

***GRADUATE STUDENT
HANDBOOK***

**Department of Chemistry
The University of Alabama**

Revised August 2011

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PREFACE

TO THE ENTERING STUDENT:

This Handbook will acquaint you with the regulations, requirements, and procedures of our graduate program in Chemistry and facilitate your smooth progression through the various stages of degree work. The Handbook is divided into three major sections. The first section deals with some general information concerning academics, degree requirements and teaching assistantship duties. The second section deals with safety regulations and emergency procedures for working in the laboratory, and the third section (Appendix) contains some sample forms and a checklist to assist you in monitoring your progress towards the degree.

Many other publications delineate the University's specific regulations, requirements and resources. The "Graduate Catalog of the University of Alabama" is the official statement of the Graduate School's policies, degrees, requirements, and course offerings. This Handbook is not a substitute for any of these publications, but augments them with a presentation of the official Department of Chemistry graduate degree requirements and policies.

Keep a copy of the current Graduate Catalog and this Handbook from your first semester - the rules and regulations contained therein are the ones to which you will be held responsible when your final degree check for graduation is performed. Remember, as the interested party, it is your responsibility to ensure that all proper forms are obtained, completed, and submitted at the appropriate times and in the appropriate sequence.

A LETTER FROM THE CHAIR

Dear New Chemistry Graduate Students:

On behalf of the faculty and staff of the Department of Chemistry, I am pleased to welcome you to The University of Alabama and to the Department of Chemistry. The contents of this handbook are intended to acquaint you with appropriate departmental procedures, course requirements, expectations we have of you in performing your teaching and research duties, and departmental safety rules and emergency procedures. You need to read this material carefully and to return the attached form, signed, to indicate that you are familiar with the procedures. It is especially important that you understand the safety rules and procedures and follow them.

If you are to be paid by the University as a teaching assistant, research assistant, or fellowship holder, please see Ms. Carolyn Walker in Room 2008 Shelby. She has the federal and state tax withholding forms and the Employment Eligibility Verification I-9 form, which you must complete and sign. She will also make certain that you are placed on the University payroll, which will enable you to get your UA Action Card.

You have been given the schedule of the placement examinations. Your performance on these examinations helps us to develop an appropriate program of study for you based on your past experience. The Graduate Committee will provide a recommended initial program to you after your completion of these examinations.

You will be assigned a box in the mailroom. You should visit it daily to make sure that you do not miss any announcements. It is located on the second floor (2003) next to the Main Office. The Chemistry Department's address is The University of Alabama, Department of Chemistry, Box 870336, Tuscaloosa, AL 35487-0336. The overnight or express mail address is The University of Alabama, Department of Chemistry, 1044 Shelby Hall, 250 Hackberry Lane, Tuscaloosa, AL 35401.

As soon as you have completed your course registration, please return a copy of your schedule to Ms. Janice Voss, Graduate Program Secretary, Room 2005 Shelby, so that teaching assignments can be made that will not conflict with your classes. Teaching assignments will be made as soon as registration is completed. Please be sure to check your mailbox on the Monday morning before classes start (in order to determine which

laboratory sections have been assigned to you) and attend the department orientation session beginning at 8:00 a.m. on that same Monday.

Dr. Stephen Woski is the Director of Graduate Studies for the Chemistry Department and is located in Room 3036 Shelby, phone: 205-348-0454, Email: swoski@as.ua.edu . He will handle any issues with registration and general issues that you might have. Teaching assistantship assignments will be made by the Undergraduate Coordinator, Prof. Michael Jennings, Shelby 2076, phone: 205-348-0351, Email: jennigm@bama.ua.edu. If you are on a research fellowship, please see your research director. Any questions to do with financial matters should be brought up with Ms. Walker, Room 2008 Shelby. Please see me or Prof. Woski about any other questions that you may have. The Chair's secretary, Ms. Jackie McPherson, is located in Room 2006 Shelby, phone: 205-348-8436, Email: jmcphers@bama.ua.edu. Please see her to make an appointment with me, if necessary.

We are excited to have you join UA's Chemistry family. The University of Alabama and the Chemistry Department are growing in size and improving in quality, and you are an integral part of making that happen. Graduate school is a time to expand your scientific background and professional horizons, to learn how to be a lifetime learner, and to grow personally. It is also the time to make the transition from undergraduate to professional, and we expect you to act professionally in your duties and in your actions. This is important as you are often the face of the University seen by our undergraduate students. We want to give you the opportunities you need to be successful in your chosen career in chemistry. Please let me know what I can do to help make your stay here both professionally and personally rewarding.

Sincerely yours,

Dr. Kevin Shaughnessy
Professor and Chair, Chemistry

I. Your Appointment as a Teaching Assistant (TA) or Research Assistant (RA)

A. Holding Jobs Outside of the Department

The Chemistry Department regards its teaching and research assistantship stipends as an aid to the graduate student's education as well as payment for specific services rendered. We feel that in order for you to make satisfactory progress toward your degree, you need to devote all of your time to your coursework, research, and other degree requirements. Therefore, teaching and research assistants are not allowed to hold outside jobs or to receive other remuneration for services rendered, with the exception of tutoring, over and above their assistantship stipends without special permission from the Chair.

We feel that tutoring aids graduate students in learning chemical subject matter more thoroughly. Therefore, tutoring is encouraged, but the time spent on it should be limited to a maximum of five hours per week. The Department will compile a list of students who are interested in tutoring, but we will not endorse or recommend specific tutors to students. Details such as hours and fees are to the individuals to negotiate. Tutoring of students in a course to which you are assigned as a TA is not allowed, nor may you charge for tutoring during office hours held as part of your teaching assignment.

B. Vacation Time and Holidays

Graduate students are normally allowed one week paid vacation per year. The vacation period should not occur when classes are in session and the vacation time must be approved by the student's research supervisor. Summer TAs should also consult with the Director of Undergraduate Studies, Dr. Michael Jennings, to find out their summer TA duties before scheduling vacation time during the summer terms. A student may forego one week vacation time in one year to bank the week for a subsequent year as long as it is cleared with the research supervisor.

Graduate students may take staff holidays at Christmas and Thanksgiving. Otherwise, students are expected to be working full time in the program, including during Spring

break and between semesters. Times when classes are not in session are prime periods for research and for working on other degree requirements.

C. ITAP Accreditation (International students only)

International students with non-US degrees are required to gain accreditation by ITAP (International Teaching Assistants Program) within their first year as a TA in order to qualify for future TA support. This requires taking the ITAP course and passing the ITAP exam. If TA support is offered to a non-ITAP qualified student beyond the 1st year, the stipend will be paid at a reduced (75%) level.

II. Responsibilities and Duties of Teaching Assistants in Chemistry

The following comments are general statements of policies and duties of teaching assistants in the Department of Chemistry. Specific policy details concerning the operation and maintenance of the laboratory will be formulated by the faculty and administered by the teaching assistants under the direction of the faculty and the laboratory supervisor. It is the responsibility of the teaching assistant to become thoroughly familiar with the policies and procedures of the chemistry stockroom, to support these policies and to work within these procedures in his/her dealings with the students in his/her laboratory sections.

The functions of the teaching assistant are to provide instruction, supervision, and assistance, as required, to the students in his/her laboratory section. The proper performance of these duties requires the undivided attention of the teaching assistant during each laboratory period.

Prior to the beginning of the laboratory period, the laboratory and balance room should be inspected to make sure they are clean and orderly and a check should be made to insure that all the required reagents, equipment and supplies are available and in sufficient quantity. If the preceding section did not leave the laboratory and balance room in the proper condition, this condition should be reported to the laboratory coordinator or to the

faculty member in charge of the laboratories. Specific details should be provided in written form.

The class roll should be checked at the beginning of the period, and no student should be permitted to leave the laboratory until his/her work has been completed (including cleanup) to the satisfaction of the TA. It is required that the TA initial each student's data sheet or laboratory report when the experimental work is completed to insure that each student has done the assigned work.

During the early part of the laboratory period, the teaching assistant should determine that each student has the necessary equipment and check each student's equipment carefully to see that it is assembled properly. The TA should move about the laboratory during the period to determine that each student does the assigned work in an acceptable manner, and to answer any questions which the students may ask. The number of students in each laboratory section is set according to the recommendation of the American Chemical Society so that the TA will be able to devote his/her personal attention to individual student problems. Under no circumstances should the TA be sitting in a chair, standing in the hall having a conversation, and/or grading lab reports or quizzes while the laboratory section is in session.

At the end of the laboratory period, the TA should inspect the laboratory and balance room to determine that each student has left the work area clean, and that the students who were assigned hood and balance room duty for the day have left these areas clean and tidy. Students who fail to leave their desk, sinks, and work areas clean will be penalized by having their grades lowered.

General departmental policy is that no student will be permitted to smoke, eat, or drink beverages in the laboratory. Furthermore, operation of electronics and cell phones is not permitted. The TA is likewise expected to observe these policies. Specific safety rules for the laboratory will be given to the students on the first day of the lab meeting, and each student must sign and return to the TA a statement that they have read and understood the safety rules and procedures, and agree to abide by them. The TA must not leave the

laboratory while he/she has a lab in session unless he/she has the permission of the supervisor or the professor in charge.

The TA is paid to work twenty (20) hours per week per unit. Typically, three hours (3) are spent for each general chemistry laboratory assignment (5 hrs for each organic lab assignment). About three (3) hours should be spent grading lab reports each week. One (1) hour per week is spent in a room (to be designated) to help any 100-level Chemistry student that may need assistance. The TA is also expected to attend a weekly meeting that is designed to review grading, planning for the experiment in the following week, and/or training sessions. He/she should inform the professor or supervisor in charge if he/she must miss a staff meeting or a laboratory meeting, and this should be done as far in advance as possible. He/she should report unavoidable absences in writing and discuss anything that is pertinent to the situation. The TA should set two (2) office hours and make himself/herself available on a reasonable basis to his/her students who wish to see him/her concerning their laboratory work. The balance of the work load may include any request by the lab coordinator or Director of Undergraduate Studies.

During weeks when labs do not meet, the TA may be expected to help try new experiments that may be adopted in future courses and/or demonstrate that he/she has practiced the labs that he/she will teach for the semester. Failure to perform this aspect of the TA duty may result in loss of pay. Other special assignments by the lab coordinator may also be requested in weeks when the lab is not in session.

The teaching assistant is expected to display the utmost integrity and professionalism in dealing with the students. It is against University and Departmental policy for a TA to tutor, for a fee, any students enrolled in a course in which the TA is assisting. The TA should not fraternize with his/her students, either during the laboratory hours or after hours.

III. Graduate Student Academic Policies and Requirements

In addition to the general requirements of the Graduate School, the following departmental rules and regulations apply:

A. Scholastic Requirements

The student must maintain a cumulative average grade of not less than “B” (3.0) in graduate courses taken at The University of Alabama to be eligible for renewal of either a teaching or research assistantship. Courses in which a student has made a grade of “P” are not considered in making evaluations of academic standing and a maximum of 6 semester hours of either Research Techniques or Advanced Research Techniques courses can be used in the departmental GPA determination. Graduate students will be permitted a maximum of 3 grades of less than “B.” Failure to pass any course (“D” or “F” grade) regardless of grade point average will result in a review of the student’s performance by the Graduate Committee to determine whether the student will be allowed to continue in the graduate program. This review will occur prior to registration of the student in any subsequent term of study.

B. Placement Examinations/Assessment Baselines

Diagnostic examinations covering the traditional areas of chemistry are required of all entering graduate students and are administered twice yearly, *i.e.*, prior to the registration for the Fall and Spring semesters. These exams are used to evaluate the undergraduate preparation of each student and to place him/her in the appropriate level of graduate coursework. It is important to prepare adequately for these exams because one’s performance may determine the number of formal graduate lecture courses the student needs to take to become qualified to conduct thesis or dissertation research. In addition, the scores on these exams will be used as the baseline from which we can assess progress toward the educational goals of the graduate program.

C. Enrollment Policies for Graduate Teaching/Research Assistants

The following is a summary of the current graduate school policies regarding course loads for all teaching assistants and research assistants. Note that a full TA or RA is considered to be a 0.5 FTE (full time equivalent) appointment by the graduate school.

When considering enrollment, students and advisors should also consider the degree requirements (see sections IV and V).

Enrollment Guidelines

1. General

Graduate assistants must be full-time graduate students during all periods in which they receive financial assistance from the University or associated agencies. Full-time in the context of this policy includes the combinations of study and employment outlined below.

<u>Award/Employment</u>	<u>Minimum hrs required</u>	<u>Maximum hrs recommended</u>
0.25 FTE (10 hours)	9 semester hours	12 semester hours
0.50 FTE (20 hours)	6 semester hours	9 semester hours
0.75 FTE (30 hours)	3 semester hours	6 semester hours
1.00 FTE (40 hours)	1 semester hour	3 semester hours

The above guidelines apply to graduate students who receive assistantships or similar University stipends for the primary purpose of pursuing graduate study. A fellowship, as a non-service award, is outside the scope of these policies. Fellows, by the terms of their appointments, are required to undertake full-time graduate study (12 hrs per semester).

2. Summer Session

Graduate students may register for 0 – 12 hours in the summer. Planning of summer scheduling by the student and faculty advisor should be done to prepare the student to meet the coursework and dissertation credit requirements for the appropriate degree. **Enrollment is not required in the summer to maintain full time status for existing graduate students in good standing in the program.**

3. Exceptions

Except for certain paid internships and clinical experiences carrying academic credit, exceptions to the foregoing must be approved by the Director of Graduate Studies in Chemistry.

D. Selection of a Research Project

1) Faculty members will present a seminar on their research during the early part of the fall semester. All new students are required to attend these seminars. In order to receive credit for seminar attendance, students will register for 1 hour of a research techniques course (CH 570). The grade will be assigned on an attendance basis as follows:

0-1 absence = A, 2-3 absences = B, >3 absences = C, D, or F

2) Students are required to interview with no fewer than four faculty to discuss available research opportunities. The initials of each faculty member interviewed should be collected on the "Choice of Research Advisor" form.

3) Students may select research groups at any time after completing steps 1 and 2. The student will choose a major area of study in chemistry and will list their top three choices for advisor. The student will be informed of their placement after consent of the advisor and the Director of Graduate Studies has been obtained.

4) Students are encouraged to select a research advisor by the end of their first semester and are normally required to do so by the end of the first month of their second semester.

E. Policy of Financial Support

Department admission letters delineate the precise nature and extent of financial support being offered to graduate students. Generally, incoming students are offered a

TA position for the first year and may be moved to RA support (paid from faculty contracts or grants) in subsequent years of study at the discretion of the faculty mentor and depending upon the availability of funds. While any student may hold an RA appointment, only PhD students in years 1-5 and MS students in years 1-2 are eligible for TA support. All students are expected to remain in good academic and programmatic standing in order to qualify for support. Good standing means maintaining a graduate GPA ≥ 3.0 and meeting the program requirements on time. A lack of good standing or unsatisfactory teaching or research performance can result in reduction of student financial support or termination.

F. Teaching Experience

As part of graduate training, graduate students are normally expected to serve as TAs for a period of not less than one academic year during their graduate studies.

IV. Degree Requirements for the Ph.D. in Chemistry

A. Course Requirements (for graduate school requirements, see catalog)

A minimum of 48 semester hours of course credit, including formal lecture, seminar and research techniques courses, is required for the Ph.D. Of these 48 hrs, a maximum of 20% (or 9 credit hours) may be pass/fail hours; the remaining 39 semester hours must be taken for a letter grade and a GPA ≥ 3.0 must be maintained overall. (Note: departmental GPA is calculated with a maximum of six hours of graded (500-level) research techniques courses.) Any credit hours beyond the required 48 may be taken either P/F or for letter grade. In addition, a student is required to complete no less than 24 hours of dissertation research (CH 699, NOT thesis research, CH 599, which counts only for M.S. students). The minimum course requirements for a Ph.D. degree are summarized below:

graded courses = 39 hrs	dissertation research (CH 699) = 24 hrs
P/F or graded courses = 9 hrs	
(total courses = 48 hrs)	
<hr/>	
total hrs = 72 hrs	

NOTE: Each student should be advised by the graduate committee or his/her research mentor prior to course registration for all semesters in residence.

1. Formal Lecture Courses (departmental requirement)

Ph.D. candidates are required to take six (6) lecture courses: **four** formal lecture graduate courses in their major field and **two** formal lecture graduate courses in one or two areas outside their major field. These courses should be selected so that upon their completion the student will have the necessary tools to perform and make original contributions to his/her dissertation. This minimum course requirement has been established on the assumption that the student has completed a B.S. degree in chemistry (with at least 32 semester hours of chemistry coursework) and has undergraduate grades to indicate that he/she has a good grasp of the subject matter.

If placement exam performance indicates that the student is weak in one or more of the areas planned for graduate study, then the student is urged to consider taking the appropriate survey course(s) first. Note that the survey course does not count toward the required six (6) formal lecture courses with the exception of CH 501, which may be used by all except inorganic majors. The survey courses, which are normally offered, include:

- (1) Analytical Chemistry Survey - CH521 (Spring semester)
- (2) Inorganic Chemistry Survey - CH 501 (Fall semester)
- (3) Organic Chemistry Survey - CH 530 (every semester)
- (4) Physical Chemistry Survey - CH 540 (Fall semester)

2. Schedule for Completing Required Courses

All Ph.D. candidates are expected to take at least two formal lecture graduate courses each semester during their first year. The remaining three hours to make up the typical nine-hour enrollment will be seminar and research techniques courses. Some divisions may require their majors to take more than two formal lecture graduate courses during the fall and/or spring semesters so that they are ready to begin research in the summer of their first year. In normal cases, all formal lecture graduate course requirements should be completed by the end of a student's 3rd or 4th semester in the program.

NOTE: In general, students will not be allowed to drop graduate courses. In extraordinary cases, the student who wants to drop a course should immediately contact the Director of Graduate Studies.

3. Courses in Major

Each student must take the core course(s) in his/her major area. A list of major courses (with core courses designated *) for each major area is given on the following page:

Graduate courses according to major area (updated Spring 2005)

* required course in the major area, † course can count in more than one area

Analytical courses:

CH 524	Spectroscopic Methods of Analysis
CH 525	Chromatography
CH 526	Chemometrics
CH 627	Mass Spectrometry
CH 626	Surface Analytical Techniques †

Biochemistry courses:

CH 561	Biochemistry I *
CH 562	Biochemistry II *
CH 563	Biochemistry Lab
CH 564	Advanced Biophysical Chemistry
CH 565	Advanced Bioinorganic Chemistry †
CH 566	Advanced Bioorganic Chemistry †
BSC 539	Biochemistry/Molecular Biology
BSC 535	Immunology
BSC 660	Protein Structure and Function

Inorganic courses:

CH 501	Introduction to Graduate Inorganic Chemistry (does not count for inorganic majors)
CH 565/605	Advanced Bioinorganic Chemistry †
CH 601	Structural Methods *
CH 602	Coordination Chemistry
CH 603	Chemistry of the Solid State
CH 604	Main Group Element Chemistry
CH 605	Special Topics in Inorganic Chemistry
CH 606	X-ray Crystallography
CH 609	Organometallic Chemistry †

Organic courses:

CH 531	Physical Organic Chemistry *
CH 532	Synthetic Organic Chemistry *
CH 637	Organic Spectroscopy *
CH 566/635	Advanced Bioorganic Chemistry †
CH 609	Organometallic Chemistry †
CH 635	Special Topics in Organic Chemistry

Physical courses:

CH 541	Advanced Physical Chemistry I: Kinetics and Statistical Thermodynamics *
CH 549	Advanced Physical Chemistry II: Atomic and Molecular Structure *
CH 643	Quantum Mechanics
CH 626	Surface Analytical Techniques †
CH 645	Special Topics in Physical Chemistry
PH 534	Digital Electronic and Computer Interfacing
PH 591	Advanced Laboratory
ChE 651	Statistical Mechanics and Multi-Scale Simulation Methods

Note: Students may count courses not listed above. In this case, the advisor will request (in writing) that the Graduate Committee count a course. This petition should briefly describe the student's situation including how the new course will enhance the student's studies. The Committee will then vote to accept or decline the petition or to request additional information. The student is then responsible for collecting the information which can include a copy of the course syllabus of and/or a detailed rationale for counting the course, including how it fits into the scientific curriculum and its impact on the student's research work.

4. Courses outside Major

Students are expected to take two courses outside their major to strengthen and broaden their backgrounds. The student should consult with the Graduate Committee or his/her Research Advisor in the selection of these courses. Courses offered outside of the Department of Chemistry must be approved by the Graduate Committee using the process described above.

5. Seminars

Graduate students must register for seminar (CH 585 or CH 586, 2 hrs) each semester (Fall and Spring). Both Ph.D. and M.S. Plan II students must present one literature seminar during their second year. In addition, Ph.D. and M.S. Plan I students must present a research seminar during the last semester of residence. First year students will not be expected to give a seminar. A grade of "C" or lower in seminar requires that an additional seminar be given during the next semester. Attendance (80% for graduate student seminars and attendance at 6 departmental seminars each semester) is a requirement for a passing grade in CH585/586.

Seminars given by students fulfill an important educational function. Research chemists are often called upon to give oral presentations of their research work or the work of others. These seminars and the discussions that follow provide one of the most important avenues of communication in science. It is, therefore, necessary to learn how to give good seminars and to benefit from the ensuing discussions. This takes some effort and practice. The literature seminar is typically a presentation with the use of PowerPoint® slides. The subject of the literature seminar should normally be chosen from a list of seminar topics submitted annually

by the faculty and available to students from the faculty Seminar Coordinator (Dr. Metzger). With approval from the student's mentor and the Seminar Coordinator, a student may be allowed to choose a literature topic that is not on the topic list. A form for approval of seminar topic and date must be submitted to the faculty Seminar Coordinator at least one semester prior to the semester in which the student plans to present the seminar. The seminar, presents the historical perspective of the subject as well as the most current and relevant results. It is expected that in the presentation, the student demonstrates a critical understanding and mastery of the subject matter.

6. Research Credit toward a Degree

a. Graduate students will normally take roughly 25 semester hours of "Research Techniques" courses over the span of their Ph.D. work. The exact number of hours of these courses required will depend on the sum of other graded coursework taken such that the total number of graded coursework hours is at least 39 hours. The research techniques courses are graded with a letter grade assigned by the research mentor. The following courses fit into this category:

1 st Year - CH 570	Research Techniques in Chemistry (1-6 hours credit each term)
2 nd year & beyond - CH 660	Adv. Research Techniques in Chemistry (1-6 hours credit each term)

Note: Normally, the advanced research techniques courses will be taken after the first year and can be used to supplement research technique hrs as needed to give the student enough graded coursework hours to meet the degree requirements (see above).

b. All other research credit (other than that listed above) will be either thesis research (CH 599 - for MS students only) or dissertation research (CH 699 for Ph.D. or M.S. students). Both CH 599 and CH 699 are offered on a P/F basis.

B. Initial Research Review (IRR, CH 680)

Ph.D. students must present to their dissertation committee (see committee description below) an initial review of their research effort (IRR, CH680), taken as a 1 hr course in their 4th semester. The purpose of this meeting is for the student to demonstrate knowledge of his/her research project and document initial research progress for the committee. The committee will learn about the student's research project and will question the student and provide helpful input about the initial research effort. Students should consult their Ph.D. advisor to determine the preferred format of this IRR meeting. Generally, a brief written summary by the student of the project and initial research findings to date is provided to the committee in advance of the meeting. The presentation should normally be 15-20 minutes with a period for discussion and questioning to follow such that the entire meeting is completed within two hours. Comments from the committee about the students IRR will become part of the student's academic record, and the committee will give the student a grade for the CH 680 course based on research progress, familiarity with the project, and the quality of the presentation/discussion. If the committee feels that research progress has been too slight (e.g. grade < B), then the student may be requested to repeat the IRR in order to demonstrate a better grasp of the project and/or more significant progress. Further research review meetings may be called as deemed necessary by the committee in cases where insufficient progress is demonstrated.

C. Literature Seminar (CH 586)

Ph.D. candidates will enroll in CH586 and present a seminar on an approved literature topic in their 2nd year of study in the program as described about in the course requirements. The student should see the Seminar Coordinator (Dr. Metzger) for scheduling, topic approval, and to obtain other information about meeting the topic seminar requirement (such as seminar abstract preparation and presentation guidelines).

D. Cumulative Examinations (Cumes)

Ph.D. candidates must pass four cumulative exams (cumes) within 20 attempts (2 years). Cumes (in each major area of chemistry: biochemistry, inorganic, analytical, organic, and physical chemistry) are given monthly, except in August and December, normally on the 3rd Monday of the month at 7-10 PM in Shelby Hall. A cume schedule is posted each August in the main hallway. Students normally begin taking cumes in September of their first year and thus have until July of their 2nd year to pass 4 exams. Students may take cumes in any area of chemistry. Although it is rare for beginning students to pass their initial cumulative exams, all students are strongly encouraged to take these exams, do their best, and treat them as a learning experience. With time, students eventually master the subject material well enough to pass these exams.

E. Original Research Proposal (ORP, CH 681)

A student must prepare and defend an original research proposal (ORP, CH681) after completion of the cumulative exams and before the end of his/her 5th semester. Every student should enroll in the ORP course (CH681, 1 hr, letter graded) no later than the 5th semester in the program. The topic of the ORP must be approved by the student's committee. In general, the student should choose a topic relevant to his/her major area of expertise but that is not a direct extension of his/her dissertation project or any other project in his/her group. The ORP requires a written summary of the student's research proposal with literature referencing (typically 7-10 pages and 15-20 references) to be distributed to the committee at least one week before the student's defense. The student's dissertation committee will evaluate the proposal and oral performance and assign a letter grade for CH681. The ORP presentation should normally be no longer than 20 minutes and will be followed by an extensive question period in which the student will defend his/her proposal. The research advisor will be present during the oral and make comments, but will not vote on the performance. Each division may set up its own guidelines for the detailed procedure for the proposal format and defense, so the student is urged to discuss expectations with his/her advisor. In addition to the ORP, the student should be present a brief summary on research accomplishments to date with an emphasis on new results since the IRR meeting. The committee will provide an assessment of the student's research progress in addition to awarding a grade for the research proposal.

Note: A handout with advice and answers to frequently asked questions concerning the ORP is available from the graduate secretary (Janice Voss).

F. Research and Dissertation

1. The Dissertation Committee

By the end of the 3rd semester, the student, in consultation with his/her research advisor, will form a dissertation committee, composed of his/her research advisor as chair, at least one faculty member in his/her major area, and three additional graduate faculty members, one of whom must be from outside the Chemistry Department.

The Dissertation Committee will meet with the student on the following schedule:

(a) By the end of the first month of the student's 4th semester for an initial research review (IRR, *vide supra*) in which the student will describe his/her research project to the committee and tell what has been accomplished to date on the project.

(b) No later than the end of the 5th semester (1st semester of 3rd year) for oral examination of student's original research proposal (ORP, *vide supra*).

(c) A few months prior to the time the student begins to write the dissertation for a final research review (FRR). At this meeting, the student will outline his/her research results and indicate to the committee what his/her dissertation will contain, what research work remains to be completed, *etc.* (This meeting is optional but is highly recommended and may be required by the research mentor or requested by the student.)

(d) After completion of the dissertation, the committee will meet with the student to hear the oral defense of the dissertation. If possible, this meeting can be held immediately following the student's presentation of his research seminar to the department. However, it may on some occasions be necessary to schedule a dissertation defense meeting separate from the research seminar presentation or to hold a special research seminar outside the normal seminar time. A final version of the dissertation should be provided to the committee two weeks prior to the final defense.

Note: After each of the above meetings, the committee chairman (Research Advisor) will make written recommendations to the student and present copies of these to the Director of Graduate Studies for placement in the student's file.

2. Amount of Research for Dissertation

Normally, the research advisor will determine the amount of work required for the dissertation; however, the entire dissertation committee is involved in judging both the quality and quantity of research work accomplished as well as its defense by the student.

3. The Final Version of the Dissertation

A final version of the dissertation will be given to each of the 5 members serving on the Dissertation Committee at least two weeks before the oral defense. The student is expected to be responsible for all aspects of the production of the dissertation, including the preparation, typing, reproduction, dissemination to the committee members, and all costs involved. No departmental supplies, equipment, secretarial time, or other departmental resources may be utilized by the student for this purpose.

4. Oral Defense of Dissertation

A majority affirmative vote by the Dissertation Committee hearing the oral defense constitutes satisfactory fulfillment of the research and dissertation requirement.

G. Policy Concerning Publications

At the time of the oral examination, the Ph.D. candidate will have at least one publication accepted by a refereed journal, or in lieu thereof, the dissertation will have been examined by an external examiner designated by the Director of Graduate Studies.

V. Degree Requirements for the M.S. in Chemistry

A. Requirements for all M.S. Candidates

1. All M.S. candidates, *i.e.*, those following Plan I or Plan II, are encouraged to select a Research Supervisor by the end of their first semester and are required to do so by the end of the first month of their second semester. In addition, a three-person Examining Committee composed of the Research Supervisor and at least two other Graduate Faculty members, one of which must come from outside the Department of Chemistry, should be formed by the end of the student's 3rd semester.
2. All M.S. candidates must register for Seminar (CH 585) and conform to the attendance policy each semester they are in residence, unless they are registered for CH 586 which requires a seminar presentation and conformation to the CH 585 attendance policy.

B. Specific Requirements for Plan I (thesis) M.S. Candidates

1. The lecture coursework requirement for the Plan I M.S. degree consists of a minimum of four courses — at least two within the student's major and at least one outside the major — for a total of 12 semester hours of credit.
2. The remaining 12 hours for the 24-hour thesis M.S. program will normally consist of two hours of seminar (CH 586) and 10 hours of research techniques courses in the student's major area of interest. The candidate will present a research seminar on the thesis research before holding the oral defense of the thesis. As in the case for Ph.D. students, a maximum of six hours of graded (500-level) research techniques courses will be counted in the departmental computation of the GPA.
3. Plan I M.S. candidates will normally register for at least six hours of thesis research, *i.e.*, CH 599, in addition to the 24 course credit hours described above.
4. Each student will meet with his/her Examining Committee by the end of the first month of the 3rd semester for an initial research review (IRR). The student will describe his/her research project to the committee and summarize what has been

accomplished since beginning the research work. This Committee may be asked by the student's Research Supervisor or the student to meet to discuss the progress of the research at any time that the need arises prior to the writing of the thesis.

5. The student's Research Supervisor and the other members of the student's Examining Committee will read the student's thesis and render a decision on the results of its oral defense. This oral defense will count as the MS comprehensive exam for the student (note: form must be filed with Graduate School).

6. The period of financial support for students following the Plan I M.S. program is limited to 2 years. In special cases, a Plan I student may petition the graduate committee for an additional semester of support to be granted as deemed warranted by the committee and dependent upon the availability of funds.

C. Specific Requirements for Plan II (coursework) M.S. Candidates

1. The lecture coursework requirement for the Plan II M.S. degree will consist of a minimum of six courses — four in the major and two outside the major — for a total of 18 semester hours of credit.

2. The remaining 12 hours required for this 30-hour program will consist of two hours of credit for a topic seminar presentation (CH 586) and 10 hours of research techniques in the student's major area of interest. Only six hours of the graded (500-level) research techniques courses will be counted in the departmental computation of the GPA.

3. Students on the Plan II program will present a literature seminar during their second year in residence which will constitute their MS comprehensive exam (note: form must be signed by committee and filed with graduate school).

4. The period of financial support for those students following the Plan II M.S. degree program is limited to 2.0 years.

VI. Working in the Laboratory

A. Laboratory Safety

Safety is Your Personal Responsibility. You are working with materials that may be extremely hazardous to the safety of yourself and your fellow-workers. Think safety - work safely. You, the Department and the University have legal responsibilities to do your work safely in a safe environment. Safety is not only the safety of you and all others in the areas in which you work but also for the environment.

- Know the characteristics of each of the chemicals you will use – their toxicity, flammability, reactivity, and environmental impact.
- Know the safety limits of the chemicals you will use – their flash point, their auto-ignition temperature, etc., and what to do if you exceed these limits
- Check your equipment before you start. Then check each item again before you put it to use.
- Be sure that you have installed the necessary mechanical safety devices, shields, hoods, etc., before you start and that they are more than ample to handle any contingency.
- Make sure that electrical connections are made properly.
- Protect your eyes, your face, your hands, and your body. Always wear safety glasses or, if necessary, a face guard; proper gloves and protective clothing. Over-protect yourself rather than under-protect yourself. Closed toe shoes are required in the laboratory.
- Practice good housekeeping. Keep your bench area clean and free from extraneous articles. Wipe up spills immediately. Dispose of waste (chemical and other such as glass) in proper closed receptacles.
- Know the location of eye baths, safety showers, respiratory equipment, fire extinguishers, fire-fighting materials, how to get to them quickly, and how to use them. Observe the “No Smoking” signs and other signs for your protection. There is no smoking in any building on campus.
- Make safety a habit. THINK SAFETY... The safety habit is always a good one...on the job, at home, everywhere.

B. Emergency Procedures

1. General emergency phone numbers:

911 (from campus phones only)

348-5454 University Police (direct number)

Report nature and location of the emergency; give your name, telephone number, building and floor number. Tell the operator where you will meet the emergency vehicle. If an individual is involved, report whether he/she is unconscious, burned, trapped, etc.; whether an explosion has occurred, whether smoke or poison gas may be present; or whether there has been a chemical or electrical fire.

2. In Case of Personal Injury...

a. Take all steps necessary to prevent further injury. Apply first aid if trained and call UA police at 348-5454, if necessary.

b. If the victim(s) is (are) found unconscious for no apparent reason, **DO NOT ENTER THE ROOM** – a poison gas may be present. Obtain assistance immediately (call police 348-5454) and notify other persons in the area. **NO ONE SHOULD ENTER UNLESS EQUIPPED AND TRAINED IN THE USE OF PROPER EMERGENCY EQUIPMENT.**

c. Check if the victim is in contact with an electrical circuit; if so, **DO NOT TOUCH HIM/HER WITHOUT DISCONNECTING THE POWER FIRST**, then apply first aid. Call UA police (348-5454) to arrange for medical assistance.

2. What to Do While Waiting for Assistance...

Do what is necessary to protect life!

- a. If a stricken person is in further danger, move if possible. Do not move an injured person unless he/she is in further danger. Keep him/her warm.

- b. If his/her clothing is on fire, wrap him/her in a coat, blanket or whatever is available to extinguish the fire (Remember: **Stop, Drop, & Roll**). Remove any clothing contaminated with chemicals. Douse with water to remove heat and place clean, wet, ice-packed cloths on burned areas, and keep warm. Get medical attention immediately.

- c. If injured person is not breathing, provide artificial respiration if you are trained. Mouth-to-mouth method should not be used in cases of gas poisoning.

- d. If the victim is bleeding severely, control the bleeding by compressing the wound with a cloth or whatever is available, and elevate the injury above the level of the heart.

- e. If chemicals have been spilled on a person, get him/her under a shower or spigot to wash thoroughly the affected area. If the person has chemicals in his/her eyes, irrigate with water for 15 minutes. Check for and remove any contact lenses.

3. In Case of Fire or Explosion...

- a. Evacuate the immediate area.

b. Attempt to extinguish flames by discharging one fire extinguisher, aiming at the base of the fire. For fires involving metals or metal hydrides, use sand to smother the flames. Other fires may be extinguished with dry-chemical ABC extinguishers.

c. If the fire is not completely out after discharging one extinguisher, close the door of the laboratory, call the Fire Department (348-5717), and/or the Police (348-5454) and warn other people in the building by sounding the fire alarm. If you decide to continue fighting the fire, **OBSERVE EXTREME CAUTION.** Consider that hot spots can re-ignite, the air in the immediate area may be hot enough to cause lung damage, oxygen in the air may be used up, fire can travel through walls and break out behind or beside you, gas cylinders may explode in the intense heat, smoke and poisonous fumes can kill, and solvent cans or bottles could burst creating an inferno. Therefore, do not try to be a hero.

d. When fire alarm sounds, all persons should shut off gas, water, and appropriate electric-powered equipment, close doors and windows, and immediately exit the building by the nearest unobstructed stairs. **DO NOT USE THE ELEVATOR. DO NOT STOP TO RETRIEVE PERSONAL BELONGINGS.** Take your keys and wallet with you (as well as a coat) in case you cannot re-enter the building. Shelby Hall administrative personnel can be found in the North parking lot.

e. Remain outside the building until permission to re-enter has been given by security personnel.

C. Minimum Safety Regulations for Research Laboratories

In order to create safer laboratories and also to meet federal and state safety regulations, the safety rules and procedures, as outlined in the booklet, Chemical Laboratory Safety Manual, have been adopted by the Department of Chemistry. These rules are not attempts to restrict or hamper research. Instead, they are based on common sense and enacted for the benefit and safety of everyone. Your cooperation is required. Please attempt to bring your laboratories and your laboratory procedures into conformity with these principles and remind others to do so. These regulations are mandated by OSHA and the EPA.

The departmental Safety Committee and/or UA Environmental Health and Safety (EHS) personnel will make unannounced inspections of laboratories. All hazards will be recorded, and the students working in that laboratory will be given a list of deficiencies and instructions on their improvement. The deficiencies will also be reported to the faculty research advisor responsible for that laboratory. Furthermore, the laboratory will be re-inspected to see that the listed deficiencies have been corrected. A comprehensive listing of all deficiencies found will be compiled so that (a) these problems can be discussed at department-wide safety meetings and (b) so that serious problems or frequently encountered problems may be brought to everyone's attention for immediate resolution.

Each of you can make an important contribution by taking this list and systematically checking and correcting unsafe conditions in your laboratory. Please begin to conduct your laboratory operations in accord with these regulations. Most importantly, please develop a positive attitude about this safety effort. It is each of you who stand to benefit most from these efforts. Later in your career, each of you will probably be

responsible for the safety of others working with you. Thus, most of the following regulations are nothing more than procedures which will be with you as long as you are in chemistry. A digest of some of the more common rules and procedures is given in the following pages. For a more complete and authoritative coverage of each of these areas, please consult the Chemical Laboratory Safety Manual.

1. Safety Equipment and Familiarity

- a.** Each student must make sure their laboratory is equipped with a minimum of one (1) fire extinguisher. They must know the location of and how to use fire extinguishers and fire buckets with sand.

- b.** Each student must be aware of the location of and know how to use eyewash fountains, showers, fire-blankets, and emergency kits.

2. Do not smoke in the laboratories or in any building on campus

There are no prescribed smoking areas inside any building on campus. If you do smoke, you must go outside the building to smoke. (The danger you create for others who work in the labs could be far greater than the danger inherent in your own operations. It is understood that this may require changing well-developed habits to accomplish this task, and your cooperation is vital.)

3. Eye Safety

- a.** Eye protection must always be worn in the laboratory (i.e. safety glasses, goggles, or shields).

b. If you don't normally wear glasses, consider purchasing a nonprescription, fitted pair.

4. Storage of Solvents

a. All solvents should be stored in appropriate containers.

b. Solvent bottles or cans should not be left or kept on bench tops or left in hallways.

c. Solvents should not be stored on shelves above benches (serious fire spreading hazard).

d. Solvents should be stored in steel solvent storage cabinets.

e. If it is impossible to store solvents in steel solvent storage cabinets, they must be stored in cabinets behind closed doors. In this way, they will not be accidentally broken when something else happens in the lab.

f. Do not store large quantities of solvents in the lab.

g. Transportation of chemicals by elevator must be minimized.

h. Transportation of chemicals should be performed in rubber safety buckets. These buckets will be provided. Meanwhile, only a single bottle of a dangerous chemical should be carried at a time.

5. Storage of Chemicals

- a. Avoid storing chemicals (especially water reactive substances) near sinks.
- b. Don't store flammable chemicals above bench tops.
- c. All chemicals must be clearly labeled.
- d. Old chemicals or excess chemicals should be periodically collected and either discarded, placed in the central storage location of your faculty advisor, or taken to the stockroom.
- e. Chemicals stored in desiccators under vacuum must be kept in closed cabinets, behind shields, or in cages. Never store such desiccators on shelves above bench tops or on lab benches. Label desiccators which are under vacuum.
- f. All gas cylinders must be clamped, and they should be located in areas reserved for gas tanks.
- g. Refrigerators:
 - 1) Refrigerators must be regularly defrosted.
 - 2) Chemicals must be clearly labeled.
 - 3) Chemicals should be stored neatly and carefully – not simply "piled in."
 - 4) Do not store food or drinks in refrigerators containing chemicals.

6. Operations Under Vacuum

- a.** Vacuum equipment should be shielded (even glass rotary evaporation units.)
- b.** Vacuum pumps must have belt guards. If not, the pumps must be housed in boxes or housings which serve the same purpose.
- c.** See 5-e.
- d.** Never evacuate flat bottom flasks, bottles etc.
- e.** All Dewar flasks and desiccators must be carefully taped.
- f.** Vacuum pump exhausts should have a filter. If not, the pump outlet should be exhausted into a hood.
- g.** Glass mercury diffusion pumps should be housed in cases which can catch the mercury if the glass is broken.

7. Waste disposal

- a.** Disposal of unwanted chemicals (waste) must follow EHS (Environmental Health and Safety) rules. Containers for unwanted chemicals must be labeled and kept closed. Do not mix incompatible chemicals in unwanted chemical containers. If any questions arise, please contact your advisor, a member of the safety committee, or EHS (348-5905).

b. Requests for pick-up of unwanted chemicals must be made through the CEMS system.

c. Never dispose of waste alumina or silica gel (i.e., from column chromatography) by dumping into waste cans. Instead, thoroughly soak with water before discarding.

d. Never throw rags or paper towels which are wet with solvents into the trash cans. Instead, thoroughly soak them with water prior to discarding them.

e. Broken glassware and other sharps should be not be thrown into trash cans (this endangers the housekeeping staff). Sharps should be stored in closed containers and labeled.

8. Safety with electricity

a. Periodically check the electrical cords on variacs, heating mantles, motors, etc. for damage. Have them repaired when not in excellent shape.

b. No power cords should be warm to the touch.

c. Electrical cords should not be strung across aisles or along the floor without being properly protected.

d. Have all electrical cords carefully placed out of the way of jacks, hot plates, solvents, etc. when in use.

- e. Electrical plugs should be three-pronged.
- f. Avoid overloading a circuit by plugging too many devices into a single outlet.
- g. Know where the fuses are for each lab.
- h. High voltage circuits (over 600 volts) should be labeled.
- i. Know what to do for a person who has had a serious electrical shock.

9. General Laboratory Operations

- a. Specialized training may be necessary before performing experiments that pose special risks. Some training will be performed by your research advisor. Other areas (such as radiation, laser safety, biosafety, bloodborne pathogens, animal care, human research, etc) will require documented training by EHS. **Your advisor will inform you if additional training is required.**
- b. Each laboratory has an inventory of all chemicals stored online in CEMS (Chemical Environmental Management System). Training in the use of CEMS is available from EHS. Contact your research advisor for details on access to the CEMS database in your laboratory.
- c. MSDSs (Material Safety Data Sheets) are available for all chemicals in your laboratory via the CEMS database. Information regarding other chemicals can

also be accessed through CEMS and other online sources. Ask your research advisor for instructions for accessing MSDSs through CEMS.

d. All reactions must be labeled. This includes operations under vacuum. (Write on a card exactly what your reaction is). Tape the card to the reaction vessel or nearby. Then if an accident occurs when you are not in the laboratory, others will be able to deal with it. If the power goes off, others will be able to anticipate problems, etc.

e. Solvent stills should be labeled.

f. All reactions should be shielded when not attended. (Have your research advisor provide lab shields if you don't have enough shielding).

g. All permanent solvent stills should be carefully shielded (your faculty advisor should arrange for the necessary shielding).

h. Cylinders should be moved only with the aid of cylinder carts. Pressure regulating gauges should be removed, and cylinder caps should be on. Return cylinders to stockroom while a positive pressure still exists in the cylinder.

i. Dewars in use should be clamped. When not in use, store in closed cabinets, not on benchtops.

j. Water hoses on condensers must be wired or clamped on. Flooding has serious consequences for other labs as well as your own.

- k.** Water hoses draining to sinks or troughs must be securely anchored in place.

- l.** Solvents should not be exposed to air for long periods (for example, during chromatography operations).

- m.** Appropriate personal protective equipment (glasses, goggles, face shields, gloves, aprons, lab coats, etc.) must be worn at all times.

- n.** Open-toed shoes are not permitted in the laboratories.

- o.** Do not eat in the lab. Food is allowed in areas such as offices and break rooms where research chemicals are not present.

- p.** Bench tops, hoods, passageways, and floors should be kept neat. The single largest cause of accidents is a cluttered and messy work area.

- q.** Emergency phone numbers should be affixed in each laboratory in an easily visible location. Emergency telephones can be found on each floor; you should know the location of the telephone nearest to your laboratory.

- r.** After fire extinguishers are discharged, contact Environment Health & Safety (348-5905) to have them replaced.

- s.** Because of the possible presence of reproductive toxins, persons who are pregnant are encouraged to inform their supervisor and/or EHS who will provide additional personal protective equipment if necessary.

VII. APPENDICES

List of forms available on Departmental website (also available in the Main Office – 2005 Shelby)

Minimum Safety Regulations Certification Statement (*enclosed in your orientation packet - must sign & return to Janice Voss after safety training*)

Selection of Research Project/Advisor (*Departmental*)

Report of Initial Research Review - CH 680 (*Departmental*)

Petition for Approval of Original Research Proposal Topic (*Departmental*)

Report of Original Research Proposal Review – CH 681 (*Departmental*)

Report of Final Research Review (*Departmental*)

Outline of Ph.D. Program - Plan of Study (*Grad. School*)

Appointment or Change of Doctoral Dissertation Committee (*Grad. School*)

Application for Admission for Candidacy for Doctoral Degree (*Grad. School*)

Application for Admission for Candidacy for Master's Degree (*Grad. School*)

Application for Degree (*Grad. School*)

Doctoral Final Defense Form (*Grad. School*)

Form Websites:

Chemistry forms –

<http://www.bama.ua.edu/~chem/resources/graduate/grad-resources.html>

Graduate School forms –

<http://graduate.ua.edu/academics/forms/index.html>

CHECKLIST FOR MONITORING PROGRESS TOWARD YOUR DEGREE:

Note: This timetable lists the maximum time limits for the completion of all degree requirements for a Ph.D. A student may accelerate the process, but the proper sequence of events must be maintained. M.S. candidates will be subject to a shorter time frame to allow for the shorter time involved in the completion of the requirements.

WHAT TO DO	WHY	WHEN
Take Placement Exams	To establish course of study.	Prior to registration - Fall, Spring.
Advising	To plan coursework during 1 st year	Prior to registration for 1 st two semesters (normally August & November)
Selection of Research Advisor	To begin the research project you have selected.	Selection must be made by the end of the first month of the second semester - submit completed form to the Director of Graduate Studies (see form on pg 48).
Plan of Study	Graduate School requirement.	Submit to Graduate School during semester in which student takes 30 th hour of credit (normally 2 nd or 3 rd semester); submit copy to Director of Graduate Studies
Cume Requirements	Part of comprehensive exam for candidacy.	Four exams must be passed by end of 2 nd year.
Selection of Dissertation Committee	Select faculty members you wish to have serve as your guidance committee.	By end of 3 rd Semester - submit completed form to the Director of Graduate Studies
Literature Seminar	Oral presentation of current topic in chemistry.	Third Semester - schedule seminar and register for CH 586.

WHAT TO DO	WHY	WHEN
Meet with Dissertation Committee for Initial Research Review (IRR)	Discuss research progress with Committee.	Early in 4 th semester - register for CH 680.
Report of Initial Research Review	Notification of the Dissertation/Thesis Committee's assessment of research progress.	Within one week from time of IRR - submit completed form to the Director of Graduate Studies.
Original Research Proposal (ORP)	Propose and defend an original research project as second part of candidacy exam	5th Semester - get approval of topic from Dissertation Committee members
Report of Original Research Proposal	Informs student and the Director of Graduate Studies of Dissertation Committee's assessment of original research proposal.	Within one week from time ORP was presented - submit form to Director of Graduate Studies
Apply for Admission to Candidacy for the Degree	Required by Graduate School. Contingent upon the recommendation of the Department and approval of the Dean of the Graduate School.	<u>Ph.D. candidates</u> - after successful completion of original research proposal. <u>M.S. candidates</u> - after completion of 12 semester hours of graduate credit. Obtain form online from Graduate School site.
Submit Application for Advanced Degree	Each candidate must apply for the Degree through the Office of the Graduate School.	No later than the registration period for the semester or summer term in which the requirements are to be completed - obtain forms online from Grad. School

WHAT TO DO	WHY	WHEN
Final Research Review (optional)	Discuss research progress with Committee; discuss what work should be completed for dissertation.	Optional; schedule a few months before beginning to write dissertation.
Report of Final Research Review (optional)	Notification of the Committee's assessment of research progress before writing dissertation.	Within one week from time of FRR - submit completed form to the Director of Graduate Studies.
Research Seminar	Oral report of research results.	FINAL SEMESTER - obtain approval from seminar coordinator and register for CH 586 .
Submit Dissertation/ Thesis Title Card	Required by Graduate School.	Obtain card from Graduate School and submit at least 10 weeks prior to graduation
Schedule Oral Defense of Dissertation/ Thesis	Informs Graduate School that oral defense is scheduled with committee.	FINAL SEMESTER Complete form and submit to Graduate School .
Submit Diss./Thesis to Committee	For reading and evaluation.	Hand out at least two weeks prior to defense.
Type Diss./Thesis approval forms and have committee members sign	Committee members must indicate approval of the final version of the Dissertation/Thesis.	FINAL SEMESTER - the format for these forms is outlined in the Handbook for Preparation of Thesis/ Dissertation , available from the Graduate School.

WHAT TO DO	WHY	WHEN
Report of Recommendation for Final Degree	The Dissertation/Thesis Committee must certify to the Graduate School that a student has passed the oral defense and recommend that the Degree be awarded.	Submitted by Research Advisor to the Dean of the Graduate School following oral defense - get forms from the Graduate School
Submit Diss./Thesis to Graduate School	Two copies of the Diss./Thesis approved by the your Committee and by the Department Chair and a receipt for the binding fee deposited in the Office of the Graduate School	Submit to Graduate School after oral defense and at least 6 weeks before graduation.
Exit Form	To keep in contact with UA.	Submit to Director of Graduate Studies

List of Chemistry Faculty

<u>FACULTY</u>	<u>OFFICE</u>	<u>RESEARCH AREA</u>
Anthony J. Arduengo III	3068 Shelby	Organic/Inorganic
Martin G. Bakker	1030 Shelby	Physical/Analytical
Silas C. Blackstock	2050 Shelby	Organic
Marco Bonizzoni	2101A Shelby	Organic/Analytical
Michael Bowman	1007A Shelby	Physical/Biochemistry
Laura Busenlehner	3097B Shelby	Biochemistry
Carolyn J. Cassady	1064 Shelby	Analytical
David A. Dixon	1007B Shelby	Physical
Patrick Frantom	3097E Shelby	Biochemistry
Daniel Goebbert	Shelby	Physical
Arun Gupta	133 Bevill	Physical
Michael P. Jennings	2076 Shelby	Organic
Robert M. Metzger	1088B Shelby	Physical_
David E. Nikles	229 Bevill	Inorganic
Shanlin Pan	1088E Shelby	Analytical
Robin D. Rogers	3006D Shelby	Inorganic/Analytical
Kevin H. Shaughnessy	2072 Shelby	Organic/Inorganic
Timothy S. Snowden	2046 Shelby	Organic
Shane C. Street	1088A Shelby	Analytical
Gregory J. Szulczewski	1088D Shelby	Analytical/Physical
Joseph S. Thrasher	3064 Shelby	Inorganic/Analytical
Russell Timkovich	3006B Shelby	Biochemistry
Thomas P. Vaid	2101D Shelby	Inorganic
John B. Vincent	3040 Shelby	Inorganic/Biochemistry
Stephen A. Woski	3036 Shelby	Biochemistry/Organic

Graduate Registration Guidelines for the Ph.D. degree

Requirements: **≥ 72 graduate credit hours total**, which must include:
 ≥ 24 hrs CH 699 (dissertation research)
 ≥48 hrs coursework (with ≥80% graded, not P/F)

Notes:

- Full time students on TA or RA must register for minimum of 6 hr in Fall and Spring semesters and may register for 0-12 hr in Summer.
- **Students do not need to register during Summer to retain full-time status, to be paid, or to continue health insurance coverage.**
 - **If supported by a TA during the first Summer in residence:**
Students should register for 12 hr of CH 570.
 - **If supported by an RA in the first Summer in residence:**
The research advisor may recommend (1) registering for 0 hr and spreading the 12 hr of CH 570 over several semesters or (2) registering for 1-12 hr of CH 570.
 - **If supported by a fellowship in the first Summer in residence:**
Students will register for either 0 hr or 3-12 hr of CH 570 (see Grad. Dir.).
 - **In subsequent summers:**
Generally, students should register for 0-1 hr of CH 599 or 0-1 hr of CH 695 or 3 hr of CH 699 (if graduating).
- Six lecture courses are required by department for Ph.D. degree, including four courses in a major area and two courses outside major area.
- Seminar (CH 585 or CH 586) is required every semester for all students in residence. Two CH 586 courses (2 hr each) are required for a Ph.D. degree.
- All students are required to register for CH 680 (IRR, no later than 4th semester) and CH 681 (ORP, no later than 5th semester).
- Students must be registered in the semester the degree is granted (usually 3 hrs of CH 699 for Ph.D. degree, 1 hr of CH 599 for either M.S. degree plan). Fewer hours may be possible if student is out of residence.
- **Conditionally admitted students** enter the Ph.D. program on academic probation. All probationary students must achieve a GPA≥3.0 after 12 hrs of work to remain in Ph.D. program, at which time they achieve regular status. If a conditional admission student drops below B average prior to completing 12 hrs, the student cannot be supported on a TA.
- 500-Level remedial courses count in place of research techniques toward 39 hrs of graded coursework but do not count toward the six required courses.
Exception: CH 501 counts toward 6 required courses for all except Inorg. majors.

Typical Ph.D. degree schedule

YEAR 1

Fall	hrs	type	Spring	hrs	type
course 1	3	A/F	course 3	3	A/F
course 2	3	A/F	course 4	3	A/F
CH 585	2	P/F	CH 585	2	P/F
CH 570-026	1	A/F	CH 570	4	A/F
total	9		12		

All students must take a total of 8 hr of CH 570. This is normally done during the first summer in residence, but the timing depends on the form of support for the individual student. Ask your advisor for details.

1st Summer:

TA: Register for 12 hours of CH570
(6 ea Summer half term).

RA: Ask your advisor whether you should register.
If yes, then register for 1-12 hr of CH570.

Fellowship: See the Graduate Director for advising.

YEAR 2

Fall	hrs	type	Spring	hrs	type
course 5	3	A/F	course 6	3	A/F
			CH 680	1	A/F
CH 660	6	A/F	CH 660	6	A/F
CH 586	2	A/F	CH 585	2	P/F
total	11		12		

Summer 2nd year and beyond:

TA: Register for 6 hour of CH660.

RA: Ask your advisor whether you should register.
If yes, then register for 1 hr of CH599 or CH695 or
register for 3-6 hr of CH699 (you cannot register
for < 3 hr of CH699).

Fellowship: Generally you will not register during the Summer.

YEAR 3

Fall	hrs	type	Spring	hrs	type
CH 681	1	A/F			
CH 660	6	P/F	CH 699	8	P/F
CH 585	2	P/F	CH 585	2	P/F
total	9			10	

YEAR 4

Fall	hrs	type	Spring	hrs	type
CH 699	8	P/F	CH 699	8	P/F
CH 585	2	P/F	CH 586	2	A/F
total	10			10	

If you will not graduate in Year 4, you may elect to take CH586 in Year 5. To graduate in summer of the 4th year, you will need to register for 3 hr of CH699

YEAR 5 (if necessary)

You must register for at least 3 hr of dissertation research (CH 699) in the semester you submit your dissertation to the Graduate School. The only exception is if you turn in your dissertation during the grace period at the beginning of each semester.