

REQUIREMENTS FOR GRADUATE STUDENTS

Department of Chemistry

Missouri University of Science and Technology

Revised February 2007

- I. **ADMISSION:** All graduate students must secure admission to graduate study through the director of admissions. Applicants must submit an official transcript of all their previous work with their applications for admission. Application for an assistantship would be addressed to the chairman of the department of chemistry and must also be accompanied by an official transcript and three letters of recommendation.
- II. **UNDERGRADUATE PREPARATION:** The normal undergraduate preparation expected of students who wish to do graduate work in chemistry is a B.S. degree in Chemistry. This includes two semesters each of general, organic, physical, analytical (including instrumental analysis), and one semester of advanced inorganic. Students with non-ACS accredited degrees or with degrees in other disciplines may, in some cases, have undergraduate courses required as a non-credit portion of the student's program.
- III. **PLACEMENT EXAMINATIONS FOR ENTERING GRADUATE STUDENTS:** Each entering graduate student will be required to take placement examinations before being allowed to register for the first time in a regular semester. The grades on this examination are not entered on the student's permanent record. The examination consists of four parts dealing with analytical, inorganic, organic, and physical chemistry as commonly presented in undergraduate curricula in chemistry. The placement examination will be used to supplement the student's official transcript(s) in recommending a proper starting point for the student's graduate study in the department as well as acting as the Qualifying Exam for preparation to the Ph.D. degree.
- IV. **UNDERGRADUATE DEFICIENCIES (Placement Examinations):** Students are required to demonstrate competency in analytical, inorganic, organic, and physical chemistry (Section III). After completion of all of the placement examinations, students will be given their results on each exam, and based on consultation with an advisor or advisory committee the students may be: a) required to take a course in area(s) where a deficiency is deemed b) recommended to take a course in area(s) where a lesser deficiency is noted, or c) given no recommendation, signifying adequate preparation for graduate work in the area. In consultation with the incoming student, the advisor or advisory committee will make a plan of action which includes the course work required to remove any deficiencies noted. Any changes in the requirements must be approved by the faculty. The division will decide the appropriate course(s) for removal of a deficiency identified by its placement exam. To remove these deficiencies, a grade of B or better must be achieved in the course. Deficiencies must be removed by the end of the second year in residence or loss of regular graduate status will result. It is anticipated that most students will fulfill any requirements by the end of the first year.
- V. **REQUIREMENTS FOR ADVANCED DEGREES:** The department of chemistry offers graduate programs leading to the degrees of Master of Science and Doctor of Philosophy. Attainment of the Master's degree is not prerequisite to a program of study leading to the Ph.D. degree.

Any student that has obtained a Master's of Science degree in Chemistry from any other institution can not pursue a second Master's degree in Chemistry. For M.S. degrees not explicitly in Chemistry, the applicability of this guideline will be decided on a case-by-case basis, as determined by the department chair.

Graduate degrees in chemistry at Missouri S&T are awarded to students who demonstrate scholarly achievement beyond the ordinary. All graduates must pass the teaching workshop with a grade of B or better before taking the comprehensive or final defense in pursuit of an advanced degree. All M.S. and Ph.D. students are required to be enrolled in Chem. 410 every semester except their terminal semester (only 1 semester, the terminal can be excused from Chem. 410). ***All Chemistry Graduate Students are required to present a seminar in Chem. 410 before graduating. The seminar should be presented in the semester prior to the semester of graduation, unless, due to extenuating circumstances, this is not possible. In this case it must be presented at least two weeks prior to the defense of one's thesis. All seminars should be given in the spring or fall semester and can only be given in summer only under special circumstances, as determined by the chair of the department.*** The incoming graduate students must pass, within the first two semesters of enrollment, a minimum of four regular lecture courses offered by the department with a minimum grade point average of 3.0/4.0. This requirement may be waived if merited by high performance on the placement examination. The time limit may be extended to a maximum of four semesters by the chairman in the case of a student admitted with a deficiency in one or more areas of chemistry. Presently approved regular lecture courses in six major areas of chemistry are listed below. At least two of these six major areas of chemistry must be represented in the student's regular courses.

- a) Analytical Chemistry
(Chem. 351, 355, 375, 451, 453, 455, 457, 458)
- b) Biochemistry
(Chem. 361, 362, 363, 367, 464, 465, 467, 468)
- c) Inorganic Chemistry
(Chem. 331, 431, 432, 435, 436, 437)
- d) Organic Chemistry
(Chem. 321, 323, 325, 328, 421, 423, 425)
- e) Physical Chemistry
(Chem. 343, 344, 346, 349, 440, 441, 442, 443, 444, 445, 446, 447, 449)
- f) Polymer Chemistry
(Chem. 381, 384, 385, 484, 486)

Students will be informed when changes in the above list are approved by the chemistry faculty.

A. Master of Science in Chemistry (with thesis)

1. Complete a minimum of 30 credit hours of acceptable graduate work, including the following minimum credits: 6 hours of 400-level lecture courses and 6 hours of Chem. 490 (research). The Graduate Bulletin recommends that 6 of the 30 be obtained in out-of-department courses. No more than 12 total hours of research, special problems, special

investigations, special readings, and graduate seminar can be applied to the 30 hour minimum.

2. Conduct a research program and write a satisfactory thesis. The M.S. thesis will only be considered by the student's committee and the final oral examination scheduled after at least one paper (refereed journal) or patent from that thesis has been submitted for publication. Exceptions to this can be made only if recommended by the student's advisor and approved by the chemistry faculty.

3. Present a departmental seminar before graduating and defending.

4. Pass a final oral examination.

It is required that a M.S. candidate chooses an advisor and submits a planned program of study by the end of the 6th week of their second semester.

B. Master of Science in Chemistry (without thesis)

The graduate advisory committee will appoint a faculty advisor for students pursuing this degree.

1. Complete a minimum of 33 hours of acceptable graduate work, including the following minimum credits: 9 hours of 400-level lecture courses and at least one graduate course in each of five of the six areas of chemistry listed previously. It is recommended in the Graduate Bulletin that at least 6 of the 33 be devoted to courses outside the major department. No more than 4 total hours of special readings, special investigations, special problems, and graduate seminar can be applied toward this 33-SCH.
2. Pass a final written comprehensive examination administered by the department. Students who have received grades of B or better in all courses as graduate students, and have a 3.5 or better cumulative GPA in their courses for graduate credit may be excused from the M.S. comprehensive upon the recommendation of the department.

3. Present a departmental seminar before graduating.

4. Continuing Ph.D. students who have successfully completed the relevant coursework described in Section B.1 and passed the written and oral comprehensive examination, associated with the Ph.D. degree, as indicated in Section C.6 (below), are deemed to have earned, and may apply for and be awarded, an M.S. degree in Chemistry (without thesis)

C. Doctor of Philosophy

This degree is awarded for original research and has no course requirements beyond those of the M.S. in chemistry (with thesis) for those who obtain that degree at UMR; the 24 SCH in item C3 below can be considered to be included in the 30 SCH in item A1 above.

1. Students must complete requirements for The Report of Qualifying Exam (Ph.D. Form IV). This requirement is satisfied when the student takes the placement exams and subsequently completes all requirements stipulated as a result of placement exams. These placement requirements should be completed by the end of the second year.

2. Students must select a research advisor and establish a graduate advisory committee by the middle of the student's second semester. At that time, the students must submit Form V and Form VI with the committee selection and degree plan to the department. When the qualification process has been completed and the Ph.D. Form IV filed, the Chairman will sign and forward the Form V and Form VI to the Dean of Arts and Sciences.
3. Requirement for 300 and 400 level courses. A minimum of 24 hours of graduate level instruction is required. At least 18 hours of chemistry lecture courses from 300 and 400 level lecture/lab courses must be completed with a grade of B or better in each. In some cases, an out of department course (e.g., physics, biological science, and math) of 300 level or higher may be substituted, if it is appropriate for the plan of study. All six of these courses must appear in the plan of study and may include up to 9 hours in graduate transfer credits.
4. The Graduate Bulletin encourages students to elect a minor field of study consisting of at least 12 hours of work outside the major area of specialization.
5. The chemistry department has no formal requirement for proficiency in any foreign language.
6. Students must pass a comprehensive examination to the satisfaction of the student's advisory committee. With the consent of the advisory committee, this requirement can be satisfied by the student writing and orally defending a research proposal. Normally this will be completed by the end of the second year; however, it must be completed by the end of the third year of graduate study.
7. ***Present a departmental seminar before graduating and defending.***
8. Students must conduct original research, write a dissertation in proper scientific terminology, and provide satisfactory defense of this work in a final oral examination. The Ph.D. dissertation will only be considered by the student's committee and the final oral examination scheduled after at least two papers (and/or patents) have been submitted to, or one accepted by, a refereed journal (U.S. Patent Office). Exceptions to this can be made only if recommended by the student's advisory committee and approved by the chemistry faculty.
9. Students must satisfy residency requirements as specified in the Graduate Bulletin.
10. Failure to comply with the deadlines above will result in loss of Ph.D. status and departmental support. Reinstatement can be made only by written petition of the student and a positive vote of the departmental faculty.
11. Travel and E & E support. The department encourages students to present papers at local, national, and international meetings, as well as do research, and will provide modest support (funds permitting) for each graduate student. Normally, \$200 will be provided to Ph.D. track status graduates to present research results at meetings. The faculty strongly encourages students to present their results at national and international meetings where possible. Graduate students in good standing also receive up to \$100/year for E&E support (funds

permitting) to support research expenditures. These funds are spent at the discretion of the advisor and are not available to students who are over the external/internal RA/GTA ratio.

VI. LIMITATIONS ON UTILIZATION OF GTA POSITIONS

- A. The maximum number of departmentally funded GTA's in a given research group is determined by:
 - a. Maximum No. GTA's/Faculty = 2 GTA's (@ 50% FTE) + 1 x [No. of externally funded GRA's (@50% FTE) or postdocs (@ 100% FTE)].
 - b. Students in excess of this number will receive low priority for financial assistance from the department.
 - B. The maximum time of GTA support per graduate student for M.S. candidate: 3 years; Ph.D. candidate: 5 years (including TA appointments while working on M.S. degree).
 - C. Graduate students are limited to 5 years TA support from departmental funds. In no case will TA support be given beyond the sixth year of residency independent of the source of earlier funds.
 - D. Students pursuing a research degree will receive priority for departmental support.
 - E. Grader support will be withdrawn if a graduate student has not passed the Instructional Communications Workshop to qualify as a Graduate Teaching Assistant after two years.
 - F. Departmental support may be withdrawn if a student switches from a PhD degree to a Master's degree.*
 - G. Students pursuing a M.S. degree will receive lower priority for departmental financial assistance than students pursuing a PhD degree.*
- ** Please Note: University rules and regulations supersede those set forth by the department.**