GEORGETOWN UNIVERSITY
Department of Chemistry

GRADUATE STUDENT HANDBOOK

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Table of Contents

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A. LEARNING GOALS

The Chemistry Department has identified learning goals, skills, and expertise that our doctoral students will have attained by the time they graduate.

We are committed to instilling in our students a deep level of scientific understanding, dedication to responsible and ethical research and sophisticated technical skills that enable them to be independent, creative and effective contributors to scientific knowledge.

1. Broad chemistry knowledge. The students will broaden and deepen their understanding of theories, concepts and models to enhance their success as scientists and educators.
2. Expertise in a specific discipline. Each student will acquire a deep working knowledge of a particular field in chemistry.
3. Communication skills. Graduates will be able to construct and defend arguments with clarity. They will be able to write for and speak with peers, experts and the public on a range of topics specific to their discipline.
4. The ability to access and evaluate primary literature. Students will have the ability to search, read and critically analyze the primary literature in order to understand and synthesize new ideas in their field.
5. Data analysis skills. Students will have the ability to produce, analyze and interpret meaningful chemical data and draw sound conclusions.
6. Become independent researchers. Graduates will be able to conceive, design and execute research projects independently.
7. Make original scientific contributions. Students will solve new and significant problems in their chosen field. They will understand the importance of this work in advancing the progress of their discipline and be able to explain its relevance. The quality and value of this work will be such that it can be published in a highly respected peer reviewed journal.
8. Responsible conduct in research. Graduates will understand and conduct research exhibiting the highest standards of safety, honesty and integrity.
9. Teamwork and interdisciplinary collaboration. Graduates will have the ability to work effectively as part of a team and to cross traditional boundaries and execute multidisciplinary research.
10. Teaching and mentoring skills. Students will acquire teaching skills and gain experience mentoring less experienced scientists in a research setting.

B. INITIAL REGISTRATION

Upon entering the Department each student will be assigned a temporary faculty advisor, who will guide the student until he or she has selected a permanent mentor (see section D). The student should see his or her temporary advisor prior to registration. At that time, the student, with the advice and approval of the temporary advisor, will select courses to be taken in the first semester. This selection will be based on the student's previous academic record (including phase I exam performance [see below]), and the student's goals and objectives. Students on full assistantship are expected to register for three 3-credit courses along with Seminar and Introduction to Chemical Education. All students entering in the Fall will take a first round of qualifying examinations, called the

"Phase I exams" before the start of the first semester (see Appendix 2A). Specifics of this set of exams and other orientation meetings are described in a letter sent to each student prior to arrival.

Students should be aware that, after the registration period has ended, "dropping" a course without concomitant replacement by one or more courses with an equivalent number of credits will entail a financial penalty **to the student**. This penalty will not be covered by any Chemistry Department or University Assistantship award. Students wishing to drop a course should first consult with their temporary advisor and with the Director of Graduate Studies.

C. TEACHING

The Chemistry Department takes all teaching duties seriously. As part of its training program, the Department requires that all Ph.D. candidates gain teaching experience. The requirement has been established for academic reasons, and does not imply the award of a teaching assistantship. Prior teaching experience can fulfill the requirement, in part or in whole.

The Department expects its teaching assistants to be prompt, to be available at assigned times, to be courteous toward both students and faculty, to be well prepared for assigned tasks, to make their best efforts to help students, to be accurate in their grading of examinations and laboratory reports, to prepare (when appropriate) written materials for use by their successors (experimental procedures, instrument instructions, etc.), to exercise care in handling chemicals and instruments, and to be conscious of, and strictly follow and enforce, all applicable safety rules. Safety regulations and information are posted in all teaching and research laboratories. Booklets on safety, prepared by ACS, and Handbook for Teaching Assistants will be made available to graduate students. See also Section T. All new graduate students are required to attend a meeting, typically held during the week before the start of classes in the Fall semester, at which the Department's policies on Safety and Teaching, are presented. In addition, 1st year Teaching Assistants normally register for "Introduction to Chemical Education" (CHEM-910), in the Fall (2 credits) and Spring (no credits) Semesters. At least one week before the start of classes, graduate students attending the Department on a University or Department Assistantship must consult the teaching assignments posted in the Departmental office. They should then, without delay, contact the faculty member in charge of the assigned course, who will discuss specific duties with them.

Teaching assistants play a vital role in the operation of the Department. In the majority of cases students fulfill their assisting obligations conscientiously and with enthusiasm. It is only relatively rarely that an individual fails to perform his or her duties satisfactorily. In such cases, the following sequence of corrective actions[1] will be taken:

1. The student and, concurrently, the Director of Graduate Studies will be informed, orally, by the faculty member in charge of the course that the student's performance is unsatisfactory. The student will be informed specifically about the nature of his or her deficiencies and be expected to correct these deficiencies immediately.

2. If the first action proves ineffective, the recurring problem(s) will be reported, in writing, by the faculty member in charge of the course to the Director of Graduate Studies, who will issue a formal, written warning to the student. The warning will remind the student of the Department's position concerning the importance of teaching duties, and will list the possible penalties for continued unsatisfactory performance. These are:
   (a) additional duties for the Department, to be completed within a specified time,
   (b) temporary loss of University Assistantship or Departmental support (e.g., one semester),
   (c) recommendation to the Graduate School for dismissal.

[1]These do not supersede any disciplinary actions that might subsequently be imposed by the Graduate School.

Unless clear and immediate improvement in performance results from the second action, the Chair, or a disinterested small Committee, will specify the appropriate penalty. It is intended that the student has at all times during this process the opportunity to present his or her views or explanations to the Chair, and to appeal the final decision to the Chair or a special Committee appointed by the Chair.

A procedure similar to that specified in 1) and 2) above will be operative if a graduate student fails to perform research or assigned departmental duties satisfactorily.

D. CHOICE OF MENTOR

Each new student must choose a permanent research advisor or "mentor" during the first semester of study. No student will be assigned to work under a mentor who is not of the student's own choosing, and no faculty member is obliged to accept direction of the research of any individual student. All full-time regular, tenured or tenure track faculty members of the Chemistry Department may serve as mentors.

In order to introduce new graduate students to research problems under current investigation in the Department, and to help them select a mentor, students joining the Department register for a 2-credit course, “Introduction to Graduate Research”, CHEM-915, given each Fall semester. This course (graded S/U) requires attendance at a series of weekly meetings in which faculty members (two per week) discuss their research programs, and during which students can become better acquainted with faculty members. Attendance is required for all graduate students who have entered since the previous Fall semester.

Before selecting a mentor, each student must interview at least five faculty members about their research. For students entering in Fall, such interviews will, typically, follow completion of CHEM-915. At the end of each interview, the student should have the faculty member sign an interview and mentorship form (Appendix 1).
Students should defer a final choice of mentor until after all of these interviews. A faculty member should not accept a student under his or her mentorship until the student has completed at least five interviews, as attested by the interview and mentorship form. The selection of the mentor must be mutually agreed upon by both student and mentor, and approved by the Chair before the end of the first semester.

Mentorship may be terminated at any time by either the student or the faculty member. It is not considered ethical for a faculty member that is not the mentor to initiate discussion with a graduate student on the subject of changing mentorship. However, it is proper at any time for the student to initiate discussions of change of mentorship. Thus, discussions of change of mentorship may be initiated only by the student, his / her mentor at that time, or a disinterested third party, such as the Director of Graduate Studies. In the event of termination of mentorship (or co-mentorship) by either party, the student shall move promptly (normally within 30 days) to obtain a new mentor (or co-mentor).

A student who wishes to gain additional experience prior to selecting a mentor should consult with the Director of Graduate Studies prior to December 1, and initiate discussions with several faculty members about the possibility of carrying out short-term research in two or three research groups, prior to final selection of a mentor for the Ph.D. thesis. If these arrangements (including a tentative schedule of short-term projects) can be worked out in a manner satisfactory to all concerned, the Director of Graduate Studies will designate a faculty member to act as the student's advisor, and one or more other faculty as members of an ad hoc committee to supervise the student's research. The advisor would normally chair that committee. The Director of Graduate Study will inform the Department of the arrangements that have been made at the first faculty meeting of the student’s second semester, normally prior to the start of classes of the Spring semester. The choice of Ph.D. mentor must be made prior to the start of the student's third semester. Arrangements involving two co-mentors are possible, and are required when retirement of a faculty member is likely within three years.

E. COURSES

The Graduate School currently requires a student entering with a bachelor's degree or the equivalent to complete 24 credits for the M.S. with thesis, 30 credits for the M.S. without a thesis, and 32 credits for the Ph.D. degree. A student entering with a master's degree that included a thesis is required to complete at least 26 credits. A student entering with a master's degree may request advanced standing towards the doctoral degree from the Graduate School through the Director of Graduate Studies. Doctoral students in the Department must successfully complete seven 3 credit graduate courses. Of these seven, it is recommended that at least three be designated "foundation" courses from three separate subdisciplines. Students must also successfully complete four other courses, Chem-915 and Chem-910 (Fall semester), and Chem-704 and Chem-910 (Spring semester). Credits earned in CHEM-903 and CHEM-910, and in seminar and research courses count towards the total credits required. Appendix 2 contains additional curricular information. The chemistry department has a flexible curriculum which can be adapted to fit the particular needs of individual students; the exact course of study for each student is worked out between the student and the mentor, with the approval of the department, via an outline of study (Section G).

F. GRADUATE GRADES IN CHEMISTRY

Graduate grades, as applied to Chemistry courses, are defined as follows:

A: excellent, outstanding
an indication of excellent performance. It is expected that this represents performance at a level of the top 10% of students in comparable courses in good universities.

A^- - an indication of excellent performance. (As for A, but top 25%)

B+: an indication of very good performance.

B: an indication of good performance.

B^- - an indication of marginally acceptable performance.

C: below expectations.

F: unsatisfactory performance; failing.

A B average is required for continuation for the eventual award of Masters or Ph.D. degree.

G. QUALIFICATION AND OUTLINE OF STUDY

Soon after the student has completed nine graduate credits in Chemistry at Georgetown, but not later than immediately following completion of twenty-six such credits, the Department, at a faculty meeting, will make a decision about the academic progress of the student. This decision will be based on a balance of factors, including the results of the Phase I examinations, course grades, performance as a teaching fellow, performance in giving of and participating in seminars and, last but not least, evidence of research potential. As a result, the Department can declare the student "qualified to proceed to the Ph.D." or "qualified to proceed to the M.S. only," or can ask the student to withdraw. Qualification to proceed to the Ph.D. includes qualification to proceed to the M.S., if desired. For good reasons, based on new evidence available after his or her last qualification, a student qualified to proceed to the "M.S. only" may later petition the Department for permission to proceed to the Ph.D. Specifically, the new evidence which may be brought before the Department for its consideration should address, to the extent applicable in the individual case, any new results of the Phase I examinations, recent course grades, performance as a teaching

and/or research fellow, performance in the giving of and participating in seminars and, foremost, research progress and potential. As with the initial evaluation, the Department's final decision will be based on a balance of such factors.

Phase I examinations (see Appendix 2A) are given three times during the first year - during the week preceding the start of fall semester, at the start of the Spring semester, and during the Spring semester. Students who do not reach "excusing level" on the first attempt, can retake the exams up to two additional times. A student who reaches "excusing level" in four Phase I exams on the first try and earns good grades in the first semester may be qualified to proceed to the Ph.D. at the beginning of the second semester. Others might be declared qualified after the Spring exams, after the May grades, or after a summer of research. It is the responsibility of the student's mentor to bring the matter of qualification before the Faculty at an appropriate time.

An outline of study will be generated by the student and mentor and given to the Director of Graduate studies for approval before the start of Add/Drop of a graduate student's second semester. This outline will specify all graduate courses taken by the student, and the titles and sequence of proposed future courses based on the two-year schedule of graduate classes. After the mentor has signed the outline of study, it will be circulated among all faculty members. Once approved (including possible amendments) by the faculty, the outline of study is binding on both the student and the Department. All courses listed must be taken and passed. Substitution can be made only with the voted approval of the Chemistry faculty acting upon a petition by the student, with prior approval from the mentor. Students entering with prior graduate-level work may request exemption from similar courses taught at Georgetown, by sending a written request to the instructor of that course. The teacher of the course involved should place a memo in the student's file when exemption is granted.

H. SEMINARS AND COLLOQUIA

All graduate students are required to make oral presentations to the Department. The first presentation is a literature seminar, which is a 25-30 minute talk given during the student's second semester as part of the required 2-credit course, "Seminar: Advanced Graduate Chemistry" (CHEM-703 or -704). The content should be based on an important topic from the recent literature (not a review article) but not directly related to his or her own research topic, and chosen by the student with the advice and approval of the mentor. The purpose of the literature seminar is to provide the student with the opportunity to investigate a new subject in some depth, to gain practice in organizing complex scientific arguments and to present those arguments to his or her colleagues in a clear manner. The date of the seminar is set during the previous semester by the Professor in charge of CHEM-703/4. Those faculty members who attended the seminar will discuss the student's performance and recommend a grade for CHEM-703/4. If the seminar is found to be deficient (in content, organization or presentation), the student will be informed of the nature of the deficiency and will be required to present another seminar at a later date.

During the student's seventh semester the student will present a 20 minute departmental research seminar, in a similar format to that of ACS national meetings. The research seminar should cover the current progress made toward the thesis research, and thus will serve to update the Department on the project's status. A poster session that occurs concurrently with the annual state of the department address at the beginning of Fall semester provides an additional opportunity for students to present their research (one poster per research group is requested – it may summarize the research of more than one student). Near the end of a student's graduate studies, he/she must also present a full public seminar (~50 minutes) on his/her thesis research. This seminar is intended to prepare the student for the thesis defense. Guidelines for the preparation and presentation of effective seminars are given in Appendix 7.

Attendance at scientific seminars given by both departmental and outside speakers is also a vital part of any scientist's education and professional life. All graduate students in the Chemistry Department are required to attend at least one seminar per week during regular academic semesters, and all departmental "colloquia" regardless of whether the student is enrolled in any of the Seminar courses (Chemistry 701-704). As outlined in Appendix 3, students will be asked, on a rotating basis, to take responsibility for the procurement and operation of the necessary projection equipment, and for preparing seminar refreshments.

I. COMPREHENSIVE EXAMINATIONS

I. Comprehensive (Phase II) Examinations

Phase I examinations are intended to test proficiency in chemistry at the bachelor's level of a good university. Building upon this knowledge, the Ph.D. course of study enhances the depth of understanding of theory, provides opportunities for its application, and, most importantly, allows the students to use deductive and inductive reasoning while conducting experiments. The central part of the Ph.D. degree program is mastering the techniques of research - learning how to solve well-defined scientific problems and how to define and solve novel problems. The extent of acquisition of these skills is tested by the comprehensive (or "Phase II") examinations.

The Phase II examination consists of two parts, Part A and Part B, which are taken sequentially. Students are required to take the Phase IIA examination in their 4th semester. The Phase IIB examination should be taken in the 5th semester, but no later than the semester following completion of the Phase IIA exam. If extenuating circumstances exist, a student may petition the Director of Graduate Studies for an extension.

Part A. The first part of the Phase II examination consists of a written paper on the student's ongoing research project and an oral defense of the paper. The student examined is expected to show sufficient progress with his/her research, in-depth understanding of the research objectives and goals, and knowledge of the relevant literature.
The paper should be no longer than 10-12 pages in length (excluding references) and include a comprehensive literature background, a detailed summary of research results obtained to date, and clear future research directions in the area. The Committee for the Phase IIA Examination will be the student's Thesis Advisory Committee, if already formed, (see section K) with the mentor acting as Chair. In many cases, the Phase IIA examination serves as an opportunity to construct the Thesis Advisory Committee. After consultation with his or her mentor and potential committee members, the student is to request a 3-4 faculty committee by email to the Chair of the Department. The committee will be appointed by the Department Chair, who may appoint additional committee members or replace suggested members, as deemed necessary. The timetable for this part of the examination will begin with a letter from the Director of Graduate Studies notifying the student during his or her 4th semester that his/her Phase IIA exam must be completed by the end of his/her 4th semester. Upon receipt of this letter, the student will be given no more than six weeks to prepare the paper; a copy of the report must be delivered to each member of the committee at least two weeks prior to the date of the oral examination.

Part B. The second part of the Phase II examination consists of a written proposal on an original research topic, followed by an oral defense of the proposal. The questions asked during the defense will usually arise from the paper and from the current scientific literature in the field, but may involve broader areas of chemistry. The student will be assessed on several factors, including but not limited to: the student's comprehension of the science described in the paper, the general depth of the student's knowledge of his or her chosen field, and the student's familiarity with and general understanding of the current issues in that field. The student is expected to show a very good knowledge and understanding of chemistry principles and concepts. The idea for the research proposal must be originated by the student and cannot be related to research being performed in the laboratory of the student's mentor, nor can it be related to current or past research performed by the student elsewhere. The timetable for the examination will begin with a letter from the Director of Graduate Studies at the beginning of the semester following completion of the Phase IIA exam to notify the student of the commencement of the Phase IIB examination process. Within four weeks of receiving this notification, the student will deliver to each member of the IIA Committee an abstract no longer than 1-2 pages outlining the original research proposal. Within one week of receiving the proposal abstract, the student's mentor will then suggest to the Department Chair a new chair for the Phase IIB committee (not the mentor). Changes in committee composition to reflect the proposal's subject matter can be suggested by the student, mentor, or any Phase IIA committee member, and should be forwarded by the student's mentor to the Department Chair who will assign the Phase IIB committee, indicating the Phase IIB chair. All Phase IIA/B and TAC members are to be notified by the executive administrative assistant of the new Phase IIB committee, especially in cases where the committee composition changes. Within two weeks of having received the proposal abstract, each IIB Committee member is expected to comment to the IIB Committee Chair on the suitability of the student's proposal. The IIB Committee Chair should share these comments with the student and will inform the student if the abstract is approved. If the abstract is rejected, the student will be provided with an explanation by the IIB Committee Chair and be asked to submit a more satisfactory abstract within two weeks.

Once an abstract is approved (either initially or after a subsequent submission), the student has six weeks to develop the proposal and submit a full research proposal no longer than 12 pages (excluding references) to all members of the IIB Committee. The oral defense will occur within two weeks of submission of the full proposal.

The format of the oral defense part of both IIA and IIB examinations is patterned after the Ph.D. thesis defense (see Appendix 7). In preparation of the IIA report and its oral defense, the student can and should consult with other members of the department, including the mentor, the research group, other faculty, and other students. For the IIB proposal, students are encouraged to seek constructive feedback from peers as to the clarity and soundness of both the written report and a practice oral presentation. Additional guidance on Phase IIB exam preparation can be found in Appendix 6. There are three possible outcomes: pass, fail, or recess. Failure of the IIA examination is considered a failure of the student's comprehensive exam, and the result will be forwarded to the Registrar. In the event of a failure, the committee will either recommend a second attempt at the exam or recommend that the student be terminated from the program. A student that desires a second attempt at an exam should make a written request to the Director of Graduate Studies within one week of completing the first attempt. A recess occurs anytime a decision is not reached at the end of the initial exam. Only one recess is allowed and the total time form the initial exam date to a final decision shall not exceed eight weeks. During a recess the committee may request various work such as: written responses to questions, certain experiments, or further oral examination.

J. GRADUATE RESEARCH

The heart of graduate education is research, in which the student apprentices him- or herself to an experienced scientific researcher. The research topic can be suggested by either the student or the mentor, but must be agreed upon by both. The topic can be modified or changed by mutual agreement. However, the mentor is the sole judge as to whether enough research has been accomplished for the student to complete his or her Ph.D. thesis, and to have a final oral defense scheduled. The final judgment as to whether or not the thesis constitutes a sufficiently significant modification or enlargement of a field of knowledge rests with the thesis examining committee. The mentor is the sole judge of scope for an M.S. Thesis. Although the mentor will usually be involved in many phases of the research, the final responsibility for the research results rests with the student. This also applies to the form of the thesis, and to the claims of research accomplishments made by the student in his or her thesis.

The procedures outlined for unsatisfactory performance of teaching duties outlined in Section C will also apply to students who fail to progress satisfactorily in their research, however, the possible actions outlined in B.2 will also include review of qualification for M.S. and/or Ph.D.

At the start of research, each student should review the laboratory safety rules with his or her mentor. During the course of his or her research each student should keep legible laboratory notebooks in a form acceptable to the mentor. It is important to note that Georgetown University and any Federal sponsor of the research (e.g. NSF, NIH) are the ultimate owners of these notebooks.

K. THESIS ADVISORY COMMITTEES

Within two years of the date that the student enters the Department or at the time of formation of the student's Phase IIA Committee, whichever occurs first, the Chair, following consultation with both the student and the mentor, will appoint a Thesis Advisory Committee (TAC) for each student. The Committee will normally consist of two faculty members in addition to the mentor, and unless circumstances intervene (sabbatical leaves, etc.) will act as the student's Phase IIA Committee and form the core of the Thesis Defense Committee. The TAC shall meet at least once a year to discuss and evaluate the student's progress. Either the student or the mentor is free to confer with the Committee at any time concerning the student's progress or well-being.

L. THE Ph.D. THESIS AND ITS DEFENSE

The thesis is the culmination of the research done by the student with the guidance of the mentor. It should be written in a manner understandable to an interested chemist. Writing a thesis is an integral part of the student's training; it must be taken very seriously. Clearly, one must first have scientific results before the need arises to communicate them, but skill in sharing one's results with the scientific community takes time to develop. The student is therefore advised to start thinking about the organization of the thesis in the early stages of research, as it can help to focus on the important questions to be answered. An early start assembling relevant literature references will help in keeping oneself informed of related work done elsewhere. Students are advised to attend thesis defenses of their colleagues.

A thesis proposal should normally be submitted by the end of the semester following advancement to candidacy, defined as completion of the Phase I exams and all course work. This would normally take place in the 4th semester for students entering with an M.S. and in the 6th semester for students entering with a B.S. /B.A.

The organization of the thesis is not prescribed, although the student should peruse previous theses as possible models. There are, however, fairly strict rules concerning the format of the thesis. The formal requirements of the Graduate School are summarized in the "Georgetown University Guidelines for Dissertation/Thesis Writers". Students should acquire the guidelines from the Graduate School along with the informal check list for submitting Ph.D. thesis. Additional Departmental requirements are listed in Appendix ~~5~~ 3.

The student submits the draft of the thesis to the mentor, who can suggest both general and specific modifications. When the mentor reports, in writing, to the Department Chair that the mentor is satisfied with the scope, quality and format of the thesis, the Chair appoints at least two additional readers, who will carefully and critically read the draft (at least rough-typed, but completely punctuated, annotated, etc.) of the thesis as approved by the mentor. One of the two readers may be a non – Georgetown University faculty member that is a recognized expert in the relevant field of research. The essential function of each reader is to decide whether or not the thesis establishes its claims with respect to new results and whether the form of presentation falls within acceptable limits (e.g., consistent with the practice of a major journal in the research field). Readers may and should consult with one another, and with the student and mentor. Students are entitled to obtain, on request, a written statement from each reader specifying the reader's objections and/or suggested corrections, if any. Students should expect to allow, and readers may reasonably expect to have, four weeks to read a thesis, counting only time within academic terms. If, in the opinion of a reader and with the concurrence of the mentor, the thesis requires significant rewriting, an additional four-week period will begin when the student submits the revised version.

After considering the draft of the thesis and any subsequent revisions made by the student, each reader will write a separate letter to the Chair stating whether he or she finds the thesis (apart from possible retyping) to be satisfactory; that is, whether he or she will be willing to sign it, certifying that it proves its claims and is in an acceptable form. In the event that, even after revision by the student, a reader is not satisfied with the thesis on one of those bases, but the mentor refuses further change, the Chair, with the concurrence of the Dean of the Graduate School, may appoint an outside reviewing authority whose decision on the point(s) will be final.

When the readers, the mentor and the student have all agreed on the thesis, and when it is in its final form, the Chair appoints a committee for the final oral examination and communicates the membership to the mentor and the student. This committee always includes the mentor, and usually all of the readers. The chair of the final oral exam committee will be a full-time faculty member of the Department, other than the mentor or the readers.

It is the student's responsibility (not that of the mentor, unless he or she so chooses) to find a suitable time during which all members of the examining committee are available, to arrange a suitable conference room for the examination for that time, to inform all committee members of that time and place, and to distribute all needed material to each member of the examining committee

Unless every member of the examining committee acquiesces to a shorter time, at least two weeks must be allowed between the appointment of the final oral examination committee and the examination. During the entirety

of this period, a copy of the thesis in its final form must be available to any committee member who wishes it. The examination may not be held if fewer than four members of the examining committee are present.

All Graduate School Students are required to register each Fall and Spring semester from matriculation to the awarding of the degree.

It is customary that final oral examinations for the Ph.D. are public exercises. In addition to the examining committee, any full-time Georgetown University faculty member from any discipline and any part-time Chemistry faculty member may attend any final oral thesis defense. Such faculty members in attendance will be extended the courtesy of questioning the candidate and participating in the confidential discussion of the thesis and its defense after the candidate has withdrawn, but only the committee members may vote. In addition, final oral defenses will be open to attendance by any other interested persons, but the Committee (by majority vote) may rule that such non-faculty persons may not attend. However, non-faculty persons may not question the candidate, unless invited to do so by majority vote of the Committee, and must leave before the confidential discussion and vote.

The specific rules governing the final oral examination are given in Appendix 4. Finally, Appendix 8 contains a clearance sheet for use after successful defense of the thesis and before final signature by the Chair.

M. REGARDING THE M.S. DEGREE

It is not required that Ph.D. students first earn a M.S., but that option is available. An M.S. thesis is similar in form to a Ph.D. thesis but of a more limited scope. Only one reader (besides the mentor) is required for an M.S. thesis. No oral exam is required for an M.S. A student who has been a graduate student in good standing at Georgetown for six semesters and who does not already hold an M.S. degree may petition the Department to approve award of an M.S.-without-thesis. A research report in a form and of a content that is acceptable to the mentor must be submitted, and at least thirty (30) graduate credits completed, to earn the M.S. without completing a thesis. Approval of the petition is not to be presumed. It is the policy of the Department to encourage students who, for whatever reason, wish to obtain M.S. degrees to submit M.S. theses. Students should acquire from the Graduate School the informal check list for submitting a Master's thesis. The clearance sheet given as Appendix 6 should also be completed after submitting an M.S. thesis.

Any student who has passed the Phase II exams and has completed at least thirty (30) of the required thirty-two (32) graduate credits will, upon request, receive approval for award of an M.S. degree without thesis.

N. POLICY REGARDING OFF-CAMPUS THESIS RESEARCH BY GRADUATE STUDENTS

The most important single component of the Ph.D. program is research. One of the main sources of intellectual stimulation for chemical researchers is intense and frequent interaction with others also engaged in academic chemical research. Georgetown University has made a commitment to maintain a community of chemists to facilitate excellent research by graduate students of the Georgetown Chemistry Department. In order to foster a sense of intellectual community, the Department has a policy that graduate student thesis research should normally be done on campus, and under the direct and full supervision of Georgetown Chemistry faculty. This means that only tenured or tenure-track members of the Chemistry Department may determine the scope of and direct theses. Topics for Ph.D. theses are selected by the student and mentor jointly, and by mutual agreement, and must lie in one of the areas of research interest of the mentor.

Modern chemistry involves complex techniques and sophisticated instrumentation. Georgetown University maintains well-equipped chemical laboratories. Some of the equipment in the Department has been purchased by grant funds awarded in response to applications from individual investigators and is primarily used by the research group for which it was purchased. However, all such equipment is owned by the University and is potentially available for use by other properly qualified students through arrangements that insure that such usage does not interfere with that of the primary users. Nonetheless, it is recognized that it sometimes will be useful, advisable and,

indeed, even necessary for graduate students to use equipment or facilities that involve working at off-campus laboratories (including national laboratories and regional academic facilities). To enable both mentor and student to plan research, the following describes three levels of off-campus thesis research by candidates for a graduate degree and the specific approval required for each level of time: ("Year" is defined as the period from July 1 through June 30.)

(1) Up to a tenth of the student's research time in a single year: only the mentor's approval is required. (The Chair requests that a memo describing the off-campus activities be placed in the student's file by the mentor.)

(2) More than a tenth but less than a quarter of the student's research time in a single year: approval of the Chair is required, and the arrangement must be announced at the next faculty meeting.

(3) More than a quarter of the student's research time in any single year: the mentor must seek explicit departmental approval for that year's activity.

Also, should it become apparent that the research done off-campus will account for more than a quarter of the substantive content of a student's thesis, as judged by the mentor, it is the mentor's responsibility to seek explicit departmental approval.

O. POLICY ON USE OF COMPUTERS

Students are expected to follow Departmental regulations in addition to the University Policy on the Use of Computers.

1. It is not permitted for anyone to use any of the personal computers in the Department without the clear and explicit permission of the faculty or staff member in charge of that particular machine. Computers in undergraduate laboratories are under the control of the faculty member teaching that course or (between sessions) the faculty member who last taught the course.

2. Permission to use a computer does <u>not</u> imply permission to alter files on that computer. Configuration files (e.g. CONFIG.SYS) should not be modified unless the modification is <u>known</u> to be reversible (and the previous version saved) <u>and</u> the person in charge of the machine has given explicit and informed consent.

3. Permission to use a computer does <u>not</u> imply permission to install additional software. If explicit permission to install software is given, installation must be done according to the instructions in the pertinent manual. Occasional users should remove all their files from the hard disk after use. Persons in charge of computers are authorized to erase files left by others unless specific arrangements have been made.

4. Students should not use and log into any computer under someone else’s name or account, even if the other person gave permission and password.

P. STATEMENTS OF PRECEDENCE

The standards, procedures, regulations and policies, described in this document and approved by the faculty of the Department of Chemistry, supersede all prior departmental standards, procedures, regulations and policies on the subjects covered. They do not supersede the standards, procedures, regulations and policies described in the Graduate School Bulletin. The students are responsible for being familiar with the Graduate School Bulletin.

Q. ACS ACADEMIC PROFESSIONAL GUIDELINES

The Chemistry Department notes the American Chemical Society Professional Guidelines, and strives to abide by them.

Preamble: The Academic Professional Guidelines are intended to provide key guidelines for graduate students, postdoctoral associates, professors, mentors, and academic administrators concerning professional relationships in the academic environment. These guidelines outline some of the obligations and reasonable expectations for individuals as they interact in the unique academic employment environment.

It should be noted that a graduate student or postdoctoral in chemistry generally meets the ACS definition of a chemist and a professional. The term "professor" is employed as a generic term referring to all ranks in the academic research and teaching hierarchy. For brevity, the expression "chemist" or "student" is employed in these guidelines to encompass biochemists, chemical engineers, and others in chemical-related sciences who meet the ACS definition of a chemist.

A. **The graduate student and postdoctoral associate**-- obligations to the professor and to the university.

1. The graduate student or postdoctoral associate should fulfill the responsibilities required by a teaching or research position.

2. The student or postdoctoral associate should maintain honesty, integrity, and diligence in the conduct of research and in the completion of academic course.

3. The student or postdoctoral associate should consult the supervising research professor at appropriate intervals regarding progress and should openly discuss relevant technical and administrative problems encountered. If a problem cannot be resolved with the professor, the student or postdoctoral associate should seek further guidance from an appropriate higher academic and/or administrative level.

4. The student should diligently pursue thesis research which should result in completion of the degree requirements in four to five years (for full-time graduate student). Included in this obligation is the timely completion of manuscripts and a dissertation.

B. **The professor--** obligations to graduate students and postdoctoral associates.

1. The professor should provide a constructive research environment, giving regular guidance, direction, and periodic evaluation to graduate students and postdoctoral associates. This communication should concern the progress of the research and provide feedback regarding the status relevant to the project, as well as constructive suggestions toward resolution of any difficulties encountered.

2. The faculty adviser should strive to help develop the initiative and independent thinking of students and postdoctoral associates within the scholarly environment of the university.

3. The professor shall advise and assist graduate students and postdoctoral associates in areas of career development.

4. The professor shall strive to supervise the graduate student so that the research can be satisfactorily finished in a reasonable amount of time. The target for a Ph.D. program would be five years for a full-time student. If the professor sees that the student is not making satisfactorily progress in the degree program, the professor should inform the student that a problem exists and offer the student the option of changing research problems or professor.

R. VACATION POLICY

The primary focus of your time at Georgetown University will be the timely completion of your thesis research. This will require considerable sustained effort on your part; vacation and rest are an integral part of effective, focused research, but if taken too often or for prolongs periods, they may seriously impede your progress. With this in mind, the suggested departmental vacation policy consists of up to three weeks of vacation per year, which may be accrued. Vacation days may be taken only after consulting with your mentor; thus, it is important that you do not make final arrangements before receiving approval from your mentor. Please be advised that students may not take vacation days that require them to be absent during teaching duties, which typically begin one week before the first day of classes and end when final grades are turned in. Exceptions for absences during teaching duties will be made only with the written permission of the instructor for the course, as follows: Students must submit, in writing, information explaining who will cover their course assignments while they are gone; this letter must be co-signed by the person(s) who will fill in for the absent TA and submitted to the course instructor. After written approval from the course instructor, the document is to be submitted to the Director of Graduate Study for approval.

S. OUTSIDE EMPLOYMENT

The following outside employment policy applies to all full-time graduate students in the Department of Chemistry receiving full stipends from the University, as either Teaching Assistants (Graduate School and Department funds) or Research Assistants (Grant support):

1. If you are a teaching assistant in a course, you are not permitted to tutor (for additional compensation) a student taking the course.

2. A maximum of four hours per week of outside employment, tutoring included, is allowed.

T. STUDENT ASSISTANCE AT GEORGETOWN

Georgetown has a number of resources available for students seeking help in a variety of areas. These include the staff of the Graduate School, the Office of Institutional Diversity, Equity and Affirmative Action, the Graduate Student Organization (GSO) and others.

Students who feel that they cannot resolve a problem directly with the mentor should consult one of the following:
1. The Director of Graduate Studies
2. The Department Chair
3. Another faculty member with whom the student feels comfortable
4. The Graduate Student Ombuds Office

Free counseling is available from Counseling and Psychiatric Services (CAPS), which is the primary mental health resource for students: CAPS, One Darnall Hall, (202) 687-6985.

U. SAFETY GUIDELINES

Teaching laboratory and Research laboratory safety is the most important responsibility that all faculty, students and staff of the Chemistry department have. As teaching assistants, graduate students have a special responsibility to ensure safety in the teaching laboratory. Additionally, it is essential that all safety considerations specific to the student's research laboratories be fully understood and followed.

If a student is unfamiliar with a piece of equipment, a reagent, a protocol, etc., the he or she should not proceed until all questions have been answered. If unsure at any time, questions should be directed to the PI or the Georgetown University Department of Safety and Environment Management (SEM).

During their first departmental orientation new graduate students will receive an ACS safety guidelines booklet. These should be read and followed. New graduate students are required to attend a formal safety training seminar given by SEM. At this training, students will learn University safety policies regarding safe research practices, chemical handling and storage of chemicals and hazardous waste, and other routine safety considerations. Students will receive a certificate of attendance. It is imperative that as teaching fellows you adhere to any additional training requested and administered by the teaching laboratory director(s). Students are not allowed to begin laboratory research and laboratory teaching without having completed the SEM training. It is imperative that TA's adhere to any additional training requested and administered by the teaching laboratory director(s).

Some students may also be required to take additional safety training related to radioactive materials, biohazards, or blood born pathogens.

APPENDIX 1

RECORD OF PROCEDURE FOR CHOICE OF MENTOR

Name of student

Candidate for what degree(s)

The above-named has had a formal consultation with me regarding the research problems available in my group, and regarding whether or not I might be willing to accept him under my mentorship.

Signatures of Faculty (at least five are required) _____ Date _____

_____ _____

_____ _____

_____ _____

_____ _____

To the Chair:

Following the above consultations, I requested Prof. to serve as my mentor.

Student's Signature_____

Date

I have agreed to accept_____under my mentorship. The general area of this student's research will be _____chemistry.

Signature of Professor_____

Date

Approved _____ Date
(Chair)

The above is a mutual agreement, which may be terminated by either party at any time.

Attention is called to the departmental regulations regarding choice of mentor, possibilities for change of mentor, and who may and may not initiate conversations on that subject.

APPENDIX 2

GRADUATE CURRICULUM

A. Phase I Examinations

1. Phase I examinations are given in the following subject areas - Analytical Chemistry, Biochemistry, Inorganic Chemistry, Organic Chemistry, and Physical Chemistry. All students are expected to take and reach excusing level on at least four of the five subject areas. ROUND 1 of the Phase I exams will be administered the week prior to the start of Fall semester. After the exams are graded, each student will have a brief meeting with the Phase I advising committee. The purpose of this conversation is to (a) provide some useful feedback as to what sub-areas the student might effectively focus on for the second round of Phase I exams (if necessary) and (b) to advise the student on course selection matters. The student will NOT learn at any time how his/her performance stands in relation to that of other students.

2. For students who do not reach "excusing level" in one or more examinations during the first round of examinations in the fall, a second and third set of examinations will be given in the spring semester. ROUND 2 of the Phase I exams will be given at the start of the second semester. ROUND 3 of the Phase I exams will be given at approximately two-week intervals starting near the beginning of February.

3. All examinations may be either standard ACS placement (multiple choice) or Georgetown-constructed (may require essay and/or mechanistic answers).

4. Each student will have up to but no more than three opportunities to reach excusing level on each type of subject examination.

B. Course Requirements

The graduate class schedule is defined on a two-year basis with input from the graduate curriculum committee provided yearly or more frequently, as needed.

1. General

Doctoral students are required to take a total of SEVEN COURSES. These would normally be taken in the first two years. Three classes are to be taken in the first semester, and it is encouraged that at least three of the seven courses taken be "Foundation" courses, as defined by the department. During the first semester students should make a careful selection of a mentor, and during the first and second semesters begin research, prepare and present a literature seminar, and prepare for possible retakes of Phase I examinations as needed. As a result, by the end of the second semester, the faculty will have information on all factors (research, course grades, teaching, seminar) to be considered regarding a student's qualification for the Ph.D. (or M.S.).

NOTE: This curriculum does not relieve the student and mentor from the responsibility of covering additional topics that are critical for or relevant to the thesis research, using methods other than formal graduate courses, e.g. directed readings, research group discussions and seminars, or the auditing of additional courses.

APPENDIX 3

CHEMISTRY DEPARTMENT THESIS REGULATIONS

Detailed regulations for the preparation of theses are specified in the Georgetown University Guidelines for Dissertation/Thesis Writers available from the Graduate School Office. The following Chemistry Department Regulations are in addition to those.

The original thesis is to be electronically delivered to the Graduate School Office.

After the thesis has been successfully defended and all corrections, changes, additions and/or deletions have been made one hard copy is to be delivered to the Chemistry Department, one to the student's mentor, and a third for the student. The title page is to be formatted as specified in the GU Guidelines, but must also include, immediately below the full name of the author, all prior degrees (e.g., John Mangler Doe, B.S. Some College, 19xx, M.S. Other College, 19yy). Please note that degrees from overseas should be listed as such: e.g. "Diploma Engineer" should be given as that and not translated into "B.S."

All figures and graphs must be given in a manner suitable for submission for publication. A caption may be on the same page as the graph or on a separate page containing only the caption. Captions must be complete enough to render the figures understandable without reference to the text. For detailed information, consult "The ACS Style Guide, A Manual for Authors & Editors"; American Chemical Society: Washington, DC, 1997.

The form of bibliographic references should be according to the practices of a major journal in the field of the thesis. The official Chemical Abstract or Web of Science abbreviations must be used, as well as author's full names (or last names plus initials).

A short biography of the author listing date and place of birth, schools attended, other experience, and academic history at Georgetown should be included on a separate page, usually at the end of the thesis. A black-and-white photograph may be included.

Additional requirements as to content and form may be set at any time by the Mentor, readers, Chair, Department Faculty or the Graduate School.

APPENDIX 4

PROCEDURES FOR FINAL ORAL EXAMINATIONS

At the start of the final oral examination, the chair of the examination committee will inform the candidate, the committee, and all others present about the scope of the Examination, the basis of decisions, the possible decision, and the examination procedure and voting procedure. These points must be specifically stated at the start of the examination even if the committee chair feels confident that everyone present knows them.

The final oral examination is a defense of the thesis. Questions with only a tenuous connection with the thesis may be asked, but the bases of judgement in the end will be the adequacy of the proof of the thesis claims, the adequacy of the defense of those claims, the student's command of background knowledge pertinent to the thesis, and, in extreme cases only, whether or not the thesis constitutes "a significant modification or enlargement of a field of knowledge".

The student must be informed, prior to the questioning, that he or she may at will defer answers to particular questions and return to them during a later round, and also that he or she may call for a limited number of 5-minute recesses.

The members of the committee will question the candidate in turn, under time limits. In general each questioner should not be interrupted during his first period of questioning. Interruptions, if deemed necessary, should be made only by requesting, through the committee chair, a yielding of the floor by the questioner. In later rounds of questions this rule may be relaxed at the discretion of the committee chair.

The first questioner will be the mentor, who will be expected to ask the candidate for a fifteen to twenty minute summary of his thesis including a clear and explicit statement of why it is a significant contribution to human understanding. The total time allotted for this and other questions of the mentor during the first round should not exceed twenty-five minutes. By this questioning, the Mentor may bring out additional contributions of the thesis and more clearly develop the context of the work. Other questioners may use up to six minutes each during the first round of questioning. After the Mentor, the next questioners will be the readers in order of rank and seniority. Then will come other committee members in order of rank and seniority, except that the committee chair will question last. Then other faculty who may be present may have up to six minutes each. Any faculty member or committee member (except the mentor) may elect to ask no questions or use less than six minutes. A second round of questioning will then ensue in the same order, beginning with the Mentor. Subsequent rounds will continue until each committee member has asked all he or she cares to ask. The committee chair, at his or her discretion, may declare a recess at any point during the examination.

After the questioning, the candidate will be asked to withdraw to a nearby room. Also asked to withdraw at this time will be any persons who have attended but who are not committee members. The committee chair will ensure that, prior to the vote, everyone remaining is given ample opportunity to discuss the decisions which must be made. The decision will be based on each member's evaluation of the thesis as a whole and of its defense. The possible votes are: Pass, Fail, Abstain. The chair will poll the committee members individually. Faculty members not members of the committee do not vote.

In order for the student to pass, at least 60% of the committee members present must vote positively to pass the candidate. A committee member must have been present for essentially all of the examination in order not to be declared "absent" by the committee chair and therefore disqualified from voting. The committee chair must maintain at least four committee members able to vote, refusing permission to leave or declaring the examination in recess if he deems it necessary to preserve this quorum.

The committee may decide by majority vote to neither pass nor fail the candidate, but to reconvene on one additional date for requestioning the candidate. The committee, either by majority vote or by acquiescence of the mentor and the readers, may require revision of parts of the thesis. The candidate will be informed of committee decisions immediately after the committee meeting. By his signature on the thesis, the department Chair certifies that the above procedures have been followed and that he or she therefore has reason to believe both that the thesis is acceptable, and that the student has successfully completed all requirements for the Ph.D. degree.

APPENDIX 5

GRADUATE STUDENT LITERATURE SEMINAR

The following information is designed to provide guidelines for the Graduate Student Literature Seminar, as well as general information about presenting a seminar.

Graduate Student Literature Seminar

The literature seminar is required of all graduate students, generally during the second semester of the first year. It is intended to provide a forum for students to demonstrate critical analysis of the literature and practice speaking skills to a technical audience. Communication skills are considered paramount to any practicing chemist, and may have only been addressed in Chem 903. Although it is normal to feel nervous about public speaking, in particular for non-native English speakers, a confident seminar can be given with enough practice.

The literature seminar is an opportunity to discuss recent discoveries, new ideas and developments in chemistry. The topic may be within your general field of study but should not be directly linked to your own previous research or to that ongoing within your research group. It is recommended that the core of your talk be based on 1-3 specific articles, which have been written within the past two years. The article should be of high quality in an area considered to have great significance to the scientific community. One measure is to search in journals with high impact factor. The topic and article must be approved by your research mentor at least 3 weeks prior to your talk so that you have adequate time to research background information.

You should strive for a balance in depth and breadth. A talk that only presents information from one article, with little or no background will be too narrow. However, a superficial talk which attempts to present an entire field in 30 minutes will be too broad.

The seminar should provide the following information:

1. Enough <u>background information</u> to explain why the topic (and the paper) is novel and important. You should provide a context for the data, experiments, theory or calculations presented in the literature. This will require that you read well beyond a single article.
2. The hypothesis of the work and what questions were asked should be clearly defined. Discuss the <u>significant experiments</u>, <u>data and methods</u> used to address the hypothesis. Providing data from additional papers may be appropriate. Be prepared to answer questions regarding the experimental set-up, instrumentation or computational methods used, as well as the interpretation of the data. It should be clear that you have considered the quality of the data *and* their interpretation.
3. Your discussion should convince the audience that you have <u>critically analyzed the work</u>. It is not enough to demonstrate that you understood what they were trying to do, and how they were trying to do it. Do the data really support the conclusions? Do the conclusions support the hypothesis? Is the work highly innovative? Is it as important as the introduction suggests? How does it compare with other work in this field? Does it represent a new way of thinking or new approach or is it really a re-packaging of old ideas? Is there any evidence missing? Could the authors have been more thorough, what additional experiments would you have liked to see? What questions remain, is this work likely to stimulate further work, and in what direction?

General advice for giving a good seminar.

Advanced preparation of slides and practice are central to giving a good seminar. You should plan on presenting your talk to your mentor and research group far enough in advance to make the corrections suggested. You are encouraged to seek out classmates and practice together.

Powerpoint Slides

1. Technology doesn't always work. It helps to know whether the computer will be a PC or MAC, and to have your talk on more than one medium (i.e. a memory stick, zip disk.

2. Use a minimum number of slides. There is no absolute number because some slides may be seen relatively quickly (such as a molecular structure) while others may require much discussion (such as a graph or table of data). However, if you have as many slides as minutes to present, then you surely have too many.
3. Limit the information on each slide. Do not use complicated graphs, large tables, or complicated equations. If these appear in the paper, you should simplify them and provide a summary if necessary. Appropriate tables and graphs should be labeled and legible. Keep each slide limited to one idea. If there are complicated ideas, try to break them into parts and present them sequentially.
4. Use a font size of 18 pt or greater. San serif fonts, such as this, are easiest to read. You do not need to use complete or long sentences. Declarative statements and header-style descriptions will enable you to keep it simple.
5. A picture can say a thousand words. If you can find an image to get across your point, it is likely to be more concise. Images can also attract more attention and interest, as does selective use of color. The font and background colors should be chosen to provide a high contrast, easily read slide.
6. Referencing should be done using ACS format, last name, first name; each author *J. Am. Chem. Soc.* **2004**, 3-4.
7. Most talks begin with an outline and end with a conclusion slide. Depending on the length of the talk an outline may not be necessary. Conclusions can be helpful to summarize and draw your talk to a close.

Presentation

1. You should write a detailed outline of your talk before deciding what to say. This will help you organize your ideas in a logical way and help you to identify important points. It may be helpful to write out the full text of your seminar, however, you should not have notes with you while speaking. If you memorize anything, you may consider one sentence for each slide that states the importance of the slide.
2. There should be enough information on each slide that you will be visually prompted into a discussion. However, transitions can make the difference between a smooth, organized talk and a bumpy awkward seminar. Think carefully beforehand what is the connection between one slide and the next. If it is difficult to articulate why your are following one slide with another, you should re-think your organization.
3. Speak distinctly and with care. Practice in front of an audience will hopefully alert you as to whether you are the type to slow down or speed up when nervous. Approach your seminar as though you are teaching the audience, and use your voice to emphasize key points. Avoid jargon, and little known acronyms. If there are special acronyms commonly used, be sure to define them the first time you use them.
4. Avoid distracting habits. This includes repetitive verbal fillers such as 'umm…', as well as pacing, throat clearing, etc… It is unlikely that you will be aware of these habits, so it is critical to practice with an audience before giving your seminar.
5. Do not face the screen and talk with your back to the audience. Make eye-contact, and keep track of the audience visually. This will cue you if you are going too fast or if something is not understandable. Also do not read information directly from the overhead. You may assume the audience can read. However, to allow enough time for them to do so, provide an alternative statement in your own words.
6. Keep to the time frame of your talk. It is very rude to talk over the allotted time and will likely offend your audience.
7. Do not point a laser pointer towards the audience.
8. In preparing the text of what you will say, consider this as a teaching opportunity where you have a story to tell.

Questions

1. State what you know with confidence, and never pretend you know something. It does not create a good impression when you are correct but you sound unsure. However, it does not create a good impression if you state something wrong with confidence.
2. Keep in mind that anything written on your slides, or spoken in your presentation is fair game for questions. Be thorough in your preparation. Try to anticipate questions beforehand. If you anticipate a difficult question it can be impressive to have a slide prepared to answer it.
3. It is perfectly okay to say, "I don't know" but try not to stop with that leaving a dead silence. It is far better to put this response in context. For example you can say, "I don't know the exact size, but it is larger than X and smaller than Y" (i.e. put some limits on the piece of data that make chemical sense. Alternatively, you can say "That information is known, but unfortunately I don't remember the exact number". If you don't know the answer at all you can say, "I am not sure I have the answer you are looking for, but what I do know is the following…" or "Yes, your question is a good one because taking into account that information enables one to comment on/determine X".

   You can acknowledge that you should know something, but don't make excuses.

4. It is easiest to trip over an *easy* question. Often these are related to ideas or concepts that are commonly used in your field or in your lab (and especially happens with jargon). You may not have questioned the idea because you have heard it so many times, but if pressed you may find it difficult to actually explain it to the uninitiated. This looks very bad when it happens.
5. It is especially impressive if you are able to estimate an answer either by drawing a useful analogy or with a quick-back-of-the-envelope calculation.
6. It will occasionally happen that you do not understand a question. You can ask for the questioner to repeat the question but it might help to say, "I'm not sure what you mean. Are you asking…?".

It is the recommendation of the faculty that you attend as many seminars as your schedule allows. In addition to the important science you will learn, it will provide you with a variety of approaches to giving a seminar and answering questions. Pay attention to the slides, the speaking style and how they answer questions. Once you can pinpoint what you appreciate and what annoys in another persons seminar, then you are more likely to give a strong seminar yourself.

APPENDIX 6

GUIDELINES FOR PHASE IIB PROPOSAL AND DEFENSE

In preparing your research proposal, you will need to address in detail questions like those posed below.

Your abstract should make it clear that you have thought these through by providing
-- the chemical question to be answered by your project and its importance
-- a brief summary of current status of research in the field
-- suggested reaction schemes, theoretical approaches and/or experimental approaches to be used
-- how your approach will address a scientific shortcoming in current approaches
-- a summary of how you will assess the success of your project as it progresses.
This will require a good deal of background research on your part. Your abstract (as well as your full proposal) should include complete citations with titles of articles referenced.
Your full proposal should
-- address any questions that were posed by your committee during their review of your abstract and
-- expand on each of the points mentioned in 1-4 below
The following guidelines are based on the criteria that are used by the NIH for proposal review. They have been modified to reflect the fact that students generally present their Phase IIB research proposals during their fifth semester of graduate study.
1. Significance**.**
-- Does this study address an important problem? As a prominent scientist once commented, "Just because something has not been done does not mean that someone needs to do it."
-- What new knowledge will be obtained from the proposed studies?
-- How will any new concepts, methods, applications that result from the studies benefit the field?
2. Approach and innovation.
-- Are the experimental design and/or methods different from those currently in use? If so, how are they different and why does the new approach have benefits over present approaches?
-- Is the approach to be used logical in terms of basic chemical theories and the context of current knowledge?
-- Are the theoretical and experimental tools appropriate for the studies?
-- Are there any potential trouble spots in your experimental or theoretical approach? If so, how might you get around these?
3. Projected outcomes
-- How will you evaluate your progress on each of the goals for your project? For example, how might spectral data be use to assess purity?
--What are your criteria for evaluating how successful you have been? These should be quantitative and should draw on reports on similar systems. For example, does a method produce a better yield (and how much better?) or a lower detection limit (by what factor?)
During your defense, you should be prepared to
--- explain material that you mentioned in your proposal such as spectra, SEMs, syntheses (including mechanisms, why given reaction conditions used, possible side products or problem spots, etc)
--- address questions that show that you have a basic understanding of the underlying principles of the chemistry and the techniques on which your project is based.
--comment on the environment required for completing the studies, if asked. For example:
-- What kind of research environment (equipment, facilities, etc) would be necessary for carrying out this project?
-- Is equipment involved that might not be commonly available? Is there another technique that might be used for initial screening?
-- What sort of background might a student need to begin to work on such a project? Could it be done by one person in a few years or would it be a broad-ranging, multi-person research effort?
--How expensive (VERY approximately) would this project be?
More resources
More information that might help in preparing your grant can be found on the NIH website at
http://grants.nih.gov/grants/writing_application.htm
http://deainfo.nci.nih.gov/extra/extdocs/gntapp.htm
Although written with NIH R01-type grants in mind, the issues that must be kept in mind are relevant for any grant.

APPENDIX 7

RESPONSIBILITIES OF SEMINAR ASSISTANTS

For each seminar or colloquium given in the Department of Chemistry, the students whose mentor or temporary advisor is the faculty host are responsible for organizing the refreshments. The names of the faculty hosts for each seminar will be posted with the seminar speakers and titles. Therefore each group will know when it is their turn for seminar duty without being assigned or reminded by the seminar committee or the faculty host. It is up to the students in each group to decide how the responsibilities will be divided. Sometimes students will be assigned to help out for hosts other than their mentor

APPENDIX 8

GEORGETOWN UNIVERSITY
Department of Chemistry

GRADUATION CHECK OUT SHEET

Before the Chair will sign the signature page of the Ph.D. or M.S. thesis, approve the Research Report for an M.S. without thesis, or approve a request for a leave of absence, the candidate must be checked out through the following people. Each of them must initial a copy of this sheet.

Students are responsible for observing **both** Graduate School **and Department** regulations (**current** Chemistry Graduate Student Handbook) regarding format of the thesis. **Students** are also responsible for seeing that their tuition is paid for the session in which they intend to graduate, and that their student account is clear.

1. **Chemistry Stockroom Supervisor** _____
   a. returned stockroom key

2. **Chemistry Administrative Officer** _____
   a. returned keys
   b. provided an unbound copy of the finalized thesis
   c. provided forwarding address and employment

3. **Chemistry Graduate Coordinator** _____
   a. no outstanding bill from student accounts

4. **Science Librarian (or circulation desk supervisor)** _____
   a. no unreturned books
   b. no outstanding fines

5. **Mentor** _____
   a. checked-out of lab, desk, chemicals and/or equipment
   b. returned laboratory notebooks
   c. returned materials borrowed from other laboratories

Student's Name: _____

Date of Completion: _____