

Graduate Study in the Department of Chemistry and Biochemistry University of Minnesota Duluth (29 November 2007) Official Program Policies

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This brochure includes the official graduate program policies of the Chemistry and Biochemistry Department. Graduate students in chemistry will be held responsible for the information contained therein. Official University disclaimer: The information in this handbook and other University catalogs, publications or announcements is subject to change without notice. University offices can provide current information about possible changes.

Refer to the Graduate School's web pages for more information about policies and procedures of the Graduate School of the University of Minnesota.

- University of Minnesota **Duluth** Graduate Office, www.d.umn.edu/grad. 431 Darland Administration Building, email: grad@d.umn.edu .
- The Graduate School section of the U MN Duluth catalog, <http://www.d.umn.edu/catalogs/current/>.
- University of Minnesota Graduate School web site, www.grad.umn.edu/Current_Students.
- University of Minnesota Graduate School catalog, www.catalogs.umn.edu/grad.

Statement of General Purpose and Policies

The Chemistry and Biochemistry Department offers both Plan A and Plan B programs for the M.S. degree.

- For the Plan A program, research leading to a thesis is required. Areas of research include Analytical Chemistry, Biochemistry, Inorganic Chemistry, Organic Chemistry, and Physical Chemistry.
- For Plan B, the emphasis is on a broad program of course work, and includes a project consisting of the preparation of three papers in the major and related fields.

As well as being suitable for students who wish to go on for further advanced study elsewhere, the programs are designed to fulfill the needs of those planning to make a career of teaching chemistry in liberal arts colleges, junior colleges and state colleges, or those seeking industrial or government positions.

Prerequisites

1. Undergraduate course work

Entering students should have the following minimum preparation:

- a. Major in Chemistry or Biochemistry and Molecular Biology, including physical chemistry with calculus and junior-senior level inorganic chemistry. If an applicant's record does not demonstrate competency in one of the areas - analytical, organic, physical, advanced inorganic - the student's preparation will be labeled deficient in that area. The deficiency must be removed during the first year in residence. The deficiency can be removed either by passing a proficiency examination in the same field above the 20th percentile level or by passing the equivalent course in the undergraduate curriculum with a grade of B or better.
- b. Mathematics through calculus.
- c. One year of university physics, taught using calculus.

2. Proficiency Examinations

The background of the student will be tested by a series of four examinations (the proficiency examinations), one in each of analytical, inorganic, organic, and physical chemistry, which will be given in the orientation sessions preceding the start of classes and two other times during the first year. These are standardized [ACS exams](#) and 40th percentile or above constitutes a pass.

The material covered in proficiency examinations corresponds to that contained in the respective undergraduate courses. As indicative of the level of the examinations, the following texts are recommended:

- a. Analytical: A standard text on introductory quantitative analysis such as Skoog *et al.*, "Analytical Chemistry," or Harris, "Quantitative Chemical Analysis." Approximately one-third of the material covered will come from a standard text on instrumental analysis, e.g., "Instrumental Methods of Analysis" by Willard, Merritt, Dean and Settle or "Principles of Instrumental Analysis" by Skoog *et al.*
- b. General and Inorganic Chemistry: For General Chemistry, a standard freshman chemistry text; for Inorganic Chemistry, an advanced inorganic text, such as Shriver and Atkins, "Inorganic Chemistry," Wulfsberg "Inorganic Chemistry," or Housecroft, "Inorganic Chemistry."
- c. Organic: Any modern textbook of organic chemistry used in a one-year course, such as "Organic Chemistry" by S. Ege, or Bruice, or Brown and Foote.
- d. Physical: An undergraduate text such as "Physical Chemistry" by Atkins and DePaula; by Laidler, Meiser and Sanctuary; or by Silbey, Alberty and Bawendi.

For the M.S. degree the test in the major field must be passed at the 40th percentile level. A proficiency examination is not given in biochemistry. A person whose research is in biochemistry must pass the organic proficiency examination. Those students who are considering applying for the Ph.D. program at the Minneapolis campus after completion of the M.S. at Duluth should pass all four proficiency examinations at the 50th percentile level. No additional proficiency examinations will be required for these students when they transfer to the Minneapolis Campus. If an examination is not passed on the first try, it may be taken again half a year later. Alternatively, the passing of equivalent chemistry courses with a "B" or "A" grade is considered to satisfy the proficiency examination requirement.

Graduate Adviser

Initial advisement will be by an assigned group of graduate faculty chosen from fields related to the student's expressed interests. As soon as possible a permanent adviser with expertise in the student's area of interest should be chosen.

Requirements

For complete details of the general University requirements for the Plan A and Plan B programs, the [Graduate School section](#) of the current UMD General Bulletin should be consulted.

1. Course Requirements for Plan A

Students must complete a minimum of 14 semester credits in the major, not counting thesis and seminar credits. Students must complete at least 6 semester credits in one or more related fields and at least 10 thesis credits [in the course Chem 8777 (Thesis Credit-Masters)]. Students who wish to elect a minor (rather than a “related field”) must complete 6 credits in graduate courses in an outside field which has a free-standing graduate major on the Duluth Campus. If a minor is chosen, at least one member of the student's thesis committee must be on the graduate faculty of the minor field.

Registration is also required in Chem 8184 (Seminar) for 1 credit, as noted below.

The course program in chemistry is built around a group of seven core courses covering the fields of modern chemistry. These are

- o CHEM 5424, Advanced Inorganic Chemistry I (3 credits)
- o CHEM 5524, Advanced Organic Chemistry I (3 credits)
- o CHEM 5624, Advanced Physical Chemistry I (3 credits)
- o CHEM 5650, Computational Chemistry (3 credits)
- o CHEM 5714, Applications of Spectroscopy (4 credits)
- o CHEM 5725, Advanced Analytical Chemistry I (3 credits)
- o IBS 5101, Biochemistry and Molecular Biology (3 credits)

All students are required to take at least four of the core courses. Appropriate additional courses are included in the program to meet the best interests and individual preferences of the student, and to fulfill the Graduate School requirements given above.

2. Plan A Thesis

The student is required to write a thesis embodying the results of original research. A thesis adviser should be chosen as soon as possible after passing the proficiency examination in the field in which the student intends to do research. Normally this will be by the end of the first semester, so that research can begin in the second semester of residence. A student doing research must have medical insurance, either insurance provided by the University or insurance obtained independently by the student.

A final oral examination of the thesis will be given by a faculty thesis examining committee. Several weeks before the exam, the student should inform the UMD Graduate School office of intent to graduate, pay the graduation fee, and submit the thesis title. Refer to *The ACS Style Guide*, 2nd edition, Janet S. Dodd, Editor (American Chemical

Society: Washington, D.C.; 1997; ISBN 0841234620) for writing and reference style. The Graduate School office furnishes [detailed instructions](#) for preparing the thesis.

Draft copies of the thesis should be given to the student's examining committee members two weeks before the examination date. After the examination the thesis can be corrected as necessary and then submitted to the Graduate School.

3. Course Requirements for Plan B

A minimum of 30 semester credits in graduate courses are required by the Graduate School, of which at least 14 credits are to be in the major field and not fewer than 6 credits in related fields. Students who wish to elect a minor must complete 6 credits in graduate courses in an outside field. Registration is also required in Chem 8184 (Seminar) as noted below.

Four of the [core courses](#) discussed above for Plan A are required for Plan B, with additional courses included in the program to serve the best interests and individual preferences of the student, and to fulfill the Graduate School requirements.

4. Plan B Papers

Students electing the Plan B program are required to complete a project consisting of the preparation of three papers in the major and related fields. Each of these is prepared under the supervision of an appropriate member of the graduate faculty.

An examination for Plan B students (oral or written at the discretion of the faculty examining committee) will be given. The Plan B Papers in final form are to be made available to members of the student's examining committee after each paper has been certified as satisfactory by the appropriate supervising instructor and at least one week before the examination.

Guidelines for the preparation of Plan B papers are given in [Appendix I](#) .

5. Seminar

All graduate students are required to participate in the Departmental Seminar, including registration in Chem 8184 (Seminar) for one semester at the end of the program, and attendance at regularly scheduled seminars. Each graduate student shall present a seminar in the final year of residence.

For a Plan A student, the seminar may be in the student's research area (preferably upon the actual thesis research problem), or, at the student's option, may be upon a topic completely unrelated to the area of thesis research.

For a Plan B student, the seminar shall be on the material in one of the Plan B papers (see the guidelines in Appendix I).

6. Degree Program

Graduate students must file a program listing all courses that will be completed and used to satisfy degree requirements. The program must be approved by the adviser, the Director of Graduate Studies in the major (and minor, if designated), and the Graduate School. Ordinarily, master's degree candidates are required to file their programs after completing 10 semester credits and not later than the second semester of registration. The program form is available in the UMD Graduate School Office and on the web in pdf format, http://www.grad.umn.edu/Current_Students/forms/gs89a.pdf.

Typical Plan-A programs of study for students in each of the program's five areas are given below. Every Plan-A program will also include Masters Thesis Credits, CHEM 8777, and Seminar, CHEM 8184. Students completing a Plan-B Masters degree must add 10 course credits plus Seminar, CHEM 8184, to each of the programs below.

Analytical Chemistry:

Major Field (14 credits)

- o CHEM 5725 Advanced Analytical Chemistry I (3 credits)
- o CHEM 5624 Advanced Physical Chemistry I (3 credits)
- o CHEM 5714 Applications of Spectroscopy (4 credits)
- o Other advanced analytical course (4 credits). This might be
 - CHEM 8224 Advanced Analytical Chemistry II **or**
 - CHEM 8750 Special Topics in Chemistry.

Related Field (6 credits)

- o CHEM 5524 Advanced Organic Chemistry I (3 credits)
- o CHEM 5424 Advanced Inorganic Chemistry I (3 credits)

Biological Chemistry:

Major Field (14 credits)

- o CHEM 5524 Adv Organic Chem I (3 credits)
- o IBS 5101 Biochemistry and Molecular Biology (3 credits)
- o CHEM 5624 Advanced Physical Chemistry I (3 credits)
- o CHEM 5714 Applications of Spectroscopy (4 credits)
- o graduate-level elective (1 or more credits)

Related Field (6 credits)

- o CHEM 5725 Advanced Analytical Chemistry I (3 credits)
- o CHEM 5424 Advanced Inorganic Chemistry I **or**
CHEM 5650 Computational Chemistry (3 credits)

Inorganic Chemistry:

Major Field (14 credits)

- o CHEM 5424 Advanced Inorganic Chemistry I (3 credits)
- o CHEM 8424 Advanced Inorganic Chemistry II (4 credits)
- o CHEM 5624 Advanced Physical Chemistry I (3 credits)
- o CHEM 5714 Applications of Spectroscopy (4 credits)

Related Field (6 credits)

- o CHEM 5725 Advanced Analytical Chemistry I **or**
CHEM 5650 Computational Chemistry (3 credits)
- o CHEM 5524 Advanced Organic Chemistry I (3 credits)

Organic Chemistry:

Major Field (14 credits)

- o CHEM 5524 Advanced Organic Chemistry I (3 credits)
- o CHEM 8524 Advanced Organic Chemistry II (4 credits)
- o CHEM 5624 Advanced Physical Chemistry I (3 credits)
- o CHEM 5714 Applications of Spectroscopy (4 credits)

Related Field (6 credits)

- o CHEM 5725 Advanced Analytical Chemistry I **or**
CHEM 5659 Computational Chemistry (3 credits)
- o CHEM 5424 Advanced Inorganic Chemistry I (3 credits)

Physical Chemistry:

Major Field (15 credits)

- o CHEM 5624 Advanced Physical Chemistry I (3 credits)
- o CHEM 5650 Computational Chemistry (3 credits)
- o CHEM 5424 Advanced Inorganic Chemistry I (3 credits)
- o CHEM 5725 Advanced Analytical Chemistry I (3 credits)
- o Physics or Math (3 credits)

Related Field (7 credits)

- o CHEM 5714 Applications of Spectroscopy (4 credits)
- o Physics or Math (3 credits)

Likely physics and math courses to choose among:

- o MATH 4230 Complex Variables (3 credits)
- o MATH 4820 Applied Math - Numerical Methods (3 credits)
- o MATH 5260 Dynamical Systems (3 credits)
- o MATH 5270 Modeling with Dynamical Systems (3 credits)
- o MATH 5327 Advanced Linear Algebra (3 credits)
- o PHYS 4021 Quantum Physics II (4 credits)
- o PHYS 4031 Thermal and Statistical Physics (4 credits)
- o PHYS 5052 Computational Methods in Physics (3 credits)

Once approved, the program must be followed to meet graduation requirements. Alterations in the program, including change of adviser or other committee members, must be requested in advance. Changes in courses are requested with a Graduate School petition form. Petition forms are available in the UMD Graduate School Office and on the web in pdf format, http://www.grad.umn.edu/Current_Students/forms/g59.pdf . Committee changes are handled through the "Committee Substitution Form" which is available in the Graduate School Office.

7. Criteria for Satisfactory Progress

In general, satisfactory progress implies registering for and successfully completing a full load of courses (usually 6-10 credits per semester) until the course requirements are met, and, for a Plan A program, choosing a thesis adviser as soon as possible in order to get started on research, so that completion of the degree requirements may be achieved promptly. To this end it is expected that a graduate student will make good use of those times when formal classes are not in session.

In regard to course grades, no credit is given for grades below C and a grade-point average of at least 2.80 must be maintained over all courses included in the approved formal degree program. The G.P.A. refers to grades in courses not graded S/N and is exclusive of seminars, proficiency examinations, and research. It should be emphasized that in judging a student's performance, the full course record, including course work not included in the approved formal degree program, is taken into consideration. Unfavorable action may be taken, even where the performance on the degree program meets the minimum requirement, if the full course record falls significantly below this level.

8. Student Conduct

All graduate students must abide by the Student Conduct Code, which is posted at <http://www.d.umn.edu/assl/conduct/code/>. Informal resolution of violations will be attempted through discussions involving the student, the Director of Graduate Studies, and the Associate Graduate Dean. In the event that no satisfaction is obtained, the matter will be brought before UMD's Student Behavior Judiciary Committee. Expectations specific to graduate students are available from the University of Minnesota Graduate School at www.grad.umn.edu/Ethics/ethics_brochure

9. Registration Requirement

The University of Minnesota requires that graduate students holding appointments as teaching or research assistants or administrative fellows must register for at least 6 A-F or S-N credits in the Graduate School each term that an appointment is held. See www.d.umn.edu/grad/reg_req for further information. This does not apply to summer terms. Exceptions to this can be done via petition to the program's director of graduate studies.

10. Limitations on S/N Credits

The Graduate School uses two grading systems: A through F and S-N. The "S" stands for "satisfactory" and "N" stands for "no credit." Graduate School policy dictates that at least two-thirds of the credits (excluding thesis credits) on a student's official degree program must be taken under the A-F system. Only courses for which A, B, C and S grades are received may fulfill degree requirements. S-N grades are not calculated in grade point average.

11. Credit Transfers

With the approval of the adviser and director of graduate studies of the major field (and the director of graduate studies in the minor field if the courses are to be applied to a designated minor) and the Graduate School, the transfer of up to 40 percent of the degree coursework from other recognized graduate schools, or from quick enroll and Continuing Education status at the University of Minnesota, is permitted. Thesis credits are excluded when calculating the 40 percent limit. A Plan-A master's program typically includes 21 credits of coursework, in addition to thesis credits, of which no more than 8 credits may be transfer credits.

The work to be transferred must be post-baccalaureate graduate level that was taken for graduate credit and taught by faculty authorized to teach graduate courses. Continuing Education courses must bear transcript entry verifying that they were completed for graduate credit. Credits transferred from other institutions must appear on official transcripts. Any transfer course which will be used to satisfy degree requirements must be included on the proposed degree program.

For further details, see the UMD Graduate Office's [web page](#) and the "UMD Graduate Student Handbook".

12. Graduation Procedures

- a. **Clearance for Graduation.** Degrees are awarded at the end of each month. To qualify for graduation for a particular month, a student must submit the "Application for Degree Form" on or before the first workday of that month and **must** complete the examination and all other requirements (including necessary forms and fees and submission of the thesis if Plan A) by the last workday of that month. Get the "Application for Degree" form from the UMD Graduate School Office, not from the Campus Center Information Desk.
- b. **Final Examinations** are required for both Plan-A and Plan-B degrees. At least one week prior to the exam the Chair of the committee should contact the Duluth Graduate School Office so that necessary forms can be prepared.
- c. **Commencement Exercises.** The University of Minnesota Duluth has a graduate commencement exercise at the end of spring semester. Graduates are encouraged, but not required, to attend. If you wish to participate in the ceremony, you must apply for graduation by the first working day of March. For further information see the "UMD Graduate Student Handbook".

13. Time Limit

The maximum time allowed by the Graduate School for completion of the master's degree is seven years. The seven-year period begins with the oldest work included on the official degree program, including any transfer work applied.

Procedures and Timetable for Plan-A Progress

The procedures and timetable are to clarify expectations and provide timelines to students and advisers. The procedures are to guide students in their research work on the MS thesis, beginning with adviser selection, and culminating in the successful defense of a thesis which describes a significant contribution to the greater body of scientific knowledge. A [table](#) of time points precedes the text outline. The time points are for Chemistry MS students following the thesis option (Plan A) and do not apply to students taking the non-thesis option (plan B).

Time points			
year	semester	week	
1	fall	orientation	proficiency exams
1	fall	1-2	learn about research activities available in the Chemistry MS program
1	fall	3-4	talk with faculty , choose adviser
1	fall	end of final exam week	submit Adviser and Project form
1	spring	end of week 4	submit Degree Program Form
1	spring	end of semester	committee review of progress and plan
2	spring	per seminar schedule	CHEM 8184 seminar
2	spring	early in the semester	committee review of progress and plan
2	spring	early in the semester	apply for degree at Grad Office if attending commencement
when student and adviser agree thesis is ready for defense			distribute thesis
		2 weeks after distributing thesis	thesis research presentation and thesis defense

Process Outline

I. Selection of the research adviser and project.

- A. Familiarization with the research of various faculty members
 1. Faculty research presentations serve multiple purposes.
 - a. recruiting students to research groups
 - b. informing students of expertise and equipment in groups other than their own
 - c. informing faculty members about colleagues' research
 2. Presentations may be given during the first two weeks of the semester.
 3. Faculty should have a brief description of ongoing research projects for which they are seeking new students, either posted on the departmental web site, or provided as handouts during the presentations.

- B. Interviews with prospective research advisers: Students should interview three or more faculty members about MS thesis research.
 1. Timing: during the two weeks following the conclusion of the faculty research presentations.
 2. Students who enter the program in the spring semester should complete interviews by the end of the fourth week of the semester.

3. Students who already have a research adviser (e.g., by agreement prior to matriculation) may choose to interview potential examining-committee members.
 4. By mutual agreement, one of those interviewed becomes the student's adviser.
- C. Student-adviser agreement on a thesis project.
1. Student and adviser agree on a tentative thesis topic
 2. Student and adviser sign the Chemistry MS [Adviser and Project form](#).
 3. The student submits the form to the Director of Graduate Studies.
 4. Timing: The form is due to the DGS by the end of final-exam week of the first (ordinarily fall) semester.

II. Planning the research project.

- A. Introduction to the research lab and procedures to conduct the proposed thesis research. As soon as possible after selecting a research adviser, the student commences work in the lab, learning the procedures to be used in the proposed project, attending group meetings, etc. Starting research promptly is important to graduating in good time.
- B. The student prepares a brief (e.g., a few pages) thesis project proposal. The proposal is a description of the research project, including its background, significance, goals, methods and appropriate references to literature. This document will be based on discussion with the research adviser and reading of the literature.

III. Selecting the thesis committee, and coursework.

- A. Select members of the thesis examining committee. The student is responsible to meet in person with potential committee members to request service on the committee. Each potential committee member should be offered a copy of the research project proposal prepared earlier. A potential member must agree to serve before being listed as a committee member.
1. The committee has at least three members.
 2. The chair of the committee is the thesis adviser.
 3. One member of the committee other than the chair must have an appointment in a program other than the Duluth Chemistry MS program. Graduate faculty memberships can be checked in the [Graduate Faculty roster](#).
- B. Plan coursework in consultation with the adviser.
- C. Complete the Graduate School [Degree Program form](#). ([form GS89a](#))
1. Submit the completed form, signed by the adviser, to the Director of Graduate Studies for approval.
 2. Timing: The degree program form is to be submitted to the Director of Graduate Studies by the end of the fourth week of the second (ordinarily, spring) semester.
- D. Satisfactory progress to this point is a prerequisite (not necessarily the only prerequisite) for departmental funding in summer and during the second academic year.

IV. Presentation and approval of progress and intermediate plan.

- A. With the adviser's approval, the student schedules the committee to meet with the student by the end of the second semester in residence to review progress (committee meeting #1). The student prepares and presents the progress to that point, including plans for the coming summer's work. Progress in coursework stipulated on the Degree Program is also discussed.
- B. Satisfactory progress to this point normally is a prerequisite for recommendation for departmental funding for a second year of study.

V. Progress and final plan.

Progress toward the thesis during summer of year 1 and fall of year 2 is reviewed again by the committee (committee meeting #2) during the beginning of the spring semester of year 2. With the adviser's approval, the student schedules the meeting. The student updates the committee on progress, and the committee and student discuss plans to complete the project in a timely manner. Projection of completion date is made, with consideration of plans for work and writing during second summer in residence as required.

VI. Seminar (Chem 8184)

Spring semester of the student's last (usually second) year, he or she registers for the Seminar course: Chem 8184, and presents a seminar to the department. The seminar will be scheduled by the instructor of Chem 8184. Seminars will be evaluated by the faculty members in attendance and comments will be given to the student. The Chem 8184 seminar is not a thesis defense. It may be a research progress report or a literature presentation.

VII. Thesis preparation.

- A. The student prepares his or her thesis in accordance with Graduate School rules.
- B. When the student and adviser agree the thesis is ready for the committee, the student distributes printed copies to all members of the examining committee.
- C. Timing: Printed copies are distributed at least 14 days prior to the thesis research presentation and thesis defense.

VIII. Thesis research presentation (open part of defense) and thesis defense (closed) is presented (committee meeting #3).

- A. This is scheduled by the student when adviser and student concur that the work is ready to be presented and defended. The student informs the Director of Graduate Studies and the chemistry office of the time and location of the defense. The student sends an abstract to the chemistry office for circulation.
- B. The time, location and title of the thesis research presentation will be announced and publicized by the chemistry office to invite attendance.

Procedures and Policies for Graduate Assistants

1. **A graduate assistant may normally expect a maximum of two nine-month (academic year) half-time appointments.** Funds permitting, renewal of fellowships and assistantships is contingent only upon satisfactory evaluation of performance of the duties of the position and satisfactory progress towards the degree (see section on [Satisfactory Progress](#) under Requirements, above). Salary payments are made bi-weekly. Also, some support is usually available during the summer months; priority is given to first year students. It is recognized that special circumstances may require exceptions to the above general policies. To hold an academic year assistantship a student must be registered in the Graduate School.
2. **Nine-month academic year appointments do not include entitlement to a vacation during the nine-month period.** As noted previously, it is expected that a graduate student will use those times when formal classes are not in session to work toward completing graduate study as promptly as possible and may have duties assigned in preparation for the coming semester. Written permission by the Department Head is required before a student is allowed to do tutoring in Chemistry courses.
3. **Since graduate assistants serve in the role of part-time faculty, as well as being students, they may expect to be consulted in matters of educational planning and policy making.**
4. **Duties of graduate teaching assistants.**
 - a. **Assignments.** Assignments for a given semester are made as soon as possible. Whenever possible, this will not be later than completion of registration for the semester, at which time the instructional picture in terms of numbers and times of lecture and laboratory sections should become clear. The Department Head works out the assignments in consultation with everyone concerned, so as to take account of individual preferences and needs to the greatest possible extent.
 - b. **Job descriptions and satisfactory standards of performance.** The graduate teaching assistants carry out the same types of functions with respect to the teaching mission as do the permanent faculty. The primary assignment will generally consist of laboratory supervision in both elementary and advanced courses and the conducting of recitation-quiz sessions. Both of these are essential in the educational process and must be handled competently and professionally. In addition to these responsibilities, graduate assistants will help with the grading of papers and examinations, preparation of unknowns, testing of experiments, and such other assignments as are necessary for the completion of the instructional mission of the Department. Graduate assistants are professional members of the staff and their performance is expected to satisfy professional standards. The Handbook for Graduate Assistants details these expectations.
 - c. **Hours of work.** Teaching assistantships are half-time appointments, which implies a load of 20 hours per week. Assigned duties usually include laboratory supervision, conducting recitation sessions, grading, holding office hours, and preparation.
5. **Duties of graduate research assistants.**
 - a. **Assignments.** The assignment under the research assistantship will be performed under the grant from which support is provided. However, acceptance of a

research assistantship does not require that the grant administrator be the thesis adviser.

- b. **Job description.** Research assistantships are half-time appointments. The specific duties of a research assistant will vary according to the needs of the individual grant administrator but will generally consist of laboratory work and/or computation and preparation of periodic progress reports.
6. **Grievance procedures.** See item 5 of the attached statement ([Appendix II](#)) of recommended policies which was prepared by an *ad hoc* committee on Grievance Procedures and approved by the Executive Committee of the Graduate School. A graduate assistant who is disciplined or discharged will receive written explanation of the cause and a statement of avenues of appeal.
7. **Notice of reappointment or non-reappointment.** To the extent that budget and other essential information permit, actions on appointments, reappointments, and non-reappointments will be completed and written notification given by April 1 if possible, and not later than April 14. The Department operates under the Resolution of the Council of Graduate Schools in the U.S. regarding freedom of the student to resign an accepted appointment through April 15, and includes the Council's official statement when an assistantship offer is made before April 15.
8. **Orientation.**
 - a. **Pre-service orientation and instruction.** The week before classes start serves as a period in which proficiency examinations are given and orientation sessions are held. As [stated earlier](#), all new students take proficiency examinations in the areas of analytical, inorganic, organic and physical chemistry. The remainder of the week is devoted to orientation sessions in which TA responsibilities and duties are discussed, and specific duties are assigned, laboratory and stockroom procedures are outlined, safety demonstrations are presented, practice recitation sections are held, with video taping for evaluation and discussion, student faculty meetings, including discussion of various research areas, are arranged, advisement and registration periods are held, and informational matters are taken up, such as room and mailbox assignments, distribution of keys, accessibility to departmental clerical staff, supplies and equipment, etc.
 - b. **In-service orientation and instruction.** Faculty members and graduate teaching assistants work closely together on teaching assignments. For large classes, conferences are held on a regular basis (usually weekly). Faculty members visit laboratories and recitation sections, and the teaching assistants are encouraged when possible to attend lecture sections.
9. **Evaluation and recognition of performance.**
 - a. **Evaluation of academic performance.** The Graduate Committee meets as a whole to review student progress. Standards of performance as set forth in the UMD official catalog in the section on [Graduate Programs](#) and in the [Satisfactory Progress](#) section above are required for satisfactory progress. Students whose academic performance is unsatisfactory will be notified by the Director of Graduate Studies.
 - b. **Evaluation of performance as a teaching assistant.** This is achieved through direct observation by the faculty member for whom the student is assisting and by use of a student course evaluation form.

APPENDIX I

GUIDELINES FOR PREPARATION OF PLAN B PAPERS

Department of Chemistry and Biochemistry, UMD, September 1981

1. Three papers representing the quality but not the range of the Plan A Master's thesis are to be prepared in the major or related fields.
 - a. One paper should be a current review of an area starting with a brief historical account, and understandable to a researcher in that area.
 - b. One paper should adequately cover an area so as to be understandable to individuals in any area of chemistry. Upon completion, this paper will be presented by the student at a department seminar.
 - c. One paper should include a discussion with recommendation for future research. It may include specific experiments with conclusions based on the possible results of the suggested experiments.

The student shall report the selection of topics for papers to the major adviser, indicating which topics fulfill the requirements outlined in 1a, 1b, and 1c.

The final examination may include questions on any or all of the papers.

2. Before undertaking preparation of a paper, the student should consult with the member of the graduate staff under whose supervision it is to be written regarding the suitability of the proposed topic to the particular paper (1a, 1b, or 1c).
3. Once the topic has been selected, the student should prepare an outline and present it to the supervising instructor for suggestions and criticisms.
4. The papers in final form are to be made available to members of the student's examining committee after each paper has been certified as satisfactory by the appropriate supervising instructor and at least one week before the comprehensive examination.

APPENDIX II

RECOMMENDED POLICIES WITH RESPECT TO GRADUATE ASSISTANT AND INSTRUCTOR APPOINTMENT, ASSIGNMENTS AND PERFORMANCE OF DUTIES, AND NON-REAPPOINTMENTS OR TERMINATIONS

1. On appointment, or on any subsequent change in the terms or conditions of appointment, the graduate student assistant should receive a copy of the appointment form, or a formal statement of the essential conditions and terms of the appointment.
2. The appointee should be informed, in appropriate detail, of the expectations of the department as to what characterizes (a) satisfactory performance of the assigned duties, and (b) satisfactory academic progress as a graduate student. And further, the student should be informed periodically by the department as to how his performance is viewed.
3. The department should give timely notice of reappointment or non-reappointment as soon as the decisions can be made with respect to these positions. In normal circumstances, April 1, or earlier, should be the appropriate deadline. When budget or other uncertainties arise, the general principle should be to notify as many as possible as soon as possible of the decision in each case.
4. Termination of or modification of the terms or conditions of appointment before the end of the term of appointment, save by mutual agreement, should follow procedures similar to those protecting the rights of the regular faculty, and should be initiated only for stated cause, given to the appointee in writing.
5. Grievances arising in the employment of graduate assistants should have a clear channel and a known procedure for settlement. Grievances arising out of assignment of duties, work load, promotion, etc., should insofar as possible be handled by informal or formal departmental procedures. But in cases where mutually satisfactory settlements are not made, appeal to formal grievance should be available and made known to all student assistants.

For such appeals, an *ad hoc* committee at the college level for each such case seems the most appropriate at this time. Normally such a committee appointed jointly by the Dean of the College and the Dean of the Graduate School should consist of (a) a member of the department (a faculty member not a party to the dispute or involved directly in the bases for the grievances); (b) a representative from the Graduate Group Committee (of the area, but not from the department involved); (c) a representative from the office of the College Dean; and (d) a graduate student (not in the field involved).

APPENDIX III. Chemistry MS Adviser and Project Form (Plan A)

This form is also available as a one-page pdf document. [AdviserProjectForm.pdf](#)

1. Students must discuss Chemistry MS thesis research with three or more members of the graduate faculty. The graduate [faculty roster](#) is available on the web site of the Graduate School.
2. Students agree to do a masters thesis project with one member of the faculty as indicated by the signatures of both parties below.
A tentative working thesis title is also entered below.
Signatures below signify mutual agreement.
3. Students send the completed form to the Director of Graduate Studies for the Chemistry MS program. This completed form is due by the end of final-exam week of the student's first semester.

Tentative thesis topic: _____

Student:

Name _____

Signature _____ Date _____

Adviser:

Name _____

Signature _____ Date _____

APPENDIX IV

A sample of the Degree Program Form appears below. The form is available at the UMD Graduate School Office and on the web as [form GS89a](#).

**University of Minnesota
Graduate School**

**Degree Program
Transmittal**

I.D. No. _____ Check here if this is a revision of a previously approved program.

To the Student:

Please read the instructions on the reverse side of this page.
This document consists of two forms (89a, 89b). Print or type to complete the appropriate sections of all forms. Complete the top half of this form (89a), including the names of your advisors. Complete form 89b and have it signed by your advisor(s) and by the Director of Graduate Studies for your major field, if declared.

Some major fields require students to contact proposed committee members regarding their willingness to serve on examining committees. Confer with your Director of Graduate Studies to determine what responsibilities you may have in that regard. Submit both forms to your Director of Graduate Studies, along with the names of the proposed committee members. After approval by the Director of Graduate Studies, submit all forms to the Graduate School, 451 Duffell Administration Bldg.

Last Name	First	Middle or Initial	Degree sought
Current Phone Number	E-mail address (optional)		Major
Student Signature/Date			Minor (if declared)
Name of Major Advisor(s)			Master's Degree Only (Check One) <input type="checkbox"/> Plan A <input type="checkbox"/> Plan B <input type="checkbox"/> Other Professional Engineering Degree Only <input type="checkbox"/> Design Project Track <input type="checkbox"/> Coursework Track

To the Director of Graduate Studies:

This document consists of two forms (89a, 89b). After the student has completed the appropriate sections of all forms and has obtained signatures as described above, it is ready for your review.

Please list below your recommendations for the student's examining committee. Indicate who will serve as chair. For master's and specialist certificate final examining committees, the chair must hold at least an associate membership in the graduate faculty. For the doctoral preliminary and examination, the chair must hold full membership in the graduate faculty. (Note: members of the final oral examination for the doctoral degree are recommended on the Thesis Proposal form GS 83.)

Sign form 89a to indicate your approval of the student's program of coursework. Sign below to indicate your approval of the student's proposed examining committee. **Note that by signing below, you certify that all proposed committee members have been contacted (by the student, by the advisor, by the Director of Graduate Studies, or by other means) established for students in your major field and that all proposed members have agreed to serve on this student's examining committee.**

Graduate School minimum requirements on the composition of examining committees:

- Master's final examination: 3 examiners - 2 from major, 1 from minor or related fields
- Specialist Certificate final examination: 4 examiners - 2 from major, 2 outside the major
- Doctoral preliminary and examination: 4 examiners - 3 from the major, 1 from minor or supporting program

Examining Committee Recommendations:

Major Field Examiners	Minor, Related Field, or Supporting Program Examiners
_____	_____
_____	_____
_____	_____
_____	_____

Signature, Director of Graduate Studies: _____ Date: _____

GS 89a Rev 1/92

**University of Minnesota
Graduate School**

Degree Program

I.D. No. _____

Last Name	First	Middle or Initial	Degree Sought
_____	_____	_____	Master of Science
_____	_____	_____	Minor
_____	_____	_____	Minor (if declared)
_____	_____	_____	Language (if required)

COMPLETING DEGREE UNDER Gen Spec **REQUIREMENTS**

TERM	COURSE NO.	CREDIT HOURS	DEPT & COURSE NO.	TITLE	Graded		GRADE	DISTINCTION OR HONORS (if applicable)	MAJORED CREDITS ONLY (Check one)
					CR	NC			
									<input type="checkbox"/> PLAN A
									<input type="checkbox"/> PLAN B
									<input type="checkbox"/> PROF. ENGINEERING DEGREE TRACK
									<input type="checkbox"/> PROJECT TRACK
									<input type="checkbox"/> COURSEWORK ONLY TRACK
									<input type="checkbox"/> OTHER

MAJORED CREDITS ONLY (Check one)
 PLAN A
 PLAN B
 PROF. ENGINEERING DEGREE TRACK
 PROJECT TRACK
 COURSEWORK ONLY TRACK
 OTHER

IDENTIFICATION OF APPLICABLE STUDENTS (SEE):
 STUDENT CATEGORY: _____
 REPORT ADVISOR 1 NAME (SEE): _____
 ADVISOR 1 DEGREE(S): _____
 REPORT ADVISOR 2 NAME (SEE): _____
 ADVISOR 2 DEGREE(S): _____
 REPORT ADVISOR 3 NAME (SEE): _____
 ADVISOR 3 DEGREE(S): _____
 DEPARTMENT OF STUDENT OF GRADUATE STUDIES (MAJOR FIELD): _____
 DEPARTMENT OF STUDENT OF GRADUATE STUDIES (MINOR FIELD): _____
 GRADE BELOW FOR OTHER USE ONLY (GRADUATE SCHOOL OFFICIALS): _____
 CHAIRPERSON OF EXAMINING COMMITTEE: _____
 EXAMINING COMMITTEE: _____

GS 89b Rev 2/92 TOTAL MAJOR CREDITS: _____ TOTAL OTHER PROGRAM CREDITS: _____ TOTAL CREDITS: _____

