

**University of Arkansas  
Graduate School  
Department of Chemistry and Biochemistry**

**Graduate Student Guide**

**Last Revision: January 2021**

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## **I. General Remarks**

### **A. Graduate School Catalog.**

General requirements of the Graduate School for the degrees of Master of Science and Doctor of Philosophy are set forth in the current Graduate School Catalog, and specific requirements for candidates majoring in Chemistry are listed in the same catalog under "Chemistry." Each graduate student should obtain a copy of this catalog from the Registrar's Office. Copies are also available online:

- <https://catalog.uark.edu/graduatecatalog/degreerequirements/#mastersdegreestext>
- <https://catalog.uark.edu/graduatecatalog/degreerequirements/#phdandedddegreestext>
- <https://catalog.uark.edu/graduatecatalog/programsofstudy/chemistryandbiochemistrychbcdepartmentof/#mstext>
- <https://catalog.uark.edu/graduatecatalog/programsofstudy/chemistryandbiochemistrychbcdepartmentof/#phdtext>

### **B. Memorandum Purposes.**

The purposes of this memorandum are: The interpretation of the general regulations of the Graduate School as they apply to the Department of Chemistry and Biochemistry, the presentation of information too highly specialized for inclusion in the Graduate School Catalog, and the recording of Department of Chemistry and Biochemistry regulations which are applicable to graduate students. In cases where, due to updates, etc., there appears to be a conflict, the Graduate School rules take precedent.

### **C. Posted Material.**

Specific information regarding scheduling of examinations and other requirements are posted at appropriate times on Blackboard, and students are responsible for material so posted.

### **D. Student Progress.**

The progress of all students through their course work and examination programs will be reviewed by the Graduate Committee of the Department shortly after the end of each semester. The Committee will communicate with the student whenever the review reveals items which need attention. Whenever a student's progress is not up to expectation, the Committee will so inform the student through the major professor. When a student's progress is unsatisfactory, the Committee will recommend appropriate action to the Graduate Faculty.

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### **E. Petitions.**

Petitions from graduate students for departure from the regulations contained herein will be considered by the Graduate Advisor, and if appropriate, by the Graduate Committee and/or the Departmental Faculty.

## **II. Basic Requirements**

Advanced degree programs are based on an undergraduate program developed in accordance with the standards used by the American Chemical Society as criteria in evaluating undergraduate professional education in Chemistry. The B.S. degree requirements in the Fulbright College of Arts and Sciences Catalog, University of Arkansas - Fayetteville are an example of a program meeting these standards. Certain elements of this program, described below, will be assigned as deficiencies if they have not been included in a student's previous course of study. A graduate student must satisfactorily complete all such deficiencies prior to admission to candidacy for any advanced degree and, to be allowed further enrollment, before the beginning of the fifth semester of graduate study.

### ***A. Requirements and Deficiencies.***

The introductory part of this undergraduate program, consisting of courses in general chemistry and elementary quantitative analysis, organic chemistry, physical chemistry, physics, and calculus is required. Deficiencies in any of these courses must be satisfactorily completed for undergraduate credit (see IV.D). If necessary prerequisites are met, other courses may be taken for graduate credit concurrently. Those students who have not completed two semesters of undergraduate organic must take Organic Chemistry I and II (CHEM 3703 and/or 3713). Those students who have not completed two semesters of undergraduate physical chemistry must complete Physical Chemistry I and II (CHEM 3504 and/or CHEM 3514).

### ***B. Requirements in Physical Chemistry.***

In addition, mastery of the quantum and the thermodynamics/kinetics portions of physical chemistry in an introductory program must be demonstrated through a two-part proficiency examination. Both sections of the physical chemistry proficiency examination are to be taken during the student's first semester in the graduate program, or the student may elect to enroll in CHEM 3504 and CHEM 3514. A graduate student who does not perform satisfactorily in the quantum chemistry portion of physical chemistry proficiency examination, must enroll in Physical Chemistry I (CHEM 3504), Quantum I (CHEM 5453) or a Molecular Modeling Class. A graduate student who does not perform satisfactorily in the thermodynamics portion of physical chemistry proficiency must enroll in Physical Chemistry II (CHEM 3514), Chemical Kinetics (CHEM 5473) or Theoretical Organic Chemistry (CHEM5603). A student must demonstrate satisfactory performance (see IV.D.) within the first four semesters as a graduate student to be allowed further enrollment.

### **C. Required Equivalent of Advanced Lecture Courses.**

The equivalent of the advanced lecture courses which are part of the University of Arkansas B.S. degree program in Chemistry, consisting of advanced courses in inorganic and analytical and a third semester of organic chemistry, are required. Students who have not had a third semester of Organic Chemistry as a part of their undergraduate training will be assigned CHEM 5753 (Physical Methods in Organic Chemistry). Courses satisfactorily completed to remove deficiencies (see IV.D.) in these areas will generally carry graduate credit. The chair of the Graduate Committee will determine whether these courses will count as advanced course requirements in cases where it is not clear (see III.A.).

### **D. Scientific Literature and Research in a Foreign Language.**

While the Department has no foreign language requirement for either the M.S. or Ph.D. degree, students should recognize that they are responsible for the scientific literature in their area regardless of the language in which it is published. Knowledge of a foreign language is thus desirable and encouraged. In cases where it is deemed essential to a student's research area, a student's advisory committee may require an appropriate foreign language.

### **E. English Requirements for Non-Native English Speakers.**

The following requirements apply to all students, regardless of citizenship, whose native language is not English. Such students must:

- I. Submit as a part of their application to graduate school a satisfactory score on the TEST of ENGLISH as a FOREIGN LANGUAGE (TOEFL). [The following are exempt from this requirement: students who have earned a Bachelor's or Master's degree from a regionally accredited U.S. or foreign institution where the official and native language is English.]
- II. Submit as a part of their application to the Department a demonstration of proficiency in spoken English. Acceptable exams and scores can be found in the Graduate Catalog or at <http://international-admissions.uark.edu/graduate-studies/english-proficiency.php> .

Those who do not meet the requirement for proficiency in spoken English at the time of admission must begin taking exams to demonstrate proficiency in spoken English during their first semester and must pass such an exam by the end of their second semester to be eligible for continued support as a Teaching or Research Assistant. English proficiency courses are available at the university to help in this effort.



### **III. Advanced Course and Registration Requirements**

#### **A. Advanced Courses.**

In addition to meeting the above basic minimum B.S. requirements, each advanced degree candidate must present a suitable program of advanced courses and research. The courses used to complete this requirement must be approved by the student's advisory committee (see VI.A.) as being appropriate for the student's program.

#### **B. Registration Requirements.**

##### **1. Minimum Registration for First Year Students**

During the first two semesters in graduate school, a student must complete six hours of graded course work each semester with an overall minimum GPA of 2.85 at the end of the first year. Credit in Chemistry 500V, 600V, 6011 and 700V cannot be used to satisfy this requirement.

##### **2. Minimum Registration for All Students.**

Minimum registration requirements for students holding 50% appointments as either teaching or research assistants are as defined by the Graduate School, currently 6 hours of degree related work in each of the fall and spring semesters and 3 hours during the summer. (It is understood that other rules (Sect. B. 1., for example) which require substantially greater enrollment for students early in their graduate program take precedence over the minimum registration requirement as defined in this section.) Registration for credit in formal courses related to the chemistry degree program, in seminar (6011), or in research (500V, 600V, 700V), may be used in fulfilling this requirement. Total registration (credit or audit) of students holding such stipend appointments must be for six credit hours each semester and three hours each summer session 3; at least one of the six hours must be either research (500V, 600V, 700V) or an audit in one course. Analogous requirements, with different credit hour limitations, apply to students holding appointments for other than 50% time which provide tuition and fee payments in addition to a stipend.

##### **3. Research Registration.**

Every student who has selected a major professor must register for a minimum of one credit hour of Chemistry 600V or 700V during each semester or summer

in residence. After a Ph.D. student has passed the candidacy examination, registration for at least one hour of research is required in each semester and summer either in residence or away from the campus until the work is completed. For each semester in which a Ph.D. candidate fails to register without prior approval of the Dean, a registration of three hours will be required before the degree is granted.

#### **4. Seminar Registration.**

Graduate students shall participate in divisional and departmental seminars at the discretion of, and to the satisfaction of, the Graduate Faculty. Each student in residence must register (credit or audit) for departmental seminar (6011, section 1) and one divisional seminar (6011, sections 2-7) each semester. Grades of Cr or F in the seminar course will be assigned by appropriate faculty members on the basis of the quality of the various seminar presentations and the general level of seminar participation throughout the student's graduate program. All Ph.D. students are required to present their Ph.D. research at an appropriate divisional or departmental seminar near the end of the Ph.D. program. Students are also expected to attend seminars and lectures by visiting scientists such as those sponsored by the American Chemical Society, Sigma Xi, et cetera.

#### **5. Withdrawal from Classes**

Graduate students are expected to take their course work seriously and should not expect to be able to drop or withdraw from courses except under the most extreme circumstances. Not doing well in a course is NOT considered as an extreme circumstance or as a reason for dropping or withdrawing from a course. Until such time as a student's committee is in place, the permission of the Director of Graduate Studies will be required. Once a committee is in place, permission to drop or withdraw from a course will only be granted with the permission of the student's advisory committee. Students dropping or withdrawing from courses on their own, without the required approvals, will be dropped from the graduate program.

### **IV. Scholarship Requirements and Stipend Eligibility**

#### **A. General.**

Graduate students are expected to maintain a B or better average on all coursework. A student who receives three C's becomes ineligible to pursue the Ph.D. degree, but may

continue study toward a terminal M.S. degree. Receipt of a fourth C will result in dismissal from the graduate program. For purposes of this rule, a grade of D will be considered the equivalent of two C's. Any grade of F will be cause for dismissal from the program.

### ***B. First Year Students.***

Students should have a 3.0 or better cumulative grade point average on all science and mathematics coursework taken during the first two semesters in the graduate program, including courses or examinations taken to satisfy deficiency assignments but excluding grades in Chemistry 500V, 600V, 6011, and 700V (see III.B. 1.). Undergraduate courses taken for credit to satisfy deficiency or proficiency assignments will be counted as 3 semester hours each toward this requirement irrespective of their listed catalog credit. Students failing to meet this requirement will be required to complete the Master's Program before being considered for readmission to the Ph.D. program.

### ***C. Graduate Scholarship Requirements.***

Any student whose cumulative grade point average on all University of Arkansas (Fayetteville campus) science graduate credit, exclusive of Chemistry 500V, 600V, 6011 and 700V, is below 3.00 at the end of the third semester in graduate school or at the end of 18 graduate hours will be required to demonstrate competence by completing a Chemistry Master of Science program before being permitted to continue in the Ph.D. program. A student must have a 3.00 or higher graduate grade point average as defined in the previous sentence in order to receive a Ph.D. (See V.B. below for the M.S. scholarship requirement.) No work of less than C quality will be accepted as meeting any course requirement.

Whenever a regularly admitted graduate student earns a cumulative grade-point average below 2.85 on graded course work taken in residence for graduate credit, he/she will be warned of the possibility of academic dismissal. When a graduate student has accumulated a minimum of 15 hours of graded course work taken in residence for graduate credit with a cumulative grade-point average below 2.85, and has received at least one warning, he/she will be academically dismissed from the Graduate School. The student may petition the Graduate Committee for a recommendation for readmission to the program and the Graduate School. Consideration of such petitions will be based on the student's entire record as a graduate student in the Department, including grades on deficiency and proficiency coursework and examinations as well as graduate coursework, cumulative examinations, and research progress. Final decisions on these petitions are outside of the department and should not be viewed as automatic approvals.

#### ***D. Correction of Academic Deficiencies - Minimum Standards.***

Courses or examinations taken by a student to satisfy any deficiency in the basic (bachelor's) program, or which are assessed as the result of unsatisfactory performance in a proficiency examination, must be passed with a grade of C or better to satisfy the deficiency. A student must have a 3.00 or higher grade point average on the sum total of all attempts at undergraduate science lecture courses and examination deficiency requirements (all such to count as 3 semester hours regardless of listed catalog credit) plus graduate course work (exclusive of Chemistry 500V, 600V, 6011 and 700V) in order to receive a Ph.D. In order to receive an M.S. degree a student must have a 2.85 or higher grade point average on the work defined above except that Chemistry 600V is counted in the average for the M.S. program.

#### ***E. Stipend Eligibility.***

Continuation of financial support will be considered for students making adequate academic and research progress toward the fulfillment of degree requirements. A 3.00 cumulative grade point average on all work taken for graduate credit and satisfactory completion of at least six credit hours of degree-related registration during the current and immediately preceding semesters are required to hold an assistantship. Other registration requirements must also be satisfied (see III.B.), and duties associated with previous service appointments must have been carried out satisfactorily.

Students pursuing a Master's degree may receive financial support as a graduate assistant for no more than four semesters, excluding summer appointments, without obtaining special permission from the Dean of the Graduate School. For doctoral students this limit is eight semesters beyond the master's degree, or, if no master's degree is taken (here or elsewhere), a total of twelve semesters, excluding summer appointments. Before support can be considered for a doctoral student's ninth semester in graduate school or fifth semester beyond a master's degree, or for a student's third semester in a master's program, the student must file with the Graduate Committee a memorandum approved by his or her major professor showing the proposed plan (including dates) for completion of all remaining degree requirements including thesis or dissertation and final oral examination. The Department will forward a copy of this memorandum to the Graduate School if assistantship support is continued.

A student who becomes ineligible for Ph.D. study owing to the failure of passing 7 courses in the prescribed amount of time, to receipt of a third C (see IV.A.), or to having less than a 3.0 GPA after 3 semesters or 18 hours (see IV.C.) will be allowed no more

than two additional semesters of financial support as a graduate assistant (teaching and/or research) toward the completion of the M.S. degree.

The advisory committee of each Ph.D. student will meet in each spring semester before April 15 to review the student's progress as evidenced by the academic and cumulative examination records and by the student's written report of research progress and plans. Continued stipend support is dependent on the written recommendation of this committee. The records of Ph.D. students for whom advisory committees have not been appointed and Master's students will be reviewed for this purpose by the Graduate Committee.

## **V. The Master's Degree**

### **A. Selection of Major Professors (M.S.)**

Before admission to candidacy, graduate students must choose a research director. This must be done by December 1 for students entering in the fall semester or by May 1 for students entering in the spring semester. Committees must be formed shortly thereafter and forms turned in to the Department of Chemistry and Biochemistry *immediately* upon formation.

### **B. Fulfillment of Degree Requirements.**

As stated in the Graduate School catalog, the requirements for the Master of Science degree may be fulfilled with 24 (or 30) semester hours of graduate course work (excluding Chemistry 6011, Seminar) plus thesis research (6 semester hours, Chemistry 600V). A cumulative grade average of 2.85 is required on this total graduate (course plus research) work.

### **C. Thesis Committee.**

The thesis committee consists of the student's major professor as chairperson and a minimum of two other members of the Graduate Faculty; at least three members, constituting a majority of the committee, must be from the regular full-time graduate faculty of the Department of Chemistry and Biochemistry (i.e., exclusive of faculty members holding Visiting, Adjunct, or part-time appointments in the Department, who may also be appointed to such committees in appropriate cases). The committee is appointed by the Chairman of the Department with the approval of the Dean of the Graduate School.

For M.S. students, the first committee meeting should occur by April 15 of the first year. Students entering in midyear could delay this first meeting until June 1, if necessary. The M.S. research proposal will be defended by April 15 of the second year.

For M.S. students, a research proposal is required no later than the second year, the same as for Ph.D. students. This proposal would serve as a preliminary draft of the M.S. thesis. The general format and grading scale is the same as for the Ph.D. proposal.

#### ***D. Thesis.***

A thesis, reporting original research, will be required of all candidates for the Master of Science degree in Chemistry. If the student wishes, arrangements can be made for microfilming the thesis and publication of an abstract of not more than 150 words by University Microfilms Library Services. Forms are available in the Graduate Office.

#### ***E. Final Oral Examination – Thesis Defense.***

Satisfactory completion of a comprehensive final oral examination is required of all candidates for the Master of Science degree in Chemistry. When the final copies of the thesis are available, the student and major professor shall arrange for and announce the time and place of the final examination. The conduct of the examination is vested in the thesis committee, but any member of the Graduate Faculty may attend and participate in the examination. A copy of the completed form on which the result of the examination is reported to the Graduate Office shall be provided to the student as the official notification of the result of the examination. A copy shall also be submitted to the Graduate Advisor of the Department. (See Schedule of Major Events, VII.I., for thesis distribution information.)

#### ***F. Entering University of Arkansas Ph.D. Program.***

Students entering the Ph.D. program from the University of Arkansas M.S. program would present their research proposal within six months of the completion of the requirements for the M.S. It should be reemphasized that the current rules require that such students have the strong recommendation of their M.S. Committee in order to enter the Ph.D. program.

### **VI. The Doctor of Philosophy Degree**

#### ***A. Selection of Major Professors and Committees.***

##### **1. Selection of Major Professors (Ph.D.):**

**Before admission to candidacy, graduate students must choose a research director. This must be done by December 1 for students entering in the fall semester or by May 1 for students entering in the spring semester. Committees must be formed shortly thereafter and forms turned in to the department *immediately* upon formation.**

## **2. Committee Formation and Meeting Deadline.**

**Students are required to form a committee and hold their first committee meeting before April 15 of their first year (students entering in January are encouraged to also meet this deadline, but if necessary, they could delay it until June 1).** At this first meeting the student will present to the committee a tentative title for the research proposal, a brief outline, and a time table for obtaining the preliminary results and writing the proposal.

## **3. Student Evaluation and Tentative Program of Study.**

Early in a prospective doctoral student's residence a committee will be appointed to evaluate the student's preparation and to draw up a tentative program of study and research. As part of this program, the fields in which the cumulative examinations may be taken will be specified. A copy of the tentative program as approved by the committee must be filed in the Departmental Office on forms which are available there.

## **4. Appointing a Committee.**

This committee should be appointed as soon as the student has selected a major professor. It shall consist of the student's major professor as chairperson and at least three other members of the Graduate Faculty. At least two members shall be from the major area in which the student is taking cumulative examinations. At least four members of the committee must be from the regular full-time graduate faculty of the Department of Chemistry and Biochemistry (i.e., exclusive of faculty members who hold Visiting, Adjunct, or part-time appointments in the Department, who may also be appointed to such committees in appropriate cases). It is recommended that an additional member of the committee be from some department other than Chemistry and Biochemistry.

## **5. Advisory Committee.**

Nominations for the advisory committee will be made by the student's major professor to the Chairman of the Department and should be submitted through the Office of the Graduate Advisor. When a Declaration of Intention to become a doctoral candidate is subsequently filed, this committee will be nominated to the Dean of the Graduate School for his approval as the student's formal Ph.D. advisory committee. At that time the committee will evaluate the student's progress, review the tentative program of study and research which was previously approved, and revise the program in any way it finds appropriate. A copy of this final program as approved by the committee must be filed in the Departmental Office on forms which are available there.

## **6. Advisory Committee Meeting.**

In its advisory capacity, the committee will meet each year in the spring semester before April 15th to review the student's progress and plans for future work (see also IV.E.). It is charged with the critical review of the doctoral dissertation and the conduct of the oral examination.

### ***B. Declaration of Intention***

During the first semester of study, a student must file a Declaration of Intention for the Ph.D. and indicate the major area of study, as indicated in the Graduate School Catalog (also see Appendix). This is currently handled by the Graduate School and is part of the admission process.

### ***C. Language and Writing Requirement***

#### **1. Effective Command of English.**

Each doctoral student in Chemistry must demonstrate to the satisfaction of the Graduate Faculty an effective command of the English language from the standpoints of (a) understanding, (b) speaking, and (c) writing.

#### **2. Foreign Language Requirement.**

There is no foreign language requirement beyond that specified in the Basic Requirements (II.C.).



### 3. Effective Proposal Writing.

The ability to present one's research ideas in a clear and concise manner through the written format is essential to the success of Ph.D. and M.S. chemists in both academia and industry. The support of graduate education in chemistry in this country is nearly completely dependent on research and teaching grants from Federal, State and private foundations. Effective writing of internal reports and proposals is equally important in industry. The proposal writing requirement is therefore designed to develop originality and critical analysis in the conception of a research plan, provide guidance in the development of clear and effective writing skills and focus attention on the thesis project.

Graduate students are required to write and defend orally a research proposal at the time of their second year annual review. This review should occur by April 15<sup>th</sup> of their second year. The format of the proposal should be modeled after an NSF or NIH proposal, as follows:

- A. Specific Aims
- B. Background and Significance
- C. Preliminary Results
- D. Experimental Plan
- E. References
- F. Figures
- G. Tables
- H. Budget, optional but strongly encouraged

Sections A-D should be a minimum of 10 pages.

**The proposal must be submitted to the student's committee no later than March 1, with the student orally defending the proposal before the Ph.D. committee no later than April 15.** Exceptions to these dates must be approved by graduate advisor. For students whose annual review occurs during the fall semester, the corresponding dates are October 1 for submission of the proposal with committee meetings being held no later than November 15. (Students should note that the March 1 (October 1) dates are for submission of proposals to the committee. They should be submitted to the student's research advisor sufficiently ahead of that deadline to allow for editing, revision and approval before the proposals are submitted to the committee.) The dissertation advisor, for the committee, will prepare a written critique. The proposal and defense will be graded as either pass, intermediate or fail. A grade of intermediate will require that the proposal be rewritten and/or defended

within six weeks, with a grade of either pass or fail given. A fail after either defense means that no financial support will be offered for the next academic year.

At each succeeding annual review a continuation proposal will be written and defended with the above format: Your research notebook will be required at each annual meeting.

#### **4. Proposal Writing Requirements for Students in Other Degree Programs**

Students whose advisors are a member of the faculty in the Department of Chemistry and Biochemistry and who are pursuing Ph.D. degrees in other programs are expected to write and defend continuation proposals as outlined above.

#### ***D. Candidacy Examination.***

##### **1. Admission to Candidacy.**

As required by the Graduate School, a student will be admitted to candidacy for the Ph.D. only after passing written or written and oral candidacy examinations in the major area at least one year before graduation.

##### **2. Candidacy Examination.**

The candidacy examination in Chemistry is made up of a series of cumulative examinations. A prospective Ph.D. candidate must pass seven of these cumulative examinations within a specified time to satisfy the requirement. The examinations are designed to test the student's advanced knowledge, ability to correlate the subject matter of formal courses, and ability to apply this knowledge to the critical evaluation of current research and the solution or discussion of significant problems in the student's major area.

##### **3. Cumulative Examinations (Cumes).**

Ten written cumulative examinations in each of the major areas, analytical chemistry, biochemistry, inorganic chemistry, organic chemistry, and physical chemistry, are given on a regular basis each academic year. One hour is allowed for each examination. The examinations are prepared and graded by the faculty members in the various major areas, either individually or in groups.

Normally no more than four cumulative examinations will be prepared by any one faculty member in a given year. Grades of pass or fail will be transmitted to the students by the Graduate Advisor on the basis of written reports by the examiners. The Graduate Committee will review periodically the student's progress in the cumulative examination program and communicate with the student as appropriate.

#### **4. Time Requirements to Pass Cumes.**

To satisfy the requirement, a student who enters the graduate program without substantial post-baccalaureate academic work in chemistry must pass the seven cumulative examinations during the first five semesters of enrollment as a graduate student. A student who enters the graduate program with considerable advanced work in chemistry, substantially equivalent to a M.S. degree as determined by the Graduate Committee at the time of first enrollment, must pass the seven cumulative examinations during the first four semesters of enrollment. A student who completes all requirements for an M.S. degree from this Department and enters the Ph.D. program directly or after an interruption of one semester must pass the seven examinations according to the following schedule. Examination passes from the five examinations immediately preceding the M.S. final oral examination will be counted. The number of sequential post-M.S. examinations within which the total of seven passes must be completed is as follows:

<u>Pre-M.S. Passes</u>	<u>Post-M.S. Examinations</u>
2	15
3	11
4	8
5	5

#### **5. First Semester Graduate Committee Information Provided.**

During the semester of first enrollment the student will be informed by the Graduate Advisor as to the number of semesters allowed for completion of the cumulative examination requirement, as well as the deficiency courses which will be required in the student's program and any requirements which are set as a result of performance on the proficiency examinations.

## **6. Special Oral Examination.**

A student who has passed six cumulative examinations by the time scheduled for the last regular examination in the student's allowed number of attempts will be given a special oral examination in place of the regular written examination as the final cumulative attempt. This oral examination will be conducted by the committee responsible for administering the cumulative examinations in the student's major area. Any member of the Departmental graduate faculty may attend and participate in the questioning. The result (pass or fail) will be determined solely by the committee conducting the examination.

## **7. Required Number of Cume Passes in Student's Major Area.**

Of the seven cumulative examinations which must be passed, the minimum number in the student's major area must be as follows: analytical, four; biochemistry, four; inorganic, four; organic, four; physical, six. The area or areas which will be accepted for the remaining examinations will be determined by the student's Ph.D. Advisory Committee at its first meeting, and will be recorded by that committee on the student's approved Program of Study for the Ph.D. degree. If non-major examinations are passed prior to a student's first Advisory Committee meeting, the acceptance of these examinations is subject to review and approval or rejection by the Ph.D. Advisory Committee at that meeting.

## **8. Candidacy Admission Requirement.**

A student cannot be admitted to candidacy for the Ph.D. prior to filing a Ph.D. Declaration of Intention and an approved program of study.

## **9. Completion of Candidacy Examinations and Requirements.**

Upon completion of the candidacy examination and all other candidacy requirements (see II. and VI.D.8.), the student will be informed of admission to candidacy by the Chairman of the Department (see residence requirements). If a Ph.D. student has not passed the required seven cumulative examinations in the specified time, he or she will be refused any further registration as a Ph.D. student in Chemistry.

## **10. Dropping Ph.D. Program but Remaining in M.S. Program.**

A student who formally, by written notice to the Graduate Committee, drops from the Ph.D. program but remains in the M.S. program prior to the end of the

time allowed for completion of the cumulative examination requirement may apply for re-admission to the Ph.D. program upon completion of the M.S. degree. Such applications are considered competitively with those from other prospective students, and re-admission is not automatic. If such a student is re-admitted, he or she must subsequently satisfy the cumulative examination requirement as specified above in paragraph 4.

## ***E. Residence Requirements.***

### **1. Time Requirement for Registration as a Resident Graduate Student.**

The residence requirements specified in the Graduate Catalog must be fulfilled. In addition, a candidate is required to be registered as a resident graduate student for two semesters after passing the last cumulative examination. The semester during which the last cumulative examination is passed will count as one of these two required semesters of residence only if the exam is one of the first two offered that semester.

### **2. Consecutive ten-year period for Ph.D. requirement fulfillment.**

The Ph.D. degree is based on a cohesive program of coursework, examinations, and research. Because basic knowledge, general requirements, course content, research techniques, etc., change with time, all formal courses, examinations, etc., which are to be used to fulfill the requirement of the Ph.D. degree must be presented within a consecutive ten-year period (as stated in the Graduate Catalog, all requirements for the Ph.D. degree must be completed within seven consecutive calendar years from the date of declaration of intention).

A person who gets a Ph.D. degree here can use previous work done here or elsewhere as part of the program so long as it is within the ten-year period. Any of the advanced course requirements (Sec. III) or any of the Ph.D. requirements (Sec. VI) which were met more than ten years before a September 1 check date are automatically voided, and must be met again in terms of the presently existing regulations before a Ph.D. degree may be granted.

Specifically, this rule applies to courses used to satisfy the advanced course requirements; to the M.S. equivalent of a minimum of 30 hours of coursework; to the various scholarship requirements; and to the candidacy examination.

## ***F. Doctoral Dissertation.***

### **1. Minimum 18 Hours Registration.**

A minimum of 18 hours of credit in CHEM 700V must be completed.

### **2. Subject of Doctoral Dissertation.**

The subject of the doctoral dissertation will be chosen by the student in consultation with the major professor and must be approved by the advisory committee. The potential dissertation title must be filed with the Dean of the Graduate School at least one year before the final examination.

### **3. Research.**

After the dissertation subject has been selected and approved, the student is expected to devote as much time and effort as possible to research.

### **4. Dissertation Draft.**

When, with concurrence of the major professor, the student considers the research to be complete, a first draft of the dissertation will be prepared and submitted to the major professor for examination and informal discussion. Upon approval the draft will then be submitted to the advisory committee for review and comment. It is the responsibility of the candidate to arrange ample time for discussion of the draft and for preparation of the final copy of the dissertation.

### **5. Regulations and Specific Dissertation Instructions.**

General regulations regarding preparation and submission of the dissertation are presented in the Graduate School Catalog, and specific instructions are available in the bulletin, "Regulations for Preparation of Theses and Dissertations," available at the bookstore.

### **6. Dissertation Format.**

The dissertation will consist largely of material acceptable for publication in reputable journals in the field. It may be divided into independent parts if the material might appropriately be published as more than one paper. References

may be given as footnotes or grouped as a consecutive or alphabetical bibliography at the end of the dissertation or at the end of each independent part of the dissertation. In other respects such as abbreviations, headings, etc., it will follow the form of the Journal of the American Chemical Society (unless the major professor issues specific instructions that it follow the form of another reputable journal).

## **7. Concise Presentation.**

The presentation should be as concise as is consistent with completeness and clarity, but it will be addressed to less specialized readers than a typical journal paper and may, therefore, be less condensed. Sufficient detail should be given so that the work may be repeated by a competent chemist precisely as it was performed.

## **8. Appendices.**

Appendices may be added to include such material as might make the body of the dissertation undesirably cumbersome. Examples of material appropriate for appendices are the following:

- (a) material for a note to a highly specialized journal;
- (b) description of negative results or preliminary forms of apparatus;
- (c) detailed descriptions of special apparatus and/or procedures which might be required only by the next person attacking the particular research problem reported;
- (d) suggestions for further work;
- (e) incidental findings and indications of the experimental work; and
- (f) detailed descriptions of specific experiments performed to obviate ambiguity of results.
- (g) copies of characterization data such as NMR spectra.

## **9. Abstract.**

An abstract of 350 words or less is required. This abstract will be filed with Dissertation Abstracts. The major professor may require a more detailed presentation in a form suitable for publication (See Schedule of Major Events, VII.I., for Thesis distribution information.)

## **G. Final Oral Examination.**

### **1. Committee Review.**

Upon completing the final draft of the thesis, the candidate will give each member of the advisory committee an opportunity to examine it, and arrange with the committee, with the approval of the Dean of the Graduate School, a time and place for the final oral examination.

### **2. Final Oral Examination.**

The conduct of the final oral examination is vested in the advisory committee, but any member of the Graduate Faculty of the University may attend and participate in the examination. Additionally, all such examinations are open to the public by Graduate School regulations. In general, the examination will consist of an oral presentation of a summary of research results and their significance, followed by an oral examination on the dissertation itself and broadly on its field. The candidate should be prepared to defend the dissertation against criticism.

### **3. Communication of Defense Results.**

The Chairman of the Department will communicate to the student a grade of "Pass" or "Fail" on the basis of a written report from the advisory committee. A grade of "Fail" may be accompanied by specific recommendations as to the student's further course of action.

## **VII. Schedule of Major Events in the Graduate Program**

### **A. Proficiency Examinations (M.S. and Ph.D.).**

Before first enrollment.

### **B. Completion of Undergraduate Deficiency Courses (M.S. and Ph.D.).**

Before the beginning of the fifth semester as a graduate student.

### **C. Selection of Major Professors (M.S. and Ph.D.).**



Before admission to candidacy, graduate students must choose a research director. This must be done by December 1 for students entering in the fall semester or by May 1 for students entering in the spring semester. Committees must be formed shortly thereafter.

**D. Appointment of Advisory Committee (Ph.D. only).**

Immediately after selection of major professor and showing progress in cumulative examinations.

**E. Declaration of Intention (Ph.D. only).**

After successful completion of cumulative exams.

**F. Suggested Program of Study and Cumulative Examinations (Ph.D. only).**

At first meeting of Advisory Committee.

**G. Admission to Candidacy.**

(M.S.) on completion of course requirements;  
(Ph.D.) on passing the candidacy examination and completing all “deficiency” courses.

**H. Residency (Ph.D. only).**

Two semesters after completion of the candidacy examination (see VI.E.).

**I. Dissertations and Theses:**

**1. Two-week Allotment of Time for Committee to Read.**

The thesis or dissertation committee should be allotted at least two weeks' time to read the thesis. More time than this may be needed because of special scheduling problems of a committee member; the student should check this point well in advance. The thesis given to the committee should be complete and in such a form that no corrections are anticipated, and should have the prior approval of the student's major professor.

**2. Corrections.**

Ample time should be allotted for corrections to be made. Copies of the corrected thesis must be delivered to the committee at least 24 hours before the final oral exam. The thesis should thus be a copy ready for signatures; only minor corrections suggested at the oral exam would be expected thereafter.

### **3. Announcement of Defense.**

Student should note the Graduate School requires that the final oral be announced two weeks before it is held. Deadlines for specific graduation times are also given by the Graduate School.

### **4. M.S. Title and Copy Submission.**

The M.S. thesis title submitted to the Graduate Dean at least three months before the oral examination. Two copies of the thesis are to be submitted to the Graduate School and one copy to the major professor.

### **5. Ph.D. Title and Copy Submission.**

The title of the Ph.D. Dissertation submitted to the Graduate Dean at least one year before the final oral examination. Two copies of the dissertation are to be submitted to the Graduate School and one copy to the major professor.

### ***J. Final Oral Examination (M.S. and Ph.D.).***

After approval of thesis/dissertation and before final copies of Dissertation are turned in. The regulations of the University Graduate Council require that an abstract of the dissertation and an announcement of the place, time and date of the final oral examination go to the Graduate Dean not less than ten days prior to the examination.

## Appendix

Current operating procedures, subject to change with notice, regarding Departmental approval of the Ph.D. Declaration of Intention are outlined below. These procedures implement Section VI.B of "Information for Graduate Students in Chemistry." Section IV, "Scholarship Requirement", is also pertinent with respect to the Ph.D. Declaration of Intention.

### **A. *M.S. Degree Student (UA Fayetteville) Entering Ph.D. Program After Absence of One Semester.***

A student who takes a University of Arkansas (Fayetteville campus) M.S. degree and who wishes to enter the Ph.D. program directly or after an absence of one semester must file a Ph.D. Declaration of Intention prior to the beginning of the second semester of enrollment beyond the M.S. degree. Such a student will be permitted to file a Ph.D. Declaration of Intention if and only if the following requirements have been met:

#### **1. Cumulative Graduate GPA.**

The cumulative graduate GPA at the time of filing is 3.00/4.0 or better.

#### **2. Recommendation.**

There is a strong positive recommendation from the M.S. oral examining committee.

#### **3. Cumulative Examination Requirements.**

At least two of the last five cumulative examinations offered immediately prior to completion of the M.S. program have been passed.

### **B. *M.S. Degree Student (UA Fayetteville) Entering Ph.D. Program After Absence of Two or More Semesters.***

A student with a University of Arkansas (Fayetteville campus) M.S. degree who wishes to enter the Ph.D. program after an absence of two or more semesters must file a Ph.D. Declaration of Intention prior to the beginning of the second semester of re-enrollment beyond the M.S. degree. Such a student will be permitted to file a Ph.D. Declaration of Intention if and only if the following requirements have been met:

#### **1. Cumulative Graduate GPA.**

The cumulative graduate GPA at the time of filing is 3.00/4.0 or better.

## **2. Recommendations.**

There are strong positive recommendations from the M.S. oral committee and other appropriate groups of individuals.