

**Outline of the M.S. and Ph.D. Programs
in the Department of Chemistry
Wake Forest University**

**First Approved 5/81
First Revision 10/98
Second Revision 6/01**

Placement Examinations/Qualification

Purpose--The purpose of the placement examinations is to identify any deficiencies that may exist in the undergraduate preparation of incoming graduate students. Results of the placement exams will assist the graduate committee in the planning of the incoming students course schedule to ensure the establishment of a broad foundation of knowledge in the chemical sciences that will ultimately prepare (qualify) the students for advanced and specialized course work. Advanced coursework (additional 700 level courses) in an area may not be attempted until a student has qualified in that area, unless permission has been granted by the graduate committee. This requirement is to be satisfied by all M.S. and Ph.D. students.

Format--Each incoming graduate student will take an examination in five general areas of chemistry: analytical, biochemistry, inorganic, organic and physical chemistry. An examination committee will prepare and grade these exams and report the results to the graduate committee. This committee in conference with the graduate committee chairman and student will outline an individual program of study. The results of these exams will be reported to the faculty by the chair of the graduate committee.

Exam Date--Placement exams will be given immediately before the beginning of any term in which a new graduate student enrolls. A tentative examination schedule would be August and January.

Performance Level--A satisfactory performance level on the placement examinations will be a 50th percentile score on a standardized ACS exam. If an examination committee chooses to prepare its own placement exam, the same level of performance for qualifying is expected. Achievement of this level demonstrates proficient background knowledge of this subject and qualifies the student for advanced study in that area. This level is the same for both M.S. and Ph.D. students. A less than satisfactory performance on the placement exam in an area may be remedied by course work in that area. Successful completion of a single prescribed course with a grade of B⁻ or higher will qualify the student for advanced coursework in that area. To ensure a broad foundation of knowledge, students must qualify in four general areas. This requirement is to be satisfied by all M.S. and Ph.D. students.

Continuation--Continuing students must be qualified in 3 of 4 areas by the beginning of their second year academic year in residence. Under normal circumstances, a student must be qualified in 4 areas before the start of his/her fourth semester of study (exclusive of the summer semester). In addition, continuing students must maintain a 2.5 GPA. The graduate committee will design programs that can be reasonably finished by the end of the student's third regular semester. When students initiate study at a time other than the fall semester, the committee will determine an appropriate deadline to impose these requirements.

Candidacy Examination (Ph.D. Preliminary Examination)

Purpose--The purpose of the preliminary examination is to assure that Ph.D. candidates have developed a thorough understanding of the advanced concepts of their major areas of specialization and the ability to apply these concepts in the context of a current research problem. Satisfactory completion of the preliminary examination forms the basis for admission to Ph.D. candidacy.

Format--The preliminary examination consists of two parts: 1) a series of written cumulative examinations and 2) the written and oral presentation of two research proposals. These requirements must be completed by the end of the student's third academic year. The graduate committee may grant exceptions to this time schedule after petition by the student. The preliminary examination must be completed at least twelve months prior to the awarding of the degree.

Cumulative Examinations--Cumulative examinations will be offered five times during each academic year on dates near the following: the beginning of the fall term, the middle of the fall term, the beginning of the spring term, the middle of the spring term and the end of the spring term. To successfully complete the cumulative examinations, a student will be required to pass four exams in a maximum of ten attempts. A student may take a maximum of five cumulative exams in a single academic year. Students must have qualified in three areas of chemistry (including their major area) before they may take cumulative examinations. A student must also be qualified in any non-major area before taking cumulative examinations in that area.

Each division of chemistry will have a cumulative examination committee that will consist of the graduate faculty members in that division. These committees (one from each division of chemistry) will submit five cumulative examination topics to the graduate committee before the beginning of the fall term. The graduate committee will prepare a cumulative exam schedule for the upcoming year. The cumulative examination committee of each division will prepare and grade the cumulative examinations on the scheduled topic by a method acceptable to that division and will make evaluation criteria known in advance of the examination. The cumulative examination committees will report a grade of "Pass" or "Fail" to the student and the graduate committee. Answers or literature references for the examinations will be posted and the examinations returned to the research advisor of the student who will keep the examinations as a record of completion.

The cumulative examinations are intended to support a student's research project. Before beginning cumulative examinations, the student with the guidance of his/her Ph.D. advisory committee, will propose a schedule for the upcoming year of the appropriate cumulative examinations in regards to that student's research. The student's Ph.D. advisory committee must approve changes to this schedule. A student may only take cumulative exams approved by his/her Ph.D. advisory committee.

Normally, students will begin to take cumulative exams at the beginning of their second academic year but qualified students may take the exams during their first year. Passes during the first year count, but failures do not count against the total of ten attempts. Once a student has begun taking cumulative exams, they are expected to continue. A student may discontinue taking cumulative examinations with the approval of his/her Ph.D. advisory committee with subsequent graduate committee approval.

Research Proposals--Students are required to present two brief oral and written research proposals on two separate topics. The first research topic is to be the student's thesis project (Dependent proposal). The student will present a brief written proposal and an oral presentation to the examination committee (In accordance with

the Graduate Bulletin, the examination committee will consist of a least three people, one of whom is outside the student's major area. Normally, the Ph.D. advisory committee will serve in this capacity). A discussion of the proposal with the student will follow this oral presentation. The examination committee passes or fails the student and reports the outcome to the graduate committee. In the case of failure, the committee can recommend that the student be dropped or that re-examination be allowed no earlier than six months from the date of the original examination. A student may be re-examined only once. This examination must take place by the end of the student's second academic year, on a date scheduled by the student's Ph.D advisory committee. Once the examination date has been set, the student must petition his/her Ph.D. advisory committee to change the examination date for the proposal. Failure to complete the proposal examination by the scheduled date or failure to petition the Ph.D. advisory committee for a change in the examination date will be recorded as a failure.

The second research proposal (Independent proposal) will focus on a different topic from the students thesis project (but may be in the same general field) and must first be approved by the student's Ph.D. advisory committee. The student will present a brief written proposal and an oral presentation to the examination committee. This proposal may be written in the style of an ACS-PRF Type G grant. A discussion of the proposal with the student will follow this oral presentation. The examination committee passes or fails the student and reports the outcome to the graduate committee. In the case of failure, the committee can recommend that the student be dropped or that re-examination be allowed no earlier than six months from the date of the original examination. A student may be re-examined only once. This examination must take place by the end of the student's third academic year, on a date scheduled by the student's Ph.D. advisory committee. Once the examination date has been set, the student must petition his/her Ph.D. advisory committee to change the examination date for the proposal. Failure to complete the proposal examination by the scheduled date or failure to petition the Ph.D. advisory committee for a change in the examination date will be recorded as a failure.

Continuation--When a student has satisfied both phases of the preliminary examination, the chairman of the graduate committee will notify the faculty of the admission of the student to Ph.D. candidacy. If a student is considered to have failed, the chairman of the graduate committee will report the examination committee's recommendation.

Final Examination

For both M.S. and Ph.D. students, the final examination will normally be a public presentation of at least 20 minutes duration, followed by a closed examination. Any member of the graduate faculty may participate in the examination. Members of the examination committee will be given the first opportunity to question the candidate, and other faculty present will be given subsequent opportunities. The possible outcomes of the final examination are unconditional pass, pass upon rectifying deficiencies, and fail. A further description of these scenarios can be found in the Graduate Bulletin.

Selection of A Research Advisor (Originally Approved 7/10/90)

Preamble

The graduate committee was charged with producing new guidelines for the selection process by the end of the spring semester. The main focus of these guidelines is to encourage the turnover of TA's to RA's while still ensuring that faculty who are actively trying to support their students are able to maintain a research group. This has been achieved by including a system to determine the eligibility of faculty members to take on new students. It should be emphasized that faculty members with students on TA's are expected to attempt to obtain external support for these students. Also, the selection process has been streamlined while still trying to ensure that students and individual faculty desires are met, if at all possible.

Normally, incoming students would enter the program on a TA. Admission of a student directly on an RA would only occur under extreme circumstances when a faculty member has RA support but not student(s) to take up the position(s). RA offers may only be made after offers are out for all available TA positions and the students must be admissible to the program. The faculty member needs to take extra care in choosing students for the RA positions because a long-term commitment is involved and expected.

1. The graduate committee chairman serves as the academic advisor for all new students. After a thesis advisor has been selected, that person will serve as academic advisor. Selection of a research advisor will normally be accomplished in early December, but no later than the third month of the student's second semester in residence. Students without previous graduate experience will be expected to interview all active and eligible research faculty. The graduate committee may allow more limited interviewing by students with previous graduate work. The selection of an advisor will be made only with the mutual agreement of both the advisor and student.
2. After the fourth week of the Fall semester, graduate students will be given a list of those faculty who are eligible to take on students and those who may become eligible in time, depending on the outcome of pending proposals. Faculty eligibility will be determined by the attached formula.
3. Students will then individually discuss research with all eligible faculty. Departmental functions where faculty and students can interact in an informal setting should be planned.
4. Students will list their preference (1, 2, 3) for research advisor and submit this list to the graduate committee chairman. Students must interview with all eligible faculty to validate their selections.
5. Individual faculty members will receive the student choices and then select students who had them as first choice up to the maximum number allowed.
6. Unassigned students will be notified and the individual faculty members will select students who had them as second choice up to the maximum number allowed.
7. If necessary, this selection process could continue until the third choice.
8. These guidelines should be periodically reviewed by the faculty to ensure the desired effects are achieved.

Selection of the Advisory Committee

Both M.S and Ph.D. students, with the assistance of their thesis advisor, should select an advisory committee by the end of their first complete year. The make-up of this committee will be reported to the graduate committee. This advisory committee should meet with the student on a yearly basis to monitor progress, plan the cumulative exam schedule and conduct proposal defense examinations for candidacy.

Committee Composition

In general, the composition of most students graduate committees is outlined by the Graduate Bulletin. The following are guidelines for reasonable implementation.

M.S. Reading Committee-Advisor plus second reader.

M.S. Final Exam Committee-Formally appointed by the Dean of the Graduate School. Must include three members of the graduate faculty. The chairman of the graduate committee, in consultation with the advisor and second reader, will recommend the composition of the final examination committee to the Dean of the graduate school.

Ph.D. Advisory Committee-Formally appointed by the department chair or graduate program director. Consists of a student's major advisor plus two other department members. One member of this committee must be from an area of chemistry other than the student's major division.

Ph.D. Preliminary Exam Committee-Formally selected by the department. Consists of at least three members (the Advisory Committee can serve this function). The primary task of this committee is to conduct the research proposal phase of the preliminary examination and to certify that the cumulative examination requirement has been satisfied.

Ph.D. Reading Committee-The advisory committee.

Ph.D. Final Exam Committee-Formally appointed by the Dean of the graduate school. Consists of the following five members of the graduate faculty: 1) the major department chair, 2) the student's major advisor, 3) another member of the major department, 4) a representative from a related area (may be from within or outside the major department, 5) a member from outside the major department who represents the Graduate Council and chairs the committee. The chairman of the graduate committee, in consultation with the advisory committee, will recommend the composition of the final examination committee to the Dean of the graduate school.

Graduate Course Requirements

- I. M.S. and Ph.D. Students-First year graduate students must register for two hours of dissertation research in their second semester. They will conduct research under a prospective thesis advisor in order to receive satisfactory credit for these hours. Failure to complete this course requirement will be viewed as unsatisfactory progress toward the degree (U for any research credit that semester).
- II. M.S. Degree-The Graduate Bulletin requires 30 hours of graduate credit course work. No more than 6 hours may be research, and at least 12 hours must be at the 700 level or above. A common selection by our students has been:

Four 700 level courses (excluding research)
Three or Four 600 level courses
Two semesters of Thesis research

At present, our 700 level course offerings are scheduled such that all students are required to distribute their course selection over at least two divisions of chemistry; many take courses in more than two divisions.

The graduate committee does not recommend changing this system, nor do we recommend making it more specific. To a considerable extent, this course requirement accomplishes the goal of a "core curriculum" without the rigidity of a specified core.

Students are to keep the graduate committee informed of their course selection, so that the overall program will have the implicit approval of that committee. As a guideline, the Graduate committee is to require that all M.S. student's academic programs continue to be broad in scope and not become very narrow or highly specialized.

- III. Ph.D. Students-No specific course requirement exists for the Ph.D. degree. Academic programs are to be planned by the student's advisory committee and approved by the graduate committee. Such a plan will be submitted to the graduate committee by the end of the student's first year, and will usually consist of at least six courses beyond the baccalaureate degree. As a guideline, the graduate committee is to require that Ph.D. academic programs be broad in scope and not become narrow and highly specialized.

Expectations dictate that the required course work will normally not extend much beyond the second year of study. The scope of required work should be broad enough and of sufficient quantity to facilitate transfer to the M.S. program if it is deemed desirable by the student's Ph.D. advisory committee and the graduate committee during the students second or third year.

The Graduate Bulletin requires training in at least one area besides the major area of specialization. To satisfy this requirement, the graduate committee will normally require at least one course outside of the student's major area of specialization.

A graduate student in the M.S. track who has qualified and maintained a "B" average in graduate courses may transfer to the Ph.D. track. If so, the student should write a formal letter to the graduate committee chair requesting permission to enter the Ph.D. program. This should normally be done no later than the

first semester of the student's second academic year. The graduate committee will then decide whether or not to grant permission and inform the student of its decision.

- IV. Part Time M.S. and Ph. D. Students-Qualified part time M.S. and Ph.D. students can be admitted to the program. Degree requirements will be the same for these students. A modified time-table for completion of the degree requirements should be proposed by the advisory committee and approved by the graduate committee.

Transfer of Graduate Course Credit

Transfer credit could be granted in exceptional cases determined by the chemistry faculty. Exceptional would mean that a student has had a similar course recently and has done extremely well (A grade) and has scored very well on the placement exam in that subject.

Seminar Requirement

All graduate students are expected to attend the regular departmental seminar program. Students in the Ph.D. program are required to present at least two departmental seminars. One of these presentations, presumably made near the end of the student's course of study, can be their dissertation defense (final examination). The other earlier presentation may be based on a literature search.

Financial Support of Continuing Students

Full time Ph.D. students in good standing are guaranteed support from the department if necessary for their first five years. If a Ph.D. student needs departmental support after their fifth year in residence, the following procedure should be followed. The student, after consulting with their thesis advisor, should present this request to the student's advisory committee. The advisory committee will then make a recommendation on further support to the graduate committee. The graduate committee will then make a recommendation on further support to the department chair who would make the final decision on the request. Full time M.S. students are guaranteed support from the department for two years.

Miscellaneous Policies

1. For the academic year, RA stipends are to be no larger than the departmental TA stipend. The summer RA stipend is not to exceed the limit determined by the graduate committee each year.
2. It is expected that Ph.D. students will gain some teaching experience. Normally, this will be accomplished by serving as a TA for at least one year.
3. MD/Ph.D. students may be admitted to the program. For admission, these students must be determined acceptable by both the graduate committee and by the medical school. Such students must fulfill all the normal requirements for the Ph.D. degree. Normally, these students will take general medical school courses during their first two years and then complete the Ph.D. requirements in their third, fourth, and fifth years. These students can be supported as either TA's or RA's.