SELECTION OF A MAJOR PROFESSOR

STUDENT/PROFESSOR MATCHING

The matching of a student and a major professor takes place early in the first semester of study by a personal and mutual agreement between the student and professor in which the department plays only an indirect role. The department encourages every student to make a serious effort to interview with as many different professors as possible.

PROCEDURE

New Student Orientation begins: August 19, 2016
New graduate students will be provided with a list of members of each research group, current projects, and groups that have openings for new students.

Faculty Research Introductions: August 22 through August 29, 2016
New graduate students are required to attend all scheduled faculty research talks. Immediately following the research talks, students should arrange initial interviews with at least five faculty members. These interviews benefit students by enabling them to learn about diverse research opportunities. At the same time, the interviews enable faculty to assess student interest in their research area or in specific projects.

Deadline to submit Initial Interview form: September 23, 2016
Each new graduate student must submit an Initial Interview form indicating at least five professors with whom she or he has met. New students are expected to take the initiative to learn more about potential research opportunities. For example, after initial interviews new students may arrange to meet with additional professors, contact members of research groups, attend group meetings, read relevant literature, or convey their interests in research areas or projects to different professors.

Deadline to submit Professor Selection form: October 7, 2016
Students must list their top three choices of advisors in order of preference. In situations where a student wishes to select co-advisors, the name of one advisor should be indicated and the student should clearly communicate their interest in the co-advised project to the advisor. The graduate associate chair, meeting with the professors involved, will recommend assignments of students to advisors. Every effort will be made to reconcile the mutual wishes and best interests of students and professors.

PROCEDURE OF GRIEVANCES

Graduate students should bring grievances to the attention of the departmental Associate Chair for the Graduate Program. If the grievance is against the Associate Chair for the Graduate Program, then the Department Chair should be contacted. Additional information on grievance policies may be found at https://grad.wisc.edu/acadpolicy/#grievancesandappeals
M.S. DEGREE REQUIREMENTS

REQUIREMENTS FOR ALL CANDIDATES
(Effective Fall 2014)

To qualify for the master’s degree, the student must complete a minimum of 30 graduate-level credits (300 & above), 24 of which must come from these two groups: I, a professional group; and II, an elective group. The student must maintain a B average or better in graduate work.

The professional group, I, must comprise a minimum of 12 credits of chemical engineering courses. At least six credits of group I must be in the range numbered 600 to 899 (excluding research). Grades of B or better are required for credit in the professional group.

Students placed on the M.S. track as a result of two or more grades of BC in core courses are required to make up the course deficiencies as well as complete a master’s degree. Course deficiencies should be made up on the usual preliminary exam schedule.

The elective group, II, must comprise a minimum of 12 credits of graduate courses. At least six of these shall be in departments other than chemical and biological engineering and shall be chosen for their relevance to chemical and biological engineering. In general, grades of B or better are required for credit in this group, but grades of BC or C in non-CBE courses will be counted if balanced credit for credit by grades of A or AB in other courses from this group.

Up to six credits will be allowed for chemical and biological engineering courses numbered between 300 and 499 in groups I and II combined, provided equivalent courses were not previously taken by the student.

An M.S. candidate not planning to seek re-admission to the PhD program must successfully complete an oral examination before a departmental examining committee of the advisor(s) plus two other CBE faculty members. An M.S. candidate who is seeking re-admission to the PhD program must successfully complete an oral examination before a departmental examining committee of the advisor(s) plus three other CBE faculty members. The candidate may defend an M.S. thesis (see Appendix D, p. 16) or an independent study project report. The independent study project will comprise a minimum of three credits of supervised CBE 790 and may involve a lab project, theoretical work, or a critical review of an advanced engineering topic.

When a candidate presents a thesis, no fewer than five nor more than 14 credits of research (CBE 790) may be counted toward the 30 credit total requirement. When a thesis is not presented, a maximum of 12 credits of research may be counted toward the total.

The Graduate School requires that the M.S. candidate earn at least 16 graduate-level credits (300 & above) at UW-Madison in order for the degree to be considered a UW-Madison degree. The Graduate School will not transfer any graduate work done at another institution toward fulfillment of the minimum UW-Madison credit requirement. An M.S. candidate who does not register for graduate work for five or more consecutive years will lose all residence credit.

Before the oral M.S. examination, the student fills out a Request for Master’s Degree Warrant and the student services coordinator requests the warrant from the Graduate School. A warrant will not be issued unless the student has cleared all grades of Incomplete and is registered for a program that will permit completion of the minimum credit requirement by the end of the current semester. After the examination, the student returns the signed warrant to the Graduate School. If a formal thesis is presented, it must be deposited in Memorial Library in accordance with instructions provided by the Graduate School.
The special M.S. degree in chemical engineering consists of a minimum of 39 credits. Students must take the following courses, unless equivalent credits can be offered from their undergraduate studies:

- CBE 320 ....................4 cr.
- CBE 326 ....................3 cr.
- CBE 426 ....................3 cr.
- CBE 430 ....................3 cr.
- CBE 440 ....................3 cr.
- CBE 450 (or 470) ..........3 cr.

Departmental M.S. degree requirements (described above), must also be satisfied, except that eight credits rather than 12 credits will be required in the elective group.

Upon matriculation, students should request approval of their proposed academic program by department faculty.
PH.D. DEGREE REQUIREMENTS

COURSE REQUIREMENTS

1. Chemical and Biological Engineering (CBE) course requirement

   Students must complete at least six semester courses (totaling at least 18 credits) in the Chemical and Biological Engineering Department. These classroom courses shall be in the range numbered 500-899 and will not be laboratory courses, Independent Studies or Research. Grades of B or better are required in all CBE courses used towards degree requirements.

   At least four of the six CBE courses shall be selected from the following set of core graduate classes:

   - CBE 620  Intermediate Transport Phenomena
   - CBE 660  Intermediate Problems in Chemical Engineering
   - CBE 710  Advanced Chemical Engineering Thermodynamics
   - CBE 735  Kinetics and Catalysis
   - CBE 781  Biological Engineering: Molecules, Cells & Systems

   At least two of the core graduate classes must be taken in the first semester of residence in the graduate program, and at least four core graduate classes must be completed with grades of B or better by the end of the second semester of residence. Students are expected to take a total of four classes in their first semester of residence.

   A student who receives one grade of BC or lower in a core class remains in the PhD program, but must earn grades of B or better in the other four core courses.

   A student who receives more than one grade of BC or lower in core graduate classes will be placed in the M.S. program. Upon completion of the M.S. program, the student may petition the full faculty for readmission to the Ph.D. program.

   The requirement of four core CBE graduate courses shall not be met by substitution of other courses. Students matriculating with an M.S. degree from another university may, with departmental approval, use up to two courses from their M.S. work toward the requirement of six CBE graduate classes.

   Students taking advanced courses outside the department in excess of minor requirements may, with departmental approval, use up to two of these courses toward the requirement of six CBE graduate classes. Seminar courses may not be used to satisfy CBE course requirements.

2. Minor course requirement – 9 credits

   A requirement of the Graduate School is that all graduate students complete a minor program (see Appendix A, pg. 11). Approval of the proposed minor program should be obtained before the student has completed half of the proposed minor courses.
3. Elective course requirement – 3 credits
Students must complete at least one course totaling at least three credits.
A "B" average is required. Pass/Fail or Audit courses may not be used for the elective course requirement. Courses used to satisfy the minor program may not be used for the elective course requirement. Advisor approval is required and secured through submission of the PhD Elective Course Approval Form. (See Appendix D, pg. 15). Elective courses can be foreign language courses.

4. Other comments regarding course work requirements
A. Residence Credit Requirements - The Graduate School requires that graduate students earn a minimum of 32 graduate level (300 & above) credits at UW-Madison in order for the degree to be considered a UW-Madison degree. The Graduate School will not transfer any graduate work done at another institution toward fulfillment of the minimum UW-Madison credit requirement. (However, you may still transfer work at the department level to fulfill department course requirements.)

B. Graduate Credit Requirements – The Graduate School requires at least 51 total credits (300 & above). At least 26 of these must be completed in CBE courses numbered 600 & above (which can include courses satisfying the CBE core requirement, research credits, as well as seminar courses).

C. Transfer of Prior Coursework –
Grad Work Other Institutions: With program approval, students are allowed to count graduate course work from other institutions toward the Minimum Graduate Degree Credit Requirement and the Minimum Graduate Course Work (50%) Requirement. No credits from other institutions can be counted toward the Minimum Graduate Residence Credit Requirement. Course work earned five or more years prior to admission to a master's degree or earned ten years or more prior to admission to a doctoral degree is not allowed to satisfy requirements.

UW-Madison Undergraduate: With program approval, up to 7 credits numbered 300 or above can be counted toward the Minimum Graduate Degree Credit Requirement. Up to 7 credits of courses numbered 700 or above can be counted toward the Minimum Graduate Course Work (50%) Requirement. No credits can be counted toward the Minimum Graduate Residence Credit Requirement.

UW-Madison University Special: With program approval and payment of the difference in tuition (between special and graduate tuition), students are allowed to count up to 15 credits of course work numbered 300 or above taken as a UW-Madison special student toward the Minimum Graduate Residence Credit Requirement, and the Minimum Graduate Degree Credit Requirement. With program approval and payment of the difference in tuition (between special and graduate tuition), students are allowed to count up to 15 credits of courses numbered 700 or above taken as a UW-Madison Special student toward the Minimum Graduate Course Work (50%) Requirement. Course work earned five or more years prior to admission to a master’s degree or earned ten years or more prior to admission to a doctoral degree is not allowed to satisfy requirements.

5.
Department approvals of course substitutions, distributed (Option B) minor programs, and other routine degree criteria are administered by the Graduate Credentials Committee. Novel requests are considered in the departmental faculty meetings. Requests of either type should be submitted to the Student Services Coordinator and must include the endorsement of the thesis advisor(s). Supporting information for course substitution petitions using non-UW courses should include syllabi, textbook titles and authors, instructor name, and any other details relevant to the requested use.

QUALIFYING REQUIREMENTS

Qualifying for the Ph.D. program requires that graduate students demonstrate both accomplishment in CBE graduate classes and potential as a researcher. To qualify for the Ph.D. program, a graduate student's GPA in four core Chemical Engineering graduate classes and grade on the preliminary exam (see below) must sum to 6.0 or higher. For example, a student with an “AB” average in core CBE graduate classes (GPA=3.5) must receive a grade of at least 2.5 in their preliminary exam to qualify for the PhD program. If a student has taken five core classes, then the GPA is based on the four classes in which the student received the highest grades.

Preliminary Exam. The preliminary exam comprises a written report and oral examination.

A. Written report: The written portion of the preliminary exam must be submitted to the CBE Graduate Program office by 3 pm on January 31 of the second year of residence in the graduate program. If January 31 falls on a weekend, it is due by 3 pm on the Monday following the weekend. The scope and objectives of the written report are described in Appendix B. Four copies (five for co-advised students) of the preliminary report shall be submitted to the CBE graduate office. These copies must be comb bound or coil bound, and printed or copied double-sided. One copy (in an ACCO pressboard report cover) is to be submitted for the department files. For students entering the graduate program in January, the written report is due July 15 of the second year of residence.

B. Oral examination: Following submission of the written document, the student will be asked to present the oral portion of the preliminary exam during the first half of February. The student shall prepare a 30 minute oral presentation based on their written preliminary report. This oral presentation will be followed by 1 ½ hours of questions from the committee. For students entering the graduate program in January, the written report is due July 15 of the second year of residence and the oral portion must be completed by the end of July. The comprehensive oral preliminary examination, based upon the written preliminary report, is given by a committee composed of four department faculty members: the student's major professor, two faculty members in the same general research area, and a fourth faculty member to be assigned according to a duty roster. If a student is co-advised by two faculty members from the Department of Chemical and Biological Engineering, the committee will comprise the student's co-advisors, two additional faculty members in the same general area of research, and a fifth faculty member assigned according to the duty roster. The major professor(s) will not be chairman of the examining committee. In some special instances, the committee will be augmented by personnel from outside the Department of Chemical and Biological Engineering. At least three faculty members of the preliminary exam committee are anticipated to become members of the student’s thesis committee.
Before the oral exam is scheduled, the student must submit a Request for Preliminary Examination Warrant form. The Student Services Coordinator will order the warrant from the Graduate School, which will first verify that the student has completed 32 credits toward their degree, their minor has been approved and their record is cleared of grades of Incomplete and Progress, except for grades of P in CBE 890 or 790. (Note that the minor courses do not need to be completed prior to the preliminary exam.)

The Graduate School issues a warrant authorizing the department to admit the student to the preliminary examination. When this warrant is completed and returned to the Graduate School after the student has completed all degree requirements except the dissertation, it serves as the formal application for admission to candidacy for the Ph.D.

In unusual circumstances, petitions for delay may be submitted to the Associate Chairman for Graduate Affairs. Failure to complete the preliminary examination will be regarded as unsatisfactory progress and the case will be brought to the faculty for action.

C. Grading of Preliminary Exam. Upon completion of the oral portion of the preliminary exam, each member of the exam committee will submit a grade between 1.0 and 4.0. This grade will reflect equally the exam committee's assessment of the written document and oral portion of the preliminary exam, using the criteria described in Appendix B, pg. 12.

A student who does not receive an aggregate score of 6.0 or higher in the qualifying process is placed in the M.S. program. Upon completion of the M.S. program, the student may petition the full faculty to be readmitted to the Ph.D. program.

RESEARCH PROGRESS MEETING
Effective with the Fall 2008 incoming class, each student will schedule a mandatory research progress meeting with their thesis committee during the fall semester of the fourth year. The meeting will consist of a 30-minute oral presentation by the student on research progress followed by a 30-minute discussion, with a written assessment provided to the student and placed in the student’s file.

TEACHING ASSISTANTSHIP REQUIREMENT
Each student in the Ph.D. program is required to serve as a teaching assistant (TA) for two semesters. Under normal circumstances, each student should TA one semester of their second year and one semester of their third year. Requests for alternate arrangements, partial or full waiver of the requirement should be submitted in writing to the Graduate Credentials Committee.

M.S. NOT NORMALLY REQUIRED FOR PH.D.
An M.S. degree is not required for work toward the Ph.D. unless the student has a B.S. in a field other than chemical engineering or unless the faculty requires the student to complete an M.S. based on the results of the qualifying requirements.

READMISSION TO THE PHD PROGRAM
Students who have been placed in the M.S. program because of course requirements or qualifying requirements may petition for readmission to the Ph.D. program after completing the following requirements.

(i) Earning grades of B or better in four core graduate classes. When repeating a core graduate class, the higher grade is counted towards this requirement.
(ii) Completing the M.S. program. In this case, the M.S. oral exam takes the place of the preliminary oral exam, and the oral presentation should contain a description of future research plans consistent with the requirements of the prelim exam.

Students placed in the M.S. program are expected to finish the M.S. program within five semesters of admission into the Ph.D. program.

The petition for readmission to the Ph.D. program should contain a summary of the student's research and academic accomplishments while in the M.S. program, and a written evaluation from the M.S. exam committee.

ADVANCEMENT TO DISSERTATOR STATUS

A student is granted dissertator status after passing the preliminary examination, completing all major and minor requirements except the dissertation (this includes any required course work, the qualifying requirement, and the TA requirement), and satisfying the Ph.D. minimum credit requirement.

To register as a dissertator for a given semester, the student must complete all requirements for dissertator status before the first day of classes.

Dissertators register for a reduced load of three graduate-level credits that are directly related to the dissertation research. Normally, this means 990 and/or required seminars. With advisor’s approval, a graduate-level 3-credit course may be substituted. The dissertator must register each semester for three credits until the Ph.D. dissertation has been deposited at the Graduate School. Students who fail to maintain continuous registration will be assessed a Ph.D. completion fee of 12 times the current per-credit fee.

THESIS AND FINAL ORAL EXAMINATION

Guidelines for preparation of the Ph.D. thesis are given in Appendix D (pg. 16). The student defends the thesis in a final oral examination. Before the oral exam, the student must clear all grades of Incomplete and complete all other requirements for the degree. In consultation with the major professor, the student chooses an examination committee of five faculty members, including at least one, but not more than two, from outside the department. It is anticipated that three members of the prelim exam committee (the advisor and two faculty members in the same general research area) will serve on the final oral examination committee. An emeritus professor may serve on a Ph.D. examination committee if less than one year has elapsed since his or her retirement. The student submits the names of the committee members to the Graduate School on the Ph.D. Final Oral Exam Committee Form to obtain a warrant and other materials needed for the final examination and degree completion. Successful completion of the exam is indicated by the signatures of the committee members on the warrant, which is then returned to the Graduate School.

The Graduate School requires that the final oral examination for the Ph.D. must be taken within five years of passing the preliminary examination, or the student will be required to take another preliminary examination.

LENGTH OF TIME TO DEGREE ≤5 YEARS

Students are expected to complete their Ph.D. degree in ≤5 years (by August 31, 2021 for students entering in Fall 2016). Any student unable to defend their thesis in this period must petition the faculty for an extension by July 1 of the fifth year. All petition requests are for one year and should include the following:
• Date of Petition
• Name of student
• Name of advisor
• Accomplishments to date (300 words or less)
• Extenuating circumstances, if any
• Plans for degree completion (include predicted defense date)
• A list of publications published, in press or submitted

Extension requests should be submitted to the Graduate Program office – EH 2033
NO LATER THAN JULY 1.

CRITERIA FOR SATISFACTORY PROGRESS TOWARD ADVANCED DEGREES

SATISFACTORY PROGRESS
Candidates for advanced degrees in chemical engineering are expected to meet the criteria and time schedules shown below. In addition, the candidate must have an advisor and receive a satisfactory appraisal from him or her. This will normally be reflected by the grade in research. The time schedules take into account the effect teaching may have on the rate of completion of a degree program.

The cases of any students failing to make satisfactory progress will be brought to the attention of the departmental faculty by the student’s major professor or graduate advisor for review and appropriate action.

QUALITY OF WORK
CBE courses.................................................. Grades of B or better are required for courses used to meet degree requirements

Other courses ............................................. Average grade B with all grades C or above

Research ..................................................... P (in Progress) or S (Satisfactory)

CREDIT LOAD
Students holding a departmental appointment (RA, RA/TA, or Fellow) must be enrolled as full-time students during the academic year and must be enrolled for at least the minimum number of credits in summer. Only graduate-level credits, numbered 300 or above, count toward these credit loads. Courses numbered below 300, even when taken to fulfill a degree requirement, are not considered graduate-level credits.

Full-time Student Credit Loads

Pre-dissertation
Fall, Spring semesters................. 8-15 credits*
Summer............................................. ≥2 credits*

Dissertator
Fall, Spring, Summer....................... 3 credits*

* Graduate-level credits, i.e. numbered ≥300 (no audits or pass-fail).
Students who do not register for at least the minimum number of credits shown above will not qualify as full-time students for payroll purposes and may forfeit their appointment and its associated benefits (health insurance, etc.).

**Maximum credit loads.** Graduate students generally may not enroll for more than 15 credits of graduate courses (≥ 300) in any semester or summer. Higher loads require special permission from the Graduate School Dean, and may incur extra tuition charges. Courses numbered below 300 (such as some language courses) do not count toward this limit.

<table>
<thead>
<tr>
<th>COMPLETION TIMES</th>
<th>1. M.S.:</th>
<th>Should normally be completed within 1 1/2 to 2 calendar years of matriculation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Ph.D.:</td>
<td>Preliminary exam</td>
<td>Written portion should be completed by January 31 of the second year of residence in the graduate program, and oral portion by February. For students entering in January, the written report is due July 15 of the second year of residence and the oral portion must be completed by the end of July.</td>
</tr>
<tr>
<td></td>
<td>CBE core course</td>
<td>Two must be completed the first semester. All four must be completed by the end of the second semester in residence.</td>
</tr>
<tr>
<td></td>
<td>CBE course</td>
<td>Must be completed before dissertator status will be granted.</td>
</tr>
<tr>
<td></td>
<td>Elective course</td>
<td>Must be completed before dissertator status will be granted.</td>
</tr>
<tr>
<td></td>
<td>Minor</td>
<td>The minor must be approved before ordering the preliminary exam warrant. All minor courses must be completed before dissertator status will be granted.</td>
</tr>
<tr>
<td></td>
<td>Final oral exam</td>
<td>Students are expected to finish the Ph.D. within five years of matriculation. Scheduling of thesis work and the thesis defense is arranged between the student and the major professor.</td>
</tr>
</tbody>
</table>
APPENDIX A.

THE MINOR REQUIREMENT

MINOR REQUIREMENT

In addition to studies in chemical and biological engineering, the Ph.D. candidate is required to undertake a program of course work in a field other than chemical and biological engineering. This requirement may be satisfied by a departmental minor (option A) or a distributed minor (option B).

The minor, whether Option A or B, is designed to represent a coherent body of work, and should not be simply an after-the-fact ratification of a number of courses taken outside the major department. To ensure coherence, the student must consult with his or her advisor. The Ph.D. Minor Agreement Form should be submitted for approval at an early date, before the student is halfway through the proposed course sequence.

MINOR OPTION A

For Minor Option A, the student is required to complete at least 9 graduate credits in a single department. The program of course work must be approved by the minor department. Departments may have specific course requirements for their minor and may require more than the 9-credit minimum. The student must meet the requirements of the minor department for satisfactory completion of the minor.

MINOR OPTION B

If the needs of the student would best be served by preparation not available as a departmental minor, the department may permit the student and the advisor to develop a special program in lieu of a departmental minor. To meet the requirements of this Minor Option B, the student must complete at least 9 graduate credits in two or more departments outside the major, in related courses selected for their relevance to the student's particular area of concentration. The proposed program of course work must be approved by the Department of Chemical and Biological Engineering.
APPENDIX B.

THE PRELIMINARY EXAMINATION

SCOPE AND OBJECTIVES OF THE WRITTEN PRELIMINARY REPORT

The primary purpose of the written preliminary report and the ensuing comprehensive oral preliminary examination is to determine the potential of the applicant as a competent researcher. It is also an important objective of this procedure to ensure that the student begin his or her research career with an initial set of goals based upon a study of the pertinent literature, a logical analysis of the proposed research problem, and preliminary results. The student must show, in the report and oral examination, satisfactory evidence of initiative, imagination, and natural curiosity, and a high level of professional ability.

The written report shall be an original document prepared by the student. The written report should contain the following sections (sections 1-5 should not exceed 20 pages in total; subsection page lengths are for guidance only):

1. A concise abstract of the problem, approach, and expected outcomes (1 page)
2. A statement of the goals and motivation underlying the proposed research (3 pages)
3. A critical analysis of past studies relevant to the goals of the proposed research (3 pages)
4. A concise summary of the accomplishments to date (3 pages)
5. A description of plans for future research (10 pages)
6. A statement of safety considerations (no limit)
7. List of references, including the titles of the papers (no limit)

The document should be prepared using 12-point font, single spacing, and 1-inch margins.

PAGE LENGTH OF WRITTEN REPORT

The total preliminary report must not exceed 20 pages (single spaced, including figures, 12-point font, 1-inch margins), not counting the section dealing with safety considerations and the list of references. Figures are included in the page count. The document should not contain appendices.

LENGTH OF ORAL PRELIMINARY EXAMINATION

The total length of the oral preliminary exam is 2 hours. The first 30 minutes of the exam will be devoted to the student's presentation. The last 1 ½ hours will be reserved for questions from the committee members.

ASSESSMENT OF PRELIMINARY EXAM AND QUALIFYING PROCESS

The student's grade on the preliminary examination will be based on an evaluation of the 10 attributes listed on the attached rating sheet. Each member of the examination committee will submit a grade on a scale of 1.0 to 4.0, which is used to determine qualification for the Ph.D. program.

To qualify for the Ph.D. program, the average grade submitted by the committee when summed with the student's GPA in four core CBE graduate classes must be 6.0 or higher.

[Examples: A student with a GPA of 3.125 (B,B,B,AB) in core CBE classes will require a prelim score of 2.875 to qualify; a student with a GPA of 3.5 in core CBE classes will require a prelim score of 2.5.]
After successful completion of the preliminary exam, the committee members will sign the warrant. If the student has also completed the major and minor requirements, the appropriate certifying signatures should be obtained on the warrant. The warrant should then be returned to the Graduate School. Students who have passed prelims, satisfied the major and minor requirements, and satisfied the residence requirement (as determined by the Graduate School) will be granted dissertator status.
Rating Sheet for Preliminary Examination

Student:  
B.S. school & year:  

Date of Exam:  
Research Project:  

Major Professor:  
Performance in core CBE classes: 620: 660: 710: 735: 781:  

<table>
<thead>
<tr>
<th></th>
<th>Committee members</th>
<th>Prelim Rating Average</th>
<th>Core GPA</th>
<th>Qualifying Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating</td>
<td></td>
<td>+</td>
<td>=</td>
<td></td>
</tr>
</tbody>
</table>

Total length of oral prelim exam is 2 hours. Devote first 30 minutes to the student’s presentation. Last 1 ½ hours is reserved for questions from the committee members.  

Guidance in assigning grades in the preliminary exam:  
Rate the candidate’s preliminary exam performance on a scale of 1.0 to 4.0 in .5 increments.

Ratings are to be based on the following attributes:  
- Ability to define research problem  
- Literature search  
- Theoretical development; comprehension of theory and application to problem  
- Planning of experimental procedures, thoroughness, regard for detail  
- Maturity of judgment  
- Originality  
- Flair for research  
- English composition: grammar, conciseness, and lucidity  
- Neatness of composition, orderliness of presentation, clarity of drawings, figures, etc. Behavior and attitude on oral examination  

Qualifying requirement: For a student to qualify for the Ph.D. program in Chemical and Biological Engineering, the student’s GPA in four core CBE graduate classes (best 4 of 5) and grade on the preliminary exam must sum to 6.0 or higher. For example, a student with an “AB” average in core CBE graduate classes (GPA=3.5) must receive a grade of at least 2.5 in their preliminary exam to qualify for the Ph.D. program.
APPENDIX C

Ph.D. Elective Course Approval Form

Name: ____________________________________________              Date: ____________________

UW I.D.#: ___________________________              Major: CHEMICAL ENGINEERING

Semester and year you entered program: ________________

Ph.D. elective course requirement (Students who entered program before Fall 2011):

  • Six credits
  • B average
  • No audit or pass/fail courses

Ph.D. elective course requirement (Students who entered program after Fall 2011):

  • Three credits
  • B average
  • No audit or pass/fail courses

List your proposed elective course(s) below. Obtain the approval and signature of your major advisor. Return signed form to Graduate Program office.

<table>
<thead>
<tr>
<th>Department name</th>
<th>Course number</th>
<th>Course title</th>
<th>Credits</th>
<th>Semester</th>
<th>F/Sp</th>
<th>Year</th>
<th>Grade</th>
</tr>
</thead>
</table>

___________________________________
Signature, Major Advisor

____________________
Date

15.
APPENDIX D.
PREPARATION OF THESES FOR ADVANCED DEGREES

GRADUATE SCHOOL REGULATIONS
In the preparation and submission of M.S. and Ph.D. theses, it is important to satisfy the regulations of the Graduate School and the department. The Graduate School regulations, which focus primarily on the physical form of the thesis, are set forth in the following publications available on the Graduate School web site:

A Guide to Preparing Your Master’s Thesis
http://www.grad.wisc.edu/education/completedegree/mdegree.html

A Guide to Preparing Your Doctoral Dissertation
http://www.grad.wisc.edu/education/completedegree/etd.pdf

TECHNICAL CONTENT
The Department of Chemical and Biological Engineering is responsible for approving the technical content of the thesis. In general, the only requirement of the department is that all theses meet the standards of excellence to be expected of a candidate aspiring to an advanced degree. Agreement between the candidate and the major professor concerning the scope, content, and arrangement of the thesis is generally sufficient to satisfy this departmental requirement. Following is a general suggested outline of the order and contents of M.S. and Ph.D. theses that has been adopted by the department as a guide for candidates in the preparation of their theses. Modifications of this outline may be necessary to meet the needs of the individual. The emphasis should not be placed on adhering to a standard form, but rather on scholarly organization and clear presentation.

COMMITTEE COPIES
A copy of your thesis (or M.S. report) must be given to each member of your committee at least two weeks before your exam. These copies must be comb bound or coil bound, and printed or copied double-sided.

DEPARTMENT COPY
The department requires that each candidate submit a library-bound copy of the thesis to the department, along with the research notebooks and original data sheets.

DEPOSITING THE FINAL THESIS
The Ph.D. thesis (unbound) must be approved by and deposited at the Graduate School as part of the final review. (See http://grad.wisc.edu/currentstudents/degree/). The M.S. thesis (unbound) must be deposited at Memorial Library, room B137. You do not need to bring your M.S. thesis to the Graduate School for approval unless you choose to publish your thesis through UMI.

SUGGESTED ORDER OF CONTENTS FOR THESES

Title Page  (See sample given in the Graduate School guidelines.)
Abstract  (In the case of Ph.D. theses this may be identical with the 350-word abstract required by the Graduate School for UMI.)

Acknowledgments
THE ABSTRACT AND THE SUMMARY

A clear distinction should be made between the abstract and the summary. The purpose of the abstract is primarily one of cataloging the contents as to scope and area of interest, whereas the summary is intended to give specific details concerning new results and recommendations for further study. The abstract should be short (350 words) and should be so written that it may stand alone; the summary, on the other hand, may be as much as 10 pages, and in it there may be references to the main body of the thesis. The abstract should be understandable to any well-trained chemical engineer, whereas the summary may be written for one who is better acquainted with the topic being discussed.

ACKNOWLEDGMENTS

It is important that acknowledgment be given to all individuals and organizations who have contributed to the conduct and support of the research.
SUMMARY

Statement of the Problem. The purpose of this first paragraph of the summary is to acquaint the reader with the nature of the research problem. This is important to those persons who cannot give attention to all details of the work, but are required to become acquainted with the problem. This paragraph should contain a concise but complete statement of the problem studied and its applicability to chemical engineering. It should be made clear how this investigation will contribute to the advance of the profession. A clear statement of the objectives of the research must be included.

Important Results. This paragraph should include a statement of the specific results obtained as well as their importance in chemical engineering as a science or as a profession. Important formulae should be referred to or quoted, and reference to tables and figures in the main text should be made if such references are of help in summarizing the results.

Conclusions and Recommendations. The conclusions of the investigation represent a most important part of the thesis. Therefore, extreme care must be exercised in presenting these conclusions and in making recommendations on the basis of them. All conclusions should be based on the results of the research and should be properly qualified if based on uncertain results or speculations. Recommendations may concern proposals for new procedures, studies of new phases of the subject or different chemical systems, or applications to different processes. The latter might include recommendations for patents. Each recommendation should be concisely and clearly worded, and should be incorporated in a separate paragraph.

HISTORICAL BACKGROUND

This section should include a complete summary of previous theoretical and experimental studies made in this department and elsewhere, as reported in the technical literature and in patents. The results of research cannot be considered conclusive or original unless the previous work done in the field has been thoroughly reviewed and analyzed. Evidence of a mature understanding of previous work should be presented in this section, and literature references should be properly documented and quoted. The historical survey should lead quite naturally into a discussion of the reasons prompting the research reported in the thesis. The statement of the objectives should be reiterated in the light of the historical discussion.

COMPLETE ACCOUNT OF THIS INVESTIGATION

In general, this section should comprise an orderly account of the original theoretical development and the experimental program completed in this investigation.

The varied nature of research projects in chemical engineering, and the desirability of maximum freedom of choice in reporting such projects preclude a detailed
outline. However, it may be suggested that the reader would benefit from the following: method of planning the program and designing the equipment and experiments, detailed construction diagrams and description of the experimental equipment, safety precautions and operating procedures, calculation procedures, and lists of all experimental runs made, where an extended program was carried out. It may be desirable to relegate some of this material to appendices.

It is particularly desirable to emphasize new and original features of the theory, calculation methods, equipment design and experimental technique.

**ANALYSIS OF RESULTS**

Considerable emphasis should be placed on an orderly presentation of results and comparisons between experimental data and various theories. Any data or correlations of questionable value should be carefully pointed out. It is advisable to include illustrative examples, when possible, to indicate how the results of the investigation may be used in practical chemical engineering calculations.

The conclusions should be discussed from the standpoint of the original objectives of the research. They should lead naturally to the formulation of concrete suggestions for future work. An indication of scientific maturity is the ability to chart a program of new research on the basis of results of completed research.