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

First Approved 5/81
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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. The chair of the graduate committee or his/her designee will prepare and grade these exams and report the results to the graduate committee. 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 50^{th} 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. Students holding master's degrees in chemistry or a related science may waive this requirement with permission of the graduate committee. 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 4 of 5 areas by the beginning of their fourth academic semester in residence. However, if no qualifying course has been given in the allotted time, the student may receive an extension. 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.

Selection of a Research Advisor

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 at the end of the first semester in residence, but no later than the end of the student's second semester in residence. Students must register for three hours of research credit under the chair of the graduate committee. To earn this credit, the students must attend research presentations by those in the faculty who wish to make them, attend weekly departmental seminars and other seminars arranged by the graduate committee.

2. After all faculty presentations are made, 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 at least three eligible faculty. Students may work in research labs on a temporary basis (i.e. rotations) so long as they do so with at least two faculty for not less than six weeks.

4. Upon completing these interviews and rotations, the student may submit their preference (1, 2, 3) for research advisor and submit this list to the graduate committee chairman.

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 academic year. The make-up of this committee will be reported to the graduate committee for approval. This advisory committee must meet with the student at least once per year to monitor progress, plan the cumulative exam schedule and conduct proposal defense examinations for candidacy. The result of the committee meeting must be reported to the chair of the graduate committee.

Committee Composition

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

M.S. Reading Committee-Advisor plus second reader. Selected by the student and advisor with approval from the chair of the graduate committee.

M.S. Final Exam Committee-Generally selected by the student but requires approval of the Dean of the Graduate School who formally appoints the commitee. The committee must include three members of the graduate faculty.

Ph.D. Advisory Committee-Generally selected by the student and advisor but composition requires the approval of the graduate committee chair. If the chair declines a committee, the student may appeal to the graduate committee as a whole. The committee should consist of the student's 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. The advisory committee will also serve as the student's Preliminary Exam and Reading committee.

Ph.D. Final Exam Committee- Generally selected by the student but requires approval of the Dean of the Graduate School who formally appoints the committee. The committee should consist 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. Except under extraordinary circumstances, the committee should include all members of the Ph.D. advisory committee.

Committee Meetings

In order for a student to be considered in good standing, they must meet with their committee at least one time per calendar year (meetings may occur in summer). It is the responsibility of the student to schedule these meetings and of committee members to attend. However, should a committee member wish to call a meeting, it shall be their right. Committee meetings are intended to both assist and exam the student and ensure that they are making progress toward their degree. The following schedule is prescribed, although meetings may be held more often if either the committee or student wishes.

No later than September 1 (or January 1 in case of students who begin their studies at Wake Forest in the spring semester) of second year in residence: At this meeting, a general course plan and cumulative exam schedule will be set. The student is expected to present to the committee the preliminary hypothesis and goals of their project and answer questions from the committee on these goals.

No later than September 1 (or January 1 in case of students who begin their studies at Wake Forest in the spring semester) of third year in residence: A short pre-proposal (2-5 pages) describing the proposed thesis project will be given to the committee at least 10 days prior to the meeting. At the meeting, the committee will ask questions about the rationale, progress and contingencies of the project as well as fundamental questions

related to the work. The student should have a clear idea of why the project is being done and how it will be accomplished. The student should be familiar with literature relevant to the project.

The committee may determine that the student is unprepared to proceed to the dependent proposal and prescribe some remedial action (course work, literature review, etc.). In this case, the student may return to this meeting within three months.

If the committee decides that the student is prepared to proceed with the dependent proposal, the student may proceed to write the dependent proposal (see instructions for this below) and must defend that proposal six months after the pre-proposal meeting (plus or minus 30 days).

Should the student fail the first attempt at passing the dependent proposal, they may re-take the exam one time, no sooner than 60 days following the failed exam.

No later than September 1 (or January 1 in case of students who begin their studies at Wake Forest in the spring semester) of fourth year in residence: The student must have passed a dependent proposal. Failure to do so results in a PhD student moving to the MS track. The first dependent proposal exam must occur 6 months (plus/minus 30 days) after the pre-proposal meeting is passed. The dependent proposal should serve as a rigorous preliminary exam. It is expected that the student be able to defend the project in terms of rationale, goals and possibility of success as well as answer detailed questions concerning fundamental aspects of the work.

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 the dependent proposal. These requirements must be completed by the beginning of the student's fourth academic year. The graduate committee may grant exceptions to this time schedule after petition by the student.

Cumulative Examinations--Cumulative examinations will be offered five times during each academic year on dates on dates determined by the faculty member administering the exam. 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 and with subsequent graduate committee approval.

Dependent proposal:
Students must register for Chm 889/888 in the spring semester of their third full year in the graduate program. The grade for this course will be assigned by Ph.D. examination committee based on the performance of the student in writing a proposal in the format of an NSF or NIH proposal based on their Ph.D. research project and an oral examination of the student by the committee. The date of the examination will be set by the committee and the student must provide the committee with a copy of their proposal two weeks before the examination date. The grade reported must be either P or F. Should the student fail the course, he/she may re-take the course the following semester. Failure to pass the course on a second try must result in the student moving to a MS track or leaving the program.

Chm 889/8 may also include any course material or meetings determined necessary by the graduate committee.

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.

Additional Requirement

Prior to completion of the Ph.D., students must complete on of the following requirements:

1) An “Independent proposal” will focus on a topic different from the student’s thesis project (but may be in the same general field) approved by the student's Ph.D. advisory committee. The independent proposal must be separated from both dependent proposal and Ph.D. final examination by no less than six months.

The student will present a brief written proposal and an oral presentation to the examination committee. This proposal must be written either in the style of an NSF or NIH proposal. An examination of the proposal will follow the oral presentation. The examination committee passes or fails the student based on the originality,

experimental design and student's ability to respond to criticism and defend the proposal. The committee then 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 2 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 fourth 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 which must result in the student either entering the MS track or leaving the program.

2) Students may present a literature review on a research area not directly related to their own research and approved by the examination committee. The review must be separated from dependent proposal exam and final examination by no less than six months. The review should be not more than 15 pages in length and followed by a public seminar on the topic of not less than 30 minutes length. The examination committee will then assign a grade (P or F) to the review. Failure to complete this requirement by the end of the fourth academic year or assignation of a failing grade by the committee shall result in the student entering the MS track or leaving the program.

Final Examination

For both M.S. and Ph.D. students, the final examination will normally be a public presentation of at least 30 (M.S.) or 45 (Ph.D.) 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.

The final examination must be separated from the independent proposal exam or literature review seminar by no less than six months.

Graduate Course Requirements

I. 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.

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 guidline, 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.

II. Ph.D. Students- Academic programs are to be approved by the student's advisory committee. Such a plan will be submitted to the advisory committee by the end of the student's first year..

Expectations dictate that the required course work will normally not extend much beyond the third 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.

III. 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 must register for Chm 681 or 682 in the first semester of residency in the program.

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. Ph.D. students must complete two semesters at a teaching assistant prior to graduation.

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.

4. The primary purpose of the Dean’s Fellowship is the recruitment of new graduate students. If the Fellowship cannot be used for this purpose, the Fellowship will be awarded to the outstanding students who have completed their first year of study based on GPA, qualifying exams, and first-year cumulative exam passes. The chair with consultation of the committee will select these students based upon these criteria.

5. Students will be eligible for TA support from the Department of Chemistry only if they are a graduate student in Track II as defined by the Wake Forest Graduate School. Students whose degree requirements are in another WFU department for which Chemistry faculty have a joint appointment may work in the department but be ineligible for TA support.

6. Students not found to be in good standing are ineligible for financial support.

Appendix I. Department Policy on Activities Providing External Remuneration

University guidelines

"A student supported on a stipend from the graduate school, faculty grant, student fellowship or other sources may be allowed to engage in additional remunerative work with written permission from his or her advisor and as long as it does not delay or interfere with the duties required for timely completion of the degree" – (WFU Graduate Bulletin 2014/15, page 24)

"Contingent upon the availability of Graduate School funds, financial support will continue throughout the academic year as long as you enroll full-time, make satisfactory progress in research, and remain in good academic standing according to the standards set forth by the Graduate School and the program."

"You will not be allowed to engage in any outside remunerative work without permission from the department. Support will be discontinued if you leave, graduate, or fail to meet academic or work standards." – (excerpts from WFU graduate school financial support letters sent to full time students).

General considerations

Chemistry graduate students may seek (i) paid internship opportunities to acquire relevant skills for advancing their professional careers and/or (ii) additional remuneration through tutoring and other activities unrelated to their degree. Engagement in such activities requires permission from the student's research advisor/principal investigator and advisory committee members. If the student's stipend is sponsored by a research grant or fellowship, extra remuneration should be in compliance with the bylaws of the funding agency. These activities should not interfere with existing Graduate Teaching Assistantship (TA) or Research Assistantship (RA) duties or compromise the candidate's progress towards completion of the degree. To become eligible, continuing graduate students must be in good academic standing, based on minimum GPA and specific degree requirements as implemented by the Graduate School Bulletin and the Chemistry Department's PhD/MS degree guidelines.

Internships

Full-time students may seek permission to participate in internships. Students receiving a stipend (TA, RA or fellowship) during the prospective term of the internship must submit an one-page letter of intent stating the reason why they are seeking this opportunity and how it will complement or augment their training and/or career preparation. Applicants should submit a one-page proposal describing the proposed activities and a tentative schedule of internship hours (max. 10h/week) along with the petition form for external remuneration signed by advisor and committee members. Internship opportunities involving more than 10h/week may be also granted if justification is provided.

Activities will be typically approved for the duration of one semester. Applications should be submitted to the graduate program director in advance of planning and initiating internships. The Graduate School will be notified of any paid internships for the purpose of effort reporting.

Paid-tutoring activities

Graduate students may be granted a request to provide tutoring services. These activities should not produce conflicts with RA and TA duties. The days and number of hours of these activities should be discussed and approved by the research advisor. The petition form for external remuneration is not required in this case. Tutoring should be held outside the chemistry department. Teaching assistants are not allowed to provide paid tutoring to students in any lecture or lab course associated with their assigned lab sections. For example, CHM223L TAs are not allow to tutor any CHM223 lecture or lab students.

Chemistry Department – Wake Forest University
Petition Form for External Remuneration

Name: _____ e-mail:_____

Advisor: _____ Academic term:_____

Stipend support (RA/TA), if RA indicate funding source:_____
Is this funding source allows extra remuneration? (Y /N)
If yes, explain:

Description of activities associated with external remuneration:

Estimated number of hours a time (max hours/week):

Location:

Degree Requirements

Completed courses: (include course number and name)

Ongoing courses: (include course number and name)

Cumulative exams: (include date, exam title, and result –P/F)

Dependent proposal (date)

Independent proposal (date)

Last committee meeting (date)

Student signature: _____

Advisor signature: _____

Advisory committee members:
Name: _____ Signature: _____

Name: _____ Signature: _____

Provide a copy of the signed form to the graduate program director, advisor, and committee members

Appendix II - Eligibility of faculty for TA support in their research group

At the start of the Fall semester the eligibility of the faculty to take on students will be determined according to the following equation:

TA_{max} = X- TA (current)

where

TA (current) = number of students you have on TA for the current academic year

TA_{max} = maximum number of students from the current incoming class which you are eligible for rounded down to the nearest integer if necessary

And where X is determined as follows:

X = 5.0 for assistant professors in the first 4 years of their appointment.

X = 3.5 for faculty with or without TAs in the current year who have submitted, in the past 12 months, proposals to support RAs. For faculty with TA's, the submitted proposals and/or ongoing support must attempt to cover all TAs in the lab.

X = 1.5 for all other faculty.

A faculty member may take a maximum of two students in one academic year if the incoming class (TA's) is less than eight and a maximum of three if the incoming class is less than twelve.

Note: If a student joins a lab in the spring semester, the formula must be recalculated based on new information (students joined in the fall, students graduating or leaving the program, or funding changes).

Statement of Understanding of M.S. and Ph.D. Program requirements
Department of Chemistry, Wake Forest University

I, _____ (student's name) have read and understood the outline describing the graduate program department and degree requirements.

Date: ___/___/___

Signature: _____

Detach this page from the document and return this signed form to the graduate program director.