# Table of Contents

## I. Degree Requirements for Ph.D. Students
- A. Course Requirements ......................................................... 1
- B. Teaching Requirement ....................................................... 2
- C. Cumulative Examinations .................................................... 3
- D. Research Advisor .............................................................. 5
- E. Degree Committee ............................................................. 8
- F. Preliminary Oral Examination ............................................ 8
- G. Progress Toward the Degree .............................................. 10
- H. Seminar Requirements ..................................................... 11
- I. Research Proposal ............................................................. 12
- J. Degree Completion Plans .................................................. 13
- K. The Ph.D. Dissertation ...................................................... 14
- L. Final Oral Examination .................................................... 15
- M. Check Out Procedures ...................................................... 15

## II. Changing Degree Program ................................................. 16

## III. Degree Requirements for Plan A M.S. Students
- A. Course Requirements ......................................................... 16
- B. Teaching Requirement ....................................................... 16
- C. Cumulative Examinations .................................................... 16
- D. Research Advisor .............................................................. 16
- E. Degree Committee ............................................................. 16
- F. Seminar Requirement ....................................................... 16
- G. Time to Completion of Degree ............................................ 16
- H. The M.S. Dissertation ....................................................... 17
- I. Final Oral Examination .................................................... 17
- J. Check Out Procedures ...................................................... 17

## IV. Degree Requirements for non-thesis Plan B M.S. Students
- A. Course Requirements ......................................................... 17
- B. Teaching Requirement ....................................................... 17
- C. Cumulative Examinations .................................................... 17
- D. Research Advisor .............................................................. 17
- E. Degree Committee ............................................................. 17
- F. Presentation Requirement .................................................. 17
- G. Time to Completion of Degree ............................................ 18
- H. Check Out Procedures ...................................................... 18

## V. Guidelines for Terminating the Research Advisor/Graduate Student Relationship ................................................. 18
- A. Termination by Advisor ...................................................... 18
- B. Termination by Student ..................................................... 19
- C. Departmental Obligation .................................................... 20
Appendices

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Degree Requirements Deadlines</td>
<td>21</td>
</tr>
<tr>
<td>II. Proposal Rating Sheet</td>
<td>22</td>
</tr>
<tr>
<td>III. Graduate Course Requirements</td>
<td>23</td>
</tr>
<tr>
<td>IV. Index of Required Graduate School Forms</td>
<td>26</td>
</tr>
<tr>
<td>V. Official Policies Regarding Cumulative Exams</td>
<td>27</td>
</tr>
<tr>
<td>VI. Family Medical Leave Policy for CSU Chemistry Department Graduate Students</td>
<td>28</td>
</tr>
<tr>
<td>VII. Preliminary Degree Completion Plan</td>
<td>29</td>
</tr>
<tr>
<td>VIII. Final Degree Completion Plan</td>
<td>30</td>
</tr>
</tbody>
</table>
I. Degree Requirements for Ph.D. Students in Chemistry

Admission, Orientation and Graduate Prerequisite Procedures:

Demonstrated undergraduate proficiency in chemistry forms a part of the admissions criteria. The Graduate Admissions Subcommittee (GOC) recognizes that the faculty desire an incoming student class that is broadly prepared, as much as possible, to take graduate chemistry coursework. As such, the GOC strives to ensure that each chemistry graduate student has the tools to succeed in graduate chemistry classes. During orientation week, GOC will be available to discuss any weak spots in prior chemistry academic experiences to help students make informed decisions. Students are also encouraged to talk with the instructor of course they are interested in taking, especially if they do not have the undergraduate pre-requisites.

To enroll in graduate chemistry courses in particular areas, students are advised that a grade of B– or better for the following undergraduate courses is recommended:

- Analytical: one semester of quantitative analysis and one semester of instrumental analysis
- Inorganic: one semester of an inorganic course that has a physical chemistry prerequisite
- Organic: two semesters of organic courses
- Physical: two semesters of physical courses, covering quantum chemistry, thermodynamics and kinetics

A. Course Requirements

All Ph.D. students are required to take:

1. A minimum of 5 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. CHEM 751 during the first semester as GTAs (see section C).
3. The appropriate section of CHEM 793 (Seminar) during the first year as well as any semester in which the student presents a seminar.
4. CHEM 702 (Independent Research Proposal) during the 8th semester in residence (see Section I).
5. CHEM 601 (Responsible Conduct in Chemistry Research). No sooner than the second semester of the first year, but no later than the end of the second year. Students may substitute another University approved RCR course for CHEM 601 by petition to the GOC. Alternative courses include GRAD 544, PHIL 666, and BC 601.
6. Any major-specific requirements (see Appendix III).
7. 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 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 petition to the GOC, requesting credit for the
course(s) specified. Petitions must be made before the start of the second semester in residence. The request must be submitted on-line at https://apply.chem.colostate.edu/gradrequest. The following information will be required: (1) the name and course number of the CSU course and (2) a syllabus that includes the name, course number, instructor, department, and university of the previously completed course. If the syllabus does not include this information or is otherwise incomplete, a written explanatory supplement may be included. If CSU does not teach a course covering the same material, no credit can be given. Further information may be requested if needed. GOC approval will be granted on a case-by-case basis.

Students may also request to substitute an out-of-department course (e.g. physics, biochemistry, etc.) for one of their out-of-area courses. The request must be submitted on-line at https://apply.chem.colostate.edu/gradrequest. The following information will be required: (1) the name and course number of the CSU course, (2) a syllabus, and (3) an explanation of why the course is appropriate as an out-of-area course.

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 GS6 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.

B. Teaching Requirement

To facilitate effective teaching, the department offers one course designed to prepare students for their GTA position (CHEM 751). CHEM 751 (Methods of Chemistry Laboratory Instruction) is required of all graduate students. This course is only offered in the fall semester. At least one semester of Supervised College Teaching (CHEM 784) is also required. For students in the Chemical Biology program, two semesters of supervised college teaching (CHEM 784) are required. Students who demonstrate extensive prior teaching experience may have this requirement waived by petition to the GOC.

After the teaching requirements are met, all students employed as GTAs must continue to register for CHEM 784 (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.

All GTA positions are determined by the Department at the request of the advisor. A GTA appointment is a professional-level appointment with a serious responsibility to represent the Department in an important and highly visible role within the University community. The department is committed to ensuring that all chemistry courses meet departmental, university-wide, and state-mandated objectives. As such, the role of a GTA in the classroom extends well beyond direct relationships with students; it also reflects All University Core Curriculum (AUCC) requirements, departmental and program goals, and best practices within the field of chemistry education. The GTA serves an important role in the undergraduate mission of the University and the Department strives for excellence in all classrooms and labs. Normally, the Department makes GTA assignments on a semester-by-semester basis. Unsatisfactory
performance of GTA duties in one semester may affect a student’s ability to obtain future GTA positions, thus resulting in loss of stipend and tuition support from the Department.

C. **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 chemical biology and inorganic students, see below) must begin taking cumes at the start of their second semester in residence (February) 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 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).
3. 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.
4. 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.
5. A Ph.D. student who does not pass 5 cumes with the allotted time may switch to the M.S. program.
6. Students in the chemical education 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.
7. Cume format for materials students: Each exam in the Materials area will be based on a specific article in the materials chemistry literature. Each month, the journal article will be posted as the “topic” for the materials cume. The exam will cover the content of the posted article, the underlying fundamental chemistry, and the literature cited in the article. Questions on each exam
will be generated by multiple members of the materials group, approaching the topic from a variety of perspectives to emphasize the interdisciplinary nature of materials chemistry. Exams will be graded on a pass/fail basis as determined by the faculty who contributed to the questions on the exam. One materials faculty mentor will serve as the coordinator for the exam, and will be responsible for final grade decisions; all questions should be directed to this person.

**Written examination policy for chemical biology students:** students in the chemical biology area are not required to take monthly cumulative examinations. Instead, students will take a cumulative examination, split into written and oral components, at the end of their first year in residence. The two-hour written portion will cover the fundamental topics discussed in the two core courses, and will be administered to all students simultaneously. The oral component will cover two literature papers, which will be distributed to the students two weeks prior to the exam. During the oral exam, a committee of participating faculty members will question individual students for one hour on their understanding of topics, experimental design, data analysis and conclusions arising from work described in the papers. Any student that fails either portion of the cumulative exam will have one opportunity to retake it. This second exam must take place before the beginning of the subsequent fall semester. Students failing either component of the exam for a second time will be dismissed from the Program.

**Written examination policy for inorganic students:** students in the inorganic area are not required to take monthly cumulative examinations. Instead, students 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:

1. **Inorganic written examination format.** A research paper will be submitted by the inorganic student to the inorganic GOC representative on (or before) the 1st Friday of 3rd semester. The report should be in the general format of a journal article, with (1) an introduction that concisely describes the rationale for your project and provides journal-appropriate background literature material; (2) a full experimental section; (3) a results section; (4) a discussion section (3 & 4 may be combined into 1 section); and (5) conclusions and outlook, which should include plans for future research. A review process similar to how manuscripts are vetted for publication is used. The division head serves as editor; other inorganic professors (not a student’s advisor) will act as reviewers. The first submission will be read by one reviewer, and the editor will go through the reviewer’s comments with the student. Subsequent revision(s) will be read by additional reviewers, and the editor will use those comments to decide if the final paper passes or fails.

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.

For a student considering a dual area affiliation (e.g. inorganic/materials), 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.

D. Research Advisor

The GOC serves as temporary academic advisor for all incoming students. Selection of a permanent research advisor is a significant decision, which clearly impacts a graduate student’s career. The overall objective of the group-joining procedures is to promote informed student choice in the advisor selection process, with important stipulations: first, the students are cognizant of all of their advisor options; second, the students gain deeper knowledge of several faculty members’ research programs, not just for joining a group but also for understanding departmental resources relevant to their research education goals; third, the students understand that “mutual agreement” is expected in order to form a student-advisor pair, and that reallocations are possible in order to maximize overlap of student and advisor interests in pursuing a mentoring relationship.

The formal procedure for choosing a research advisor/group is outlined below (except for chemical biology students):

• Weeks 0-3: students attend at least 50% of the open house sessions.

• Weeks 0-3: students meet one-on-one with at least five faculty members to discuss research opportunities before participating in rotations.

• Weeks 4-12: students complete at least three research group rotations before requesting a research advisor.

• Week 13: students request groups by providing a ranked list of (3) preferences for research advisor to the Graduate Operations Coordinator.

• Week 15/16: the GOC formally assigns students to research groups based on mutual agreements between students and faculty members.

Details of the procedure are provided below:

1. Research open houses. These will take place in the evenings during orientation week and the early part of the fall semester. These presentations highlight potential advisors’ philosophies, research efforts and opportunities for incoming students. The themes of each open house reflect
common areas or research interests for the faculty members involved. The presentations may take several forms, including seminars, open houses and lab tours. Faculty may participate in several different sessions, according to their research interests. Faculty may elect to not participate; that does not mean they are not interested in taking new students. Students may attend any faculty research seminar; they must attend at least 50% of the sessions in order to do rotations. A schedule will be made available at orientation.

2. **One-on-one meetings.** Students will arrange meetings with at least 5 faculty members during the first weeks of the semester. Students are welcome to attend group meetings and related functions for any group. Faculty members are encouraged to express interest to students regarding rotations.

3. **Group rotations.**
   a. At the end of week 3, students will provide a ranked list of three groups for rotation. Students will be assigned to groups for the first two rotations, taking into account student preferences as well as faculty scheduling.
   b. At the end of week 9, students will provide a ranked list of two groups for the third rotation. Students will be assigned to the third rotation based primarily on their preference but also taking into account faculty preferences and scheduling. This is intended to allow students appropriate time to focus their research interests.
   c. During the rotations in weeks 4-12, students and faculty members will agree at the outset on the requirements for a satisfactory rotation. The rotators’ research priorities are with the rotation group; the students will not engage in research outside of their rotation assignment, but can attend outside meetings/functions as long as they do not interfere with the current rotation assignment.
   d. Students must satisfactorily complete 3 rotations (faculty member signs off on the rotation) before they can bid to join any research group. Among other things, faculty may request that rotating students present or write up materials related to a project that they might pursue in that group.
   e. Chemistry research at CSU in the summer prior to matriculation may be counted as one group rotation.

4. **Requesting research groups.** Week 13 (the week before Fall Break) will not include rotations to give students time to finalize their preferences for research groups. They are encouraged to contact the faculty members with whom they are most interested in doing research. At the end of week 13, students will provide the GOC with their top 3 choices for research groups. They must give 3 choices. They do not have to rotate with a group to list it amongst their options. It is expected that their choices will not surprise faculty members; frank discussions between students and faculty are encouraged.

5. **Assignment of research groups.** The GOC will create a master list of student preferences for distribution to the faculty. With this information, faculty will provide the GOC with lists of students they would take into their groups, in order of preference. Based on the lists, the GOC will assign groups where student-advisor overlap is obvious, and will facilitate discussion between faculty members where there are conflicts. Students will be assigned to their first choice of
research group, provided that the faculty member has listed the student as one of his/her top two choices. Discussions involving the Executive Committee will be initiated for any situation where a faculty member would be interested in taking three or more students who list that person as their top choice. Ultimately, group joining represents an agreement between student and advisor—the role of the GOC and Executive Committee is to mediate discussions as necessary. The GOC will inform all students simultaneously about group joining decisions.

Students will not designate an “area” or program until they join groups at the end of the semester.

Group joining procedure for chemical biology students:

- Weeks 0-2: students attend at least 50% of the **faculty research seminar** sessions.
- Weeks 0-2: students **meet one-on-one** with at least five faculty members to discuss research opportunities before participating in rotations.
- Week 3: students start three research **group rotations** of 7 weeks each.
- No later than 1 week after the end of the 3rd rotation, students must begin graduate research no later than one week after their last rotation.

Details of the procedure are provided below for chemical biology students:

1. **Research open houses**: Same as for chemistry students – see above.

2. **One-on-one meetings**: Same as for chemistry students with the exception that students must meet with at least one faculty member from Biochemistry.

3. **Rotations**: Beginning in the third week of class, students must begin the first of three lab rotations, each being seven weeks in length (two in the fall, one in the spring). At the end of each rotation, students must write a concise (~2 page) summary of their rotation detailing relevant background and rationale for their research, as well as research accomplishments. The summary will be submitted to the PI supervising the rotation and to the Chemical Biology faculty coordinators. Students must perform at least one rotation in a lab outside their home department; however, their first rotation must be within Chemistry.

4. **Assignment of research groups**. Students select advisor by mutual agreement between the advisor and student by 1 week after the end of the 3rd rotation.

To remain in good academic standing, all 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.
E. **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 31. 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. The out-of-department member will be determined by the students/advisor by the time the GS-6 form is due.

For chemical biology students, the research committees will be comprised of one out-of-department faculty member, two faculty members within the Chemical Biology Program, and the student’s advisor. All first year students will provide the GOC with a committee nomination form by March 31. The form should list, in order of preference, five faculty members within the chemical biology program (includes both participating chemistry and biochemistry faculty members). Final committee assignments will be made by the Chemical Biology program advisory board. The out-of-department member will be determined by the students/advisor by the time the GS-6 form is due.

F. **The Preliminary Oral 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. Students become eligible to take the preliminary oral exam two months after passing their last cumulative exam, or at the start of their fourth semester in residence, whichever comes later. Students are expected to take the exam as soon as possible after they become eligible. Normally the exam should be completed by the end of the 4th semester of residency (Note, the 4th
semester completion date is **required** for Chemical Biology students). To remain in good academic standing, the exam date must be scheduled by no later than October 1st of the 5th semester in residency.

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. 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).

For all programs of study, 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.

G. 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.

H. 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 (CHEM 793) 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.

Chemical Biology: one seminar based on a student’s independent research proposal is required no later than the beginning of the fifth 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 seminar based on the Ph. D. student’s original proposal is required before the end of the fourth 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; students are required to present a literature seminar in the second year in residence and a research seminar in the fourth year 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.
I. 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 (except chemical biology 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.

Chemical biology students:
Students must submit a written independent proposal following NIH F32 NSRA format and submit the proposal to their committee during the eighth semester in residence. Students are required to make the changes on the proposal that are provided by their committee. The final proposal is due before the beginning of the ninth semester in residence.

Submission and Evaluation

Students must register for CHEM 702 (Independent Research Proposal) 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.

J. Degree Completion Plans

The Chemistry Department is committed to facilitating timely degree completion for all Ph.D. students. Given current national and Department norms, it is expected that students will earn a degree by the end of twelve semesters in residence. In keeping with this goal, no student beyond the twelfth semester will be guaranteed departmental support (e.g., in the form of a GTA).
To ensure that students approaching this deadline are on track, a Preliminary Degree Completion Plan must be distributed to the student’s committee and filed with the Graduate Coordinator by the beginning of the ninth semester in residence. The form lays out in rough terms both the current project status and the remaining objectives that must be completed to finish the thesis. It must be signed by the student and research advisor. If the student and research advisor cannot agree on a plan, a formal committee meeting must be scheduled, during which an acceptable plan must be completed. As this plan demonstrates that a student’s degree progress is on schedule, to the filing of this plan is a prerequisite for a student’s participation in the on-campus job interview program.

Any student intending to remain in the Ph.D. program into the twelfth semester must also file a Final Degree Completion Plan, which is due before the end of the eleventh semester in residence. This form includes a brief outline of the state of current progress, and list of remaining specific objectives, along with target dates for their completion. Importantly, a target defense date must be supplied. A copy of the Preliminary Degree Completion Plan should be attached. The completed plan should be circulated to the thesis committee. If the student and a majority of the committee - including the research advisor - agree that the plan is viable, the completed form should be returned to the Graduate Operations Coordinator, and no formal committee meeting is required. If a majority of the committee (or the research advisor) is unwilling to agree to the plan, the student must schedule a formal committee meeting to discuss his/her progress in detail. That meeting must take place before the end of the eleventh semester, and at its conclusion an acceptable Degree Completion form should be submitted.

Any student remaining in the program beyond the twelfth semester who does not have a Final Degree Completion form on file will be in jeopardy of losing his/her good standing, and will not be supported on Department GTA funds under any circumstances.

It is expected that the target defense date represents a realistic deadline for dissertation/thesis defense. One extension of the defense date is permitted, if a majority of the committee members (including the research advisor) agree.

K. 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.
L. **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.

M. **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.

Guidelines for the thesis submission can be found at the Graduate School’s website, and is briefly summarized here. The completed thesis submission form for both M.S. and Ph.D. candidates must be handed in to the Department of Chemistry’s main office for signature by the Department Chair. When signed, this form must be submitted to The Graduate School prior to submitting your thesis electronically. In addition, for Ph.D. candidates a survey of earned doctorates must be submitted with the thesis/dissertation form to the Graduate School. This form is found at [http://survey.norc.uchicago.edu/doctorate/](http://survey.norc.uchicago.edu/doctorate/). The Graduate School requires that the thesis has been published by the deadline date of the graduating term. The thesis must be submitted electronically as a pdf named “last name_first name.pdf” to [http://lib.colostate.edu/etd](http://lib.colostate.edu/etd) in its final form. There are two methods in which the thesis can be published. You will be asked to commit to either traditional publishing (no charge) or open access publishing (for a fee). You can copyright your thesis for an additional fee.

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 Plan A M.S. Students in Chemistry

A. Course Requirements: same as Ph.D. (section A, page 1), except that M.S. students are not required to complete an independent research proposal, and thus need not register for CHEM 702. Students who switch into the M.S. program from the Ph.D. program must adjust their GS6 forms to delete CHEM 702.


C. 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 C, page 3).

D. Research Advisor: same as Ph.D. (section D, page 5).

E. Degree Committee: same as Ph.D. (section E, page 7), 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.

F. Seminar Requirement: All M.S. students must present an acceptable seminar within their area of study; this may include the public portion of the M.S. final oral examination.

G. Time to Completion of Degree: It is expected that M.S. students will complete their degree in a “reasonable time” and departmental support of M.S. students (e.g. in the form of a GTA) will be guaranteed only until that time 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.

Any student intending to remain in the M.S. program past the “reasonable time” period must file a Final Degree Completion Plan (see Ph.D. section J). This is a mandatory prerequisite for GTA support beyond
the “reasonable time” period, and necessary for the student to maintain good standing in the M.S. program.

As with all GTA positions, any support is also contingent upon availability, the student being in good academic standing, and the student meeting adequate teaching standards as set by the departmental GTA committee.


IV. Degree Requirements for Non-Thesis M.S. Students in Chemistry (Plan B)

A. Course Requirements: same as Ph.D. (section A, 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.

B. Teaching Requirement: none

C. Cumulative Examinations: M.S. candidates are required to pass a total of two out of twelve cumulative examinations or their equivalent, without restriction as to field. See Ph.D. requirements for all other details (section C, page 3).

D. Research Advisor: same as Ph.D. (section D, page 5).

E. Degree Committee: same as Ph.D. (section E page 8), 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.

F. Presentation Requirement: All M.S. students must make a faculty refereed scientific presentation and pass an examination associated with that presentation. Students may fulfill this requirement three different ways:

1. Seminar: Students may present a public seminar focused on literature within their area of study, followed by a private examination by the degree committee.
2. Final Oral Examination: Students may present a public seminar based on their research project, followed by a private examination by the degree committee.
3. Ph.D. Candidacy Examination: Students may fulfill the presentation requirement by having passed
the candidacy exam for the Ph.D. degree.

In cases where a student has completed the seminar prior to opting into the Master of Science degree, the student may schedule the private examination by the degree committee at a time separate from and after the seminar presentation in which they make a short presentation about the seminar topic or their research project followed by a private examination by the committee.

G. Time to Completion of Degree

Students should have attained all the requirements to satisfy the plan B Master in Science in Chemistry degree by the end of their fourth semester in residence. It is expected that the student will graduate from the program after the fourth semester or within a semester after the term in which they switch to the M.S. program, if they move from the Ph.D. to M.S. program at a later date. Any student intending to remain in the M.S. program past this time period must file a Final Degree Completion Plan (see Ph.D. section J). This is a mandatory prerequisite for GTA support beyond the “reasonable time” period, and necessary for the student to maintain good standing in the M.S. program.


V. 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

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 the fall semester.

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):
Scheduled no later than October 1 of the 5th semester in residence. A written report must be submitted at least one week prior to the exam date.

Research Proposal (Ph.D. only):
Must register for C702 (Independent Research Proposal) 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 two weeks prior to 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

<table>
<thead>
<tr>
<th>Course #</th>
<th>Course</th>
<th>Credits</th>
<th>Semesters Offered</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Analytical (six credit hours total)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Three credit hours from the six one-credit modules of C530 Advanced Topics in Chemical Analysis:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 530A</td>
<td>Environmental Chemical Analysis</td>
<td>1</td>
<td>varies</td>
</tr>
<tr>
<td>CHEM 530B</td>
<td>Absorption and Emission Spectroscopy</td>
<td>1</td>
<td>varies</td>
</tr>
<tr>
<td>CHEM 530C</td>
<td>Bioanalytical Chemistry</td>
<td>1</td>
<td>varies</td>
</tr>
<tr>
<td>CHEM 530D</td>
<td>Statistical Analysis in Analytical Chemistry</td>
<td>1</td>
<td>varies</td>
</tr>
<tr>
<td>CHEM 530E</td>
<td>Mass Spectrometry</td>
<td>1</td>
<td>varies</td>
</tr>
<tr>
<td>CHEM 530F</td>
<td>Analysis of Materials</td>
<td>1</td>
<td>varies</td>
</tr>
<tr>
<td></td>
<td>Plus three credit hours from:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 532</td>
<td>Advanced Chemical Analysis II</td>
<td>3</td>
<td>odd SP</td>
</tr>
<tr>
<td>CHEM 533</td>
<td>Chemical Separations</td>
<td>3</td>
<td>varies</td>
</tr>
<tr>
<td>CHEM 537</td>
<td>Electrochemical Methods</td>
<td>3</td>
<td>varies</td>
</tr>
<tr>
<td>CHEM 577</td>
<td>Surface Chemistry</td>
<td>3</td>
<td>even SP</td>
</tr>
<tr>
<td></td>
<td><strong>Chemical Biology (ten credit hours total)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM521</td>
<td>Principles of Chemical Biology</td>
<td>3</td>
<td>FA</td>
</tr>
<tr>
<td></td>
<td>Methods in Chemical Biology</td>
<td>3</td>
<td>SP</td>
</tr>
<tr>
<td></td>
<td>Plus four credit hours from:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC563</td>
<td>Molecular Genetics</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>BC565</td>
<td>Cell Biology</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Inorganic (six credit hours total)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Three credit hours from the four one-credit modules of C563 Physical Methods in Inorganic Chemistry:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 563A</td>
<td>Group Theory</td>
<td>1</td>
<td>FA</td>
</tr>
<tr>
<td>CHEM 563B</td>
<td>Vibrational Spectroscopy</td>
<td>1</td>
<td>SP</td>
</tr>
<tr>
<td>CHEM 563C</td>
<td>Electronic Structure and Magnetism</td>
<td>1</td>
<td>varies</td>
</tr>
<tr>
<td>CHEM 563D</td>
<td>Magnetic Spectroscopies</td>
<td>1</td>
<td>SP</td>
</tr>
<tr>
<td></td>
<td>Plus three credit hours from:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 551</td>
<td>Organometallics</td>
<td>3</td>
<td>odd SP*</td>
</tr>
<tr>
<td>CHEM 566</td>
<td>Bioinorganic Chemistry</td>
<td>3</td>
<td>even SP</td>
</tr>
<tr>
<td>CHEM 511</td>
<td>Solid State Chemistry</td>
<td>3</td>
<td>odd FA</td>
</tr>
<tr>
<td>CHEM 560</td>
<td>Fundamentals of Inorganic Synthesis</td>
<td>1</td>
<td>FA</td>
</tr>
<tr>
<td>CHEM 561</td>
<td>Inorganic Synthesis</td>
<td>2</td>
<td>FA</td>
</tr>
<tr>
<td>CHEM 565</td>
<td>Inorganic Mechanisms</td>
<td>3</td>
<td>varies</td>
</tr>
<tr>
<td>CHEM 569</td>
<td>Chemical Crystallography</td>
<td>3</td>
<td>odd SP</td>
</tr>
<tr>
<td></td>
<td>*must be taught by an Inorganic faculty member to count for Inorganic credit</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Organic (nine credit hours total)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 543</td>
<td>Structure/Mechanisms in Organic Chemistry</td>
<td>3</td>
<td>FA</td>
</tr>
<tr>
<td>CHEM 545</td>
<td>Synthetic Organic Chemistry I</td>
<td>3</td>
<td>FA</td>
</tr>
<tr>
<td>CHEM 549</td>
<td>Synthetic Organic Chemistry II</td>
<td>3</td>
<td>SP</td>
</tr>
<tr>
<td></td>
<td><strong>Physical (six credit hours total)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 570</td>
<td>Chemical Bonding</td>
<td>3</td>
<td>varies</td>
</tr>
</tbody>
</table>
CHEM 571  Quantum Chemistry  3  FA  
CHEM 575  Chemical Thermodynamics  3  even FA  
CHEM 576  Statistical Mechanics  3  odd SP  
CHEM 579  Chemical Kinetics  3  odd FA  
CHEM 773  Atomic and Molecular Spectroscopy  3  even SP  

Materials (six credit hours total)  
CHEM 511  Solid State Chemistry  3  odd FA  
CHEM 515  Polymer Chemistry  3  odd FA  
CHEM 517  Chemistry of Electronic Materials  3  varies  
CHEM 530F  Analysis of Materials  1  even FA  
CHEM 550A  Materials Chemistry-Hard Materials  1  FA  
CHEM 550B  Materials Chemistry-Soft Materials  1  FA  
CHEM 550C  Materials Chemistry-Nanomaterials  1  FA  
CHEM 555  Chemistry of Sustainability  3  SP  
CHEM 563C  Electronic Structure and Magnetism  1  varies  
CHEM 569  Chemical Crystallography  3  SP  
CHEM 577  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:  

<table>
<thead>
<tr>
<th>Course #</th>
<th>Course</th>
<th>Credits</th>
<th>Semesters Offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSY 652</td>
<td>Methods of Research in Psychology I</td>
<td>4</td>
<td>FA</td>
</tr>
<tr>
<td>STAT 511</td>
<td>Design and Data Analysis for Researchers</td>
<td>4</td>
<td>FA</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course #</th>
<th>Course</th>
<th>Credits</th>
<th>Semesters Offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSY 600F</td>
<td>Adv Psychology–Human Learning &amp; Memory</td>
<td>3</td>
<td>FA &amp; SP</td>
</tr>
<tr>
<td>PSY 600M</td>
<td>Adv Psychology–Cognitive Processes</td>
<td>3</td>
<td>FA &amp; SP</td>
</tr>
<tr>
<td>PSY 692B</td>
<td>Cognitive Psychology Seminar (specific topics and credits vary)</td>
<td>V (FA, SP, &amp; SU)</td>
<td></td>
</tr>
</tbody>
</table>

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: CHEM 530A–F, CHEM 532, CHEM 533, CHEM 537, CHEM 539A-C, CHEM 577
Courses that satisfy inorganic out-of-area: CHEM 511, CHEM 551*, CHEM 560, CHEM 561, CHEM 563A–F, CHEM 565

Courses that satisfy organic out-of-area: CHEM 543, CHEM 545, CHEM 547, CHEM 551*

Courses that satisfy physical out-of-area: CHEM 570, CHEM 571, CHEM 575, CHEM 576, CHEM 579, CHEM 773

Courses that satisfy materials out-of-area: CHEM 515, CHEM 517

Courses that satisfy biological out-of-area: CHEM 521 (chemical biology)

Note: Since 2008, CHEM 569 has been approved by the GOC on a case-by-case basis as satisfying out-of-area requirements when the other out-of-area course was from the inorganic area.

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC 511</td>
<td>Structural Biology</td>
</tr>
<tr>
<td>CBE 514</td>
<td>Polymer Science and Engineering</td>
</tr>
<tr>
<td>ECE 503</td>
<td>Ultrafast Optics</td>
</tr>
<tr>
<td>ECE 504</td>
<td>Physical Optics</td>
</tr>
<tr>
<td>ECE 505</td>
<td>Nanostructures: Fundamentals and Applications</td>
</tr>
<tr>
<td>MECH 507</td>
<td>Laser Diagnostics for Thermosciences</td>
</tr>
<tr>
<td>MECH 531</td>
<td>Materials Engineering</td>
</tr>
<tr>
<td>MECH/BIOM 573</td>
<td>Structure and Function of Biomaterials</td>
</tr>
<tr>
<td>PH 531</td>
<td>Introductory Solid State Physics</td>
</tr>
<tr>
<td>PH 631</td>
<td>Solid State Physics</td>
</tr>
<tr>
<td>PH/ECE 672</td>
<td>Principles of Semiconductors</td>
</tr>
</tbody>
</table>

*course taught by multiple divisions, assigned area depends on instructor
# Appendix IV: Index of Required Graduate School Forms

## Forms required of all graduate students:

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

## Forms required of all Ph.D. students:

<table>
<thead>
<tr>
<th>Form</th>
<th>Description</th>
<th>Deadline Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>GS16</td>
<td>Report of Preliminary Examination</td>
<td>Two working days after results are known (must be taken two terms prior to final exam)</td>
</tr>
<tr>
<td></td>
<td>Survey of Earned Doctorate</td>
<td>Prior to end of 12th week of graduation term**</td>
</tr>
<tr>
<td></td>
<td>UMI Doctoral Dissertation Agreement Form</td>
<td>Prior to end of 12th week of graduation term**</td>
</tr>
<tr>
<td></td>
<td>Dissertation Release Form</td>
<td>Prior to end of 12th week of graduation term **</td>
</tr>
</tbody>
</table>

## Additional forms required for other actions:

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

* 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 Materials and Physical will be posted two weeks before the exam on bulletin boards opposite the elevator. In general, Organic and Analytical cumes do not have topics.

- Cumes are written by faculty members 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.
Appendix VII: Preliminary Degree Completion Plan

Preliminary Degree Completion Plan

Student: ___________________ Date: ___________________

A copy of this form must be distributed to the student’s committee and filed with the Graduate Operations Coordinator before the beginning of the ninth semester in residence. The plan must be signed by both student and research advisor. Submission of this form is a prerequisite for participation in on-campus interviews.

Below, provide a *brief* description of current degree progress, listing major accomplishments and their state of completion.

**Brief Description of Current Degree Completion Status**

List below any remaining major tasks required to complete the degree (e.g., synthesis of molecule X, data collection on compound Y, writing up paper Z, etc.). Each task should have a specific measurable objective.

**Remaining Objectives (a one page description may be attached):**

The plan described above is considered “in effect” when the student and advisor sign in agreement. If these parties cannot agree to the plan, then a meeting of the entire committee must be convened to arrive at an acceptable plan.

Student Signature _________________________

Advisor Signature__________________________
Appendix VIII: Final Degree Completion Plan

Final Degree Completion Plan

Student: ________________________________ Date: __________________

A copy of this form must be filed with the Graduate Operations Coordinator before the end of the eleventh semester in residence for Ph.D. students, or before the end of the final semester of guaranteed support for M.S. students. The plan must be signed by the student and a majority of the thesis committee members, including the advisor. Submission of this form before the end of departmentally-guaranteed support time (12 semesters for Ph.D.) is a prerequisite for continued eligibility as Chemistry Department GTA, and necessary to maintain good standing in the degree program.

Below, provide a brief description/bulleted list of current degree progress, listing major accomplishments and their state of completion.

Brief Description of Current Degree Completion Status

- 
- 
- 
- 
- 

List below any remaining major tasks required (e.g., synthesis of molecule X, data collection on compound Y, writing up paper Z, etc.). Also provide the committee's best estimate of when each of those tasks should be finished. Finally, provide the current best estimate of a date for the dissertation/thesis defense.*

Remaining Objectives (additional detail can be provided on a separate sheet):

1. ___________________________________________ complete by: __________________
2. ___________________________________________ complete by: __________________
3. ___________________________________________ complete by: __________________
4. ___________________________________________ complete by: __________________
5. ___________________________________________ complete by: __________________

Projected Defense Date: ________________________________

*Note: whereas the individual objective completion dates are considered non-binding estimates, it is expected that the “projected defense date” represents a realistic deadline for dissertation/thesis defense. One extension of the defense date is permitted, if a majority of the committee members (including the research advisor) agree.
Final Degree Completion Plan

The plan described above is considered “in effect” when the student and a majority of the committee members (including the advisor) sign in agreement. If these parties cannot agree to the plan, then a meeting of the entire committee must be convened to arrive at an acceptable plan.

Committee Members (including advisor) in Agreement:

_________________________  Print name:  ___________________________
_________________________  Print name:  ___________________________
_________________________  Print name:  ___________________________
_________________________  Print name:  ___________________________
_________________________  Print name:  ___________________________

Committee Members Dissenting:

_________________________  Print name:  ___________________________
_________________________  Print name:  ___________________________

Student Signature  ___________________________
Final Degree Completion Plan

Student: ___________________________ Date: __________________

A copy of this form must be filed with the Graduate Operations Coordinator before the end of the eleventh semester in residence for Ph.D. students, or before the end of the final semester of guaranteed support for M.S. students. The plan must be signed by the student and a majority of the thesis committee members, including the advisor. Submission of this form before the end of departmentally-guaranteed support time (12 semesters for Ph.D.) is a prerequisite for continued eligibility as Chemistry Department GTA, and necessary to maintain good standing in the degree program.

Below, provide a brief description/bulleted list of current degree progress, listing major accomplishments and their state of completion.

Brief Description of Current Degree Completion Status

- 
- 
- 
- 
- 

List below any remaining major tasks required (e.g., synthesis of molecule X, data collection on compound Y, writing up paper Z, etc.). Also provide the committee's best estimate of when each of those tasks should be finished. Finally, provide the current best estimate of a date for the dissertation/thesis defense.*

Remaining Objectives (additional detail can be provided on a separate sheet):

1. ___________________________ complete by: ______________

2. ___________________________ complete by: ______________

3. ___________________________ complete by: ______________

4. ___________________________ complete by: ______________

5. ___________________________ complete by: ______________

Projected Defense Date: ___________________________

*Note: whereas the individual objective completion dates are considered non-binding estimates, it is expected that the “projected defense date” represents a realistic deadline for dissertation/thesis defense. One extension of the defense date is permitted, if a majority of the committee members (including the research advisor) agree.