Master’s Degree Requirements

1) Admissions requirements: There are no direct admissions to the master’s program, although the M.S. may be en route to the Ph.D. See Ph.D. admission requirements.

2) M.S., Plan I

This plan requires a minimum of 30 units of graduate-level courses and a thesis. All 30 units must be in Chemistry or in other programs approved by the graduate adviser.

3) Course Requirements - Core and Electives

Chemistry has areas of specialization in Analytical, Biological, Inorganic, Organic, and Physical Chemistry. Each area has different required core classes. Neither courses taken to clear a deficiency, nor CHE 261, 263, 264, 280, 290, 293, 294, 295, 299, 390 can be used to satisfy the core class requirement.

a) Core Courses (9-12 units)

Students must take a total of three graduate-level courses in order to fulfill the course requirements for the MS degree. Unless otherwise approved by the Graduate Adviser, the three courses are those that are specified as core classes in the PhD program for the specific areas of specialization below:

**Analytical Chemistry:**
- Che 240  Advanced Analytical Chemistry  3 units
- Che 205  Symmetry, Spectroscopy and Structure  3 units
- Che 241A-E  Special Topics in Analytical Chemistry (2 courses)  6 units

**Biological Chemistry (pick one: BioOrganic or BioPhysical):**

*BioOrganic:*
- Che 238  Introduction to Chemical Biology  3 units
- or MCB 221A  Physical Biochemistry  3 units

*and all the following:*
- Che 233  Physical-Organic Chemistry  3 units
- Che 219  Spectroscopy of Organic Compounds  3 units
- Che 219L  Laboratory in Spectroscopy of Organic Compounds  1 unit

*BioPhysical*
- MCB 221A  Physical Biochemistry  3 units
- Che 205  Symmetry, Spectroscopy and Structure  3 units
- Che 210A  Quantum Chemistry: Introduction and Stationary-State Properties  3 units

**Inorganic Chemistry**
- Che 226  Principles of Transition Metal Chemistry  3 units
- Che 205  Symmetry, Spectroscopy and Structure  3 units
- Che 228A-D  Special Topics in Inorganic Chemistry (2 courses)  6 units
Organic Chemistry
Che 233  Physical-Organic Chemistry  3 units
Che 219  Spectroscopy of Organic Compounds  3 units
Che 219L Laboratory in Spectroscopy of Organic Compounds  1 unit
Che 231A Organic Synthesis: Methods and Strategies  4 units

Physical Chemistry
Che 211A Advanced Physical Chemistry: Statistical Thermodynamics  3 units
Che 210A Quantum Chemistry: Introduction and Stationary-State Properties  3 units
Che 210B Quantum Chemistry: Time-Dependent Systems  3 units

b) Additional Course Requirements (18 units)
Che 293 Intro to Chemistry Research (fall quarter, Yr-01)  2 units
Che 290 Research Seminars (3 quarters required, Yr-01/2 units ea)  6 units
Che 261 Research Group Meeting (Winter & Spring, Yr-01/2 units ea)  4 units
Che 264 Research Class (Winter & Spring, Yr-01/3 units ea)  6 units
Che 299 Research (enough units to meet the 30 unit minimum) variable

c) Summary:
9-12 units of core coursework, a minimum 18 units of additional required courses, and enough Che 299 units to meet the total 30 unit minimum requirement. Full-time students must enroll for 12 units per quarter including research, academic and seminar units. Courses that fulfill any of the program course requirements may not be taken S/U unless the course is normally graded S/U. Once the total minimum course requirements are completed, students take additional classes as needed, although the 12 units per quarter are generally fulfilled with a group meeting (261) and research units (263/264 and 299). Per UC regulations, students cannot enroll in more than 12 units of graduate level coursework (200) or more than 16 units of combined upper division and graduate level coursework (100,200,300) per quarter. Each core course and any deficiency course must be passed with a grade of 3.0 or higher.

4) Special requirements:
Each candidate for the MS degree must serve the equivalent of three academic quarters in a minimum of 25% appointment as a teaching assistant. A student serving in a 50% appointment/quarter (the maximum allowed) will satisfy the requirement in two quarters. Stipends for students serving in a 25% appointment as a TA may be supplemented by fellowships or research assistantships.

5) Committees:
a) Admission Committee:
Once the completed application, all supporting material, and the application fee have been received, the application will be available to the GPC Admissions Committee for review and vote. The GPC Admissions Committee consists of seven graduate group faculty and one graduate student (when possible). Based on a review of the entire application, a recommendation is made to accept or decline an applicant’s request for admission. That recommendation is forwarded to the Dean of Graduate Studies for final approval of admission. Notification of admissions decisions will be sent by the Office of Graduate Studies.
b) **Course Guidance or Advising Committee**

All incoming students are assigned a Graduate Adviser in their area of specialization to develop the student’s study plan according to the requirements for that specialization (see consultation sheet in Appendix I near the end of this document). The student’s Graduate Adviser, or Research Director/Major Professor may also suggest additional coursework in addition to the required courses noted above.

c) **Thesis Committee**

Thesis Committee: The student, in consultation with his/her research director/major professor and graduate adviser, nominate a minimum of three faculty to serve on the Thesis Committee. These nominations are submitted to the Office of Graduate Studies for formal appointment in accordance with Graduate Council policy. The research director/major professor serves as Chair of the committee.

6) **Advising Structure and Mentoring:**

The **Research Director/Major Professor** is a member of the GPC, and the faculty member who supervises the student’s research and thesis and serves as the Chair of the Thesis Committee. The **Graduate Adviser**, who is nominated by the Chemistry Department Chair and appointed by Graduate Studies, is responsible for course guidance and is a resource for information on academic requirements, policies and procedures, and registration information. The **GPC Student Affairs Officer** is responsible for providing information concerning the program from initial contact through graduation, administering ACS placement exams, organizing initial counseling appointments, identifying appointments, assisting the students with processing of required documents and providing assistance and information concerning general university policies. The **Mentoring Guidelines** can be found in the Chemistry Graduate Student handbook that is given to each incoming student during the Program’s student orientation, but can also be found on the **GPC SmartSite**:


7) **Advancement to Candidacy:**

Every student must file an official application for Candidacy for the Degree of Master of Science after completing all of their course requirements, their residency requirement and at least one quarter before completing all degree requirements; this is typically in the 3rd or 4th quarter. The candidacy form for the Master’s Degree – Thesis Plan I can be found online at: [http://www.gradstudies.ucdavis.edu/forms/](http://www.gradstudies.ucdavis.edu/forms/). A completed form includes a list of courses the student will take to complete degree requirements. If changes must be made to the student’s course plan after s/he has advanced to candidacy, the Graduate Adviser must recommend these changes to Graduate Studies. Students must have their Graduate Adviser and committee Chair sign the candidacy form before it can be submitted to Graduate Studies. If the candidacy is approved, the Office of Graduate Studies will send a copy to: the GPC Student Affairs Officer, the student, and the Thesis Committee Chair. If the Office of Graduate Studies determines that a student is not eligible for advancement, the GPC Thesis Committee Chair and the student will be told the reasons for the application’s deferral. Some reasons for deferring an application include: grade point average below 3.0, outstanding “I” grades in required courses, or insufficient units.
8) **Thesis Requirements:**

a) **Thesis Requirements (Plan I):**

- **Thesis committee meetings:** The candidate and research director/major professor should meet at least once a year with the other members of the thesis committee to discuss progress and any changes in research objectives.

- **Thesis:** Research for the Master's thesis is to be carried out under the supervision of a GPC faculty member (Research Director/Major Professor) and must represent an original contribution to knowledge in the field. The thesis research must be conducted while the student is enrolled in the program. The thesis must be submitted to the thesis committee at least one month before the student plans to make requested revisions. All committee members must approve the thesis and sign the title page before the thesis is submitted to Graduate Studies for final approval. Should the committee determine that the thesis is unacceptable, even with substantial revisions, the GPC will recommend the student for disqualification from the program to the Dean of Graduate Studies.

The thesis must be filed in a quarter in which the student is registered or on filing fee. Instructions on preparation of the thesis and a schedule of dates for filing the thesis in final form are available from Graduate Studies; the dates are also printed in the UC Davis General Catalog and in the Class Schedule and Registration Guide issued each quarter. A student must have a minimum GPA of 3.0 for the M.S. degree to be awarded.

9) **Normative Time to Degree:**

Normative time to degree for a student who is accepted into the MS program is two years (6 quarters). As mentioned in item 7 above, normative time to advancement is one year (i.e., the student will advance near the end of the 3rd quarter or near the beginning of the 4th).

10) **Typical Timeline and Sequence of Events:**

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<td>Linguistic course if required for international student</td>
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<td>Chem 299 (variable research)</td>
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11) **Sources of funding**

Students typically are funded by TAship upon entering the program and for long enough to fulfill the teaching requirement stated in the Special Requirements above (section 4). Once the student has selected a research director/major professor, the decisions as to whether the student will serve as a TA or GSR falls to the research director/major professor (in accordance with TA availability); full details can be found at the GPC SmartSite: https://cas.ucdavis.edu/cas/login?service=https%3A%2F%2Fsmartsite.ucdavis.edu%2Fxsl-portal%2Flogin (with Kerberos access).

12) **PELP, In Absentia and Filing Fee status.**

Information about PELP (Planned Educational Leave), In Absentia (reduced fees when researching out of state), and Filing Fee status can be found in the Graduate Student Guide: http://www.gradstudies.ucdavis.edu/publications/
Ph.D. Degree Requirements

1) Admissions Requirements:

Consideration for program admission requires a four-year bachelor’s degree, three letters of recommendation, official transcripts from all colleges and universities attended beyond high school, GRE scores, TOEFL or IELTS score (if applicable) and the Office of Graduate Studies online application with fee by the stated admission deadline. A minimum GPA of 3.0 is required. Admissions decisions are made on a case-by-case basis. Meeting these criteria does not guarantee admission. The decision to recommend admission to the Dean of Graduate Studies will be made by the GPC Admissions Committee on the basis of available space and the competitiveness of applicants compared to the eligible pool.

a) Prerequisites: In addition to the admission requirements stated above, applicants are expected to have equivalent major coursework required for a BS/BA in Chemistry.

b) Deficiencies: All chemistry graduate students take American Chemical Society (ACS) placement exams upon entering the program. These exams establish any knowledge deficiencies that the student may possess in the five designated areas of chemistry. A passing score is set for each exam by the ACS. Deficiencies identified by the ACS exams can be cleared by retaking an equivalent exam at the beginning of the student’s second quarter in residence or by taking a prescribed course (or series of courses depending on the subject area) and passing each with a grade of 3.0 or better.

GPC Placement Exam Policies

Each candidate for the Ph.D. degree must clear all deficiencies that are identified by the placement exams taken upon entering the program. Deficiencies must be cleared by the end of Spring quarter in the first year either by passing the ACS standardized exam or by taking the appropriate undergraduate course and receiving a grade of 3.0 or higher.

(1) In early May of each year, applicants who have accepted our offer to join the UC Davis GPC will be sent a link to an online survey. The survey will:
   (i) provide a listing of our placement exam policies and their implications.
   (ii) contain a digital signature check box through which the student will affirm that s/he has received the information and understands the policies.
   (iii) suggest placement exam preparative materials (names/authors/editions of the text books UC Davis uses for its A/B/I/O/P undergraduate courses).
   (iv) give an illustrative exam consisting of 50 questions which are representative of the placement exam; it will contain 10 questions from each of the 5 areas (A/B/I/O/P) of Chemistry. Students will be encouraged to take this online exam.

(2) All students may retake once any placement exam on which their first score was below the 50th percentile, regardless of how far below the 50th percentile they scored. Retakes will be offered on the 1st Friday after instruction begins in their Yr-01 2nd quarter.

(3) First-year students who score below the 50th percentile on both attempts in their declared area of specialization have a deficiency and will be notified at the beginning of their Yr-01 2nd quarter that they are being placed on academic probation. They will have until the end of Yr-01 2nd quarter to clear the deficiency or academic disqualification will be recommended to the Dean of Graduate Studies.

(4) All other placement exam deficiencies must be cleared by the end of their Yr-01 3rd quarter. If deficiencies have not been cleared by that time, academic disqualification will be pursued. Upon petition (with Research Director/Major Professor signature), Graduate Affairs Committee (GAC) may consider an exception to this policy. GAC approval of
exception to these policies requires a GAC meeting. When considering petitions, the GAC will take into consideration the student’s overall performance to date.

(5) Placement exam deficiencies may also be removed during Yr-01 with a grade of 3.0 or better in undergraduate courses as follows:
A → take CHE-105 or CHE-115;
B* → take BIS-102 and/or BIS-103;
I → take CHE-124A;
O* → take CHE-128A and/or CHE-128B;
P* → take CHE-110A and/or CHE-110C.

Note: graduate advisers may suggest additional “in area” coursework for their advisees.

* Placement exams deficiencies in these areas may require one or two courses to resolve. While “out of area” deficiencies may be truncated with a grade of A- or higher in the first course, “in area” deficiencies require taking both courses.

2) Dissertation Plan:

The GPC follows Plan B. Specifies a three-member (minimum) dissertation committee, and an optional final oral examination (made on an individual student basis by the dissertation committee). No exit seminar is required.

The Candidate in Philosophy Degree - C.Phil.

All students who are advanced to candidacy for the Doctor of Philosophy degree are eligible for the Candidate in Philosophy (C. Phil.) degree. To be eligible for this designation, the student must possess the intellectual capacity to complete the requirements for the Ph.D. The Candidate in Philosophy degree is intended as a formal indication that the student has completed the requirements for advancement to candidacy; it is not intended as a terminal degree or a consolation prize for not completing the Ph.D. The advantage of this intermediate degree is that students who have fulfilled their residence requirements and have advanced to candidacy will have tangible evidence of this accomplishment if they wish to complete their dissertation while holding a full-time teaching or research position. To award the C.Phil., the Chair of the GPC should submit a letter outlining the justification for the award to their respective Student Affairs Officer in the Office of Graduate Studies.

3) Course Requirements:

Each candidate for the Ph.D. degree must clear all deficiencies that are identified by the placement exams taken upon entering the program. Deficiencies must be cleared by the end of Spring quarter in the first year either by passing the ACS standardized exam or by taking the appropriate undergraduate course and receiving a grade of 3.0 or higher. Each candidate must complete a total of six graduate-level courses, exclusive of Chemistry 261, 263, 264, 280, 290, 293, 294, 295, 298, 299, and 390. These six courses consist of a set of specified core courses and a specific number of elective and special topic courses, as given below for the five areas (particular fields of interest). Elective courses may be taken from the Chemistry curricula or from other approved departments with prior approval from their academic adviser, depending on the area. Students should complete all required course work early in their second year in residence. Each core course, and any deficiency course, must be passed with a grade of 3.0 or higher. In addition, candidates must enroll and participate in Chemistry 290, Seminar, during each quarter in residence, until they advance to candidacy. Enrollment in Chemistry 290 is highly recommended thereafter to stay abreast of innovations in the field. Candidates must be fully registered (12 units) every quarter in residence and maintain a 3.0 or better overall GPA.
a) Core Courses (9-12 units)

**Analytical Chemistry:**
- Che 240 Advanced Analytical Chemistry 3 units
- Che 205 Symmetry, Spectroscopy and Structure 3 units
- Che 241A-E Special Topics in Analytical Chemistry (2 courses) 6 units

**Biological Chemistry (has two tracks BioOrganic and BioPhysical)**

*BioOrganic:*
- Che 238 Introduction to Chemical Biology 3 units
*or* MCB 221A, Physical Biochemistry 3 units
*and all of the following:*
- Che 233 Physical-Organic Chemistry 3 units
- Che 219 Spectroscopy of Organic Compounds 3 units
- Che 219L Laboratory in Spectroscopy of Organic Compounds 1 unit

*BioPhysical*
- MCB 221A Physical Biochemistry 3 units
- Che 205 Symmetry, Spectroscopy and Structure 3 units
- Che 210A Quantum Chemistry: Introduction and Stationary-State Properties 3 units

**Inorganic Chemistry**
- Che 226 Principles of Transition Metal Chemistry 3 units
- Che 205 Symmetry, Spectroscopy and Structure 3 units
- Che 228A-D Special Topics in Inorganic Chemistry (2 courses) 6 units

**Organic Chemistry**
- Che 233 Physical-Organic Chemistry 3 units
- Che 219 Spectroscopy of Organic Compounds 3 units
- Che 219L Laboratory in Spectroscopy of Organic Compounds 1 unit
- Che 231A Organic Synthesis: Methods and Strategies 4 units

**Physical Chemistry**
- Che 211A Advanced Physical Chemistry: Statistical Thermodynamics 3 units
- Che 210A Quantum Chemistry: Introduction and Stationary-State Properties 3 units
- Che 210B Quantum Chemistry: Time-Dependent Systems 3 units

b) Elective Courses (4-12 units):
Elective courses may be taken from the Chemistry curricula or from other approved departments, depending on the area. A minimum of 2-3 elective classes (4-12 units) is required depending upon which area of specialization a student is pursuing.

c) Additional Course Requirements (18 units)
- Che 293 Intro to Chemistry Research (fall quarter, Yr-01)
- Che 290 Research Seminars (until advancement to candidacy)
- Che 261 Research Group Meeting (beginning Winter Yr-01 2nd quarter)
- Che 263 Research Class (pre-candidacy – 3 units/quarter)
- Che 264 Research Class (post-candidacy – 6 units/quarter)
- Che 294 3rd-year Seminar (until advancement to candidacy)
- Che 299 Research (enough units to bring registration to 12 units/quarter)
d) Summary:

**Students should complete all required course work early in their second year in residence.** A full-time student must enroll for 12 units per quarter including research, academic and seminar units. Per UC regulations, students cannot enroll in more than 12 units of graduate level coursework (200) or more than 16 units of combined upper division and graduate level coursework (100, 200, 300) per quarter. Courses that fulfill any of the GPC course requirements may not be taken S/U unless the course is normally graded S/U.

4) **Special Requirements:**

**Teaching:** Each candidate for the Ph.D. degree must serve the equivalent of three academic quarters in a 25% appointment as a teaching assistant (TA). A student serving in a 50% TA appointment (the maximum allowed) will satisfy the requirement in two quarters. Stipends for students serving at one-fourth time as a TA may be supplemented by fellowships or research assistantships.

**3rd-Year Seminar:** A 3rd-year seminar presentation is required of all Ph.D. students to demonstrate that the candidate is making research and dissertation progress.

**Purpose of the 3rd Year Graduate Seminar:**

a. Give the graduate student formal cause to evaluate his/her research progress.

b. Give the graduate student valuable experience in organizing and presenting his/her science.

c. Calibrate 1st and 2nd year graduate students as to expectations placed on a 3rd year graduate student.

d. Allow the graduate student’s Dissertation Committee to monitor and evaluate his/her progress.

**Format of 3rd Year Graduate Student Seminar:**

e. Each graduate student speaker should deliver a 25 minute lecture and expect to entertain~5 minutes of questions. There will be no break between talks.

f. In general, the speaker should state the research problem, discuss the importance or relevance of the research, present and analyze the research data, and conclude with a statement about future research plans.

g. Speakers are encouraged to read pertinent information in the ACS Style Guide (by J. S. Dodd).

h. Graduate students are encouraged to meet with the individual members of their Dissertation Committee prior to giving their 3rd Year Graduate Student Seminar in order to foster interaction with and contribution by the Dissertation Committee.

**Evaluation of 3rd Year Graduate Student Seminars:**

i. The graduate student’s Dissertation Committee will receive a specific invitation to attend the seminar.

j. The graduate student and his/her Dissertation Committee will meet within two weeks of the seminar to evaluate the graduate student’s seminar. The student (with, as necessary, the assistance of the student’s research director) is charged with scheduling this meeting. The purpose of this evaluation will be two-fold: (1) to critique the delivery and (2) to critique the research progress.

k. If the graduate student’s Dissertation Committee decides that either poor delivery or insufficient science warrant a repeat seminar, the Seminar Committee will reschedule the graduate student’s seminar for a date ~6 months later. Each graduate student is strongly
encouraged to schedule future meetings (perhaps every six months) with his/her Dissertation Committee.

Full details for the 3rd Year Seminar requirement can be found in the GPC Graduate Student Handbook. See Third-year evaluation form in Appendix II near the end of this document.

5) Committee:

a) **Admissions Committee:**

Once the completed application, all supporting material, and the application fee have been received, the application will be available to the GPC Admissions Committee for review and vote. The GPC Admissions Committee consists of seven GPC faculty and one graduate student (when possible). Based on a review of the entire application, a recommendation is made to accept or decline an applicant’s request for admission. That recommendation is forwarded to the Dean of Graduate Studies for final approval of admission. The Office of Graduate Studies will send notification of admissions decisions.

b) **Course Guidance or Advising Committee:**

All incoming students are assigned a Graduate Adviser in their area of specialization to develop the students’ study plans in accordance with the requirements of each area of specialization. The student’s Research Director/Major Professor may also suggest additional coursework beyond the required courses noted in the course requirements section.

c) **Qualifying Examination Committee:**

Graduate Advisers identify the chair and three other faculty members to serve on the qualifying exam committee. These committee members come from within the GPC. The Graduate Advisers, working together with the Student Affairs Officer, balance the assigned workload so that no faculty member is overly burdened. The Student Affairs Officer notifies graduate students by letter regarding the make-up of their committees. A student may ask to have one member removed and replaced for any reason. The student, in consultation with their Research Director/Major Professor and with the concurrence of the Graduate Adviser, chooses a fifth member from outside the GPC. It is the student's responsibility to notify the Student Affairs Officer concerning the identity of the fifth person.

Once all members of a student’s QE committee have been identified and a date has been arranged, the Student Affairs Officer submits the application for the Qualifying Exam to the Dean of Graduate Studies for formal appointment in accordance with Graduate Council policy. The research director/major professor does not serve on the committee. The QE Committee conducts the exam and submits results to the Office of Graduate Studies.

d) **Dissertation Reading Committee:**

The Dissertation Committee is a three-member committee selected by the student, in consultation with the Research Director/Major Professor. The majority of the committee should be from the GPC. The composition of the dissertation committee is entered on the Advancement to Candidacy Form and approved by the Office of Graduate Studies. The role of the Dissertation Committee is to advise the doctoral student on the research topic and methods, and then to review the final completed dissertation for acceptance. The Committee Chairperson (usually the Research Director/Major Professor) should determine the desires of the individual members regarding assistance with the research and dissertation review at the time the dissertation committee is constituted. Students are expected to meet with the Chair of their dissertation committee regularly. Dissertation committee members are expected to read and
comment on a dissertation within four weeks from its submission. The student and faculty will coordinate a timeline for the student to present the dissertation to the dissertation committee. This timeline must allow all dissertation committee members enough time to fulfill their responsibilities within the four-week deadline.

6) Advising Structure and Mentoring:

The Research Director/Major Professor is the faculty member who supervises the student’s research and dissertation; this person serves as the Chair of the Dissertation Committee. The Graduate Adviser, who is nominated by the Chemistry Department Chair and appointed by Graduate Studies, is responsible for course guidance and is a resource for information on academic requirements, policies and procedures, and registration information. The GPC Student Affairs Officer is responsible for providing information concerning the program from initial contact through graduation, administering ACS placement exams, organizing initial counseling appointments, identifying appointments, assisting the students with processing of required documents and providing assistance and information concerning general university policies. GPC Mentoring Guidelines can be found in the Chemistry Graduate Student handbook that is given to each incoming student during the GPC’s student orientation, but can also be found on the GPC SmartSite: https://cas.ucdavis.edu/cas/login?service=https%3A%2F%2Fsmartsite.ucdavis.edu%2Fxsl-portal%2Flogin (with Kerberos access)

7) Advancement to Candidacy:

Before taking the Qualifying Exam and advancing to candidacy for a doctoral degree, a student must have satisfied all requirements set by the graduate program, must have maintained a minimum grade of 3.0 in each core and deficiency course undertaken (except those courses graded S or U), and must have passed a Qualifying Examination before a committee appointed to administer that examination. Normally, students advance by the end of the 5th or 6th quarter; students must pass their QE by the end of the 9th quarter in order to remain eligible for academic appointments (TA, GSR, AI, etc.). The student must file the appropriate paperwork with the Office of Graduate Studies and pay the candidacy fee in order to be officially promoted to Ph.D. Candidacy. Refer to the Graduate Council website for additional details regarding the Doctoral Qualifying Examination at http://gradstudies.ucdavis.edu/gradcouncil/policiesall.html.

Following the successful completion of the qualifying exam, the student completes the petitions for advancement to candidacy for the degree of Doctor of Philosophy. The Graduate Adviser reviews and signs the petition and, after consultation with the student and the student's research director/major professor, recommends to the Dean of Grad Studies the membership of the dissertation reading committee. The dissertation committee is responsible to direct the research and guide the student in preparing the dissertation.

8) Qualifying Examination and Dissertation requirements:

a) Preliminary Examination

No preliminary examination or paper is required.

b) Qualifying Examination

1. General Information

Students must clear any deficiencies and complete all of the TA and course requirements before they are eligible to take the oral qualifying examination. For each area, the chemistry graduate adviser notifies students when they have satisfied these requirements.
The qualifying examination committee, which is appointed by the Dean of Graduate Studies in consultation with the graduate adviser for the area, consists of four GPC faculty members (excluding the research director/major professor) and one non-GPC faculty member. The qualifying examination is normally scheduled in the student's fifth quarter in residence.

The primary purpose of the Qualifying Examination (QE) is to validate that the student is academically qualified to conceptualize a research topic, undertake scholarly research and successfully produce the dissertation required for a doctoral degree. The QE must evaluate the student’s command of the field, ensuring that the student has both breadth and depth of knowledge, and must not focus solely on the proposed dissertation research. In addition, the QE provides an opportunity for the committee to provide important guidance to the student regarding his or her chosen research topic.

The Qualifying Examination will consist of written and oral components.

2. Guidelines For The Ph.D. Oral Qualifying Examination In Chemistry
   Rules for the Student

1. The student should meet with their qualifying examination chair once the committee has been formed.

2. In consultation with their Research Director/Major Professor and with the concurrence of the Graduate Advisor, the student should make a recommendation to the Student Affairs Officer for appointment of the fifth member of the qualifying exam committee.

3. The student may request that any one member of the qualifying exam committee be changed. Such a request should be made within three days of the student being informed of the composition of the proposed committee.

4. The student should meet with the chair of the qualifying exam committee at least two weeks prior to the qualifying examination to discuss any concerns or questions about the examination and to deliver the doctoral research abstract (signed by the Research Director/Major Professor).

   The doctoral research abstract provides the qualifying exam committee with:
   a. background,
   b. research plan,
   c. significance of research,
   d. status of research progress, and
   e. expected future directions.

   That description should be in the form of a Journal of the American Chemical Society communication having a three-page limit, as formatted for journal publication using the journal template for communications (references are required and are not counted in the page limit). The document should utilize color-coding as appropriate: black = introduction and work done by others; blue = accomplishments of the student; red = planned work and expectations; green (if applicable) = work to be done by collaborators.

   The doctoral research abstract should be approved and signed by the Research Director as valid and representative. The qualifying exam committee chair should review the doctoral research abstract for clarity and completeness, and return it to the student within three days with suggestions for appropriate modification.
At least one week prior to the qualifying examination, the student should submit (preferably in PDF format) the following documents to the qualifying exam committee members: (i) the approved doctoral research abstract; (ii) copies of any publications or manuscripts submitted or in press that have resulted from their research at UC Davis.

5. In Part I of the qualifying examination, the student should present a description of their research project(s). The research presentation style and scope should be similar to the brief presentations given at ACS meetings. The objective of the research presentation is to clearly explain the broad importance of the scientific work, with particular emphasis on communicating the big picture to a non-specialist audience, rather than providing detailed descriptions of experimental procedures and methods.

The presentation should define the main scientific questions being addressed and explain how answers to these questions will be relevant to the field of study. The overall goal is to communicate the research results in a concise fashion, as well as to demonstrate the broader impact and significance of the work. Note, however, that during questioning, members of the qualifying exam committee may ask about specific details of the experimental procedures and the student should be prepared to explain the rationale behind the experimental design.

6. The student may use up to five PowerPoint™ (or equivalent) slides to present complex formulas, graphical material, and other details that would be difficult to reproduce by hand on the blackboard. Normally, no other materials are allowed as this is Qualifying Examination, not a seminar.

7. In Part II of the qualifying examination, the questions will broadly address the student’s area of specialization (analytical, biological, inorganic, organic, physical). Also, areas of weakness evident from Part I of the examination may be addressed.

The oral portion of the qualifying exam is intended to demonstrate the student's critical thinking ability, powers of imagination and synthesis, and broad knowledge of the field of study.

The committee will evaluate the student's general qualifications for a respected position as an educator or leader as well as the student's preparation in their chemical area of specialization based upon relevant portions of the student’s previous academic record, performance on specific parts of the examination, and the student's potential for scholarly research as indicated during the examination.

3. Outcome of the Exam

At the conclusion of the qualifying examination, the chair will assist the discussions by the committee members to reach a final recommendation. In reaching their decision, members of the committee will consider all areas of the student’s progress including the graduate academic record, performance on specific parts of the qualifying examination, and an overall evaluation of the student’s performance and potential for scholarly research. Some committees may choose to weigh the Research Director/Major Professor's advice at this stage rather than earlier. Possible outcomes are Pass, Not Pass, or Fail. A vote of Fail at the first qualifying examination would be an unusual outcome. As appropriate, the chair will record the comments of the qualifying exam committee members and incorporate them into a written report to be shared with the student.
While Pass or Fail are final decisions for the committee, in the case of a Not Pass, the qualifying exam committee has several options. These include: (i) reexamine the student (this option spans a partial or full Qualifying Examination retake); (ii) make a writing assignment, which the student should submit by an agreed date – the product must be examined by all members of the Committee and a joint decision reached (typically such an assignment addresses shortcomings pertinent to research but outside the immediate area of specialization); (iii) complete specified course(s) for specified grade(s); (iv) any other option within graduate studies guidelines. In all but exceptional cases, the qualifying exam committee will arrange to make a final Pass or Fail decision no later than the end of the academic quarter immediately following the quarter in which the examination was originally administered. Thus, any proposed coursework will only involve courses given in the quarter immediately following the examination.

The chair must inform the student of the decision – Pass, Not Pass, or Fail – immediately at the conclusion of the committee discussion and voting. The chair must complete the qualifying examination report and return it to the Student Affairs Officer within 72 hours of the examination so it can be forwarded to the Office of Graduate Studies. The chair will inform the Research Director/Major Professor of the decision, preferably in writing. In the case of a Pass, the chair must sign the Advancement to Candidacy form and refer the student to the Student Affairs Officer for additional instructions. In the case of a Not Pass, the chair must clarify for the student and the Research Director/Major Professor the nature of the deficiencies identified, and must provide a written description of the requirements that should be met, and the timeline for meeting them. This must be done within 72 hours of the examination. In the case of a Fail, the student cannot remain in the Ph.D. program; the qualifying exam committee has the option of recommending in the report that the student be allowed to pursue an M.S. degree in chemistry if the performance on the exam was sufficient to establish competence at the Masters level. In the case of a Not Pass or Fail, the Chair of the Committee shall inform the student of the right to appeal the committee’s decision for cause as delineated by The Dean of Graduate Studies.

c) The Dissertation

A dissertation on a subject chosen by the candidate, bearing on the principal subject of study and of such character as to show ability to pursue independent investigation, must receive the approval of the dissertation committee. As part of the dissertation process, the student will present his/her research to the dissertation committee in a 3rd Year Graduate Student Seminar (please see “Guidelines for 3rd-year Graduate Student Seminar in the student handbook).

1. Exit Seminar
   No exit seminar is required.

2. Dissertation: General Requirements

Filing of a Ph.D. dissertation with the Office of Graduate Studies is normally the last requirement satisfied by the candidate. The deadlines for completing this requirement are listed each quarter in the campus General Catalog (available online at the website of the Office of the Registrar or from the Bookstore). A candidate must be a registered student or in Filing Fee status at the time of filing a dissertation, with the exception of during summer sessions. The PhD. Dissertation will be prepared, submitted and filed according to regulations instituted by the Office of Graduate Studies
Satisfaction of this requirement must be verified by the Dissertation Committee Chair.

3. **Dissertation:**
The research conducted by the student must be of such character as to show ability to pursue independent research. The dissertation reports a scholarly piece of work of publishable quality that solves a significant scientific problem in the field and is carried out under the supervision of the student’s Research Director/Major Professor, while the student is enrolled in the program. The chair of the dissertation committee must be a GPC member and must be immediately involved with the planning and execution of the experimental work done to formulate the dissertation. The research director/major professor’s laboratory is the setting for most of the student’s research activities, unless an alternative site and immediate supervisor are approved in advance by the Graduate Affairs Committee.

Students should meet regularly with their dissertation committee. The dissertation must be submitted to each member of the dissertation committee at least one month before the student expects to make requested revisions; committee members are expected to respond within 4 weeks, not including summer months for nine month faculty. Informing committee members of progress as writing proceeds helps the members to plan to read the dissertation and provide feedback within this time frame. The dissertation must be approved and signed by the dissertation committee before it is submitted to Graduate Studies for final approval.

9) **Normative Time to Degree**

Students will have four calendar years after the date they pass their Qualifying Examination (QE) to submit their dissertation. At this time, if a student has not submitted his/her dissertation to Graduate Studies, this student will receive a notice from Graduate Studies that s/he is placed on probation, and has one year from that date to submit the dissertation. If not submitted within one year, the student will no longer be allowed to enroll the following quarter and will be disqualified.

The clock is “set” from the date of passage of the QE, not the time the student officially advances to candidacy through submission of the form to Graduate Studies. This prevents a student from delaying submission of the form to Graduate Studies when they have, in fact, “advanced.” After disqualification, a student will have to be readmitted to the program through the GPC’s admission process to receive his/her Ph.D. If programs are willing to readmit the student, the student will be required to retake the qualifying examination to demonstrate that his/her knowledge of the research area is current.

Research directors/major professors, academic advisers, or students may petition Graduate Council for an exception to this policy for cause. In addition, a dissertation committee may petition for an exception to retaking the QE. Students, faculty and programs have the right to appeal the denial of the exceptions to policy for cause.

This is a generous timeline given that normative time for programs on campus is typically five to six years. Thus, if a student passes his/her QE during the third year (before the ninth quarter), this requirement gives the student an additional four years to complete dissertation work and remain in good academic standing. This would represent submission of the dissertation in the seventh year of registration. In addition, a student has one probationary year beyond that for completion. This represents eight years total, which is well beyond the normative time for programs on this campus.
10) Typical Timeline and Sequence of Events

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<th>Year One</th>
<th>Fall</th>
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<td>Chem 293</td>
<td>Chem 261 (Group meeting)</td>
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<td>Linguistic course if required for international student</td>
<td>Chem 263 (research)</td>
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<td>Chem 294 (3rd-yr seminar)</td>
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<td>Advancement to PhD candidacy</td>
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<td>Chem 299 (variable research)</td>
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11) Sources of funding.
Students typically are funded by TAship upon entering the program and for long enough to fulfill the teaching requirement stated above. Once the student has selected a research director, the decisions as to whether the student will serve as a TA or GSR falls to the research director, and in accordance with TAship availability.

12) PELP, In Absentia and Filing Fee status.
Information about PELP (Planned Educational Leave), In Absentia (reduced fees when researching out of state), and Filing Fee status can be found in the Graduate Student Guide: http://www.gradstudies.ucdavis.edu/publications/

13) Leaving the Program Prior to Completion of the PhD Requirements.
Should a student leave the program prior to completing the requirements for the PhD, they may still be eligible to receive a Masters Degree if they have fulfilled all the requirements (see Masters section). Students can use the Change of Degree Objective form available from the Registrar’s Office: http://registrar.ucdavis.edu/PDFFiles/D065PetitionForChangeOfGraduateMajor.pdf
Appendix I

CONSULTATION WORKSHEET

NAME: 

ENTERED PROGRAM: 

Fall  Winter  Spring

Undergraduate Degree From: 

GPA

Area:  A  B  I  O  P

Program: 

Ph.D.  M.S.  CWO

Required Action(s)

Placement Exams*  Score

Analytical  %

score is \( \geq 50\% \), no further action

score is \( < 50\% \), retake exam or

score is \( < 50\% \), take Chem 115 or 105

Biological  %

score is \( \geq 50\% \), no further action

score is \( < 50\% \), retake exam or

score is \( < 50\% \), take BIS 102/103

BIS 102  (needs)

BIS 103  (needs)

Inorganic  %

score is \( \geq 50\% \), no further action

score is \( < 50\% \), retake exam or

score is \( < 50\% \), take Chem 124A

Organic  %

score is \( \geq 50\% \), no further action

score is \( < 50\% \), retake exam or

score is \( < 50\% \), take Chem 128A/128B

128A  (needs)

128B  (needs)

Physical  %

score is \( \geq 50\% \), no further action

score is \( < 50\% \), retake exam or

score is \( < 50\% \), take Chem 110A/110C

110A  (needs)

110C  (needs)

* Ph.D. students must pass 4 of the 5 exams, Chem Physics students must pass Inorganic & Analytical, MS must pass research area

COURSES

Fall

Winter

Spring

Student Signature: 

White – Dept  Yellow – Adviser  Pink – Student

Revised 08/10
Appendix II
Chemistry Department Third-Year Student Presentation Evaluation Form

Reviewer Name: ____________________________

Presenter Name:
Presentation Date:
Presentation Title:

Abstract: From

Evaluation  (Please circle one with 1 as the lowest and 5 as the highest):

Organization and Development:
The organization of Presentation was easy to understand and follow. 1 2 3 4 5
In the conclusion, the speaker summarized the main points effectively. 1 2 3 4 5
In the conclusion, the speaker answered questions effectively. 1 2 3 4 5

Use of Graphics:
The speaker used presentation graphics effectively to reinforce and explain the main points. 1 2 3 4 5
The presentation graphics looked correct and professional. 1 2 3 4 5

General Overview:
Is the student’s abstract acceptable as expected for a conference? 1 2 3 4 5
Would the student’s presentation be acceptable as a talk at a professional meeting? 1 2 3 4 5
Did the student avoid verbal filter, “ah”, “eh,” “um,” etc. 1 2 3 4 5
How did you like this presentation? 1 2 3 4 5

What would you have done differently if you had been the speaker (back side)?

Please return to the Chem 294 Instructor for credit and to be handed back to the presenter after the reviewer name is removed