

Graduate Student Procedures

Department of
Chemistry



Revised 8/21/2008

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I. Degree Requirements for Ph.D. Students in Chemistry

A. Placement Examinations

Each student must demonstrate undergraduate-level proficiency in each of four areas (analytical, inorganic, organic, and physical) by the end of his/her second year in residence to continue in the graduate program. The GOC reviews all incoming student transcripts, taking notice of the following:

- Lack of coursework in core chemistry classes (defined below)
- A grade lower than B- in any core chemistry class (in the absence of significant mitigating circumstances)

The core chemistry classes are:

Analytical: one semester each of quantitative and instrumental analysis

Inorganic: one semester of inorganic with physical chemistry prerequisite

Organic: two semesters of organic

Physical: one semester each of quantum and kinetics/thermodynamics

If the transcript(s) show no flags (i.e. all core courses taken, As and Bs achieved), the student will be considered to be proficient in all four areas. If the transcript(s) show flag(s), students may take the appropriate placement exam, and demonstrate proficiency by passing it. Alternatively, students may choose to forgo the exam and simply take the appropriate undergraduate course at CSU.

The placement exams are typically ACS standardized exams (or the equivalent), consisting of a number of multiple-choice questions, sometimes broken down into themed sections. The exams are given for two hours, there is no penalty for wrong answers (i.e. educated guessing is encouraged), and the level is that of a typical undergraduate course. The cutoff scores for proficiency will be determined by the GOC periodically, in part by comparison with data from previous years.

To fulfill proficiency requirements, all undergraduate coursework must be passed with a grade of B- or better. If this grade standard is not met, students will have one opportunity to retake the course and receive an adequate grade.

B. Course Requirements

All Ph.D. students are required to take:

1. A minimum of 6 credits outside their major area of interest in **two** different areas (except by petition to the GOC). The list of acceptable courses can be found in Appendix III. Joint students must take 3 credits outside both major areas.
2. C751 (Methods of Chemistry Laboratory Instruction) and/or C752 (Advanced Methods of Chemistry Instruction), during the first and/or second semesters as GTAs (see section C)
3. The appropriate section of C793 (Seminar) during the first year as well as any semester in which the student presents a seminar.
4. C702 (Proposal Writing) during their 8th semester in residence (see Section I).
5. Any major-specific requirements (see Appendix III).
6. Additional coursework, if any, specified by the thesis committee after the preliminary oral exam.

All required courses must be included on the graduate school's GS6 form. All course requirements must be fulfilled by the time of graduation. Students may not take graduate courses in any area without having demonstrated proficiency in it (Section A, page 1), unless it is the major research area.

Students who have taken graduate courses at another institution that are comparable to courses taught at CSU, and received a grade of B or better, may submit a course waiver form to the GOC, requesting credit for the course(s) involved. Such requests should be submitted before registering for first-year coursework, as they may affect GOC recommendations for subsequent classes. If CSU does not teach a course covering the same material, no credit can be given.

Students may also request to substitute an out-of-department course (e.g. physics, biochemistry, etc.) for one of their out-of-area courses. GOC approval will be granted on a case-by-case basis. All such requests must be accompanied by written approval of the research advisor(s) [i.e. signature on the request].

Students who wish to be affiliated with more than one area of study must meet with their advisor(s) to determine an appropriate curriculum. This curriculum must then be approved by the GOC prior to submitting the GS-6 form to the Graduate School.

All graduate students at Colorado State University are required to be continuously registered from the time of first enrollment through the graduation term.

C. Teaching Requirement

At least one semester of supervised college teaching is a requirement for the Ph.D. degree in chemistry. To facilitate effective teaching, the department offers two courses designed to prepare students for GTA work: C751 (Methods of Chemistry Laboratory Instruction, fall) and C752 (Advanced Methods of Chemistry Instruction, spring). First- and second-time GTAs must register for the appropriate course depending on the semester (they may be taken in either sequence). All students employed as GTAs (even those with more than two semesters of experience) *must* register for C784 (Supervised College Teaching) during *each and every* semester in which they serve as GTAs. Failure to register will result in loss of the GTA position.

Students who demonstrate extensive prior teaching experience may have this requirement waived by petition to the GOC.

D. Cumulative Examinations

Cumulative examinations are administered on the first Saturday of every month from September through June (except for January). These examinations consist of graduate-level questions in analytical, materials, organic, and physical chemistry. The questions are designed to emphasize the application of fundamental principles and knowledge of the current literature to research problems. See Appendix V for specific policies regarding the administration of the cumulative exams.

All students (except inorganic students, see below) must begin taking cumes at the start of their second semester in residence (February for fall students, September for spring students), and continue to take them every month they are offered. Students are **strongly encouraged** to begin taking cumes earlier (i.e. in the first semester), to get a feel for the process.

Ph.D. students wishing to continue in the program must:

- Pass 5 exams in no more than 12 official attempts (e.g. up to and including April of the second year for fall students)
- Pass 3 of the 5 cumes in the designated major area of study

Additional notes:

1. All cumulative exams are given simultaneously, during a three hour time block. A student may take more than one exam per session, but each counts as a separate attempt.
2. Students in the Chem. Ed. Program will be required to pass 3 cumes in their designated major area of study, and will also be required to pass a written examination on chemical education.
3. Students with two major areas must pass 3 cumes in one area and 2 in the other (i.e. all 5 must be in the two joint major areas).
4. A Ph.D. student who does not pass 5 cumes with the allotted time may switch to the M.S. program.
5. Students may turn in up to two first-semester exams (so-called "free tries") without using one of the official 12 attempts. If more than two exams are turned in during the first semester, the third exam counts as the first official attempt. Thus, a fall student who turned in the September, October, and November cumes would have until February of the second year to complete the required 5 exams.

Missed exams (after the first semester) are counted as automatic fails unless excused by the GOC *in advance*. Excused absences require a letter addressed to the GOC and documentation of the reason for the absence.

Written examination policy for inorganic students: students in the inorganic area will not be required to take monthly cumulative examinations. Instead, they will (1) complete a research paper due at the end of their first summer in residence, and (2) will participate in a modified inorganic seminar program. These new requirements are outlined below:

1. Inorganic written examination format. A research paper will be submitted by the inorganic student to the inorganic GOC representative on (or before) the first Tuesday after Labor Day of the second year (for incoming fall 2008 students, this will be 9/8/09). The paper will focus on literature background for the student's research project, the student's experimental results, and a discussion of the short term future direction of the project. The report will be read by two members of the Inorganic Division (the advisor will not be a reader) and returned to the student for revisions as many times as necessary. The final paper must be approved before the end of the third semester in residence, or a failing grade will be awarded. It is expected that all papers will have to be revised at least once, but it would be possible for a particularly terrible entry to be failed on the first reading, and for an outstanding paper to be passed without revision.
2. Inorganic seminar discussions and reports. All inorganic students will register for inorganic seminar during the first four semesters in residence, and for any semester in which they will give a presentation. Starting in the spring, students must turn in at least one satisfactory seminar report per semester until four are passed. This requirement must be completed before the end of the 4th semester in residence. Students may pass more than one report per semester. The seminar report will include:
 - A pre-seminar overview that summarizes papers relevant to an outside speaker's topic (due one week before that particular seminar).
 - A pre-seminar discussion, led by the students writing reports and attended by the host as well as other graduate students and faculty. These discussions will cover papers suggested by the seminar speaker.
 - A post-seminar report that outlines the presentation and places the work in a more general context. The report must be submitted to the host within one week of the seminar.Students who do not fulfill this requirement will get an incomplete grade for the semester, which can revert to an F according to University policy. Up to two of these reports may be substituted by passing an equivalent number of cumes offered by other divisions/programs.

Under this system, an inorganic student's 2nd year preliminary oral examination will be scheduled for 2-6 months after satisfactory completion of all of the research and seminar reports, with the exception that no oral exam will be scheduled before the student's fourth semester in residence (February 2010 for fall 2008 first year students).

For a student considering a dual area affiliation (e.g. inorganic/materials), note that successful completion of the research and two seminar reports will count as three of the student's five cumes. In keeping with current policy, two cumes must be passed in the other area.

Non-inorganic students are not affected by this policy.

E. Research Advisor

The GOC serves as temporary *academic* advisor for all incoming students. Selection of a permanent *research* advisor is a significant decision, and students are encouraged to gather as much information as possible to inform their choice. The formal procedure for choosing a research advisor/group is outlined below:

1. All students must attend all faculty research seminars, presented in the first three weeks of the fall semester. (Students entering in the spring are exempted from this.)
2. Each student must meet one-on-one with at least five faculty members to discuss research opportunities.
3. Each student must complete at least three research group rotations before making a final selection of his/her research advisor. Research at CSU in the summer prior to matriculation may be counted as one group rotation.
4. Students may select a research advisor no earlier than the Monday after the final exam period following their first semester in residence. Fall students must select an adviser no later than January 31, and spring students must do so by May 15th.

To remain in good academic standing, students must have a research advisor. If a faculty member is unwilling to continue as a student's research advisor, the GOC will resume the role of academic advisor (in keeping with graduate school policy), but is not obligated to take over the role of research advisor. The student is responsible for selecting a new research advisor, by mutual agreement with that faculty member. Failure to do so will result in dismissal from the graduate program.

F. Degree Committee

The Ph.D. degree committee, chaired by the research advisor, consists of five faculty members and forms the primary faculty contact group for each student. Besides the research advisor, the committee consists of three chemistry faculty members and one non-chemistry faculty member (i.e. from another department). The GOC will assign committees with respect to area rather than division. Each committee will contain, in addition to the advisor, at least one in-area member and at least one out-of-area member. The remainder of the committee will be assembled by the GOC to ensure both depth and breadth on committees as well as equality in faculty committee assignments. This may or may not result in the presence of two in-division members (besides the advisor), because the focus is on appropriateness of area.

The out-of-department member is selected by the research advisor and student, and must be approved by the Dean of the Graduate School. Note that any faculty members with joint appointments in Chemistry (even zero time ones) are not eligible to serve as out-of-department members.

For the preliminary oral exam, committee chair duties temporarily shift to an in-area faculty member, rather than the research advisor. The oral exam chairperson is specified at the time of committee assignment. Each exam committee must have four non-advisor members. For students with multiple research advisors, in-area exam-only members will be added to ensure this minimum number.

All first year students will provide the GOC with a committee nomination form by March 1. The form should list, in order of preference, five in-area chemistry faculty members and three out-of-area members (also in Chemistry). The research advisor(s) should **not** be listed. Classification of in- and out-of-area faculty should be done in consultation with the chosen faculty advisor(s), and be specific to each students' thesis project. Every effort will be made to honor student priorities, while ensuring equal distribution of faculty committee assignments.

G. The Preliminary Examination

The preliminary examination is an oral examination taken by a student in his/her second year, conducted by the student's Ph.D. (exam) committee. The Graduate Coordinator will schedule each student's oral exam no sooner than two months and no later than six months after the student passes his/her last cumulative exam, except that no exam will be scheduled before the start of the fourth semester in residence.

Each student will distribute to his/her committee a written research report **at least one week** before the oral exam. Failure to distribute the report on time to even a single committee member may result in failing the exam. The report should be detailed and complete and will normally contain diagrams of any apparatus designed and/or built by the student, figures, tables, spectra, etc., as well as some background discussion, planned research efforts, and relevant references. *As a guideline*, the report should generally be 10-12 pages in length, exclusive of any references, figures, tables, etc.

The oral exam is a closed meeting, in which only the student and committee may be present. The exam begins with a brief committee review of the student's file and laboratory progress. This review is conducted in the student's absence, and usually does not exceed 5 minutes. The student then presents a 30-minute research seminar, which is followed by a question and answer period focusing on basic chemical knowledge and on the student's research. Although present during the exam, the research advisor is barred from answering questions for the student, or in any way providing assistance that interferes with the committee's ability to evaluate student progress.

In judging student oral exam performance, several factors will be considered. Specifically, the thesis committee will judge whether the student has

1. An acceptable "fund" of chemical knowledge. Questions of a general chemical nature are fair game. This includes any topic that is covered in undergraduate courses such as general chemistry, organic chemistry, basic inorganic chemistry, quantitative analysis, physical chemistry, or instrumental analysis as well as topics covered in graduate courses taken at CSU. Note that these questions will usually be related to material in the student's presentation or written research report.
2. An acceptable understanding of the literature in his/her research area. This includes basic knowledge of recent publications and advances, outstanding researchers in the field, and recent publications from the student's own research group.
3. The ability to interpret results and plan research. This is an ability to examine data critically, to identify trends in data, to explain data analysis procedures, and to offer possible explanations or mechanisms for observations. In addition, the committee also looks for the student's ability

to extend beyond the data at hand to identify the “next steps” in the research project, projected outcomes for planned experiments, potential pitfalls in planned research, and possible alternate research paths the student may take, should a planned experiment fail.

4. Evidence of substantial, tangible progress toward solving his/her research problem. Examples of tangible progress include (but are not limited to): published or publishable results, building of an apparatus, progress on a multi-step synthesis, collection of data, progress on writing computer code, development of an analytical technique, etc. Tangible progress is *not* to be interpreted *solely* as publishable results; level of effort, persistence, and determination are key elements to this criterion.

Passing all four of these requirements is necessary to pass the oral exam. Students who have accomplished a great deal of research but who have a shallow depth of understanding will not pass; likewise, students who have a solid academic knowledge of chemistry but who have accomplished very little research will not pass.

The committee will take the exam timing into account in measuring research progress (i.e. those students who take the exam earlier in their careers will not be expected to have accomplished as much work as those who take it later).

After the oral exam, the committee will assign (by majority vote) either a passing or failing grade.

- Pass: The preliminary examination has been satisfactorily completed, and the student advances to Ph.D. candidacy. In keeping with Graduate School policy, no “conditions” may be attached to the award of a passing grade.
- Fail: The oral exam performance was comprehensively weak, such that additional course work is not sufficient to complete the preliminary examination. With committee approval, students will have three to six months to retake the exam, and the committee may suggest additional coursework or experiences expected to improve student performance. Students may petition the GOC for an extension of the retake deadline, but typically this is reserved for problems beyond the student’s control (e.g. if the committee requires taking a course that is not offered until a later semester).

Once the preliminary examination has been completed (*regardless of the pass/fail outcome*), the student must complete and turn in form GS16 to the graduate school **within 48 hours**.

H. Progress Toward the Degree

The fundamental charge to a thesis committee is to monitor student progress towards the degree, providing assistance and evaluation along the way. Traditionally, the preliminary exam is the first time that the entire committee meets to discuss a student’s progress toward the Ph.D degree, although such meetings may be called at any time (by either students or committee members).

As it is usually the first close scrutiny of student performance, the preliminary examination may spotlight particular weaknesses that the Ph.D./exam committee feels may impede future progress. Often these issues are not sufficient to warrant failing the exam, but the committee may nonetheless ask that they be addressed. To ensure adequate progress, the committee has wide latitude in defining “progress,” and imposing remedies. In general, evaluation criteria follow along the four themes tested at the preliminary examination (see Section G).

After the preliminary oral exam, the committee will establish a timeline for future meetings to make sure that progress is being made. Timelines may range from months to years (e.g. the next meeting could take place at the student’s Ph.D. defense). At one or more such meeting(s), the committee may require a student

to present and defend an oral presentation on his/her research (or a specific aspect thereof). The committee chair is responsible for communicating this timeline to the student, in writing, following the exam. A copy of the report is placed in the student's file.

The committee may require that a student satisfactorily complete additional coursework. This must be added to a student's plan of study, resulting in the submission of an amended GS-6 form.

At any time, a student's Ph.D. committee may determine that insufficient progress is being made toward earning the doctorate, and dismiss the student from the Ph.D. program. However, it is very rare that such a determination would be made without allowing the student a hearing on the specific issue(s) involved.

I. Seminar Presentation Requirements

Ph.D. students are required to fulfill the seminar requirement of their major research area (see below). Students are required to register for divisional seminars (C793) for the semester(s) in which they will present a seminar.

Analytical - two seminars are required; the first one is required in the third semester in residence and the second one is required in the fourth year in residence.

Inorganic - two seminars are required; the first one is a literature seminar and is required in the second year in residence, and the second one is based on the thesis research and is required in the fourth year of residence. Passing the first seminar requires a majority vote of the inorganic and in-area faculty present; no such vote is taken for the research seminar.

Organic - one literature seminar is required before the end of the third year in residence.

Physical - two seminars are required; the first one is required by the end of the second year in residence and the second one is required before the end of the fourth year in residence.

Materials- two seminars are required, in whichever division is deemed appropriate by the research advisor, in consultation with the head of the Materials Program; students are required to present a literature seminar in the third semester in residence and a research seminar in the 8th semester in residence.

Chem. Ed.- two seminars are required; a literature seminar in the 2nd year in residence, preferably in the declared area of chemistry; and a research seminar in the 4th year in residence.

Students with dual major areas must give one seminar in each area.

J. Research Proposal

Each Ph.D. student is required to propose an original research idea in the field of chemistry. It should not be a trivial extension or modification of an existing research project. Proposals may be in the general area of a student's doctoral research, but must be sufficiently distinct to be considered original by the advisor and primary reader.

Students who have submitted a postdoctoral fellowship application (e.g. to NIH, NSF, etc.) may fulfill the proposal requirement by submitting a copy of that application. All other students should follow the format below.

General Guidelines

1. Provide sufficient background information to permit review without extensive consultation of the literature.
2. Emphasize brevity and clarity of presentation.
3. Prepare publication-quality figures and schemes.
4. Take care to avoid spelling and other grammatical errors.

Specific Guidelines

1. Length

The abstract (section a) is not to exceed 1 page single-spaced. The body of the proposal (sections b and c) should be a minimum of 5 pages and a maximum of 10 pages, including figures. There is no restriction on the length of the literature cited (section d) section. The text must all be in 10-12 point font.

2. Format

- a. Abstract/Specific Aims. Concisely state the broad overall nature of your proposal. State the hypotheses to be tested and the aims of the research idea.
- b. Background and Significance. Provide a brief sketch of the background leading to your idea. Critically evaluate and summarize existing knowledge and specifically identify the problem that your proposed research will solve. State concisely the importance of your proposal.
- c. Research Design and Methods. Describe the research design and the procedures that will be used to accomplish the specific aims. Include how the data will be collected, analyzed, and interpreted. Describe any new methodology and its advantage over existing methodologies. Discuss the potential limitations of the proposed procedures and alternative approaches to achieve the aims.
- d. Literature Cited. List all pertinent references. Each reference must include the complete title of the paper or article, names of all authors, book or journal, volume number, page numbers, and year of publication. Do not include an excessive amount of text in your references. This section should be limited to relevant and current literature.

Submission and Evaluation

Students must register for C702 (Proposal Writing) in the spring of the eighth semester in residence, and may submit the proposal during that semester. The grade for the course will be that awarded to the proposal, or a grade of I (incomplete) if the proposal is not submitted. It is University policy that any grade of I is converted to an F after one calendar year, and that no student may receive a degree with an unresolved I on his/her transcript. A 1-page preliminary outline describing the original idea must be submitted to the thesis advisor and reader for approval. By default, the GOC assigns the proposal reader from the student's in-area thesis committee members. Students may petition the GOC for a change of assignment if a non-committee member with expertise in the research area is identified. Unacceptable outlines will necessitate the formation of a new proposal.

The final written proposal must be submitted to the Graduate Operations Coordinator for copying and distribution to the advisor and reader no later than two months before the student's final defense.

The reader will complete a proposal rating sheet, including a pass/fail grade, turn it in to the main office, and provide a copy to the student. This evaluation, along with a copy of the proposal, will become part of the student's permanent file.

If a failing grade is assigned, specific recommendations for improvement will be provided, and the student must re-submit a revised proposal. The final (revised) proposal must be presented to the thesis committee with the dissertation, and, at the option of the student, may be included with the final dissertation copy for the Graduate School.

The GOC will be consulted in the case of disagreements on the proposal evaluations. Remedies include, but are not limited to, calling a conference including the advisor and full thesis committee, assigning additional readers, or organizing a formal defense of the proposal by the student. The reader will adjust the rating sheet to incorporate the necessary changes.

K. Final Research Conference

Ph.D. candidates can opt to meet with their degree committee prior to writing their dissertations (in some cases, as explained below, this meeting is mandatory). The conference is designed to ensure timely completion of the Ph.D. degree, to facilitate satisfactory completion of the thesis research, and to prepare the student for the final oral examination. At the conference, the student will summarize the research done to date, as well as the work necessary to complete the research project.

The Graduate Operations Coordinator automatically notifies students who are approaching the end of their sixth year that a conference must be scheduled. *This meeting is required for all sixth year students unless they are likely to defend before the end of the year.* If all parties (student, advisor, committee, GOC) agree that completion of degree requirements is imminent and the conference is unnecessary, it will be waived. In keeping with time-to-completion goals, no student beyond the sixth year will be guaranteed departmental support (e.g., in the form of a GTA). Should the committee conclude at the final research conference that degree completion is not imminent, but that adequate progress is being made, it will establish and supervise a firm schedule for the completion of requirements. If the committee finds that adequate progress is not being made, termination from the Ph.D. program will be recommended.

L. The Ph.D. Dissertation

The final Ph.D. dissertation should be prepared in accordance with current graduate school policies and regulations. It must be submitted to the committee *in completed form* no later than **two weeks** before the final oral examination. To be considered *complete*, the dissertation must include all chapters and data which the student and advisor agree are required to fully describe the research project. No additional experiments or inclusions should be planned or ongoing at the time of submission, unless they are not intended to be included in the final document. Many modern research projects involve substantial contributions from several coworkers, often resulting in joint publication. In such cases, each dissertation must clearly delineate work actually done by the student from that done by co-workers on the project.

M. Final Oral Examination

Students present a public seminar on the thesis work, followed by a private examination by the degree committee. A signed GS-24 form must be submitted to the Graduate School **within two working days** after the exam. The time and place of the exam must also be posted throughout the department no later than one week prior to the exam.

N. Check Out Procedures

Ph.D. students must provide their thesis advisor, and any member of their degree committee who requests it, a copy of their final, corrected thesis. In addition, some faculty members may require additional thesis copies from their students. Students must also return to the advisor all intellectual property (i.e. data, spectra, chemicals, apparatus, disks, notebooks, and all other devices and equipment being utilized in the research project) associated with their research at Colorado State University.

The Graduate School requires that two unbound copies of the thesis in final form must be submitted by the deadline date for the term of graduation. Before submitting these copies the student must get final approval by the Department of Chemistry's main office. The graduate school will not accept final copies of a student's thesis without this departmental clearance. If the student chooses, the main office will be responsible for submitting the thesis to the graduate school. At this time, the student will also be required to complete an informational exit form for the department (including the student's forwarding address, termination dates for payroll, and other information needed for the department's annual report).

Students who fail to comply with these requirements or who fail to complete the departmental exit form, may, at the behest of their advisor or the department chair, have their transcripts put on hold at the Office of Admissions and Records and/or will not have completed their degree requirements and will not receive their degrees until all degree requirements, including proper check-out procedures from the department and research group, are met.

II. Changing Degree Program

Students who decide to change from a Ph.D. degree to a M.S. degree program must submit the GS-7 (Request for Change of Department and/or Degree and Program) and GS-6 (Program of Study) forms to the Graduate School. These forms can be obtained from the Graduate Operations Coordinator or the Graduate School.

III. Degree Requirements for M.S. Students in Chemistry

- A. Placement Examinations: same as Ph.D. (section A, page 1).
- B. Course Requirements: same as Ph.D. (section B, page 1), except that M.S. students are not required to complete an independent research proposal, and thus need not register for C702. Students who switch into the M.S. program from the Ph.D. program must adjust their GS6 forms to delete C702.
- C. Teaching Requirement: same as Ph.D. (section C, page 2).
- D. Cumulative Examinations

M.S. candidates are required to pass a total of two out of twelve cumulative examinations, without restriction as to field. See Ph.D. requirements for all other details (section D, page 2).
- E. Research Advisor: same as Ph.D. (section E, page 4).
- F. Degree Committee: same as Ph.D. (section F, page 4), except:
 - 1. Only three members: research advisor, one in-area chemistry faculty member, one out-of-department faculty member.

2. If the student has a Ph.D. committee when entering the M.S. program (i.e. if the student was previously a Ph.D. candidate), the new committee will be formed by deletion of two members, as selected by the advisor.

G. Seminar Requirement

All M.S. students must present a seminar within their area of study that is separate from the public portion of the M.S. final oral examination.

H. Time to Completion of Degree

In an effort to monitor the progress of M.S. students toward their degrees, the following guidelines have been instituted:

Departmental support of M.S. students (e.g. in the form of a GTA) will be guaranteed only until a “reasonable time for completion” of the degree has expired. The reasonable time will be defined according to when students switch into the Master’s program as follows:

1. For students who switch prior to completion of the oral exam (including those who switch essentially upon matriculation), the “reasonable time” will elapse at the end of their third year in residence.
2. For those who switch after completion of their oral exam requirements, the “reasonable time” will elapse one year after the student has switched degree programs.

As with all GTA positions, any support is also contingent upon the student being in good academic standing and meeting adequate teaching standards as set by the departmental GTA committee. Additional support after the “reasonable time” has expired may be available, but will not be guaranteed.

If a M.S. student has not completed degree requirements prior to the end of the fourth year in residence, a research conference must be scheduled between the student and his/her M.S. thesis committee. If all parties (student, advisor, committee, GOC) agree that completion of degree requirements is imminent and the conference is unnecessary, it will be waived.

This research conference is designed to ensure timely completion of the M.S. degree, to facilitate satisfactory completion of the thesis research, and to prepare the student for the final oral examination. At the conference, the student will summarize the research done to date, as well as the work necessary to complete the research project.

Should the committee conclude at the final research conference that degree completion is not imminent, but that adequate progress is being made, it will establish and supervise a firm schedule for the completion of requirements. If the committee finds that adequate progress is not being made, termination from the M.S. program will be recommended.

I. The M.S. Dissertation – same as Ph.D. (section K, page 9)

J. Final Oral Examination – same as Ph.D. (section L, page 9).

K. Check Out Procedures – same as Ph.D. (section M, page 9).

IV. Guidelines for Terminating the Research Advisor/Graduate Student Relationship

The Colorado State University Bulletin Handbook on Graduate Study (USPS 775-920) states that: "Pursuant to State Statute, CRS 24-19-104, all graduate assistants are 'employees at will' and their employment is subject to termination by either party at any time. The Provost/Academic Vice President must review and approve any recommendations concerning the termination of graduate assistants on any grounds, except for terminations at the end of the stated employment period. The provisions of this section shall not be interpreted to authorize the termination of any graduate assistant for any reason that is contrary to applicable federal, state or local law."

Most graduate students in the Department of Chemistry at CSU choose an advisor in their first year and remain with that advisor for their entire graduate career. The faculty advisor/graduate student relationship may be terminated, however, because of dissatisfaction by either the student or the faculty advisor. In either case, it is important that both parties respect the needs of the other. The following procedure is designed to accomplish this.

A. Termination by Advisor

If a faculty member is dissatisfied with the research efforts of a student, it is his/her prerogative to terminate the relationship. The decision to terminate the advisor/student relationship may be precipitated by various events, including but not limited to:

- disruptive behavior;
- failure to make satisfactory progress toward the dissertation problem as determined by the advisor and/or the thesis committee;
- scientific misconduct;
- unethical behavior;
- poor scholarly attitude; or
- poor performance in laboratory and/or course work.

To terminate the advisor-student relationship, the research advisor must notify the student, the student's thesis committee, and the department chair in writing, giving reasons for the dissatisfaction in performance. The faculty advisor may elect to allow a probationary period, to allow the student to improve, or may decide upon immediate dismissal.

The advisor must keep the student on the payroll for 30 days after the notification is received or until a new research director puts the student on his/her payroll (whichever is shorter). If the student is terminated early in the semester, the student's advisor, the department chair, and the appropriate GOC member (as a mediator) will meet to work out a reasonable compromise regarding possible further financial obligations on the part of the advisor and/or the department. The mediator will also help define the student's status, vis-à-vis hourly employment, registration for classes, the graduate school, etc. A reasonable attempt will be made to have this meeting within the 30-day time period.

Since a graduate student's thesis committee is charged with determining whether the student is making satisfactory progress toward a degree (see section I.H), the student and/or the advisor may request a meeting of the student's thesis committee to discuss the situation. According to the CSU bulletin (USPS 775-920) on Guidelines for Graduate Advising and Committee Service, the meaning of satisfactory progress "clearly extends beyond course work performance and involves the making of a collective judgment on the part of the committee." Under certain circumstances, the committee may recommend immediate dismissal of a student.

It is the student's obligation to turn over all intellectual property (i.e. data, spectra, chemicals, apparatus, disks, notebooks, and all other devices and equipment being utilized in their research), arranged in a manner that will allow the research director to continue the work. The student must also

turn in all keys to the Chemistry Main Office. If these materials are not turned over within one week of the notification of termination date, the remaining salary obligation of the research director is canceled and any pay from a new research director or the department will be held in escrow until the above obligations are met.

B. Termination by Student

To terminate the advisor-student relationship, the student must give the faculty advisor, the thesis committee, and the department chair 30 days written notice, giving reasons for leaving the research group. During this time the research project must be brought to a point where it is easily passed on to a new person. All intellectual property (i.e. data, spectra, chemicals, apparatus, disks, notebooks, and all other devices and equipment being utilized in their research project) and keys must be returned to the advisor's research areas before the student can be put on another faculty member's payroll.

C. Departmental Obligation

The chemistry department recognizes that the student-advisor relationship is a crucial element in the education experience of graduate students. For this reason, a chemistry graduate student without a research advisor at CSU is not considered to be in good academic standing in the department. The chemistry department is under no obligation to provide financial support, laboratory space, or any other educational materials for a student who is not in good standing.

Appendix I: Ph.D. Degree Requirements Deadlines

Placement Requirements

Demonstrate undergraduate proficiency in each of four areas (analytical, inorganic, organic, and physical) by the end of the second year.

Cumulative Examinations:

Pass 5 exams in no more than 12 official attempts (e.g. up to and including April of the second year for fall students)

Research Advisor:

Select an advisor no later than the end of January (fall students) or middle of May/end of spring semester (spring students) of the first year.

Program of Study (GS6) form:

Must be submitted before registration for the fourth regular semester. Typically submitted during the first summer, once committees have been established.

Preliminary Oral Examination (Ph.D. only):

May/January of second year for fall/spring students. A written report must be submitted at least one week prior to the exam date.

Research Proposal (Ph.D. only):

Must register for C702 (Proposal Writing) in the spring of their eighth semester in residence to complete this degree requirement.

Submission of Thesis or Dissertation:

Must be submitted to all committee members at least two weeks prior to the final oral examination.

Signed and Final Thesis or Dissertation:

Must be submitted to the Graduate School for binding two weeks prior to graduation.

Final Clearance:

A GS-25 form must be submitted to the Graduate School prior to the second week before graduation.

Appendix II: Proposal Rating Sheet

Student Name _____

Date of Conference _____
(if applicable)

Advisor _____

Reader(s) _____

Grade (check one) P F

Rate each of the following aspects on a scale of 1-6:

(1) Truly Exceptional (2) Excellent (3) Very Good (4) Good (5) Fair (6) Poor

— Originality

— Justification / Literature Precedent

— Experimental Design

— Written Presentation

— Overall Proposal Evaluation

Comments (100 words minimum):

Reader signature _____

Advisor signature _____

Appendix III: Graduate Course Requirements

Course #	Course	Credits	Semesters Offered
<u>Analytical (six credit hours total)</u>			
Three credit hours from the six one-credit modules of C530 Advanced Topics in Chemical Analysis:			
C530A	Environmental Chemical Analysis	1	even FA
C530B	Absorption and Emission Spectroscopy	1	even FA
C530C	Bioanalytical Chemistry	1	odd FA
C530D	Statistical Analysis in Analytical Chemistry	1	odd FA
C530E	Mass Spectrometry	1	even FA
C530F	Analysis of Materials	1	odd FA
Plus three credit hours from:			
C532	Advanced Chemical Analysis II	3	odd SP
C533	Chemical Separations	3	even SP
C537	Electrochemical Methods	3	odd SP
C577	Surface Chemistry	3	even SP
<u>Inorganic (six credit hours total)</u>			
Three credit hours from the four one-credit modules of C563 Physical Methods in Inorganic Chemistry:			
C563A	Group Theory	1	SP
C563B	Vibrational Spectroscopy	1	SP
C563C	Electronic Structure and Magnetism	1	varies
C563D	Magnetic Spectroscopies	1	SP
Plus three credit hours from:			
C551	Organometallics in Catalysis	3	odd SP*
C562	Bioinorganic Chemistry	3	varies
C511	Solid State Chemistry	3	odd FA
C565	Inorganic Mechanisms	3	varies
C561	Inorganic Synthesis	3	FA
C569	Chemical Crystallography	3	varies
*must be taught by an Inorganic faculty member to count for Inorganic credit			
<u>Organic (nine credit hours total)</u>			
C543	Structure/Mechanisms in Organic Chemistry	3	FA
C545	Synthetic Organic Chemistry I	3	FA
C549	Synthetic Organic Chemistry II	3	SP
<u>Physical (choose six credit hours total)</u>			
C570	Chemical Bonding	3	varies
C571	Quantum Chemistry	3	FA
C575	Chemical Thermodynamics	3	even FA
C576	Statistical Mechanics	3	odd SP
C579	Chemical Kinetics	3	odd FA
C771	Molecular Spectroscopy	3	varies
C773	Atomic & Molecular Spectroscopy	3	varies
<u>Materials (choose at least six credit hours total)</u>			
C511	Solid State Chemistry	3	odd FA
C515	Polymer Chemistry	3	odd FA
C517	Chemistry of Electronic Materials	3	even FA
C563C	Electronic Structure and Magnetism	1	varies
C569	Chemical Crystallography	3	varies
C577	Surface Chemistry	3	even SP

Chemistry Education

Students who specialize in chemistry education research (Chem. Ed.) must also declare a specific “area” in chemistry (i.e., analytical, inorganic, materials, organic, physical) in which they will study and perform graduate research in addition to their research in chemistry education. The required coursework for students in the Chemistry Education Program includes the following:

6 credit hours from within their declared area (see above listings)

+ one of the following two courses:

Course #	Course	Credits	Semesters Offered
PSY 652	Methods of Research in Psychology I	4	FA
STAT 511	Design and Data Analysis for Researchers	4	FA

+ at least 3 credit hours from the following list of courses:

Course #	Course	Credits	Semesters Offered
PSY 600F	Adv Psychology–Human Learning & Memory	3	FA & SP
PSY 600M	Adv Psychology–Cognitive Processes	3	FA & SP
PSY 692G:	Cognitive Psychology Seminar (specific topics and credits vary)		V (FA, SP, & SU)

Out of Area Requirements

Out of area requirements may be fulfilled from the following list of courses, or other out-of-department courses approved by the GOC on a case-by-case basis. Most of these courses do not have graduate level prerequisites.

Courses that satisfy analytical out-of-area: C515*, C530A-F, C532, C533, C537, C539A-C, C577

Courses that satisfy inorganic out-of-area: C511, C551*, C561, C563, C565

Courses that satisfy organic out-of-area: C543, C545, C547, C551*

Courses that satisfy physical out-of-area: C570, C571, C575, C576, C579

Courses for materials students that will satisfy their out-of-area requirements: C532, C543, C545, C547, C565, C575, C576, C579

Out-of-department courses that have been used (or suggested) recently to satisfy out-of-area requirements:

BC 511	Structural Biology
CH 514	Polymer Science and Engineering
EE 671	Thin Film Phys. Vapor Deposition
ME 531	Materials Engineering
ME 573	Biomaterials
PH 531	Solid State Physics I
PH 631	Solid State Physics II
PH/EE 672	Principles of Semiconductors

*course taught by multiple divisions, assigned area depends on instructor

Appendix IV: Index of Required Graduate School Forms

Forms required of all graduate students:

GS6	Program of Study	Before registration for the 4 th semester
GS25	Application for Graduation and Diploma Name Form	Check with Graduate School for deadline dates at the beginning of the graduation term*
GS24	Report of Final Examination Results	Within two working days after results are known, but no later than published deadline dates

Forms required of all Ph.D. students:

GS16	Report of Preliminary Examination	Two working days after results are known (must be taken two terms prior to final exam)
	Survey of Earned Doctorate	Prior to end of 12th week of graduation term**
	UMI Doctoral Dissertation Agreement Form	Prior to end of 12th week of graduation term**
	Dissertation Release Form	Prior to end of 12th week of graduation term **

Additional forms required for other actions:

GS1B	Re-admission	At least two months prior to re-entry term
GS7	Request for Change of Department and/or Program	Prior to the term the change is to occur
GS9A	Petition for Change in Committee	As changes occur or prior to final examination
GS14	Report of Departmental Examination	File results of departmental exams
GS25B	Departmental Requirements	No later than last day of term
GS26	Request for Certificate of Completion	Upon request. Usually available after thesis deadline date

* Prior to the end of the 1st week of the eight-week summer term.

** Prior to the end of the 5th week of the eight-week summer term.

Graduate School forms and deadline dates are available from the Graduate School office or at website:
<http://graduateschool.colostate.edu>

Appendix V: Specific Cumulative Exam Procedures

- All cumes are held in Chemistry A101, from 9:00 a.m. – 12:00 p.m.
- Exams are administered on the first Saturday of each month, September-June (except January)
- Topics for cumes in Analytical, Materials, and Physical will be posted two weeks before the exam on bulletin boards opposite the elevator. In general, Organic cumes do not have topics.
- Cumes are written by a faculty member of the appropriate division or program. Identities of cume writers can be obtained after (but not before) the cume is administered.
- Pens, pencils, a calculator, a molecular model kit, snacks, and beverages are permitted during the exam. Neither models nor calculators may be shared. All other items (including backpacks, coats, cell phones, iPods/MP3 players, etc.) must be left elsewhere or put to the side of the room. Blank paper will be provided.
- All exams are administered simultaneously. You may pick up, inspect, and keep any/all exams.
- Once you enter the exam room, you may not leave before handing in your exam, except to use the first-floor restrooms (no breaks for coffee, cigarettes, etc.).
- A proctor from the GOC will be present either in the exam room or in the lobby during the exam. If you have questions, you should feel free to ask the proctor. No other talking is permitted during the exam.

Appendix VI: Family Medical Leave Policy for CSU Chemistry Department Graduate Students

Under CSU's Family Medical (FM) Leave Policy, any graduate student who has been employed full time for at least twelve (12) months is eligible for unpaid leave (up to 12 weeks) for any one (1) or a combination of the following reasons: (a) The birth of a son or daughter, and to care for the newborn child (leave must be completed within twelve (12) months of the date of birth); (b) The placement of a son or daughter for adoption or foster care with the employee and to care for the newly placed child (leave must be completed within twelve (12) months of the date of placement); (c) To care for a spouse, son, daughter, or parent with a serious health condition; and (d) Because of a serious health condition which causes the employee to be unable to perform one or more of the essential functions of his or her position. (Refer to <http://www.facultycouncil.colostate.edu/files/manual/appendic.htm>, Appendix 3, for further details regarding the University's Family Medical Leave Policy.)

The Chemistry Department may provide for such FM leave to be paid for students who are in good standing in the graduate program in chemistry and who have not yet defended their thesis or dissertation. In keeping with University policy regarding FM Leave, graduate students must submit requests for paid FM leave in writing, using the "Chemistry Graduate Student Paid FM Leave Request Form" and the "Certification of Health Care Provider" forms, which follow this description. Such requests should be submitted to Shelly Swanson in the Main Office of the Chemistry Department as soon as practicable, and preferably at least thirty (30) days prior to the requested start date, to allow the Department the maximum opportunity to provide for coverage of responsibilities.

Students who qualify for paid FM leave will be paid at their normal rate during the approved leave period.