

Graduate Manual

Department of Chemistry

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OF SCIENCE AND TECHNOLOGY

	Page No.
PREFACE.....	4
1. PROFICIENCY REQUIREMENTS.....	5
1.1. Proficiency in Chemistry.....	5
1.1.1. Diagnostic examinations.....	5
1.1.2. Demonstrating proficiency.....	5
1.2. Proficiency in English.....	6
1.2.1. Examination.....	6
1.2.2. Testing of Nonnative English speaking students.....	7
2. ADVISING AND REGISTRATION.....	8
2.1. At the Start.....	8
2.1.1. Entrance interview.....	8
2.1.2. Temporary adviser.....	8
2.1.3. Initial advising and registration.....	8
2.2. Subsequent Semesters.....	8
2.2.1. Registration.....	8
2.2.2. Changes in schedule.....	8
3. SELECTING A MAJOR AND A MAJOR PROFESSOR.....	9
3.1. Areas of Study.....	9
3.1.1. Major.....	9
3.1.2. Minor.....	9
3.2. The Major Professor.....	9
3.2.1. Learning about research programs.....	9
3.2.2. Choosing a major professor.....	9
Expressing the choice.....	9
Early selection of a major professor.....	10
Recording the choice of major and major professor.....	10
Change of major professor.....	10
4. PROGRAM OF STUDY.....	11
4.1. The Program of Study Committee (POSC).....	11
4.1.1. The Ph.D. committee.....	11
4.1.2. The M.S. committee.....	11
4.1.3. Appointment of the POS committee.....	11
4.1.4. Changes.....	12
4.2. Degree Requirements.....	12
4.2.1. The Ph.D. degree.....	13
4.2.1.1. Graduate College requirements for all majors.....	13
4.2.1.2. Chemistry Department requirements for all majors.....	13
4.2.1.3. Chemistry Department requirements for specific majors....	14
4.2.1.4. Minor requirements.....	15
4.2.1.6. Additional Specialties.....	15
4.2.2. The M.S. degree.....	16
4.2.2.1. Proficiency.....	16
4.2.2.2. Graduate College requirements.....	16
4.2.2.3. Chemistry Department requirements for all majors.....	16

4.2.3.	Preparing the POS.....	17
4.2.4.	Teaching experience.....	18
4.2.5.	A Chemistry minor.....	18
5.	PRELIM EXAMINATIONS AND Ph.D. CANDIDACY.....	19
5.1.	Preliminary Orals.....	19
5.2.	Advancement to Candidacy	20
5.3.	Time limitations	20
6.	RESEARCH, THESIS, AND GRADUATION	21
6.1.	Research.....	21
6.2.	Other requirements	21
	Continuous registration	
	Diploma slip	
	Tuition and Fees for the final semester	
	The final examination	
	Graduation approval	
7.	SCHOLASTIC STANDARDS AND THE EVALUATION OF STUDENTS	23
7.1.	Remaining in good standing.....	23
7.2.	Review of first-year students.....	24
7.3.	Annual review of students.....	24
7.4.	Academic Probation.....	25
8.	ASSISTANTSHIPS	26
8.1.	Promotions	26
8.2.	Fellowships	26
8.3.	Students admitted without Departmental support	26
9.	PROGRESS TOWARD THE GRADUATE DEGREE	27
9.1.	Normal academic progress	27
9.2.	Conditions of appointment, stipend reductions.....	27
10.	GRADUATE PROGRAM REQUIREMENT TABLE	28
11.	VACATION AND LEAVE POLICIES	29
10.1.	Vacations	29
10.2.	Leaves of absence.....	29
12.	GRADUATE STUDY BY FULL-TIME EMPLOYEES	30
13.	GRADUATE STUDENT ACADEMIC MISCONDUCT.....	30

GRADUATE MANUAL

Preface

This document is a compilation of the policies and practices of the Department of Chemistry and the Graduate College (Graduate College Handbook). It has been prepared to guide graduate students through the program. Few of the policies stated are so inflexible; however, that an exception cannot be made if circumstances warrant.

The Graduate Activities Committee (GAC) is charged by the faculty with administration of the Chemistry Graduate Program. The committee, which consists of four or five professors appointed by the Department Chair, monitors the progress of all chemistry graduate students throughout their graduate careers and periodically updates this manual. The Graduate Student Liaison Committee (GSLC) is a Subcommittee of the Graduate Activities Committee. The GSLC, whose charge is to address graduate student concerns, is composed of the faculty members of the GAC, plus 4-6 graduate students. The graduate student members of the GSLC are elected by the Chemistry graduate students at large. The center of operations of the Graduate Activities Committee is at the desk of the Graduate Records Secretary, located in the Department of Chemistry Office, 1605 Gilman Hall. Students may obtain the required Chemistry and Graduate College forms from the Graduate Records Secretary or you may access the Graduate College forms at www.grad-college.iastate.edu/forms/forms.html and the Department of Chemistry forms at <http://www.chem.iastate.edu/students/docs/Graduate-Departmental-Forms.pdf>.

ALL forms should be submitted to the Chemistry Graduate Records Secretary for processing.

The Graduate Bulletin Board is located immediately outside the Department of Chemistry Office, next to the graduate student mailboxes. This Bulletin Board displays notices of general interest.

The faculty has defined standards as to the length of time that students may receive full assistantship support (please see Section 10). Diligent effort on the part of the student in the early stages of graduate work is the best way to avoid a prolonged stay in graduate school.

Graduate students are invited to consult any member of the Graduate Activities Committee when that would be helpful. A list of the current members of the Graduate Activities Committee can be obtained from the Chemistry Graduate Records Secretary.

The members of the faculty and staff would like to wish each graduate student in the Department the greatest possible measure of success. The years that you spend here will be, we hope, ones that you will look back on with fondness; may you inherit the joy of scientific inquiry which graduate study is intended to instill in every participant.

1. PROFICIENCY REQUIREMENTS

1.1. Proficiency in Chemistry

1.1.1. Diagnostic examinations. All entering graduate students take diagnostic exams in four areas: analytical, inorganic, organic, and physical. The exams are offered during the first week of Orientation. The results are used to counsel students into suitable courses.

Each exam is scored as "P" or "NP". A "P" signifies that the student is familiar with the material at the undergraduate level (Chem 211, 316; 301, 402; 331, 332; 321, 322) corresponding to a grade of "B" or better.

An "NP" represents a deficiency that must be removed as discussed in Section 1.1.2. Ph.D. candidates must demonstrate proficiency in four areas, M.S. candidates in three, including the major.

1.1.2. Demonstrating proficiency. Students must demonstrate chemistry proficiency for each discipline in which a deficiency was found by the end of the third semester in residence to remain in good standing in the Chemistry Graduate Program.

A. Clearing deficiencies. This can be accomplished in any one of the following ways listed below. This choice should be made with the advice of the temporary advisor and/or major professor:

1) A student could demonstrate proficiency in the area(s) in which they did not pass the diagnostic examination by retaking the diagnostic examination(s) in January and again, if necessary, the following August. This may be accomplished by self-studying or by auditing or sitting in on courses.

2) A student could enroll in an approved graduate course in the deficient area and earn a grade of B- or better. The current list of acceptable courses follows:

Analytical: CHEM 511, 512, 513, 516, 577 (576 is acceptable for EITHER analytical or physical, but not both)

Inorganic: CHEM 502, 503, 505, 571, 574, 578

Organic: CHEM 531, 537

Physical: CHEM 561, 562, 563, 564, 575, 576, 580

3) A student could enroll in an appropriate undergraduate course and earn a grade of B- or better. This might be appropriate for a student who fared very poorly in the corresponding diagnostic. Such action by the student would be acceptable insofar as registration in an undergraduate course does not count for graduate credit. The appropriate undergraduate courses are:

Analytical: CHEM 316
 Inorganic: CHEM 402
 Organic: CHEM 332
 Physical: CHEM 324 or 325

All deficiencies must be cleared by using one or more of these mechanisms by the end of the third semester in residence.

- B. Should a student fail to clear a deficiency on the third attempt to pass a diagnostic exam, he or she must remove the deficiency by taking an appropriate course (as outlined in point A above) during the third semester in residence.
- C. Some outcomes of unresolved deficiencies could be:
- a. Pass 3 diagnostics by any option under "A" above (and have acceptable grades): MST (M.S. terminal) track.

1.2. Proficiency in English - Graduate English Requirements for Nonnative Speakers of English

1.2.1 Examination. Graduate students whose native language is not English and who do not have a bachelor's or advanced degree from ISU or a US institution must take the English Placement Test at the beginning of their first semester of enrollment. This test is administered by the Department of English. It must be taken in addition to TOEFL (Test of English as a Foreign Language), which is taken as part of the admissions process. A student who does not pass this examination is assigned to one or more courses in the English 99 and 101 series. This course work must be completed during the first year of study. (There is a developmental course fee for the English 99 course.)

Non-native English speaking ISU graduate students who meet or exceed the TOEFL or IELTS scores below are exempted from taking the English Placement Test. Self-enrollment in English 099 or 101 courses remains possible.

- Paper-based TOEFL (PBT)--640 (and above)
- Computer-based TOEFL (CBT)--270 (and above)
- Internet-based TOEFL (IBT)--105 (and above)
- IELTS--8.0 (and above)

A graduate student whose native language is not English but did graduate from a U.S. institution, may bring to the Graduate College the "[Graduate English Requirement Approval](#)" form, available from the Graduate College or on the [Graduate College's Web site](#). Two conditions must be met:

- the student must have received a bachelor's, master's, or Ph.D. degree from a U.S. college or university and
- the language of instruction at that college or university must have been in English.

1.2.2 Testing of Nonnative English Speaking Students

[SPEAK/TEACH](#) testing is required of graduate students who fit **both** of these categories:

- those who are not native speakers of American English (i.e., learned another language first), and

The [SPEAK/TEACH](#) tests of oral proficiency will be given during fall Orientation. Registration for the test is the day before the test is administered.

A prospective teaching assistant who does not pass these tests is required to successfully complete course work and be retested. University Studies 180 is a series of communication courses designed to help new teaching assistants. Students focus upon pronunciation, listening, question-handling, teaching and lecturing skills, and analyze the culture of U.S. university life. Because enrollment is restricted, TAs cannot register for the courses online through AccessPlus. Enrollment will be arranged during the first week of Orientation.

*The stipend of students who have not demonstrated proficiency in English and/or TA's not fully certified by the [SPEAK/TEACH](#) test, will be reduced according to the schedule shown in Section 10.

2. ADVISING AND REGISTRATION

2.1. At the Start

An Orientation schedule will be provided for new graduate students prior to and on the first day of Orientation in August.

2.1.1. Entrance review. New graduate students' application materials will be reviewed individually by the Graduate Activities Committee to determine each student's area(s) of interest for assignment of a temporary adviser(s).

2.1.2. Temporary adviser. A list of temporary advisers will be posted on the Graduate Bulletin Board and distributed to the professors and the students. The advisers will counsel students on academic matters until the assignment of a Major Professor is made in mid to late November.

2.1.3. Initial counseling and registration. Students will meet with their temporary advisers to review the results of the diagnostic exams, to discuss their first semester's course work, and to fill in the registration form. The temporary adviser must sign the registration form. The following are the steps to follow to complete registration for courses:

Step 1: The completed registration form must be taken by the student to the Graduate Chemistry Office, 1605 Gilman. The registration form will be reviewed by the Graduate Program Coordinator and then the "hold" will be removed from your registration so you may access AccessPlus to complete your registration on-line.

Step 2: The student should go on-line on a computer provided in 3354 Gilman and register for first semester of classes.

Step 3: The student completes the on-line Availability for Teaching Card and emails this form to the Undergraduate Secretary.

2.2. Subsequent Semesters

2.2.1. Registration. Students must obtain a registration sheet in the Graduate Chemistry Office, complete the registration sheet and obtain their major professor's signature. The Graduate Records Secretary will then remove the "hold" so that the student may register by the Web through AccessPlus. <https://accessplus.iastate.edu/frontdoor/login.jsp>. The schedule of available classes is available at <http://classes.iastate.edu/>. After logging onto AccessPlus, click on "Register for Classes" under "Students".

2.2.2. Changes in Schedule. The "Request for Schedule Change" form, available from the Graduate Records Secretary, is used for drops, adds, credit changes. Limitations apply regarding the timing of such changes and are available at www.iastate.edu/~registrar/registration/.

3. SELECTING A MAJOR AND A MAJOR PROFESSOR

3.1. Areas of Study

3.1.1. Major. Options for graduate degree majors are:

- a. Chemistry
- b. Analytical Chemistry
- c. Inorganic Chemistry
- d. Organic Chemistry
- e. Physical Chemistry

Options b through e are the “traditional” disciplines. The availability of the first major, “Chemistry,” provides considerable flexibility in designing an interdisciplinary program of study. It is also the major to be selected by those who wish to specialize in “Chemical Education”.

3.1.2. Minor. A student may elect an optional minor in another discipline or in another department.

3.2. The Major Professor

Any professor may serve as Major Professor to any graduate student regardless of the student’s major. The choice of a Major Professor represents an agreement between the graduate student and the professor to work together in planning academic studies and research for an advanced degree. Students should give this matter careful consideration, exploring conscientiously the available options as to major, research specialty and research group. The following policies are intended to promote a thorough exploration and a free decision on the part of all students.

3.2.1. Learning about research programs

CHEM 579. All new graduate students must register for this course in their first semester. This course will acquaint students with the research underway in the Department.

In the Fall Semester, CHEM 579 consists of research presentations and one-on-one discussions with the faculty. As a part of the process, students are to engage in such personal discussions with at least three professors and obtain the signatures of those professors on the form provided during CHEM 579.

In the Spring Semester, for January entrants, only one-on-one discussions with the faculty are offered.

3.2.2. Choosing a major professor

Expressing the choice. During CHEM 579, students will be asked to return the “Major Professor Preference Form” to the Graduate Records Secretary. On this form students state their preference for a Major Professor by listing up to three choices and numbering them 1 to 3 in order of preference with 1 being the first choice. In extenuating circumstances a student may elect to postpone the choice of Major Professor with Departmental approval, but for

no longer than the end of Spring Semester.

The faculty will honor a student's preference for a given research group insofar as allowed by considerations of faculty workload, space, and research support.

Early selection of a major professor may be arranged by petition to the Graduate Activities Committee, with an adequate justification for the immediate initiation of research. If the petition is approved, the student may submit the "Major Professor Preference Form" after interviewing three professors and obtaining their signatures on the Major Professor Preference Form. The student is still required to attend CHEM 579.

Recording the choice of major and Major Professor. Once the choice of the Major Professor has been ratified by the faculty, the student should submit to the Graduate Records Secretary the form entitled "Selection of Major Discipline and Major Professor" (Form 1) which can be obtained from the Graduate Records Secretary.

Change of Major Professor. A graduate student should make a careful selection of discipline and Major Professor. Nonetheless, in the rare event a change might be desired, a student should act promptly, preferably by the end of the second semester to avoid prolonging the time to an advanced degree. (See the longevity schedule, Section 10). This is particularly so if the change also entails a change in major.

Any such change must first be adequately explored with the potential new Major Professor. If the new Major Professor concurs, then the student should give the reasons in a memorandum to the Graduate Activities Committee. The new Major Professor should sign the memorandum to indicate concurrence; the current Major Professor should also sign the memorandum to indicate cognizance of the pending change. The change requires the approval of the Department. If the POS Committee has already been constituted, the Graduate College must also be informed and a modification to RCA and POS forms needs to be completed and filed with the Graduate Records Secretary and the Graduate College. These forms are available from the Graduate Records Secretary or on-line at <http://www.chem.iastate.edu/students/docs/Graduate-Departmental-Forms.pdf>.

4. PROGRAM OF STUDY

4.1. The Program of Study Committee (POSC)

The student's personal POSC approves the Program of Study (POS), and conducts the oral prelim and final exams. In addition, oversight of the student's progress is ensured by annual meetings of the POSC, which is assembled no later than the end of the student's second semester. The student (with help from their Major Professor) initiates the annual meetings. The purpose of the meetings, which start no later than the student's third semester in residence, is to provide informal discussion of planning and progress of the student's program and *not* to entail formal presentations on the part of the student. These meetings are not examinations. No more than one member of the committee may be absent at these informal meetings. These discussions are not held in years in which the oral exams are scheduled. The "Program of Study Committee (POSC) Annual Meetings" form should be completed and returned to the Graduate Records Secretary upon completion of the meeting. This form is available from the Graduate Records Secretary or on-line at <http://www.chem.iastate.edu/students/docs/Graduate-Departmental-Forms.pdf>.

4.1.1. The Ph.D. committee consists of five professors, and is chaired by the Major Professor. It must include at least three members, including the major professor, from within the student's major or program. The committee must include member(s) from different fields of emphasis so as to ensure diversity of perspectives.

A minor discipline, if any, must be represented.

A list of the professors of the Department of Chemistry by discipline is available on-line at <http://www.chem.iastate.edu/students/>.

4.1.2. The M.S. committee consists of three professors, and is chaired by the Major Professor. One member must be from another discipline or department.

Students who are aiming solely for the M.S. degree should inform the Department as soon as possible, to avoid an excessive time to the degree. This form is available from the Graduate Records Secretary or on-line at <http://www.grad-college.iastate.edu/forms/forms.html>.

4.1.3. Appointment of the POSC. The student and Major Professor select the members and submit the "Recommendation for Committee Appointment" form to the Graduate Records Secretary. Copies of the approved form will be returned to the Major Professor, the student, and the originals will be filed with the Graduate College. **Pre-registration for your third semester will not be approved until this has been completed.** The "Recommendation for Committee" form is available from the Graduate Records Secretary in 1605 Gilman, or you may access the Graduate College Forms on-line at <http://www.grad-college.iastate.edu/forms/forms.html>.

4.1.4. Changes. A member of the POSC may be replaced permanently or temporarily by another professor by submission of the “Request to Change Committee Appointment Form” available from the Graduate Records Secretary or on-line at <http://www.grad-college.iastate.edu/forms/forms.html>. In the case of an emergency and a member of the committee other than the chair is not available for a meeting please contact the Graduate Records Secretary immediately.

4.1.5. Annual POS Meetings. The student and committee members will meet annually in a manner to foster student/faculty interactions as well as collaboration between the many divisions and departments. The purpose of the meetings, which start no later than the first day of the student’s third semester in residence, is to provide informal discussion of planning and progress of the student’s program and will include a short student led discussion of their research. This discussion is designed to make the committee aware of the student’s academic and research progress and allow for collaborative discussion by the student and faculty that may address on going problem areas. The format of the discussion may include PowerPoint slides, transparencies, outline, or a chalk talk and last no more than 15 minutes to allow time for discussion. *These meetings are not examinations.* No more than one member of the committee may be absent at these informal meetings. The Prelim Oral and Final Defense will substitute for these annual meetings. The “Program of Study Committee (POSC) Annual Meetings” form should be completed and returned to the Graduate Records Secretary upon completion of the meeting. This form is available from the Graduate Records Secretary or on-line at <http://www.chem.iastate.edu/students/docs/Graduate-Departmental-Forms.pdf>

Annual Meeting Schedule:

Prior to the 1st day of the 3rd semester – Set up POSC and POS constitutes first Annual Meeting

Before end of the 4th semester – Prelim Oral or Annual Meeting

Before end of the 6th semester – Prelim Oral or Annual Meeting

Before end of the 8th semester – Annual Meeting

Before end of the 10th semester – Final Defense or Annual Meeting (showing justification for continued funding for post fifth year)

4.2. Degree Requirements

This section describes the requirements to obtain Ph.D. and M.S. degrees. Graduate study centers on research, carried out under the guidance of the Major Professor whose selection is described in Section 3. Expectations regarding research are summarized in Section 6.1. The focus of this section is on the other requirements, such as courses and preliminary examinations.

Students who wish to pursue the Ph.D. specializing in Chemical Education will obtain a degree in “Chemistry”, as described below. The research component of their degree shall have two parts. The first component of the research will be carried out in the laboratories of any member in the Department who is active in a chemical research area other than Chemical Education. This component shall be of the quality and quantity of a M.S. degree, and the students will ordinarily write a thesis, defend it, and obtain the

M.S. Students may obtain this M.S. in one of the traditional disciplines or in “Chemistry”, but must in any case; fulfill the academic requirements for the Chemical Education specialty. The second component of the research may be carried out under the same or a different Major Professor and shall consist of research in the field of Chemical Education.

4.2.1. The Ph.D. Degree

4.2.1.1. Graduate College requirements for all majors:

- (a) Complete ≥ 72 semester hours of graduate credit. 550, 555, and 579 courses do not count towards the outside credit. Courses included within each major are defined in Section 4.2.1.3.
- (b) Pass courses on the POS.
- (c) Pass the preliminary oral exam conducted by the student's POSC.
- (d) Pass a final exam in defense of the thesis.

4.2.1.2. Department of Chemistry requirements for all majors:

(a) **Coursework.** Students take at least 16 credit hours of 500-level chemistry courses (CHEM 550, 555, and 579 may not be counted) or substitutions approved by the POSC and the Major Professor. Most individual majors have more specific requirements, as given in Section 4.2.1.3.

Additionally, the student must take at least one (CHEM 540, 601, 619, 632, or 667) special-topics course in or out of the Department of Chemistry. This course must be for at least one credit-hour. Alternately, with the approval of the POSC, the student may take a course that is at least 500-level outside of the Department of Chemistry or a 500-level Chemistry course given in alternate years or less frequently. This course cannot be one of the seminar courses (CHEM 600, 611, 631, or 660) and does not count among the 16 credit hours noted above.

All students must take:

"Safety in the Chemical Laboratory", CHEM 550, offered in Spring Semester.

“Introduction to Research in Chemistry”, CHEM 579, offered in Fall Semester.

(b) **Seminars.** Students must present at least one public seminar (on their research or on scientific literature) before the end of their sixth semester in residence. An oral presentation at a regional, well recognized discipline specific, national or international meeting before the end of the sixth semester in residence may satisfy this requirement. Documentation of completion of the seminar should be filed with the Graduate Records Secretary by completing the “Seminar/Oral Presentation Record” form available from the Graduate Records Secretary or on-line at <http://www.chem.iastate.edu/students/docs/Graduate-Departmental-Forms.pdf>.

4.2.1.3. Department of Chemistry requirements for specific majors:

The following courses must be included in the POS for each individual major.

Chemistry: No set course requirement. The selection of courses for this major are based on:

- Student input
- Major professor input
- Area of research
- Approval of POSC

Chemical Education: The chemical education specialty is administered as a “chemistry major”, but will ordinarily have the following requirements, subject to the agreement of the POSC. Students will take at least 12 units of 500-level chemistry courses, as outlined for one of the masters level programs. They must fulfill the special topics requirement of Section 4.2.1.2. Additionally, students will take the following courses to develop their understanding of education and education research: STAT 401 (3), STAT 402 (3), CI 615 (2, twice), CI 533 (3), CHEM 599 (1-3 each semester).

Analytical: Any of three of the following, CHEM 511 (3), 512 (3), 513 (3), 516 (3), plus 611 (1 each semester offered).

Inorganic: CHEM 502 (3), 505 (3), 600 (3x1, a public seminar may count for one of the 600 credits under the criteria in section 4.2.1.2), at least 1 credit in 601, and at least 4 credits from two of the following courses: CHEM 503 (2), 571 (2), 574 (2), 578 (2).

Organic: CHEM 531 (2), 532 (2), 537 (3), 538 (2), 632 (*2 for credit, 2 for audit), plus 631 (1, each semester offered). Students must present one seminar in 631, and must receive a grade of B- or better or present a public seminar under the criteria in section 4.2.1.2 (b). Also, CHEM 572 (3, with a grade of B or better). *Please note, if you chose to substitute another special topics course for this requirement you will need to complete a “Special Topics Substitution” form and return it to the Graduate Records Secretary. The form may be requested from the Graduate Records Secretary or accessed at <http://www.chem.iastate.edu/students/docs/Graduate-Departmental-Forms.pdf>.

Physical: CHEM 561 (4), 563 (2), 583 (1) and 562 (3), or 564 (3); plus 660 (1 credit every semester offered). Each course requirement may also be met by the following substitutions: PHYS 591 for CHEM 561; PHYS 592 for CHEM 562; PHYS 531 for CHEM 563 (they may be particularly attractive to students interested in Chemical Physics).

4.2.1.4. Minor requirements: About 12 hours in a discipline, chosen from:

Analytical: CHEM 511 (3), 512 (3), 513 (3), 516 (3).

Inorganic: CHEM 502 (3), 505 (3), 601 (1-2).

Organic: CHEM 531 (2), 532 (2), 537 (3), 538 (2).

Physical: CHEM 561 (4), 562 (3), 563 (2), 564 (3).

General: CHEM 571 (2), 573 (2), 574 (2), 575 (3), 576 (3), 578 (2).

4.2.1.6. Additional Specialties: A Ph.D. student in chemistry may choose one of six specialties, in addition to the major discipline. M.S. students may petition their POSC and the Graduate Activities Committee for permission to add a specialty. This addition should, however, not extend the student's time to degree. A minimum of 10 credits is required for each specialty. Any course which could be used to fulfill the requirements of the student's major may not be used for a specialty. Any special topics course offered by Chemistry (CHEM 601, 619, 632, or 667) which is not eligible for the student's major may count toward the specialty, with approval from the POSC. A course which satisfies the preceding requirements, and which is not listed below, may be used with approval from the Curriculum Committee and from the POSC. A student must choose at least one course from outside of chemistry. In addition to special topics courses, suitable courses for the six specialties are:

Materials Chemistry: CHEM 571; MAT E 317,351,334; MAT E/CH E 542; MSE 510, 552 630 652; PHYS 511, 512.

Industrial Chemistry: CHEM 574, 576, 578; CH E 415, 421, 562, 688; BRT 501; STAT 401, 402, 407.

Biomolecular Science: CHEM 503, 578; CH E 540, 625; BBMB 404 or 501, 405 or 502, 411, 451 or 551, 607, 615, 622, 632, 642, 652, 660, 653, 675; BIOL 302, 302L, 314, 314L; GDCB/BBMB/MCDB 520; GEN 444; TOX 501.

Chemical Instrumentation: CHEM 513, 516, 576, 577; BBMB 411; PHYS 310.

Forensic Chemistry: CHEM 511, 512, 513, 516, 572, 577; BBMB 411; TOX 501; STAT 401 or 447.

Chemical Education: CHEM 555 [required]; STAT 401 [required], STAT 402; CI 533, 541, PSYCH 546.

Students who do not have the prerequisite coursework (or equivalent) in their background for any of the above should contact the course instructor about waiving the requirement.

4.2.2. The M.S. Degree

4.2.2.1. Graduate College requirements

- (a) Complete ≥ 30 semester hours of graduate credit.
- (b) Pass courses on the POS.
- (c) Pass a final exam in defense of the thesis.

4.2.2.2. Department of Chemistry requirements for all majors:

(a) Complete CHEM 550, "Safety in the Chemical Laboratory" offered during Spring Semester.

(b) Complete ≥ 12 credit hours, but not more than 16, of graduate course work exclusive of seminars, orientation courses (such as CHEM 550, 555, and 579), special topics courses and research. Of these, at least 6 must be within the major discipline, and 4 outside of the major discipline, as defined in Section 4.2.2.3. CHEM 571-578 are acceptable as 'outside' courses.

(c) Present at least one public seminar (on current research or on the scientific literature), prior to their final defense. An oral presentation at a regional, well recognized discipline specific, national or international meeting may satisfy this requirement. Documentation of completion of the seminar should be filed with the Graduate Records Secretary by completing the "Seminar/Oral Presentation Record" form available from the Graduate Records Secretary or on-line at

<http://www.chem.iastate.edu/students/docs/Graduate-Departmental-Forms.pdf>.

4.2.2.3. Department of Chemistry requirements for specific majors.

Students must complete ≥ 6 hours in the major. Coursework acceptable for each major is defined below. Coursework required for the M.S. in each major is indicated by an asterisk.

Chemistry: No set course requirement. The selection of courses for this major are based on:

- Student input
- Major professor input
- Area of research
- Approval of POSC

Analytical: CHEM 511 (3), 512 (3), 513 (3), 516 (3), 611 (1, each semester)

Inorganic: CHEM 501 (2), 502 (3), 505 (3), 600 (1)

Organic: CHEM 531 (2), 537 (3), 572 (3), and either 532 (2) or 538 (3)

Physical: CHEM 561 (4), 562 (3), 563 (2), 564 (3), 660 (1, each semester)

4.2.3. Preparing the POS

The student and Major Professor prepare the proposed Program of Study (POS). The form is then approved (or modified) by all members of the POSC, and submitted to the Graduate Records Secretary. The "Program of Study" form is available from the Graduate Records Secretary in 1605 Gilman, or on-line at <http://www.grad-college.iastate.edu/forms/forms.html>. Return the completed form to the Graduate Records Secretary for processing.

All students are expected to submit the POS no later than the beginning of their third semester. Pre-registration for the third semester will not be approved without completion and submission of the POS.

Further Instructions appear on the reverse of the POS form. Note:

Part I, Item 4: All M.S. degrees require a thesis.

Part I, Item 6. List Chemistry

Part I, Item 7. List the major (e.g. Analytical Chemistry)

Part I, Items 8 to 11: Specify NONE unless a minor is desired.

Part I, Items 12 and 13: These dates are tentative guides that should agree with the schedule in section III of the POS form.

Transfer Credits: Transfer credits from another university to be applied for graduate credit are designated T in the * column. The request must be approved by all members of the POSC on a signed form accompanying the POS. Transfer credit is not normally given for a course in an area in which a student received an "NP" on the Diagnostic Examination, for a course in which the student received a grade below B, or in courses that are not comparable to the 500-level courses in this University. Transfer credit will not be awarded for courses applied to a student's undergraduate degree. Transfer requests must be accompanied by photocopies of the relevant transcripts, course syllabus, exams, and any other pertinent course materials. The materials should be submitted to the Program Coordinator who will then ask the professor who teaches the comparable course in the Department of Chemistry to review the materials and make a recommendation for acceptance of the transfer credit. The Graduate Activities Committee will then review the final recommendations and either approve or not approve the transfer credits. To access the appropriate form go to <http://www.chem.iastate.edu/students/docs/Graduate-Departmental-Forms.pdf>.

Graduate Courses: List the courses in the major first, indicating them as "X" in the ** column. Outside or minor credits are designated "Y". Courses in foreign languages, elementary computer science, remedial English, and other courses not receiving graduate credit should be designated "Z".

Audits: Audits are listed on a student's transcript only if the student obtains the instructor's approval on the "Request for Audit(s) to Appear on Transcript" form. A thorough listing of policies applying to auditing a course appears on page 4 of the *Graduate College Handbook*. The form is available from the Graduate Records Secretary or on-line at <http://www.grad-college.iastate.edu/forms/forms.html>.

Changes in the POS are made on the "Modifications to POS Form". Both forms are available from the Graduate Records Secretary or on-line at <http://www.grad-college.iastate.edu/forms/forms.html>.

4.2.4. Teaching Experience

One semester of half-time teaching experience is required for a graduate degree. Normally such experience is gained as a TA in this Department, but equivalent, substantive prior science teaching as a high school teacher or as a TA at a university in which English is the language of instruction can be substituted. However, teaching done during a student's undergraduate career or as a teacher's aide does not qualify.

These possible reductions in the required TA service will not allow a student to be released from a teaching assistantship agreement, unless the change is acceptable to the Department.

4.2.5. A Chemistry minor

A minor in Chemistry or in any of its disciplines, for students from other departments requires 10 credit hours of lecture courses carrying graduate credit, six of which must be at the 500 or 600 level, and exclusive of credit for seminars and research. The specific courses chosen require approval by the chemistry member of the student's POSC.

5. PRELIMINARY EXAMINATIONS AND Ph.D. CANDIDACY

The Preliminary Examination is designed to promote an integration of the student's knowledge, to require the student to stand up to oral questioning by experts in the field, and to screen students being considered for the Ph.D. degree.

5.1. Preliminary Oral Exam

The Preliminary Oral Exam will take place no later than the end of the fifth semester in residence (not counting summers). The form for scheduling the oral exam, Form 3A, is available from the Graduate Records Secretary and must be submitted to the Graduate Records Secretary at least two weeks prior to the preliminary oral exam.

Preliminary oral exams will comprise discussion in three broadly defined areas: (1) the student's general knowledge in the field of the major; (2) the student's research up to the time of the preliminary oral exam; and (3) proposed research. The student will prepare a presentation that addresses the latter two points. The research component of the preliminary oral examination is a presentation of the student's own research, including background and significance, objectives, results, conclusions and future work. For the proposed research part, the student may elect one of two options for conducting the preliminary oral examination. For either option, the student prepares a full proposal that will be evaluated for significance, creativity, and feasibility. The proposal should have a maximum of 2,000 words, excluding references. References should be in ACS format, but with complete titles, as required by NIH and NSF.

Option A:

The student will prepare and defend a research proposal as part of the preliminary oral exam. The proposal will be on the student's own future research.

The student prepares a full proposal, giving copies to the members of the POSC a week before the preliminary oral examination. During the examination, the student will present, expand upon, and defend her/his understanding of her/his future research plan. The preliminary oral exam will conclude with general questions.

Option B:

The student will prepare and defend an original research proposal as part of the preliminary oral exam. The proposal should not be related to the student's own research or to projects in the student's research group.

The student shall submit a pre-proposal for original research to his/her POSC. The pre-proposal must not be longer than 2 pages, excluding references. It will include a title, date, and concise statements of what questions will be answered, why the problem is important, what will be done, the new and significant knowledge that can be anticipated and key references. A review of the pre-proposal will take place within a week of submission. The Major Professor will convey to the student a decision of "approved" or "not approved". In the latter case, suggestions for revision may be made, or the idea may be rejected, in which case the student is to submit a revised or a new pre-proposal.

After approval of the pre-proposal, the student will prepare a full proposal, giving copies to the

members of the POSC a week before the preliminary oral examination. During the examination, the student will present, expand on, and defend the idea. The preliminary oral exam will conclude with general questions.

5.2. Advancement to Candidacy

The Preliminary Oral Examination can have one of the following outcomes:

- (a) **Pass:** The student is admitted to Ph.D. candidacy.
- (b) **Conditional Pass:** (subject to specified remedial action, such as submission of a research report, further academic course work). Promotion to Ph.D. candidacy is delayed until the conditions are met. The conditional pass is to be used when the student is unprepared for the presentation or is unable to defend the proposal to the committee's satisfaction. A deadline for conditions to be met should be decided on by the POSC. At the latest, this deadline should be 90 days from the first exam and no more than 90 days past the end of the fifth semester.
- (c) **Fail:** A failure will result if the student is unable to show a clear understanding of the research he or she is involved in, or clearly lacks an understanding of chemistry. The POSC might require the student to terminate with an M.S. degree. The POSC may decide as to whether or not the student may be allowed to repeat the exam or a part of it. Any repeat should be completed within 90 days of the first exam and no more than 90 days past the end of the fifth semester.

5.3. Time Limitations. The preliminary oral exam should be passed by the end of the fifth semester in residence to avoid a reduction of the assistantship stipend (See Section 10).

6. RESEARCH, THESIS, AND GRADUATION

6.1. Research

The content of research resulting in a thesis is the basis for awarding the M.S. and the Ph.D. degrees at ISU. Usually a student will begin to participate in research work before having been admitted to Ph.D. candidacy. After attaining candidacy, the advancement and completion of the thesis research should become the central objective of the student's study and work.

6.2. Other requirements

Continuous Registration: All graduate students, including off-campus and part-time students are required by the Iowa Board of Regents to register for at least 1 Cr. or "R" Cr. each semester after passing the preliminary oral exam. This policy involves fee payment for Fall and Spring semesters each year. Off-campus M.S. students need register only for the semester they plan to graduate. Note that graduate students on a fulltime "C base" appointment must be registered for a minimum of 9 credits Fall and Spring semesters and 5 credits for Summer semester.

Diploma Slip: Application for graduation should be made by the end of the first week of the semester (fall or spring) in which the student expects to receive the degree, or by the last day of the spring semester when wishing to graduate during summer session. This form is available from the Graduate Records Secretary or on-line at <http://www.grad-college.iastate.edu/forms/forms.html>. If the student does not graduate in that semester contact the Graduate Records Secretary to have your application for graduation to be moved to the following semester. You will only be charged a onetime graduation fee.

Tuition and Fees for the Final Semester: When registering for their final semester, students planning to finish should be aware of Graduate College and ISS deadlines on the termination of Graduate Assistantships. Please refer to the Graduate Student Handbook and/or consult the Business Manager. Missing certain deadlines can result in severe fee penalties.

The Final Examination: The final examination is conducted by the POSC. The candidate submits a copy of the thesis to each member of the POSC two weeks in advance. The final defense consists of a publicly announced oral presentation, which is open to the public, followed by a closed examination. This applies both to Ph.D. and M.S. candidates. The convening of the final exam rests with the student and Major Professor. The student submits Form 4 (only available from the Graduate Records Secretary) to the Graduate Records Secretary and completes the "Final Defense" title form three weeks prior to the Final Examination. The Major Professor completes Form 5 and returns it to the Graduate Records Secretary immediately after the exam

Graduation Approval and Electronic Thesis Submission: Since thesis and dissertations are now submitted electronically, a signed signature page is no longer required. However, the Graduate College still needs the approval of the committee and program before it can review the final copy of the document and deliver it to the university's microfilming company (ProQuest/University Microfilms). A "Thesis/Dissertation Submission

Request” form available from the Graduate College's Web site at <http://www.gradcollege.iastate.edu/forms/forms.html> must be completed and mailed, emailed with an attachment, faxed, or hand carried to the Graduate College office in 1137 Pearson Hall by the published deadline each term. After the form is received, the student is given approval to sign on to ProQuest's Web site and submit their thesis electronically for review and final deposition.

7. SCHOLASTIC STANDARDS AND THE EVALUATION OF STUDENTS

7.1. Remaining in good standing

Graduate College policies stipulating requirements for academic grades, probation, appointments, etc., are given in the Graduate Student Handbook, <http://www.grad-college.iastate.edu/publications/gchandbook/homepage.html>.

The Graduate Activities Committee evaluates each student's progress in graduate studies. First year students are evaluated at the end of their first semester in residence and again with the entire graduate student population at the end of spring semester. The faculty as a whole, not just the Graduate Activities Committee or the Major Professor, will determine whether the student is making satisfactory progress toward the degree being sought, based on the academic and research performance of the student.

These areas are pertinent:

- Active involvement in research as soon as is feasible within the limitations of the time necessary to choose a Major Professor and a research problem. The student should have exhibited sufficient proficiency in the chosen research area by the end of the first year that the Major Professor may have a basis for judging whether or not it would be to the student's benefit to remain in the chosen area, or indeed, to remain in the Graduate Program. The extent to which a student can become deeply involved in research during the first year will, of course, depend upon the major area and the student's preparation and program.
- Performance in research as determined by the Major Professor and POSC. The criteria are the motivation, aptitude and capacity of the student for research. A student is expected to be productive and competent as a research scientist, and to be able to communicate with members of the research group, discipline, and profession. Familiarity with current literature in the student's major discipline is mandatory.
- The preliminary oral exams, which are to be taken by the end of the fifth semester in residence.
- Maintenance of a grade point average ≥ 3.0 in academic courses (exclusive of research).
- Proficiency in English.
- Proficiency in Chemistry.
- The student and the Major Professor are expected to be in communication regarding research performance. Major Professors should keep students apprised of their progress.

7.2. Review of first-year students.

At the end of the first semester, students are provided with timely information on their scholastic standing. Because of the limited amount of information available at that time, this first review is preliminary in nature, and is based upon their grades and additional evaluations solicited from the faculty. The Graduate Activities Committee then places each student in one of the following groups:

Group I: Satisfactory progress.

Group II: Some indication of possible scholastic weakness as evidenced by a GPA slightly below 3.0, or a grade of C or C+ in one course, or the completion of only one substantive course during the first semester. Such students are sent a letter expressing mild concern about their progress.

Group III: Serious scholastic difficulties. These students are encouraged to show substantial improvement in order to be permitted to continue. Students should consult their Major Professor and/or a member of the Graduate Activities Committee in writing or in person, to avoid further academic difficulty.

7.3. Annual review of students

Review data: At the completion of Spring Semester all professors are asked to evaluate students on research, teaching performance, and overall intellectual and research potential. The evaluating professor may be familiar with the student from an academic course or as a teaching supervisor.

As part of the evaluation process, the faculty recommends that each professor meet with each of his/her students to discuss research progress and progress toward the degree at least twice per year.

The faculty within each major then recommends to the entire faculty the tentative placement of students in one of the eight scholastic groups described below, and the students are so informed in writing.

Scholastic groupings:

Group A: Admitted to Ph.D. candidacy. The student must have passed the preliminary oral and demonstrated proficiency in Chemistry and English.

Group B: Satisfactory progress toward the Ph.D., prior to admission to candidacy. A student in **B** may obtain an M.S. degree while progressing toward a Ph.D. degree.

Group MSC: A student plans to terminate with an M.S. degree by choice. The POSC will consist of 3 members only. A student who may go on to the Ph.D. degree should not be in this group, and an **MSC** student who later decides to work for the Ph.D. degree will still be held to the time requirements, which include the time in **MSC**. Students who are in this group will be financially responsible for one half of their tuition costs.

Group MSP: These students are required to complete an M.S. thesis before

they can be considered for Group **B**, and should endeavor to do so by the end of the second year.

Group MST: A student in this group will terminate graduate studies with an M.S. degree. Students who are in this group will be financially responsible for one half of their tuition costs.

Group D: Uncertain Degree Status. This is a temporary assignment, and students will not normally remain in Group **D** beyond the third academic semester.

Students in Group **D** must carefully plan their courses, research and exams to ensure two objectives in the second year: (1) to determine whether they will be able to continue towards the Ph.D.; (2) to be able to complete the M.S. degree promptly if called upon to do so.

The faculty of the major will recommend to the faculty as to whether a student in Group **D** should be moved to Group **B**, **MSP** or **MST**. The performance during the first semester of the second year is therefore crucial.

Group F: No graduate degree

Group S: Special cases

7.4. Academic Probation

If a graduate student does not maintain a cumulative 3.0 grade point average on all course work taken, exclusive of research credit, he or she may be placed on academic probation by the Dean of the Graduate College. Grades earned by graduate students in undergraduate courses are included in the calculation of the grade point average. Academic probation judgments are made on the basis of grades in course work only.

New, first-term, degree-seeking graduate students who fall below a 3.0 GPA at the end of their first semester at Iowa State University will be given a one term grace period to bring their grades back to a 3.0 GPA. These students will receive a warning letter from the Graduate College.

While on academic probation a doctoral student will not be admitted to candidacy for a degree and if appointed to a graduate assistantship, he/she will not receive a Graduate College tuition scholarship. If a student is to qualify for a tuition scholarship, he/she must be removed from probation by the tenth class day of the term.

To insure that registration does not take place without a review by the program, the Graduate College places a hold on future registrations by a student on probation. Before the student registers for each term, the program must review his or her record and recommend in writing if the Graduate College should permit further registration. Before graduation is approved, the student must complete all courses listed on the program of study with a minimum grade of C and have achieved a 3.0 GPA or greater.

8. ASSISTANTSHIPS

8.1. Promotions

Appointment as a TA is contingent upon proper certification as a result of the SPEAK/TEACH test; if a Fully Certified level is not attained, the stipend will be reduced based on the SPEAK/TEACH rating (see timeline chart in Section 10).

8.2. Fellowships

Students making excellent progress are encouraged to apply for outside fellowships (NSF, NIH, etc.). Departmental fellowships are awarded by the Graduate Activities Committee during the Spring Awards Ceremony based on faculty nominations.

8.3. Students without Departmental Support

Such students become eligible for graduate assistantships only by action of the Graduate Activities Committee and the Chair of the Department. *Admission without support carries with it no assurance that an assistantship will ever be awarded.* To be eligible for departmental support, students must have completed at least 7 credits of graduate courses other than research and seminars at ISU; maintained a GPA of >3.0 (excluding research and seminars) at ISU; demonstrated proficiency in English, and obtained the concurrence of their POSC. Of course, funding must also be available.

9. PROGRESS TOWARD THE GRADUATE DEGREE

9.1. Normal Academic Progress

A student in good standing must maintain a 3.0 grade point average, make timely progress in preliminary written and oral exams, and demonstrate accomplishments, diligence, competence and progress in research. These expectations are given in more detail elsewhere in this manual.

The Department has set standards as to timely progress. It is not to a student's advantage to prolong the time toward a graduate degree. To avoid an unduly long time to attain a graduate degree, students should exert due effort in the early stages of their graduate work, paying careful attention to program deadlines.

9.2. Conditions of appointment; stipend reductions

The Department will reduce the assistantship stipends of students not making timely progress; in extreme cases, it will not renew a graduate assistantship.

10. GRADUATE PROGRAM REQUIREMENT TABLE

Level of Attainment	Level of stipend and tuition reduction if requirements for attainment are not reached by the start of the year shown
English proficiency <ul style="list-style-type: none"> • Completion of Graduate English Exam by end of 2nd semester 	By the beginning of the 5 th semester: 5% reduction in stipend. By the beginning of the 7 th semester: 10% reduction in stipend. By the beginning of the 9 th semester: No support in stipend.
Chemistry proficiency <ul style="list-style-type: none"> • Completion of diagnostics or clearing of any deficiencies by end of 3rd semester. 	Students entering 4 th semester must petition their POSC for continued support if the deficiencies are not cleared. The POSC makes a recommendation to the Graduate Activities Committee based on the comments of the POSC, which then makes the final decision. There will be no support after the 5 th semester, except in circumstances approved by the POSC, the Graduate Activities Committee, and the Department Chair.
SPEAK/TEACH	At the beginning of the 1 st semester: TA status. “1-2” rating = no reduction. “3” rating = 10% reduction in stipend per month. “4” rating = 20% reduction in stipend per month.
M.S. Degree (required or desired)	By the beginning of the 7 th semester: 5% reduction in stipend. By the beginning of the 9 th semester: No support in stipend.
Ph.D. Candidacy <ul style="list-style-type: none"> • Completion of preliminary oral examination by the end of 5th semester 	By the beginning of the 6 th semester: 5% reduction in stipend. By the beginning of the 7 th semester: No support in stipend. Includes time to prior M.S. degree at ISU.
Ph. D. Degree	By the beginning of the 11 th semester: No support in stipend. Students entering Year 6 must petition their POSC for continued support in stipend and tuition. The student must obtain the “Request for Support” form, schedule a meeting of his/her POSC, and present a completion plan to the POSC. The POSC makes a recommendation to the Graduate Activities Committee based on the results of the POS meeting, which then makes the final decision. The Graduate Activities Committee will either implement full support for students in good standing who are expected to complete their dissertation in the next year, or zero support for students making insufficient progress to expect completion in the next year. There will be no support after Year 6, except in circumstances approved by the POSC, the Graduate Activities Committee, and the Department Chair.

11. VACATION AND LEAVE POLICIES

11.1. Vacations

- a. Arrangements for vacation and leaves of absence are made between the graduate assistant and that assistant's supervisor. A graduate assistant on a teaching appointment should also get approval of their teaching supervisor. When a graduate student employee needs to be absent either for personal reasons or illness, the supervisor should be understanding and accommodating to that need. At the same time, the graduate assistant should attempt to plan personal leave so that it does not interfere with or cause neglect of the duties associated with his or her appointment. Supervisors of graduate assistants are responsible for ensuring that their assistants do not exceed reasonable limits for leave.
- b. Although we do not tabulate any record of accruals, usage or balances, there will still be a requirement to submit absence requests to the Department. These will be filed in the main office for each major professor.
- c. Assistants whose appointments are in the Ames Laboratory submit Ames Laboratory absence requests. Students on Department of Chemistry appointments obtain and submit their forms in the Department office.
- d. Research Assistants should take their vacation so that it can be conveniently worked into the research plans of their major professor.

11.2. Leaves of absence

11.2.1. Maternity leave. A six month extension on stipend reductions (Section 10) is automatic.

11.2.2. Military leave. These are honored upon petition.

11.2.3. Other leaves. These are handled as special cases.

12. GRADUATE STUDY BY FULL-TIME EMPLOYEES

Full-time employees of ISU or another employer who pursue a graduate degree must have the background expected of regular students, including the required technical courses a Chemistry major takes and an appropriate grade record. Application should be made to the Graduate College. Applicants are invited to correspond with the Department concerning their suitability for admission. Applicants who do not qualify may be admitted as Special Students in an effort to fulfill admission requirements.

Because of the special circumstances involved, it is recommended that the student, the employer, the Major Professor and the Department agree in writing on the plans and time schedule of the candidate.

Immediately prior to the semester in which graduate study will begin, the student is to take the diagnostic exams in all four areas. Proficiency requirements in Chemistry and English must be met promptly.

The student should complete the forms "Recommendation for Committee Appointment" and "Program of Study" at an early date. A maximum of 6 hours per semester may be earned by an employee of ISU.

Full-time employees, like other students, are required to undertake an original research project and defend their thesis before the POSC. Results of a routine or repetitive nature which lack a creative, original component are not acceptable. If a student plans to include in the thesis research done in fulfillment of job requirements, not only must the employer agree, but such students should delineate in advance to their POSC their intentions in a written statement, so that the suitability of such plans may be judged at an early stage.

The time requirements stated elsewhere in this document will be appropriately extended for full-time employees.

13. GRADUATE STUDENT ACADEMIC MISCONDUCT

Academic misconduct by graduate students is taken very seriously. The more serious cases involve cheating or plagiarism on preliminary written and oral examination, thesis or dissertation. Plagiarism involves taking or passing off as one's own the ideas or writings of others. Other individual's ideas or writings should always be openly acknowledged and thoroughly referenced. Such matters of misconduct are very serious violations of academic ethics and usually result in dismissal from the University without a degree.

Cheating on a course examination or plagiarism on a paper related to a course more often results in lesser penalties than permanent dismissal. If a graduate student is believed to have plagiarized a term paper or to have cheated on an exam, most often that situation is handled informally between the professor and the student or by a representative of the Department. The student or the faculty member may ask for more formal review by the Dean of Students' office using policies developed for ensuring that due process is followed. A formal investigation of the situation may be conducted by the Dean of Students office, a hearing held by a committee of the all-university judiciary, and a recommendation made to the Vice President for Student Affairs. The student may appeal to the Vice President for Student Affairs if he/she is not satisfied with the decision of the hearing committee.

Information and text included in this manual has been compiled from previous Department of Chemistry Graduate Manuals and the Iowa State University Graduate College Handbook which may be accessed at:

<http://www.grad-college.iastate.edu/publications/gchandbook/homepage.html>