A Guide to Graduate Studies in Chemical and Biomolecular Engineering

Department of Chemical & Biomolecular Engineering
University of Notre Dame

DO NOT DISCARD THIS GUIDE

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1. Introduction

The following information has been gathered to provide a guide to the policies and procedures for graduate studies in the Department of Chemical and Biomolecular Engineering (CBE). It contains information that pertains specifically to this department, as well as information from other University sources that is included here for convenience. This document should be consulted by graduate students and faculty to determine departmental policies on graduate matters. It supplements the Graduate School Bulletin of Information by stating those policies that are left to the discretion of the academic departments.

A special note to graduate students: *This guide cannot be made to anticipate every eventuality. Circumstances will arise that either have not been addressed below, or which may require changes in what has been written below. The CBE Graduate Administrator will often be able to answer questions concerning campus forms, procedures and other "red tape." Your advisor is always the first person to contact if a question about academic matters should arise. If a problem cannot be resolved, then talk to the Director of Graduate Studies or the Department Chair. The goal of this guide is to clarify the departmental procedures and policies, and you should* ***feel free to ask questions and make suggestions.***

2. Typical Degree Programs

The department offers Master's and Ph.D. degree programs. Students entering the department with financial support participate in the research programs of the departmental faculty, producing dissertations based on their original contributions.

During the first semester, a student in either degree program begins basic course work, serves as a teaching assistant, selects an advisor and initiates a research project. The degree programs are described separately below.

A full-time student is one who is working full time toward his or her degree objective, and who has enrolled for the number of credit hours specified in Table 1 (for M.S. students) or Table 2 (for Ph.D. students). All degree-seeking students are expected to maintain full-time status and to devote full time to graduate study. No degree-seeking student may hold a job, on or off campus, without the explicit permission of the Department and the Graduate School.

2.1 Typical M.S. Degree Program

2.1.1 Expected Time to Degree

A student entering the M.S. program with an undergraduate degree in Chemical Engineering can expect to take approximately 18-24 months to complete the requirements for the M.S. degree. Thus a student will normally complete all of the requirements during the fourth semester of study. While this is the desired timing, the actual timing may be somewhat longer or shorter depending upon the nature of the research attempted and the student's academic progress.

A student entering the M.S. program with an undergraduate degree that is not in Chemical Engineering may expect to take some undergraduate courses (not all of which may

count towards the M.S. degree) in addition to the requirements outlined below. Consequently, such a student may require additional time to complete the degree. In these cases, the exact program is tailored to the student's previous exposure to Chemical Engineering in consultation with the departmental Chairperson or Director of Graduate Studies.

2.1.2 Credit and Course Requirements

The M.S. degree in Chemical Engineering requires a minimum of 15 credit hours of course work, plus 15 hours of thesis research (CBE 68801, CBE 68901) and graduate seminar (CBE 63001). With the consent of the research advisor, a student may take additional graduate course credits which substitute for research credits.

In the first semester, a student will typically take 3 graduate courses and graduate seminar, in addition to performing teaching assistantship duties (with some exceptions as noted below), selecting a research advisor and initiating a research project. The second semester normally consists of 2 graduate courses, teaching assistantship duties, graduate seminar, and thesis research.

There are four required courses, which are taken during the first academic year. These are CBE 60542 (Mathematical Methods in Engineering I), CBE 60544 (Transport Phenomena I), CBE 60546 (Advanced Chemical Reaction Engineering), and CBE 60553 (Advanced Thermodynamics). If any of these are not offered during the first academic year, substitute core courses will be designated. Table 1 summarizes a typical course distribution for an MS degree.

Teaching assistantship duties are required of all M.S. students in Chemical Engineering. Under some circumstances, for example for students whose undergraduate degree is not in chemical engineering, teaching assistantship duties may be deferred.

Table 1 (M.S.)

First Semester	*Credit*	*Total*
Courses (3)	9	
CBE 63001 Graduate Seminar	1	
CBE 68801 Research	3	
	13	13
Second Semester		
Courses (2)	6	
CBE 63001 Graduate Seminar	1	
CBE 68801 Research	6	
	13	26
Summer		
CBE 67890 Summer Research	0	
	0	26
Third and Remaining Semesters		
CBE 63001 Research	8	
CBE 63001 Graduate Seminar	1	
	9	35

Students graduating in August must enroll for CBE 68801 during the last summer session.

2.1.3 Master's Comprehensive Evaluation

This evaluation constitutes the Master's Examination required by the Graduate School. The evaluation consists of a course work evaluation (see Section 5.1), a teaching evaluation (see Section 5.3), and a research evaluation. The research evaluation is based on a written and/or oral report following the same format as the PhD Comprehensive Evaluation (see Section 5.2). Evaluation results are prepared, in consultation with the faculty, by the Director of Graduate Studies and the research advisor, and consist of a grade of either PASS or FAIL. Generally this evaluation is done at the beginning of the third semester of study.

2.1.4 Thesis Preparation and Defense

Following the completion of required course work, a M.S. student is expected to devote his/her full time to thesis research. Once approved by the advisor, the thesis is prepared following the Graduate School's formatting guide, which is available from the Graduate School's website. The Director of Graduate Studies, usually on the basis of recommendations from the research advisor, assigns to the student a thesis committee consisting of the advisor and two thesis readers. Copies of the thesis, bearing the signature of the advisor, are distributed to the readers at least one week in advance of the scheduled date for the oral defense.

Prior to scheduling the defense, the student should contact the CBE Graduate Administrator to discuss scheduling requirements and to initiate the preparation of necessary forms. The defense is scheduled within the department for a time mutually convenient for the student and committee members. Following the oral defense, the readers indicate their approval of the thesis in the form of a reader's report that is submitted to the Graduate School by the Department**.** Once approved, the candidate submits to the Graduate School two signed copies of the thesis, which are verified for compliance with the style manual. The student is responsible for the binding and duplicating costs.

2.1.5 M.S. Degree Minimum Grade Requirements

The department adheres to the Graduate School Requirements for the M.S. degree, which are as follows (Graduate School Bulletin of Information):

Continuation in and graduation from a graduate degree program requires maintenance of at least a 3.0 cumulative GPA. A student whose semester GPA drops below 3.0 for two consecutive semesters is subject to dismissal, as is a student with less than a 2.5 GPA in any one semester.

A student whose semester GPA drops below 3.0 for two consecutive semesters will not be eligible for initiation or continuation of financial support.

For M.S. students, graduate course grades awarded within the department have the following interpretation. The grade of A indicates mastery of the course material, while A- denotes strong comprehension and understanding. Grades of B or B+ indicate acceptable performance. B- indicates some deficiency. Grades of C and lower indicate serious deficiencies.

2.2 Typical Ph.D. Degree Program

2.2.1 Expected Time to Degree

Students entering the Ph.D. degree program with an undergraduate degree in Chemical Engineering can expect to take approximately four to five calendar years to complete the degree requirements, with the average being about four and a half years. An exact schedule will, of course, depend upon the nature of the research undertaken and the student's academic progress. For students entering with a Master's degree, the expected time to finish the degree requirements is generally somewhat less.

A student entering the Ph.D. degree program with an undergraduate degree that is not in Chemical Engineering, may expect to take some undergraduate courses (not all of which may count towards the Ph.D. degree) in addition to the requirements outlined below. Consequently, such a student may require additional time to complete the degree. In these cases, the exact program is tailored to the student's previous exposure to Chemical Engineering in consultation with the departmental Chairperson or Director of Graduate Studies.

2.2.2 Credit and Course Requirements

The Ph.D. degree in Chemical Engineering requires a minimum of 24 credit hours of course work, plus 36 hours of thesis research (CBE 68801, 68901) and graduate seminar (CBE 63001). With the consent of the research advisor, a student may take additional graduate course credits which substitute for research credits. Up to 24 semester hours can be transferred if the student has earned a Master's degree within the past five years from an approved institution. Of these hours, a maximum of 12 hours can be applied towards the 24-hour coursework requirement. Up to 6 hours can be accepted from another institution if no graduate degree has been earned. All requests for transfer of credit must satisfy the Graduate School requirements for credit transfer (see the Graduate School Bulletin of Information, which is available on the Graduate School's website).

In the first semester, a student will typically take 4 graduate courses and graduate seminar, in addition to performing teaching assistantship duties (with some exceptions as noted below), selecting a research advisor and initiating a research project. The spring semester normally consists of 3 graduate courses, teaching assistantship duties, and graduate seminar and thesis research.

There are four required courses that are taken during the first academic year. These are **CBE 60542** (Mathematical Methods in Engineering I), **CBE 60544** (Transport Phenomena I), **CBE 60546** (Advanced Chemical Reaction Engineering), and **CBE 60553** (Advanced Thermodynamics). If any of these is not offered during the first academic year, a substitute core course will be designated. Table 2 summarizes a typical course distribution for the Ph.D. degree, based on the assumption that 4 courses are taken during the first semester, 3 in the second semester, and 1 in the second year first semester.

Teaching assistantship duties are required of all Ph.D. students in Chemical Engineering. Under some circumstances, for example for students whose undergraduate degree is not in chemical engineering, teaching assistantship duties may be deferred.

Table 2 (Ph.D.)

1st Academic Year

First Semester	*Credits*	*Second Semester*	*Credits*	*Total Credits*
Courses (4)	12	Courses (3)	9	
CBE 63001 - Seminar	1	CBE 63001 - Seminar	1	
		CBE 68901 - Research	3	
	13		13	
		Summer		
		CBE 67890 - Research	0	
			0	26

2nd Academic Year

First Semester		*Second Semester*		
Courses (1)	3	CBE 68901 - Research	8	
CBE 68901 - Research	5	CBE 63001 - Seminar	1	
CBE 63001 – Seminar	1		9	
	9			
Summer				
		CBE 67890 - Research	0	
			0	44

3rd Academic Year

First Semester		*Second Semester*		
CBE 68901 - Research	8	CBE 68901 - Research	8	
CBE 63001 – Seminar	1	CBE 63001 - Seminar	1	
	9		9	
		Summer		
		CBE 67890 - Research	0	
			0	62

4th Academic Year and Beyond

First Semester		*Second Semester*		
CBE 68901 - Research	8	CBE 68901 - Research	8	
CBE 63001 – Seminar	1	CBE 63001 - Seminar	1	
	9		9	
		Summer		
		CBE 67890 - Research	0	
			0	

Students graduating in August must enroll for CBE 67890 or 68801 during the last summer session.

2.2.3 Ph.D. Comprehensive Evaluation

Students in the Ph.D. program stand for the Comprehensive Evaluation at the beginning of the third semester in residence. Details of this evaluation are outlined in Section 5.

2.2.4 Ph.D. Degree Minimum Grade Requirement

For Ph. D. students, graduate course grades awarded within the department have the following interpretation. The grade of A indicates mastery of the course material, while A- denotes strong comprehension and understanding. A grade of B+ indicates acceptable performance. A grade of B- indicate some deficiencies, which, in the opinion of the course instructor, should be remedied if the student seeks the Ph.D. degree. Grades of C+ and lower indicate serious deficiencies.

Students seeking the Ph.D. Degree are held to a somewhat higher requirement than those set by the Graduate School (see section 2.1.5), which are acceptable for a M.S. degree. These expectations are described in Section 5.1. **Performance in course work is a major component of the Ph.D. Comprehensive Evaluation.**

2.2.5 Language Requirement

The Department of Chemical Engineering does not have a foreign language requirement.

2.2.6 Ph.D. Oral Candidacy Exam

After passing the Comprehensive Evaluation, a student seeking the Ph.D. degree must take the Ph.D. Oral Candidacy Exam in order to become a Ph.D. Candidate. Students should take the oral candidacy exam by the end of the fifth semester, or within the month following (i.e. 24-29 months after joining). Failure to pass the oral candidacy exam within this time frame may result in the suspension of financial support.

The Ph.D. Committee includes the research advisor and three other examiners (readers). The Director of Graduate Studies appoints the committee, and designates a committee chair. Arrangements to set the exam date and time agreeable to all members of the committee are the responsibility of the student. Please email this exam information, along with a room preference, to Anne Veselik in the department office to reserve the room.

Prior to the oral candidacy exam, the student submits a written proposal outlining the Ph.D. research work. See Appendices 2 and 3 for details on preparation of the written proposal. The student must prepare the written proposal on his or her own and submit a copy to his or her Ph.D. Committee one week in advance of the examination date. The student is responsible for the binding and duplicating costs. Once determined, please send Anne Veselik the proposal title.

The oral candidacy examination consists of a short presentation of the proposal (20-25 minutes), followed by a period of questions from the Ph.D Committee on *specific details of the proposal and general knowledge in the research field*. The examination is required to last a minimum of 90 minutes. Approval of the oral candidacy exam requires three out of four votes. Failure to pass the exam signifies the termination of the student in the Ph.D. program. The committee may recommend re-evaluation of the candidate in a re-examination. The

departmental Chair authorizes this retake and, if approved, the second exam must take place within 90 days of the first exam. Failure to pass the second time results in the irrevocable termination of the student in the Ph.D. program.

2.2.7 M.S. Degree for Ph. D. Students

A student pursuing the Ph.D. Degree will be eligible to receive an M.S. Degree after 1) completing five semesters in the Ph.D. Program AND 2) passing the Ph.D. Candidacy Exam AND 3) preparing and submitting for publication a research paper in collaboration with his/her research advisor(s). This paper shall 1) describe work in which the student has a primary (not supporting) role AND 2) be submitted to a research journal or to the proceedings of a technical conference AND 3) be subject to peer review. As an alternative to submitting a paper for publication, the student may instead prepare and present a paper or poster at a technical conference. This presentation shall 1) describe work in which the student has a primary (not supporting) role AND 2) be presented by the student himself or herself AND 3) be presented at a technical conference that is national or international in scope.

2.2.8 Ph.D. Thesis Preparation and Defense

After completing the above requirements and research work, and upon approval of the advisor, the student can start writing the dissertation. The dissertation is prepared following the Graduate School's formatting guide, which is available from the Graduate School's website. Upon completion, it must be defended in front of the Ph.D Committee.

Prior to scheduling the defense, the student should contact the CBE Graduate Administrator to discuss scheduling requirements and to initiate the preparation of necessary forms. It is the candidate's responsibility to determine a mutually agreeable time for the members of the examination committee to convene for the defense. The thesis must be submitted to the Committee (the readers) at least 3 three weeks before the defense. The student is responsible for the binding and duplicating costs.

The defense is open to the public. Fellow graduate students pursuing research in similar areas are encouraged to attend. The candidate should post the time and place one-week in advance of the defense. The candidate should work with the CBE Graduate Administrator to reserve a room for the defense and to be sure that necessary audiovisual equipment is available.

The examination begins with a summary presentation by the degree candidate. The presentation should review the major elements of the thesis and be directed to the thesis readers and to researchers familiar with the research area. Normally the summary presentation is 20-30 minutes in length.

After the presentation, the chair of the committee calls for questions from the audience. Additional questioning by the committee is conducted in private upon excusing the public audience.

After the examination is completed, the chair excuses the candidate and calls for discussion, followed by a vote of committee members. At least three votes (out of four) are required to pass a candidate. The chair sends a written report of the voting results to the

Graduate School, with a copy to the departmental Director of Graduate Studies. After the defense is passed and changes and any corrections recommended by the committee are incorporated into the final text of the thesis, the advisor signs the cover page and the thesis is submitted to the Graduate School.

3. Selection of a Research Advisor

A research advisor is selected soon after joining the graduate program. The departmental Chair sets the timetable for this procedure. During a designated two-week period during the Fall Semester, the faculty post times during which they are available for individual meetings or group conferences with entering students and in which the faculty describe their research work and available projects. After meeting with **all** the faculty, students submit their first, second and third choices of research projects to the departmental Chair. The Chair, on the basis of the choices submitted and available projects, then assigns the student to a research advisor. Every effort is made to assign each student his or her highest priority. However, in some instances, several students select the same project and thus a first choice cannot be assigned to all of them. While a typical student will have an open choice of research projects, there are special circumstances in which a student is admitted with the explicit commitment of working on a specific research project. A significant number of research projects result from collaborations between faculty members. Thus, in some situations, a student may be jointly advised by two faculty members.

4. Teaching Assistantship Duties

Serving as teaching assistant is a required part of the academic program for a graduate degree in Chemical Engineering. Teaching assistantship duties may involve the grading of homework assignments for lecture courses, or include contact with undergraduates in laboratory or study sessions. The course instructor evaluates teaching assistants at the end of each semester; and these evaluations are a component of the Comprehensive Evaluation. Most students will complete their required TA duties during their first two academic years in residence. Under some circumstances, for example for students whose undergraduate degree is not in chemical engineering, teaching assistantship duties may be deferred.

5. Ph. D. Comprehensive Evaluation

The purpose of the Comprehensive Evaluation is to determine whether a student is prepared to perform research at a level consistent with his or her degree objective. The evaluation is normally after the first academic year, typically at the start of the third semester in residence. The evaluation includes a review, based on the student's course work, of his or her knowledge of chemical engineering fundamentals, results of the written and oral components of a research examination, an evaluation by the research advisor of the student's performance in research, and an evaluation of the student's performance as a teaching assistant.

5.1 Knowledge of Chemical Engineering Fundamentals

The student's knowledge of chemical engineering fundamentals is judged by his or her performance in chemical engineering courses taken by the time of the Comprehensive Evaluation. It is expected that the student will have achieved a grade point average of at least 3.25 in CBE graduate courses. In addition, the student will be expected to achieve a grade of B+ or better in at least one course in at least four of the following six core areas

Mathematics: CBE 60542, 60552, 60634, designated special topics courses

Thermodynamics: CBE 60510, 60538, 60547, 60553, 60631, designated special topics courses

Transport Phenomena: CBE 60544, 60545, 60581, 60993, 60995, designated special topics courses

Catalysis & Reaction Engr: CBE 60546, 60567, designated special topics courses

Materials: CBE 60556, 60561, 60565, 60582, 60910, 60913, 60926, designated special topics courses

Systems and Simulation: CBE 60539, 60547, 60572, 60574, 60575, 60576, 60584, 60631, 60916, 60598 (Fall 2007), designated special topics courses

All graduate courses in chemical and biomolecular engineering will count in one of the above six categories. If a course is not listed, or if it is unclear in which category a course belongs, please consult the Director of Graduate Studies. Some courses might be placed into more than one area, and can be counted for either, but not both, area.

If deficiencies should appear in the course work evaluation while the other evaluation components appear satisfactory, specific remedies may be identified on an individual basis at the discretion of the faculty.

5.2 Research Evaluation

The research evaluation consists in part of a written report and an oral examination. The primary criteria are the student's ability to 1) clearly describe the research objectives, 2) demonstrate an understanding of the fundamental principles underlying the research and of the key research literature, and 3) propose a research plan. The ability to justify the research with preliminary results is an important aspect of the evaluation. Guidelines for preparing the written report are attached as Appendix 1.

The oral examination is conducted before a subcommittee of the departmental faculty, including the research advisor. The student makes an oral presentation, no more than 15 minutes in length, describing his/her research objectives, plans, and preliminary results. This is followed by a 30-minute period of questions from the faculty.

In preparing the written report and the oral presentation, the student may consult his/her research advisor on matters of general report or presentation structure *only*. There should be no input from the research advisor on the detailed content of either the written report or oral presentation.

An evaluation by the research advisor of the student's performance in research is also taken into account.

5.3 Teaching Evaluation

Teaching assistantship duties are a required part of the academic program in Chemical Engineering. The evaluation is based on summary reports of assistantship performance prepared by the faculty in charge of the various departmental courses.

5.4 Evaluation Results

Results of the Ph.D. Comprehensive Evaluation are reported as a PASS, a RESTRICTED PASS, a PASS TO A TERMINAL MASTER'S DEGREE, or FAIL.

A student is awarded a **PASS** if performance is judged to be satisfactory in all aspects of the evaluation.

A **RESTRICTED PASS** indicates that the student has performed satisfactorily in most aspects of the evaluation, but with limited and specific deficiencies. As examples, these might consist of a particular course grade, a component of the research examinations, or the teaching evaluations. In the case of a RESTRICTED PASS, specific remedies are outlined to the student, which might include taking a specific course, retaking the research examination, or reviewing a portion of a graduate course. If carried through to the satisfaction of the faculty, the RESTRICTED PASS then reverts to a PASS.

Alternatively, a Ph.D.-seeking student may be given a **PASS TO A TERMINAL MASTER'S DEGREE**. This level of evaluation indicates that a student may continue to work towards a final M.S. degree, but that academic deficiencies exist which jeopardize the student's progress to a Ph.D. degree.

A **FAIL** represents unsatisfactory progress towards the student's declared degree objective, and thus serves as grounds for terminating a student's continuation in the graduate program.

5.5 Reporting of Results

Students are informed of the evaluation results by letter from the Chairperson or the Director of Graduate Studies shortly after the research examinations..

5.6 Re-evaluation

In some cases, student may be required to retake the research components of the Comprehensive Evaluation if there is a substantial change in research area.

A student may also request reconsideration of a previous result of a PASS TO A TERMINAL M.S., or of FAIL. The faculty will consider these requests on a case-by-case basis.

6. Financial Support from Departmental Sources

When a student is admitted with financial support, assuming satisfactory progress and with the approval of the advisor, every effort is made to continue financial support until the thesis is completed. However, for a student entering with a Bachelor's degree in Chemical Engineering, the upper limit for eligibility for financial support from *departmental* sources is 48 months for a Ph.D. student and 16 months for an M.S. student. If a student enters with a Master's Degree in Chemical Engineering, then these times are decreased by the equivalent of one academic semester (4.5 months) for each 12 credits transferred from the previous institution. If research

grant funds are available, then individual advisors usually provide funding beyond the indicated periods; however, eligibility for support from departmental sources ends.

Satisfactory progress means that the student continues to maintain the minimal grade requirements outlined in section 2, and meets the deadlines for the indicated degree objectives as outlined in section 2. In particular, financial support may be suspended if the deadline for the Ph.D. Oral Candidacy Examination is not met as described in section 2.2.6.

The date for completing thesis research is decided jointly by the advisor and the student, typically 2 to 3 months in advance of the date of the thesis defense. If financial support should terminate before that date, then the advisor provides the student a three-month written notice in advance of the anticipated termination date for financial support.

7. Vacation Policy

The basic departmental vacation policy for graduate students is that each graduate student is eligible to take two weeks vacation during each twelve-month period, in addition to University holidays of: Thanksgiving, Christmas through New Year Celebration, Good Friday though Easter Monday, Memorial Day Observance, and Independence Day. Students are to consult with their advisors regarding specific days that they wish to take as vacation so that research can progress in a planned and coordinated manner.

8. Safety

Safety is of paramount importance in all aspects of departmental operation. While knowledge of appropriate procedures is of particular importance in the research and instructional labs, all members of the department should be aware of the possibility for accidents or unsafe conditions to occur, and should actively participate in the program to make a safe environment for everyone. All members of the department should familiarize themselves with the departmental Safety Manual and follow the directives therein. All students are required to attend a safety seminar at the beginning of each Fall Semester.

In general terms, there are several ways in which graduate students can improve their degree of personal safety. The first is to be aware of any potentially hazardous materials that may be in the laboratories. A Material Safety Data Sheet (MSDS) should be available wherever materials are located. Additionally, personnel should report any unusual sensitivities or allergies to the chemicals handled in the research or instructional laboratories to the advisor or instructor in charge, and appropriate precautions must be taken. For example, this might include the use of respirators, gloves, and hoods when handling particular compounds, or else completely avoiding possible exposure.

A second main area concerns laboratory routine. Many items of research equipment can be dangerous if not handled intelligently or if not appropriately maintained. Examples include high-pressure gas cylinders and regulators, high temperature furnaces, flammable or hazardous compounds, machinery, electrical equipment, and lasers. It is essential that students be familiar with the proper operation and maintenance of research equipment, as well as the handling of hazardous compounds. This is an area where students must exercise prudent judgment.

Emergency phone numbers should be posted by telephones in laboratories and offices. A list of hazardous materials and running experiments should be posted on the laboratory door with phone numbers for emergency personnel to contact.

Finally, students should learn elementary first aid and safety procedures in the event of an accident in their own or other laboratories, or else at home or at other university functions. CPR and first aid courses are recommended for all members of the department.

9. Health Insurance

All registered graduate students are automatically enrolled in the Notre Dame student insurance plan unless proof of comparable coverage with an American-based insurance company is provided. The premium for the student health insurance plan is charged to your student account with the University.

The Graduate School provides a subsidy of the health insurance premium cost for full-time, fully funded students who purchase the University health insurance plan. See the Graduate School's website for more information (http://graduateschool.nd.edu/graduate-student-life/health)

10. Grievance Procedures

In the event that a student has an unresolved complaint or grievance with the Department, he or she may appeal in writing to the Department Chair and/or the Director of Graduate Study (DGS). If the grievance is related to dismissal from the graduate program, then the student must file the written appeal within 14 days from the time notified of dismissal. To hear the appeal, the Department Chair (or DGS) will then appoint a committee of three faculty members, who are unconnected factually with the case or the reasons for appeal, to investigate the complaint. If both the Department Chair and DGS are involved in the case, then the Dean of the College, or his/her designee, will appoint the committee. The person who appoints the appeals committee will also designate a chair for the committee.

The student's statement should indicate details on the nature of the problem, the date(s) the problem occurred, the grounds upon which the appeal is based, background information that the student considers important, and the relief requested.

The appeals committee will promptly and thoroughly investigate the appeal to determine whether the relief requested is warranted. The investigation may include interviews and/or written statements from the student, any student witnesses, faculty or staff members who may be able to provide pertinent information about the facts, as well as a review of any pertinent documents. In most situations, the appeals committee will complete the investigation in 30 business days (business days do not include weekends or employee holidays as recognized by the University). There may be some reports that cannot be investigated within 30 business days. In such cases, the chair of the appeals committee will communicate to the student that the investigation is going to take longer than 30 business days and will also include a statement indicating when the committee anticipates completing the investigation. The chair of the appeals committee will notify the student in writing of the decision of the committee.

If a student is unsuccessful in resolving a complaint at Department level, the student may choose to appeal to the Dean of the Graduate School, who will make a final determination. The student should not make such an appeal until after exhausting available procedures within the Department. The Graduate School's grievance process can be found at: http://graduateschool.nd.edu/assets/9047/info_appeal_procedure.pdf.

The procedure described here is not to be used to address issues of sexual or discriminatory harassment or disability-related grievances (see *du Lac: A Guide to Student Life* at http://orlh.nd.edu/dulac/) or of academic fraud (see 'Academic Integrity' section of the Graduate School *Bulletin* at http://graduateschool.nd.edu/assets/16757/bulletin.0910.pdf).

Appendix 1.

COMPREHENSIVE EVALUATION
WRITTEN REPORT CONTENT

See Appendix 3 for format details (margin, spacing and font requirements).

I) **Title page:**
Include the project title, your name and your advisor's name(s), and the date.

Sections II and III combined should be no more than 5 pages, excluding figures and tables (place figures and tables immediately after the 5 pages of text).

II) **Background:**
Discuss the state of the art in the field of your research, describing, for example, key problems to be solved, theories proposed, and results obtained by others to date (cite references, and give full citations in Section IV). Be sure to include any previous and ongoing work in this field in your own research group.

III) **Proposed Studies:**

3.1 ***Objectives*:**
State the specific objectives of your work, and explain clearly the difference between your work and previous work in or outside of your group. Summarize the methods or theories that you plan to use. Indicate the expected significance of your work.

3.2 ***Research Plan***:
Indicate and justify a research plan to attain the stated objectives.

For laboratory work, describe briefly the schematics of your apparatus. Indicate what measurements will be made and how they relate to your objectives. Discuss the capabilities of your apparatus and whether the sensitivity of the instruments used will allow you to make measurements with the appropriate resolution. Use examples, along with preliminary results if possible.

For modeling, computational and/or theoretical work, describe the approach to be followed, stating all assumptions, outline the computational algorithms to be used or developed, and discuss the relevant computational requirements (e.g. CPU time, memory). Indicate the criteria that will be used to judge the success of your model, algorithms or theory. Use examples, along with preliminary results if possible.

IV) **References**:
Citations for references used. Please use the citation format used in the *AIChE Journal*.

V) **Career Objectives**:
(One or two lines) Include on the last page of references.

VI) **Appendices**:
If deemed *essential* to the report, detailed equations or experimental procedures could be included in appendices, which should not exceed a total of five pages. Reports without additional appendices are generally preferred.

Appendix 2.

CANDIDACY EXAM
WRITTEN PROPOSAL CONTENT

See Appendix 3 for format details (margin, spacing and font requirements).

I) **Title page:**

Include the project title, your name and your advisor's name(s), and the date.

II) **Project Summary (1 page maximum):**

This should be an executive summary describing your project in terms that will be understood by someone who is not an expert in the field. The summary should be written in the third person and include a statement of objectives and methods to be employed. The intellectual merit of the proposed work should be clearly stated.

III) **Project Description (15 pages maximum):**

The Project Description should:

- Provide a clear statement of the work to be undertaken, as well as its objectives and its expected significance.
- Summarize the state of the art in the field, including previous and current work in the student's research group, and explain how the proposed work will advance the present state of knowledge.
- Outline the general plan of work, including the broad design of activities to be undertaken, and, where appropriate, provide a clear description of experimental methods and procedures.
- Include results already obtained by the student
- Justify the ongoing research as well as future work.

NOTE: Figures, tables, equations, photographs, and other non-textual items used are all included in the 15 page limitation.

IV) **References**:
Citations for references used above. Please use the citation format used in the *AIChE Journal*.

NOTE: These guidelines and page limitations have been adapted from the National Science Foundation requirements for research proposals.

Appendix 3.

Formatting Requirements for COMPREHENSIVE EVALUATION WRITTEN REPORT and CANDIDACY EXAM WRITTEN PROPOSAL

Your report or proposal must be clear, readily legible, and conform to the following requirements:

a. Use one of the following typefaces:
   - Arial, Helvetica, or Palatino at a font size of 10 points or larger
   - Times or Times New Roman at a font size of 11 points or larger
   - Computer Modern family of fonts at a font size of 11 points or larger.

   A font size of less than 10 points may be used for mathematical formulas or equations, figure, table or diagram captions and when using a Symbol font to insert Greek letters or special characters. Students are cautioned, however, that the text must still be readable.

b. No more than six lines of text within a vertical space of one inch.

c. Margins, in all directions, must be at least an inch.

d. Use only a standard, single-column format for the text.

e. The text may be single spaced, but extra space between paragraphs is encouraged.