

CHEMISTRY M.S. PROGRAM REQUIREMENTS AND GUIDELINES

Introduction: The M.S. program in Chemistry has certain clear, objective, and well-defined quantitative requirements with definite deadlines. These are indicated in this document. This document provides guidelines and recommendations, but specific requirements and deadlines will be determined in consultation with the thesis advisor and advisory committee.

Annual Review: A yearly review of each graduate student's progress will be conducted by the Graduate Education Committee (GEC). Each student will fill out a GEC progress report form at the end of spring semester. The GEC will review the progress of each student and will determine whether he/she has made satisfactory progress on the requirements as defined below, and will also make recommendations to the student and advisory committee regarding any pending requirements.

1. Proficiencies

Within the first week of entering graduate school, the student will take proficiency exams offered in the five different disciplines of chemistry: organic, inorganic, physical, analytical and biochemistry. The purpose of these exams is to determine if the student has the appropriate background to succeed in the chemistry graduate program. Based on the student's performance on the exams, specific coursework or self-study will be recommended by the GEC. However, the responsibility for passing the proficiency exams rests with the student. The student will have two additional opportunities to take the exams within the first year of graduate study. Failure to pass proficiency exams in at least three of the five disciplines within the first year will result in termination from the program.

2. Coursework (Thesis and Non-thesis Options)

The coursework that a graduate student takes is dependent upon their research area, the degree they are pursuing, and the need to cover deficiencies as determined from the proficiency exams. In general, at least 30 semester credits are required for the M.S. (thesis option) and 36 semester credits for the M.S. (non-thesis option) of which 18 credits must be lecture-based courses (e.g. six courses usually worth 3 credits each at the 500 level; some 400 level courses can be used; special approval must be received from the Graduate School upon recommendation of the advisory committee and department if a student wishes to count more than six (6) credits of 300 UG courses toward their graduate degree.).

Specific requirements:

- Students must successfully complete Chem 501 and Chem 640 in the first Fall Semester registered. Students must successfully complete Chem 650 in the first two Spring Semesters registered.
- All graduate students will register for Chem 630 (Departmental Seminar) every semester. Attending departmental research seminars is integral to a student's education and allows the student a chance to learn about areas of science outside of their research area. Attendance of these seminars is mandatory unless excused by the faculty member responsible for organizing the seminar. The method of grading this class is the choice of the faculty member organizing the seminar.
- Twenty (20) of total credits must be in Chemistry (a Graduate School requirement). Seminar, research and thesis credits at the 500 and 600-level and approved transfer credits can be included in this total. A 400-level Chemistry course can also be included if it is not a requirement for any B.S. Chemistry degree. The Department and student's committee may require more than the minimum Graduate School requirements.

- Students must complete 18 credits in letter-grade courses. At least 9 of the 18 credits must be in 500-level letter-grade Chemistry courses. Six of these 9 credits must be in 500-level letter-grade Chemistry courses outside the student's research specialty area, as determined by the advisory committee. The remaining 9 of the 18 credits may be in traditional letter-grade courses within or outside the Department of Chemistry when approved by the student's committee.

The student should consult with his or her thesis advisor and advisory committee for recommendations regarding coursework.

Students must maintain a B average in courses taken for graduate credit at The University of Montana; no grade below C will be accepted toward any degree requirement. The graduate school automatically places a student on academic probation if the cumulative grade point average falls below 3.0. Satisfactory progress in seminars and graduate level research is also expected. The department will take the following actions for a student who fails to maintain this average:

End of Semester 1: Receive a notice from the chair of his/her advisory committee and/or from the Graduate Education Committee warning of academic probation.

End of Semester 2: Be retained or placed on probation by the department for a deficiency of six or more grade points. Grade point deficiency is defined in terms of the number of hours of A which would be needed to make the average 3.0. For example, either 3 hours of D or six hours of C would require six hours of A to bring the average to 3.0 and a six grade point deficiency would exist.

End of Semester 3: Be recommended automatically to the Graduate School to be dropped from the graduate program of the department during the second year if the deficiency exceeds nine grade points, or at the end of the second academic year or thereafter if the deficiency exceeds six grade points. Reinstatement can be made on the basis of a petition approved by the department and the Graduate Dean. Such a petition can only be considered during the regular academic year.

Graduate School regulations allow the repeat of up to six semester credits to raise the grades obtained, upon approval of department chair. Students should be aware that the repetition of "F" grades counts within this limit and that the approval of the department chair can be expected only in the case of compelling extenuating circumstances. The continuation of the student in a given program is subject to periodic review by the departmental faculty.

There are no options on grading procedures in courses taken for graduate credit. Traditional letter grades must be obtained in all courses except research (graded N, Continuation), thesis (graded N, Continuation) and seminar (graded Pass/Fail) courses. Continuation grades are converted to letter grades at the end of a student's program.

The student must satisfy all other coursework requirements of the Graduate School of The University of Montana. The student must consult the Graduate School requirements. For instance, the Graduate School requires that of the completed credits submitted in the M.S. degree application, after subtracting a maximum of ten combined research and/or thesis credits, one-half of the remaining credits must be at the 500 or 600-level. Thus, if a student has completed 10 or more research/thesis credits, $(30 - 10)/2 = 10$ credits (Thesis option) or $(36 - 10)/2 = 13$ (Non-thesis option) must be at the 500 or 600-level. Generally speaking, if a student completes the requirements of the Chemistry Department and their thesis committee, the

Graduate School requirements will most probably be met. The student must confirm this in discussions with the Graduate Education Committee, their thesis director and the Graduate School.

Transfer of Graduate Credit: Graduate School policy allows for the transfer of graduate credits taken elsewhere only with the Department's recommendation and after satisfactory work at UM has been demonstrated. Credits with grades other than A or B, thesis or correspondence credits, extension credits outside the Montana university system, or credits earned at institutions not offering graduate degrees in the discipline of the course are not transferable. In the Department of Chemistry, the student's advisory committee must initiate the recommendation for transfer of credits. The advisory committee should be organized as soon as possible if credit transfer is desired. The advisory committee will take in consideration the student's background and professional goals along with the performance on the incoming proficiency exams in making the recommendation.

Special M.S. requirements for the non-thesis option: Before choosing this option the student should consult faculty in his/her area of interest. The faculty in some fields of chemistry might consider this option inappropriate to the field, making it impossible to form a thesis committee.

Unanimous approval of the thesis committee must be obtained for the student's program. This program, prepared by the student and his/her advisor, will include (a) a list of all courses and credits to be presented for the degree, (b) an outline of the proposed independent project that will result in a professional paper, and (c) a justification of the program. After approval by the thesis committee, copies of the program (a, b and c, above) will be distributed to every chemistry faculty member. The program must be approved by a majority vote in a departmental meeting on the basis of its educational value. Any subsequent change in the student's program must be justified in writing, and requires approval in the same manner as the original program.

3. Graduate Student Committees

Not later than the second semester of graduate study, students should select a thesis advisor and become active in research (doing research and attending group meetings). In consultation with their thesis advisor, the student should select an advisory committee that reflects their area of study. The advisory committee is comprised of three members that include the thesis advisor, one internal and one external member chosen by the student in consultation with the thesis advisor. Students should have their first committee meeting early in the third semester and every semester thereafter.

4. Seminar

All graduate students will enroll in and successfully complete Chem 650 during the first two Spring Semesters registered. In the second Spring Semester registered, all students will give a seminar as part of Chem 650 on a topic that is not directly related to their dissertation research. The topic will be decided in consultation with the faculty member of record for Chem 650 that semester and the thesis advisor. The faculty member of record for the course will define other requirements of Chem 650 in a given semester.

5. Application For Graduation

At least one semester before the Master's degree is to be awarded, the student must submit to the Graduate School three copies of the Application For Graduation Form and a graduation fee of \$25.00. The Graduate School will conduct a degree audit and send two copies of this form back to the graduate program (one departmental copy and one student copy) early in the graduating semester. The department and student should note any problems and rectify them at least two weeks prior to the end of the final semester by using a Graduation Amendment Form.

If the student fails to meet the original graduation date as requested on the form, the student may request the application be reactivated for the following semester by notifying the Graduate School one semester prior to the revised completion date.

6. Thesis and thesis defense

Students are required to submit an Electronic Thesis, Dissertation and Professional Paper (ETDP) that describes their empirical or scholarly research and findings. The ETDP consists of a thesis (thesis option) or a professional paper (non-thesis option). The topic of the thesis or professional paper is one of the first subjects of discussion between the student and research advisor. After reaching agreement with the research advisor, the student brings the thesis or professional paper proposal to the thesis committee for approval; this occurs by the third semester of the student's program.

A thesis is based on original research. The professional paper (non-thesis option) is based on an independent project that is not necessarily original; it is chosen and approved on the basis of its educational value and its appropriateness to the rest of the student's program. It might, for example, consist of a literature review, a computer programming problem, or application of known synthetic or analytical methods. The professional paper describing the independent project must be of publishable style and literary quality. Academic credit (a minimum of five semester credits) for the independent project is granted under Chemistry 593.

The EDTP will have a front section, including a title page, abstract, acknowledgements, and table of contents, a body section that contains an introduction, literature review, materials and methods, results, discussion and conclusions, and a back section that contains references and appendices. The document is prepared using a word processor, converted to pdf format with relevant multimedia objects embedded. ETDPs may contain supplemental files, hypertext links, audiovisuals and other interactive features. The ETDP will in most cases be available to anyone who can browse the World Wide Web. Wide dissemination of research results and scholarly inquiry are encouraged, but the advisor and advisory committee can request limited access where there are legitimate patent or publishing issues. The student should arrange for submission of the draft and final versions of their EDTP with their thesis advisor.

The style of the EDTP text must follow the formal recommendations in the latest edition of *Form and Style: Theses, Reports, Term Papers* by W.S. Campbell and Stephen V. Ballou or *A Manual for Writers of Term Papers, Theses and Dissertations* by Kate L. Turabian (copies are available in the UM Bookstore). The following requirements are supplementary to the above-mentioned material:

- Literature references are to be collected in a bibliography at the end of the thesis (not as footnotes and not at the end of chapters).
- Entries in the bibliography may be in alphabetical order or in order of citation in the text.
- The form of each bibliographic entry and the manner of citing the reference in the text of the thesis may follow the style of any major journal in the area of the student's thesis. The principal methods of citing references are listed on pp. 106-107 of the *ACS Style Guide*, James S. Dodd, Editor. A copy is available in the chemistry office.
- The student must consult with his or her advisor concerning preferred bibliographical style, particularly regarding the omission or inclusion of article titles.

In addition, students should refer to the [UM Graduate School guidelines](#), which are available on the Graduate School web site. When preparing the Approval Page, Copyright Notice and Abstract for the ETDP, students should use the [templates](#) provided by the Graduate School.

The Graduate School and the Chemistry Department have established several deadlines and procedures relative to the thesis defense. At least 36 days before the thesis defense, the candidate must submit unbound committee drafts or electronic copies (with prior committee approval) of the thesis to his/her advisor. If approved by the research advisor, drafts are then submitted to the other members of the advisory committee at least 10 days before the thesis defense for their comments regarding the revision. One week prior to the defense, the committee chair must electronically submit the thesis or professional paper. [Instructions](#) for submitting the draft are available from the Graduate School. This submission indicates that the document is defensible and all members of your committee have agreed it is ready for defense. The document should be correctly formatted using the Graduate School formatting guidelines. The Graduate School will review your document for formatting and content and will e-mail you any revision notes.

The thesis defense is an oral examination of the student's knowledge and a defense of the thesis or professional paper. This examination is held no later than 3 weeks before the end of the semester in which the degree is to be granted. It must be preceded by the preliminary approval of the thesis or professional paper by the thesis committee and the Graduate School as well as the completion of all other requirements for the degree, including any set by the thesis committee.

The time and place of the thesis defense must be announced to the entire department. The thesis defense begins with a seminar (less than one hour) that the student gives on the thesis topic. This is followed by a question and answer session that is open to the public; guests may ask questions upon recognition by the examination chair. After the public session the examination chair closes the session to all except the candidate, the committee, and interested UM faculty. Those present are then allowed by the examination chair to closely question the candidate on his or her general chemical knowledge and on the thesis. Finally the committee members discuss privately the student's performance and vote upon the outcome, which will be one of the following: (1) The candidate passes, and the thesis is accepted as presented. (2) The student passes, but minor revisions are required in the thesis. (3) The student fails and/or major revision is required in the thesis. If the student fails, he/she must make the necessary revisions and defend again. At least thirty days must elapse between examinations. The committee result is a pass if no more than one member dissents. If the seminar is given as a general departmental seminar, it need not immediately precede questioning by the committee. If both seminar and questioning period are scheduled in one session, then three hours must be allowed, even though the sessions normally last only two hours.

If the student passes the thesis defense, the committee chair will [submit](#) the final thesis or professional paper electronically to the Graduate School. The document is submitted only after it has met all of the following criteria: 1. reviewed and approved for defense by the Graduate School, 2. successfully defended, 3. revisions made for your committee and the Graduate School.

Prior to the final graduation deadline, the following items must be submitted to the Graduate School (the Graduate School staff will obtain the Dean's signature on items where appropriate):

- **Certificate of Approval Form** signed by you and your chair or co-chairs. The chair or co-chairs must have the approval of **ALL** your committee members in order for your document to be certified. The Graduate School staff will obtain the Dean's signature.
- **Completion Document** - The "Department" copy of your Graduation Application signed on the back by your chair or co-chairs under **Final Degree Requirements**.
- Any course or research credit grade changes needed for degree. The Graduate School is responsible for changing thesis, dissertation or professional paper credit grades (599 or 699) to CR once your PDF and one hard copy paper are received

Once approved, the EDTP must also be submitted to the Mansfield Library submittal [site](#). In addition, one bound thesis copy is given to the Department for its library. A bound copy should also be provided to the research advisor. It is a courtesy to provide bound copies to members of the advisory committee.

The following outline summarizes deadlines relating to the thesis defense and graduation.

- Submit thesis draft to research advisor – 36 days before the thesis defense.
- Submit approved (by research advisor) draft to the committee – 10 days before the thesis defense.
- Advisor submits approved (by thesis committee) EDTP draft to the Graduate School – 7 days before thesis defense.
- Announce time and place of thesis defense to chemistry faculty – in a timely manner before the thesis defense.
- Thesis defense – 3 weeks before the end of the semester in which the student expects to graduate.
- Submit approved EDTP to Graduate School and Mansfield Library—before the final graduate deadline.