for students who entered in the spring). Oral examination dates will be determined and announced by the Graduate Office at the beginning of the academic year.

CONTENT OF ORAL PRESENTATION:

The oral examination will last one hour. It begins with a formal presentation (no back-up slides will be allowed) from the student to the committee, and is followed by questions and additional

discussion. Students should plan their presentation to no longer than 20 minutes uninterrupted. This presentation should include a brief overview of important concepts in the research area relevant to the thesis topic, a statement of research objectives, a summary of research progress so far (training, methods, preliminary results, and analysis), and a research plan for the next 12 months. The presentation will be followed by a 30- minute question/answer period to allow the student to clarify information for the committee. The student should be prepared to answer both area-specific and general Chemical Engineering questions related to their research. The remaining ten minutes are reserved for a short discussion among the committee members (in the absence of the student); the total examination time for each student is restricted to 60 minutes. The committee will use a rubric to evaluate the student and to provide formal feedback both to the student and to the Graduate Committee.

QUALIFIER OUTCOMES:

Each student's evaluation subcommittee will assign a chair person who will be responsible for preparing a short (less than a few sentences) write-up summarizing the results of the examination. After all students complete their oral qualifiers, all nine Qualifier Committee members will convene to finalize the committee's recommendations and reports before the results will be communicated to the Graduate Committee.

1.The student be admitted to the Ph.D. program;

2.The student is asked to retake the qualifier (oral, written, or both) by the end of January (August for Spring Admissions); or

3.The student terminates with a M.S. (non-thesis) degree by December (May for Spring admissions)

For those that retake the qualifier, the following are the possible decisions based upon student performance:

1.The student is admitted to the Ph.D. program; or

2.The student terminates with an M.S. thesis degree by August graduation (December graduation for Spring admissions).

QUALIFIER COMMITTEE STRUCTURE:

A committee of faculty members from the Davidson School of Chemical Engineering (three members for each student). The committee is appointed by the Head (or Executive Officer) of the school. Individual student's subcommittee assignments will be made by the Director of Graduate Studies/Graduate Office. Attempts will be made to assign at least one member of the subcommittee on the qualifier who is familiar with the topic. The student's advisor/co-advisor may not serve on the subcommittee for the student's qualifier, nor may he/she attend the qualifier.

ADMISSION TO THE PH.D. PROGRAM AFTER THE QUAL:

Once the oral/written research examination is completed, the Graduate Committee will meet to decide the results of the Ph.D. Qualifying Procedure based on the following:

1.Coursework performance;

2.Recommendations from the student's advisory committee following the oral examination.

All students who (1) have a GPA of 3.0 or higher, (2) have a GPA of 2.85 or higher in core courses, and (3) are recommended for admission to the Ph.D. program by the qual committee will automatically be admitted to the Ph.D. program.

Students who do not meet all of the GPA requirements will be considered on a case-by-case basis by the Graduate Committee. Students will receive formal notification of the Graduate Committee decision by the end of November (fall students) or April (spring students).

Where a student is required to terminate with an M.S. degree, financial support (stipend and tuition fees) during completion of the M.S. degree is at the discretion of the advisor and the Head of the School.

5. The Ph.D. Preliminary (Prelim) Examination

Ph.D. candidates in the School of Chemical Engineering are required to schedule and conduct their oral Preliminary Examination, which must be taken by the 8th week of the student's sixth semester and is required before a student is admitted into Ph.D. candidacy. There is a possibility of an extension to the second half of the sixth semester, but would need a written explanation from the student and approval by the DGS. Students who need to re-take Prelim will be allowed to re-take exam in the summer (for total of 36 months in the graduate program maximum). After 36 months in the program, student's funding will be discontinued until Prelim is passed. If a student is required to do M.S. first, the Prelim will then be delayed by one semester or summer period.

PRELIM MUST BE TAKEN TWO FULL SEMESTERS BEFORE STUDENT SCHEDULES DISSERTATION DEFENSE:

The Purdue Graduate School requires that the Preliminary Examination be completed at least two full semesters prior to scheduling the Ph.D. Final Examination (Defense). For example, a student completing a Preliminary Examination in the spring semester may then defend his/her thesis in the spring semester of the following year. Typically, in the School of Chemical Engineering, students take and pass their Preliminary Examination in the fifth or sixth semester of their graduate studies.

SCHEDULING THE PRELIM AND GRADUATE SCHOOL FORM 8 REQUIREMENT:

The student will need to arrange with his/her Advisory Committee for a suitable date and time for the Prelim, and student will work with the grad office to schedule a room for the Prelim. At least four weeks in advance of the Prelim, he/she should file a request to conduct the Preliminary Examination by electronically filling out Graduate School Form 8 through Mypurdue. On the GS Form 8, the student will list the names of his/her advisory committee, and the student will fill out the date, time, and location of the Prelim. This form must be approved by all committee members, the Plan of Study Coordinator, the Director of Graduate Studies, and submitted to the Graduate School at least two weeks before the student's Prelim. **If the date, time and place are not scheduled by this time, the exam may be cancelled and the student will have to reschedule.**

SUBMISSION OF WRITTEN PRELIM REPORT:

Prelim written report should be in 12 pt. Times New Roman font, and report should be at a maximum 40 pages double-spaced with one-inch margins. It may contain appendices (do not count in 40 pages). The written Preliminary report should be submitted to each committee member **a minimum of two weeks prior to the oral examination**. Student should contact committee to see if they prefer hard copy or electronic copy. The written report may contain appendices. A written report for the examination should have the following structure:

- Summary
- Introduction and Research Objectives
- Literature Review
- Plan for publications
- Theory (if applicable)
- Methods and Materials
- Results to date
- Research plan and schedule to complete the Ph.D.

It is important that the introduction and critical literature review support the originality and significance of the stated research objectives. The report structure may vary a little with the research field and with the progress at the time of the Preliminary Examination. Students should agree on a structure for the report with their advisor and discuss content of the report at least a month before it is submitted.

If any AI tools are used for the written exams in the graduate program, e.g., qualifying exam, preliminary exam and final dissertation, we require you to submit a statement

acknowledging the use of writing tools. Please be prepared to specify the tools and the prompts given upon request so that the work could be checked for authenticity.

PRELIM ORAL EXAM/DEFENSE:

The Prelim Examination is intended to demonstrate to the committee that the student is adequately prepared for Ph.D. research. Student must demonstrate a good understanding of the previous work done on the topic by other researchers, and student must be able to situate his/her own research in relationship to previous work and current work being done by others on that topic. Student must articulate a set of realistic objectives for his/her work, and student must develop a set of methods, which will be used to help achieve his/her research objectives. In most cases, the student will have performed enough work (experimental and/or theoretical) to demonstrate that the chosen methods produce results. However, since the committee's objective is to consult with the student on the directions and methods of the Ph.D. work, a significant amount of the thesis work will occur after the examination.

The oral examination lasts between 1.5 and 2 hours. It begins with a formal presentation from the student to the committee and is followed by questions and additional discussion. Students should plan their presentation to be approximately 40 minutes. The presentation should give a *brief* review of the literature followed by stating the research objectives; describing the research methods; presenting and critiquing results to this point; and explaining the research plan for the completion of the thesis.

The committee uses the School of Chemical Engineering Prelim Rubric to examine the student and to provide formal feedback. (See Appendix C for copy of Prelim Rubric). The committee should provide constructive feedback. They should provide suggestions on the originality and significance of the proposed research, the suitability of the proposed methods, and the likelihood of the plan being achieved in reasonable time.

The committee may ask the student to read and collect more information (either on current topic or on a new topic that the committee recommends the student explore). The committee may also ask the student to rewrite a section (or sections) of the written Prelim Report before approving the student's candidature. The committee may also wish to meet with the student again at a later time to discuss the student's response (written and/or oral) to their concerns. If the student has met the required Prelim deadline with his/her first Prelim Exam meeting and then passes the examination at a second or later meeting (but no later than by the end of the sixth semester), the student will have completed the Preliminary Examination. He/she will then be admitted to Ph.D. candidacy.

6. The Ph.D. Final (Thesis) Examination

The PhD thesis must be prepared according to a preset format and processed following specified procedures. Once the thesis is prepared and all other requirements have been

completed, the student must present and defend his/her work in a Final Examination. The defense should be scheduled for a maximum of two hours with the student presenting their work for approximately 40 minutes. Detailed information available at http://www.purdue.edu/gradschool/research/thesis/index.html. The thesis draft (approved by the advisor) must be sent to their committee two weeks before the scheduled exam. The exam will be cancelled by the Graduate Administrator if this is not done.

7. Grades and Grade Appeal Procedure

The C grade is viewed as marginal performance in courses at the graduate level. If a student's graduate index falls below 3.0, he/she will be assigned a probationary status and must attain a semester index of 3.0 or better for each subsequent semester that the student is on probation. If the student does not subsequently maintain a 3.0 semester average, he/she may be asked to leave the graduate program in Chemical Engineering. If the student's graduate index rises above 3.0, his/her probationary status will be removed.

GRADES IN CHE 698 M.S. AND CHE 699 RESEARCH:

If a student receives two consecutive grades of U (unsatisfactory) in research (ChE 698 or 699), he/she will not be allowed to continue in the graduate program in Chemical Engineering.

Graduate School Policy Regarding GPA of 3.0 or Higher: A graduate student is expected to maintain a graduation index representing a B average (3.0/4.0 GPA.) or better. Indices below this level are marked "less than good standing" on the transcript. A graduate student also is expected to earn S (Satisfactory) grades for research registration. Two consecutive sessions of U (Unsatisfactory) grades for research registration mandate that the department take formal action and inform the student, in writing, and the Graduate School with regard to discontinuation of the student's graduate study. In any event, the student's progress should be reviewed each session by the student's department. The student's progress also may be reviewed by the Graduate School. Should the student fail to perform in either coursework or research on a level acceptable to the advisory committee, the departmental graduate committee, or the dean of the Graduate School, he or she may be asked to discontinue graduate study at Purdue. The graduation index for graduate students includes all grades earned in 50000- and 60000-level courses taken while enrolled as a graduate student, except FR, GER, RUSS, or SPAN 60100, 60300, or 60500.

GRADE APPEAL PROCEDURE:

If a student feels that the grade in a course or in research has been unfairly assigned, he/she can appeal that grade using the University appeal procedure https://www.purdue.edu/odos/osrr/grade-appeal-process/ .

8. Electronic Plans of Study

PLAN OF STUDY REQUIREMENT:

All graduate students must file an electronic Plan of Study with the Graduate School. Students can file a Plan of Study through Mypurdue. The Graduate Program Administrator is the Plan of Study Coordinator for the School of Chemical Engineering, and he/she should be consulted about the mechanics of the process. Ideally, the Plan of Study should be filed before the prelim exam.

DEFINITION OF PLAN OF STUDY:

The Plan of Study lists the courses the student plans on taking (or has taken) to fulfill the Ph.D. or M.S. degree course requirements. The Plan of Study also lists the members of the student's Advisory Committee.

PH.D. PLAN OF STUDY:

The Ph.D. Plan of Study must list 30 credit hours of graded coursework (usually 10 courses), and four of these courses must be the core courses. Graduate students with an M.S. degree in Chemical Engineering from another university may be able to apply some of their M.S. coursework to fulfill their Ph.D. degree, and those courses will be mentioned in a note in the student's Ph.D. Plan of Study.

M.S. PLAN OF STUDY FOR M.S. THESIS AND M.S. NON-THESIS:

The M.S. Plan of Study should be filed before the end of the first semester after the student has been assigned a major professor. M.S. non-thesis and M.S. thesis Plans of Study must list all coursework that the student plans to take to fulfill the degree requirements. The Plan of Study must include two of the four required Chemical Engineering core courses 610, 620 (or 540), 630 (or 697 Statistical Methods), and 660 (or543). The Graduate School does not allow students to use coursework from a prior M.S. degree toward a M.S. degree at Purdue, and students should not put such coursework on their Plans of Study.

The course requirement for the M.S. thesis degree is 15 credit hours of graded coursework (usually 5courses). Four of these must be the core courses. All four of those courses (and the additional coursework to be counted toward the M.S. coursework requirement) must be listed on the plan of study. The M.S. non-thesis degree must list 30 credit hours of graded coursework (usually 10 courses). Four of these must be the core courses. All four of those courses (and the additional coursework to be counted toward the M.S. coursework requirement) must be listed on the Plan of Study.

CHANGES TO PLANS OF STUDY:

Any course changes or committee changes to the plan of study may be requested through Mypurdue by making a request for change to the plan of study.

PLAN OF STUDY DEADLINE FOR STUDENTS TAKING THEIR PRELIM:

The graduate school requires that the plan of study be filed and approved by the student's advisory committee, the plan of study coordinator, the director of graduate studies, and the graduate school before the student can schedule his/her Prelim and file the electronic GS Form 8.

PLAN OF STUDY DEADLINE FOR GRADUATING STUDENTS:

For students who intend to graduate, the plan of study must be filed and approved before the first day of classes of the semester in which the student intends to graduate. This is a graduate school requirement. The deadline is the last business day before classes begin.

If a graduating student files his/her plan of study late (after the Plan of Study deadline), then the graduate school will charge the student a late fee to add him/her to the candidate list, and will be required to submit a memo (with the thesis advisor's and the head of Chemical Engineering's signatures) explaining the reason as to why the grad school should add the student to the candidate list late. You do not need to file a new plan if you already have an approved plan for the degree in which you will receive.

9. Teaching Fellow Duties

Serving as teaching fellow is a required part of the academic program for a graduate degree in chemical engineering. Teaching fellow duties may involve grading of homework assignments and exams in both graduate and undergraduate lecture courses; running help sessions in such courses; and assisting undergraduates in laboratory courses.

Teaching fellow duties typically begin in the fourth semester. All graduate students are expected to be a TF twice during their time in the School of Chemical.

As this service is an academic requirement of the degree, students will register for the course CHE 68600 *Chemical Engineering Teaching Experience* during the semester in which they teach for the first time, and the course will be recorded on their academic transcript. The course consists of a one-hour weekly workshop on developing teaching skills and putting these skills into practice through teaching fellow duties. It is expected that these duties should require 10-12 hours of work per week on average over the semester. Advanced students may have the opportunity to participate directly in the planning and presentation of undergraduate courses that are related to their thesis work. In addition, those considering the possibility of an academic career may request the opportunity to serve as a classroom instructor during the later phases of Ph.D. study. In this case, they should contact the DGS. The DGS will work with

the head of school and faculty member in charge of teaching assignments to consider the request and make a decision.

10. School of Chemical Engineering Seminar Requirement

All students must register for ChE 690 (seminar), which is a non-credit course. Seminar meets almost every week. Attendance at seminar is required, and students are graded P (Pass) or F (Fail) based on their attendance. Seminar provides students with the opportunity to hear invited speakers from universities and organizations around the world talk about their latest research in the field of chemical engineering. Occasionally, there may be required School lectures not scheduled during regular seminar time. Students will be given e-mail notice about these additional lectures, and they will be expected to also attend these lectures to fulfill their Seminar requirement.

SEMINAR ATTENDANCE POLICY:

Two unexcused absences are allowed per semester. Any excused absences (i.e., attendance at a professional meeting, a class conflict, etc.) must be approved by the graduate program administrator prior to the absence. The graduate program administrator tracks attendance at all seminars.

Students may attend up to two seminars outside ChE (seminars in other departments on campus) and count them toward their overall seminar attendance. A Seminar credit form must be turned in to graduate office no later than 24 hours after the outside seminar was held. Please see Appendix D for copy of this form.

11. Safety

CHE 655 REQUIREMENT:

All PhD and MS (with thesis) students must enroll in CHE 655 (Safety in the Chemical Engineering Laboratory) in the first semester, and attend the introductory lecture, the lecture on fire extinguishers and gas masks, the field trip on operating fire extinguishers, and at least six of the remaining eight lectures. Failure to satisfactorily complete this course may result in an interruption of the student's research. A student will not be allowed into the school of chemical engineering's research laboratories until he/she has successfully completed CHE 655. Safety is of paramount importance and safe conduct is essential to operation of modern laboratory facilities in industry, academia, and government. Knowledge of proper procedures is of particular importance in the research and instructional laboratories in the school. Graduate students, along with all other members of the school of chemical engineering, must actively participate in various departmental safety programs to make the environment safe for

everyone. In addition to taking ChE 655, all graduate students must do an initial safety training with the Director of Industrial Safety (scheduled during the first week of orientation), and all students should familiarize themselves with the departmental Safety Manual and follow the guides/directives therein. Please see the following link for more information: https://engineering.purdue.edu/ChE/AboutUs/Safety.html .

12. Ethics and Responsible Conduct of Research (RCR)

It is imperative that students and faculty are honest in their discovery and learning endeavors and adhere to the highest ethical standards. Therefore, the graduate school has developed the Purdue University Responsible Conduct of Research (RCR) program. The purpose of this program is to ingrain, promote and sustain an environment of integrity among all stakeholders, i.e., graduate students, staff and faculty, at Purdue University.

In the School of Chemical Engineering, the "workshop" portion of the requirement will be covered in ChE 600 (Approaches to ChE Research) course.

The College of Engineering requires that you complete the online training through the CITI website www.citiprogram.org .

For more information on RCR: https://www.purdue.edu/gradschool/research/rcr/index.html

13. Vacations

Students accrue 22 vacation days during each twelve-month period. In addition, they are given several university holidays off. Students should consult with their advisors regarding specific days that they wish to take as vacation days so that research can progress in a planned and coordinated manner. An official request must be submitted and approved through Success Factors prior to leaving on vacation.

Appendix A: Typical Sequence of Events and Timetable for Ph.D. Student

Semester 1

Take 4 three-credit courses (three core and one elective) and other required course work, CHE 699 PhD research, select research/thesis advisor

Semester 2

Start research (all graduate students register for CHE 699 PhD Research) and take 2-4 additional courses

Summer Semester 1

Full time on research (CHE 699 PhD Research)

Semester 3

Continue research (CHE 699 PhD Research) and coursework and do Ph.D. Qualifying Procedure: Turn in written research report (by September 15) and take oral research exam, performance in first-year coursework evaluated by student's advisory committee (part of the Qualifying Procedure)

Semester 4

Take one or two elective courses (if necessary) and continue research (CHE 699 Ph.D. Research), serve as a teaching fellow

Summer Semester 2

Full time on research (CHE 699 Ph.D. Research)

Semester 5

Continue research (CHE 699 Ph.D. Research) and any remaining elective courses, serve as a teaching fellow

Semester 6

File PhD plan of study, submit GS Form 8 (Request for Appointment of Examining Committee) one month before preliminary exam, take preliminary exam, continue research (CHE 699 Ph.D. Research) and any remaining elective courses

Summer Semester 3

Full time on research (CHE 699 Ph.D. Research)

Present seminar during Graduate Student Organization Symposium in August (optional)

Semester 7

Full time on research (CHE 699 Ph.D. Research), start writing Ph.D. thesis

Semester 8

Full time on research (CHE 699 Ph.D. Research) and continue writing Ph.D. thesis, submit changes to plan of study, if necessary

Summer Semester 4

Submit GS Form 8 (Request for Appointment of Examining Committee) at least one month before defense of Ph.D. thesis, deposit thesis with graduate school and give (paper or electronic) copies to members of advisory committee (if requested), fill out check-out form and leave with graduate program administrator

Before the thesis defense can be scheduled, you must have one 1st author peer reviewed journal article published, and one additional journal article submitted. Review articles do not count toward this requirement.

Appendix B: Qualifier Rubric

Title of Dissertation:

Categories and Guidance

1. **Problem Definition and Research Hypothesis.** The candidate, in consultation with the advisor, has identified a critical knowledge gap in a science or engineering field, and has proposed a clear, hypothesis and/or problem definition that is readily testable in order to address this knowledge gap. Note that the scope of this problem definition and/or corresponding hypothesis should be limited to that of an individual student project, and it should not be an overarching goal that would require a multi-student or multidisciplinary team to address.

   Criteria for "Acceptable" Evaluation: The candidate states the research hypothesis and/or problem definition; however, the candidate may struggle with communicating how this issue will be evaluated through a systematic means. The candidate is familiar with the current state-of-the-art in the field, but the candidate may not be able to provide deep insights regarding strengths and weaknesses of all previous work. Upon questioning, an acceptable candidate will be able to defend the underlying basis for the proposed hypothesis.

   Evaluation: Acceptable _____ Not Acceptable _____

Feedback if "not acceptable" selected:

2. **Impact of the Proposed Work.** The candidate provides a clear, yet succinct, review of the literature in order to set the context of the proposed work to the multidisciplinary review committee. Moreover, the candidate then positions the proposed work in terms of these previous efforts in order to state the potential impact of the proposed work. That is, there is a clear (and realistic) statement from the candidate as to how the greater field would respond if the proposed work was successful, and how this work would enable future scientific and engineering advances.

   Criteria for "Acceptable" Evaluation: The acceptable candidate will have a good grasp of the most important works in his/her field. In addition, the candidate provides evidence that he/she has considered literature for relevant related fields that are outside of the candidate's specific focus area. As an example, a candidate proposing an experimental analysis might summarize relevant computational or theoretical studies on related systems. The acceptable candidate will be able to describe how the project addresses a critical need.

   Evaluation: Acceptable _____ Not Acceptable _____

Feedback if "not acceptable" selected:

3. **Preliminary Results and Mastery of Key Research Techniques.** The candidate has obtained significant theoretical, computational, and/or experimental results that clearly go towards addressing the hypothesis and/or problem definition of the research project. Additionally, the candidate demonstrates the ability to perform theoretical, computational, and/or experimental techniques beyond that of an advanced undergraduate researcher. Included in this mastery is the ability to demonstrate the fundamental operational principles of the theory, code, or experimental techniques that are to be utilized heavily by the student during the course of the thesis work.

   Criteria for "Acceptable" Evaluation: An acceptable candidate has acquired a significant amount of data that has either begun to support or disprove (either avenue is acceptable) the initially proposed hypothesis. Moreover, the candidate shows the ability to utilize common instrumentation and/or code that will be required for the successful completion of the research project.

   Evaluation: Acceptable _____ Not Acceptable _____

   Feedback if "not acceptable" selected:

4. **Potential of the Project for Tangible Product Generation.** The candidate presents a reasonable path, both in terms of the proposed next steps and the timeline for those steps, forward regarding a research plan for generating a product by the start of the fifth semester of study in the graduate program. This research plan should include an evaluation of the work performed to date, clear proposed short-term objectives, or a contingency plan of action if the initial hypothesis was refuted by the currently-available data.

   Criteria for "Acceptable" Evaluation: Acceptable progress is such that, assuming that the initially-proposed hypothesis has been supported by the preliminary data, the student can sketch the outlines of a research publication that could emerge from the project within approximately the next calendar year. Conversely, a candidate may also receive an acceptable mark if there has been a significant amount of preliminary data that has been collected, and the analysis indicates the flaws, and potential solutions to, the original research plan. In either instance, the candidate will have a clear vision for the future research plans and a reasonably-paced timeline moving forward for the project.

   Evaluation: Acceptable _____ Not Acceptable _____

   Feedback if "not acceptable" selected:

5. **Communication Ability.** The candidate is able to present the previous and future work of the project in a manner that is accessible to both an audience of chemical engineering faculty members with diverse backgrounds and to experts in the field of the candidate. Moreover, the work is presented in a professional, logical, and clear manner that is consistent with the format of respected journals and conferences associated with the chemical engineering discipline. This means that all written communication in the presentation slide) should be legible and appropriately sized. Presentation slides should have selective utilization of color, animation, and other effects, while the title of a presentation slide should be a declarative sentence that summarizes the main message of the slide. During speaking, the candidate should have a clear and enthusiastic voice at a level that is easy for the audience to hear.

Criteria for "Acceptable" Evaluation: The oral presentation is to be almost entirely free of typographical errors, and figures are clearly presented. In general, the prose should be easy to follow, although it may have minor errors. The candidate should be able to answer the majority of questions directly. Although it is expected that the candidate will outline the state of the field and relevant literature in their presentations, an acceptable presentation will nonetheless devote the majority of slides to discussion of the hypothesis, results, and future plans.

Evaluation: Acceptable _____ Not Acceptable _____

Feedback if "not acceptable" selected:

Note: More than one "failing" mark out of the five categories is considered a "fail" for that committee member. If the student receives a failing evaluation from two of the three committee members, the student fails that portion of the qualifying procedure.

Name of the Examining Committee Member: _____

Signature of the Examining Committee Member: _____

Title of Dissertation: Categories and Guidance

1. **Problem Definition and Research Hypothesis.** The candidate, in consultation with the advisor, has identified a critical knowledge gap in a science or engineering field, and has proposed a clear, hypothesis and/or problem definition that is readily testable in order to address this knowledge gap. Note that the scope of this problem definition and/or corresponding hypothesis should be limited to that of an individual student project, and it should not be an overarching goal that would require a multi-student or multidisciplinary team to address.
   Criteria for "Acceptable" Evaluation: The candidate states the research hypothesis and/or problem definition; however, the candidate may struggle with communicating how this issue will be evaluated through a systematic means. The candidate is familiar with the current state-of-the- art in the field, but the candidate may not be able to provide deep insights regarding strengths and weaknesses of all previous work.

   Evaluation: Acceptable _____ Not Acceptable _____

   Feedback if "not acceptable" selected:

2. **Impact of the Proposed Work.** The candidate provides a clear, yet succinct, review of the literature in order to set the context of the proposed work to the multidisciplinary review committee. Moreover, the candidate then positions the proposed work in terms of these previous efforts in order to state the potential impact of the proposed work. That is, there is a clear (and realistic) statement from the candidate as to how the greater field would respond if the proposed work was successful, and how this work would enable future scientific and engineering advances. *Criteria for "Acceptable" Evaluation:* The acceptable candidate will have a good grasp of the most important works in his/her field. In addition, the candidate provides evidence that he/she has considered literature for relevant related fields that are outside of the candidate's specific focus area. As an example, a candidate proposing an experimental analysis might summarize relevant computational or theoretical studies on related systems. The acceptable candidate will be able to describe how the project addresses a critical need.

   Evaluation: Acceptable _____ Not Acceptable _____

   Feedback if "not acceptable" selected:

3. **Preliminary Results and Mastery of Key Research Techniques.** The candidate has obtained significant theoretical, computational, and/or experimental results that clearly go towards addressing the hypothesis and/or problem definition of the research project. Additionally, the candidate demonstrates the ability to perform theoretical, computational, and/or experimental techniques beyond that of an advanced undergraduate researcher. Included in this mastery is the ability to demonstrate the fundamental operational principles of the theory, code, or experimental techniques that are to be utilized heavily by the student during the course of the thesis work. *Criteria for "Acceptable" Evaluation:* An acceptable candidate has acquired a significant amount of data that has either begun to support or disprove (either avenue is acceptable) the initially-proposed hypothesis. Moreover, the candidate shows the ability to utilize common instrumentation and/or code that will be required for the successful completion of the research project.

   Evaluation: Acceptable _____ Not Acceptable _____

Feedback if "not acceptable" selected:

4. **Potential of the Project for Tangible Product Generation.** The candidate presents a reasonable path, both in terms of the proposed next steps and the timeline for those steps, forward regarding a research plan for generating a product by the start of the fifth semester of study in the graduate program. This research plan should include an evaluation of the work performed to date, clear proposed short-term objectives, or a contingency plan of action if the initial hypothesis was refuted by the currently-available data.
   Criteria for "Acceptable" Evaluation: Acceptable progress is such that, assuming that the initially-proposed hypothesis has been supported by the preliminary data, the student can sketch the outlines of a research publication that could emerge from the project within approximately the next calendar year. Conversely, a candidate may also receive an acceptable mark if there has been a significant amount of preliminary data that has been collected, and the analysis indicates the flaws, and potential solutions to, the original research plan. In either instance, the candidate will have a clear vision for the future research plans and a reasonably-paced timeline moving forward for the project.
   Evaluation: Acceptable _____ Not Acceptable _____

Feedback if "not acceptable" selected:

5. **Communication Ability.** The candidate is able to present the previous and future work of the project in a manner that is accessible to both an audience of chemical engineering faculty members with diverse backgrounds and to experts in the field of the candidate. Moreover, the work is presented in a professional, logical, and clear manner that is consistent with the format of respected journals and conferences associated with the chemical engineering discipline. This means that all written communication should be legible and appropriately sized.

   Criteria for "Acceptable" Evaluation: The written document is almost entirely free of typographical errors, and figures are clearly presented. In general, the prose should be easy to follow, although it may have minor errors.

   Evaluation: Acceptable _____ Not Acceptable _____

Feedback if "not acceptable" selected:

Note: More than one "failing" mark out of the five categories is considered a "fail" for that committee member. If the student receives a failing evaluation from two of the three committee members, the student fails that portion of the qualifying procedure.

Name of the Examining Committee Member: _____

Signature of the Examining Committee Member: _____

Appendix C: Prelim Rubric

EVALUATION RUBRIC: PRELIMINARY EXAM – PROPOSAL PRESENTATION

Candidate Name: Date:

Title of Dissertation:

Evaluation/Guidance	**Poor**	**Marginally Acceptable**	**Acceptable**	**Very Good**	**Excellent**
1. **Problem Definition:** Stated the research problem clearly, providing motivation for undertaking the research					
2. **Literature and Previous Work:** Demonstrated sound knowledge of literature in the area, and of prior work on the specific research problem					
3. **Impact of Proposed Research:** Demonstrated the potential value of solution to the research problem in advancing knowledge within the area of study					
4. **Solution Approach:** Is applying sound state-of-the-field research methods/tools to solve the defined problem and has described the methods/tools effectively					
5. **Results:** Analyzed and interpreted research results/data effectively					
6. **Quality of Written and Oral Communication: (a)** Communicates research proposal clearly and professionally in both (a) **written** and (b) **oral** form **(b)**					
7. **Critical Thinking:** Has demonstrated capability for independent research in the area of study, significant expertise in the area, and ability to make original contributions to the field					
8. **Broader Impact:** Demonstrates awareness of broader implications of the concluded research. Broader implications may include social, economic, technical, ethical, business, etc. aspects.					
9. **Publications:** Journal or conference publications have resulted (or anticipated) from this research					

Overall Assessment: The assessment of the overall performance of the candidate based on the evidence provided in items 1 – 9 above.

CRITERIA	**PERFORMANCE RATINGS**				
	Does NOT PASS PRELIMINARY Exam	**Passes PRELIMINARY Defense Exam**			
OVERALL, My Rating of the Dissertation:	**Poor**	**Marginally Acceptable**	**Acceptable**	**Very Good**	**Excellent**

Name of the Examining Committee Member: _____

Signature of the Examining Committee Member: _____

Graduate Seminar Credit

College of Engineering

- Please complete this form for each seminar that you would like to receive credit for.
- Please submit this form to the appropriate Graduate Education Program Administrator in your School.

Print your name: _____

Purdue ID: _____

Home School/Department: _____

Major Professor: _____

Major Professor Signature: _____

Date of Seminar: _____

Seminar Speaker's Name: _____

School or Department sponsoring seminar: _____

Course Number: _____

Credits: _____

Seminar Title: _____

_____

_____