

# Graduate Student Policies for the MS and PhD Programs in Chemistry

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## 1. General Information

The Department of Chemistry and Biochemistry (hereinafter abbreviated C&B) offers Master of Science (MS) and Doctor of Philosophy (PhD) degrees in both Chemistry and Biochemistry. Major areas of specialization are: analytical chemistry, inorganic chemistry, organic chemistry, physical chemistry, biochemistry and molecular biology. Other curricula, such as materials chemistry or chemical physics can be arranged within one of these specializations. ***The purpose of this document is to present the academic and research requirements as well as the procedural regulations of the NDSU Graduate School and the Department of C&B for students in the MS and PhD degree tracks in Chemistry.***

Student progress toward the MS or PhD Degrees in Chemistry is monitored throughout the student's tenure by the Department of C&B's Graduate Student Progress Committee (hereinafter designated GSPC). The GSPC functions as the Graduate Program Supervisory Committee until a student's Advisory and Examination (A&E) Committee has been established and approved by the Dean of the Graduate School. The GSPC comprises one representative from each major area of study in the Department of C&B. The GSPC will notify students annually of their status with regard to the degree requirements in an effort to help them stay on the appropriate time line, which is set forth herein and summarized for the MS and PhD tracks in sections 19 and 20, respectively.

Under extenuating circumstances, deviation from the regulations set forth in this document may be requested by the graduate student via a written petition to the Department Chair, with a copy to the GSPC Chair. If an A&E Committee has been approved by the Graduate Dean at the time of petition, it should first be discussed at a meeting of the student's A&E Committee. Based on that discussion, a recommendation from the A&E Committee Chair should also be sent to the Department Chair.

## 2. Admission Classifications for Graduate Students

Graduate students may be admitted under one of the following classifications:

- Full Graduate Standing. These students have met the admission requirements for both the Department and the Graduate School.
- Conditional Graduate Standing. These students do not meet all admission requirements (e.g., undergraduate GPA of 3.0), but they show potential for successful graduate study.

A student can neither have a program of study approved, nor become a candidate for a graduate degree until they have achieved full graduate standing. Students who are admitted with conditional graduate standing should verify with the Graduate School that their conditional status has been resolved before submitting their plan of study. Eligibility of students with conditional graduate standing for graduate assistantships will be

determined by the Department, contingent upon approval by the Dean of the Graduate School.

### **3. Scholarship Standards for NDSU Graduate Students**

In fulfilling graduate course requirements on any Plan of Study, only grades of A, B, or C are acceptable. For Master's Thesis (798) or Doctoral Dissertation (899), which are evaluated as "Satisfactory" (S) or "Unsatisfactory" (U), only the grade of S is acceptable. For Seminar (790), only grades of A, B, C, or S are acceptable for graduate credit.

All courses evaluated by the grades A, B, C, D, or F are used in calculating the grade point average (GPA.) If a course has been repeated, both grades will appear on the transcript, but only the second grade will be used in calculation of the GPA. A specific course can be retaken only once, and a maximum of three courses may be retaken.

While some graduate courses may count for graduate credit with a grade of C, more than two grades of C or below may be grounds for dismissal from the program if the students A&E Committee and the Department Chair are in agreement.

In order to maintain Good Graduate Standing and to receive a graduate degree, a student must maintain a cumulative GPA of at least 3.0.

Any student in Good Graduate Standing whose cumulative GPA drops to less than 3.0 at any time during their tenure is automatically placed on academic warning. Any student admitted with Conditional Graduate Standing because of a GPA deficiency is subject to dismissal from the program if their first-semester GPA is less than 3.0. A student on academic warning who fails to achieve a cumulative GPA of at least 3.0 by the end of the subsequent semester of enrollment will be placed on academic probation.

A student on academic probation may not continue in their graduate degree program without a waiver from the Dean of the Graduate School, pursuant to a recommendation from the Department Chair. This recommendation must include a review of the student's status and a proposed recovery plan that will assist in the student's return to Good Graduate Standing within the following semester. If the cumulative GPA is not at least 3.0 after an additional semester, the student in question will be dismissed from the graduate program.

A student on academic probation is ineligible for the tuition waiver and may be ineligible for a graduate assistantship. International students should be advised that loss of their assistantship may impact their U.S. Visa status.

### **4. Academic Evaluation Test and Initial Academic Advising**

During the week preceding registration, all new graduate students are required to take an Academic Evaluation Test (AET) covering undergraduate subject material in

Analytical, Inorganic, Organic, and Physical Chemistry, as well as in Biochemistry and Molecular Biology (a total of six subject sections). Each subject section of this exam comprises twenty (20) multiple choice questions. Students with a reasonable command of skills and concepts presented in a typical undergraduate chemistry and/or biochemistry curriculum should be able to pass the exam. The results of the AET are used in conjunction with other information concerning the student's background to assess any deficiencies in their chemical and biochemical knowledge base. A copy of each student's AET results will be placed in their Department file. Any student holding a Master's Degree from an American or Canadian University may be excused from the AET based on graduate course work in these areas. Requests for such special consideration must be submitted in writing to the Department Chair with a copy to the GSPC Chair.

Students are required to pass three (3) of six (6) subject sections of the AET with scores of  $\geq 70\%$  by the end of their first academic year (second semester). One of the three sections must be outside the student's primary discipline. In other words, chemistry students must pass either the biochemistry or the molecular biology section, whereas the biochemistry students must pass one of the four chemistry sections. The AET will be administered by the GSPC three times during the academic year (August, January and May). Students may attempt to satisfy this requirement any time the AET is offered during their first academic year in the degree program. Receiving a grade of at least a B in the following courses will also satisfy as a pass of the corresponding AET subject:

<b>AET Subject Section</b>	<b>Course Number</b>
Organic Chemistry	CHEM 341 or 741
Inorganic Chemistry	CHEM 625 or 725
Analytical Chemistry	CHEM 632 or 732
Physical Chemistry	BIOC 665 or 765
Biochemistry	BIOC 660 or 701
Molecular Biology	BIOC 674

Failure to prove competency in three of six sections (vide supra) by the end of the second semester in the program will trigger an appropriate adjustment to the student's Plan of Study by the GSPC. That adjustment could include addition of remedial courses and/or a change from the Chemistry PhD to the MS track.

Prior to registering for the first semester of courses, each new student will meet with the GSPC for academic advising. The Committee will recommend a program of study for the first academic year based upon:

- performance on the Academic Evaluation Test,
- previous academic record, and
- a personal interview with the student.

The GSPC may recommend that a student register for an undergraduate course, either as an unregistered audit, or for credit. If an unregistered audit is recommended, then the student will be required to:

- attend lectures regularly,
- take all examinations in the course, and
- earn a grade of A or B for the course.

A memo from the instructor indicating the student's final letter grade will be placed in the student's file.

Other approaches to removing deficiencies are possible. For example, the student could enroll in a 600- or 700-level graduate course in the area of their deficiency. Earning a grade of A or B removes the deficiency with no further action required. Alternatively, the student can study and retake the relevant section(s) of the AET. A passing score will removed the deficiency with no further action required.

While it is desirable to remove deficiencies during the first year of graduate study, scheduling of certain courses may require that the time be extended to a second year. The assessment of whether or not a student has in fact removed a deficiency must be discussed at the student's first and second A&E Committee meetings and underscores the importance of such meetings. It is the responsibility of the student's Committee to decide whether deficiencies have been removed, and it is their prerogative to postpone or decline advancement to candidacy.

Students must recognize that graduate courses are taught with the assumption that all those enrolled have the appropriate background to succeed in the course. Any student who enrolls in a graduate course for which the prerequisite overlaps with one or more demonstrated, unresolved deficiencies should understand that it is their responsibility to gain command of the requisite background concepts such that they can keep up with the course.

## **5. Credit Load**

According to North Dakota State Board of Higher Education policy, a nine-credit academic schedule is considered to be a full-time load for graduate students who do not hold assistantships. Students holding a normal ( $\frac{1}{2}$ -full-time equivalent, FTE) teaching or research assistantship and carrying five or more credits are considered full-time students. Graduate teaching and research assistants on these regular appointments should register every semester, including the summer session, for a minimum of five credits comprising didactic courses, research, and seminar. Graduate assistants on other percentage appointments would adjust their academic load proportionately. Graduate assistants wishing to register for more than ten academic credits in a regular semester shall secure the approval of the Department Chair, and the Graduate Dean before registering.

For international students to maintain proper immigration status, six credits are required if the student holds a ½-FTE assistantship. Only when all courses are completed may international students register for fewer than six research credits to maintain proper immigration status.

## **6. Selection of Advisor and Members of the Advisory and Examination Committee**

By the end of the first semester in residence each graduate student should choose, by mutual agreement, a faculty mentor (i.e. advisor). This agreement should be conveyed, for final approval, to the Department Chair using the Departmental Mentor Form, which may be found in electronic format on the C&B web site. The GSPC Chair should receive a copy of this form. In making this decision, the student is responsible for becoming familiar with the research programs of the various faculty members.

Before the end of the second semester of enrollment, the student, in consultation with his or her advisor, will establish an Advisory and Examination (A&E) Committee. Until such time, the Graduate Student Progress Committee will fulfill the advisory role. The A&E Committee will be responsible for advising the student in preparing a Plan of Study, reviewing the student's progress at least annually, and administering the comprehensive and other oral examinations.

The A&E Committee will consist of at least four members of the NDSU graduate faculty. The major advisor will serve as the chair of the student's A&E Committee. The student and their advisor shall agree upon three additional Committee members:

- one from the student's area of specialization, typically from C&B
- a second from the Department of C&B, and
- a third from outside the Department of C&B, subject to approval by the Graduate Dean.

Additional Committee members having expertise in the student's research area may also be appointed. These additional members need not be members of the NDSU graduate faculty.

The A&E Committee, agreed upon by the student and their advisor and approved by the Department Chair and the academic Dean (College of Science and Mathematics), shall be recommended to the Dean of the Graduate School for approval and formal appointment. Once the Committee has been constituted, each member shall have an equal voice in Committee recommendations and equal vote in Committee decisions.

## **7. Annual Meetings and Assessment of Progress in the MS and PhD Programs**

Students must, barring extenuating circumstances, meet with their A&E Committee at least once annually until their final defense. The emphasis of these meetings will vary, according to the student's status in their degree program. Each student must assemble their A&E Committee after joining a research group and must meet with the

Committee for the first time during the second semester in residence. The principal purposes of the first meeting will be to

- review the student's academic standing,
- approve the student's plan of study and
- provide the student an opportunity to introduce themselves and their thesis research to the A&E Committee.

The second meeting will typically occur late in the third semester or early in the fourth semester in the program. The purposes of this meeting will be to

- provide the student an opportunity to present a brief summary of their early research progress and
- have the student present two white papers (mini-proposals) describing their ideas for the original research proposal. See §11 for details of this meeting.

The third and fourth meetings will typically occur during the spring semesters of the respective years in residence. The principle purpose of these meetings will be evaluation of the student's research progress. At the fourth meeting, the Committee will expect a discussion of the time line to the final defense. The fifth meeting will typically be the final oral exam, details of which are discussed in §17.

Following each annual meeting, the Committee will generate a report that documents the student's progress toward achieving each of the seven non-didactic program outcomes. Progress toward each outcome will be scored from 0 to 4 and a composite (average) score will be reported. Additionally, certain external indicators of progress, such as conference presentations, authorship on peer-reviewed publications and whether the student has participated in outreach activities will be noted. Based on the student's score and how it compares with previous progress/performance, the Committee will make a program recommendation and provide clear narrative feedback explaining the student's strengths and weaknesses. The student will receive a copy of the report within three days of the meeting, whereupon it will also be deposited in the student's department file.

It is important that student scores increase after each annual Committee meeting. Two failures to improve at any time during their tenure as a graduate student will be grounds for dismissal from the program, regardless of whether or not they have advanced to candidacy.

Any student in the MS track (due to either the student's original selection of this degree program, or to action of the A&E Committee) may, upon successful completion of the MS degree, and with the approval of the student's A&E Committee and the Department Chair, enter or re-enter the PhD track. All graduate level courses and the AET will count towards the PhD Program. Any student receiving a Master's Degree in the Department and continuing on for a PhD must meet the AET requirement by the end of the second semester after entering the PhD track. The student must pass both the written and oral components of the comprehensive exam (vide infra) by the end of the sixth semester after entering the PhD track.



Any decision made by the student's A&E Committee may be appealed first to the Department Chair, who will consult with the Graduate Student Progress Committee. If the student feels that fairness has not been served by this first appeal, a second appeal may be made to the Dean of the Graduate School.

The GSPC will periodically review the files of all graduate students and inform the Department Chair of students who are not in compliance with graduate regulations (*vide infra*). The chair of the Department of C&B will issue a warning and give the student one semester to bring themselves into compliance. If the student's lack of compliance remains at the end of that semester, then the student's assistantship will be reduced to  $\frac{1}{4}$  FTE. If at the end of the next semester the deficiency remains, then the student's stipend will be withdrawn. This policy applies to the following regulations: (i) annual A&E Committee meetings, (ii) Plan of Study, (iii) required seminars, (iv) miniproposals, (v) written comprehensive examination and (vi) Defense of an Original Proposal (Oral Comprehensive Exam). International students should be advised that reduction and/or loss of stipend may impact their U.S. Visa status.

## **8. Plan of Study**

The graduate student, in consultation with their A&E Committee, must file a Plan of Study with the Graduate School before the end of the second semester in residence, exclusive of the summer term. If for any reason the student is ineligible to file a Plan of Study with the Graduate School (*e.g.*, the student has been placed on probation), the student must file an unofficial Plan of Study with the GSPC by the end of the second semester in the program.

The Plan of Study shall be appropriate to meet the interest and needs of the student's chosen field, as determined by the A&E Committee and approved by the Department Chair and the Dean of the Graduate School. The Plan of Study becomes official only after all approvals have been granted.

A maximum of 12 credits may be transferred from another institution via the petition process into a student's Plan of Study. The Graduate School specifies that all transfer credits must: (i) have been earned from a U.S. or Canadian institution that is accredited to offer graduate courses and degrees (credits from international institutions are transferable only after examination and approval by the A&E Committee, the GSPC and the Department Chair), (ii) carry grades of A or B, (iii) have been earned within a ten year period at the time of the final examination, (iv) be clearly graduate level (credit from courses listed in both graduate and undergraduate curricula are not transferable), (v) not be from continuing education, correspondence, extension, or workshop courses, (vi) not be from internship, individual study, special problem, or research disquisition courses, or courses graded pass/fail or Satisfactory/Unsatisfactory, (vii) not have been used to fulfill the requirements of a baccalaureate degree, (viii) be verified by an official transcript, and (ix) not be used in calculation of the NDSU graduate grade point average.

The Plan of Study may be revised as necessary. Revisions must follow the same approval process as the original Plan of Study. If revisions occur prior to the oral comprehensive exam, the revised Plan of Study must be submitted for approval by the end of the third week of the fourth semester in residence (*i.e.*, spring semester of the second year). This revised Plan of Study, the proposal topic and content, and fundamental principles, concepts, and knowledge base applicable to a particular discipline will be the basis for the oral comprehensive exam and defense of an original proposal (Section 11).

## 9. Curricular Guidelines

### 9.1 PhD in Chemistry

Candidates for the PhD Degree in Chemistry are required to earn at least 90 semester credits, which can include credits for seminar and research. Students in the Chemistry degree programs must successfully complete the six didactic courses listed below, which total 19 credits. The four advanced survey courses are considered to be the core of the curriculum. They will typically be completed during the first two semesters of the program, exclusive of summer terms. This time line can be extended to the second year when academic deficiencies must be eliminated as a prerequisite to enrolling in one or more of the core courses.

- |            |  |           |
|------------|--|-----------|
| • CHEM 720 | <i>Introduction to Research</i>                | 2 credits |
| • UNIV 720 | <i>Scientific Integrity</i>                    | 1 credit  |
| • CHEM 725 | <i>Advanced Survey of Inorganic Chemistry</i>  | 4 credits |
| • CHEM 732 | <i>Advanced Survey of Analytical Chemistry</i> | 4 credits |
| • CHEM 741 | <i>Advanced Survey of Organic Chemistry</i>    | 4 credits |
| • CHEM 759 | <i>Advanced Survey of Physical Chemistry</i>   | 4 credits |

The remaining 71 credits required for graduation will be earned through three semesters of seminar (CHEM 790), dissertation research (CHEM 899) and elective courses numbered in the range of 601 to 789. Elective graduate courses in chemistry may be taught from time to time. Additionally, students may elect to enroll in appropriately numbered graduate courses from other programs (e.g. Biochemistry, Materials & Nanotechnology, Coatings and Polymeric Materials, Microbiology, Physics, Math, etc.) Enrollment in these courses will be by mutual agreement between the student, their advisor and their A&E Committee. The A&E Committee may *require* one or more courses in addition to the core curriculum if it deems them necessary to building the student's research expertise.

A student matriculating with a Master's Degree, including one earned at an international institution, must earn not fewer than 60 graduate credits at NDSU, including the six courses listed above. Elective courses numbered 601-689 may be used for the Plan of Study as long as they have not been taken in an undergraduate or previous graduate program. Approved CHEM courses are 625, 626, 627, 628, 628, 630, 632 and 665; approved BIOC courses are 660, 673 and 674.

## **9.2 MS in Chemistry**

Candidates for the MS Degree in Chemistry are required to take a minimum total of 30 semester credits, which can include seminar (CHEM 790) and Master's Thesis Research (CHEM 798). In the fulfillment of that 30-credit minimum, students must take the six courses listed under the first paragraph of §9.1. Elective courses carrying CHEM or other relevant designations numbered from 601 to 689 may be used for the Plan of Study as long as they have not been taken in an undergraduate or previous graduate program. Approved CHEM courses are 625, 626, 627, 628, 630, 632 and 665; approved BIOC courses are 660, 673 and 674. Elective courses numbered from 701 to 789 may also be included in the plan of study upon mutual agreement among the student, their advisor and their A&E Committee. The number of research credits (CHEM 798) applied to the MS Degree must be at least 6, but cannot exceed 10.

Any student in the MS track (due to either the student's original selection of this degree program, or to action of the A&E Committee) may, upon successful completion of the MS degree, and with the approval of the student's A&E Committee and the Department Chair, enter or re-enter the PhD track. All graduate level courses and the AET will count towards the PhD Program. Any student receiving a Master's Degree in the Department and continuing on for a PhD must meet the AET requirement by the end of the second semester after entering the PhD track. The student must pass both the written and oral components of the comprehensive exam (*vide infra*) by the end of the sixth semester after entering the PhD track.

## **10. Departmental Seminars**

### **10.1 MS Students**

A minimum of two departmental seminar presentations is required for the MS Degree. The first seminar is typically delivered during the third semester in residence (hereinafter designated the second-year seminar). The seminar shall be based on the refereed literature and typically, although not necessarily, on a topic that is relevant to the student's research. The second required seminar is the public thesis seminar, which is delivered just prior to the final thesis defense. The thesis seminar shall be a presentation of the student's research. Each student must enroll in Graduate Seminar (CHEM or BIOC 790) for the semester in which their seminar will be presented. Students who leave NDSU prior to completing their thesis must register for Graduate Seminar in the semester of their defense and present their final seminar in order to have their thesis defense paperwork processed.

### **10.2 PhD Students**

In addition to the second-year and dissertation seminars, students in the PhD track are required to give a seminar presentation of the original research proposal (maxi proposal, *vide infra*).

### **10.3 MS & PhD Students**

A copy of each seminar notice must be submitted by the student to the Departmental Administrative Assistant, and to the GSPC Chair, at least one week prior to presentation of the seminar. The Dissertation or Thesis seminar is a significant event for both the student and the Department. As such, it should be scheduled during a “normal” seminar time to facilitate the largest possible attendance of Department members and guests. For example, Monday, Tuesday or Thursday afternoons in Ladd 209 would be appropriate. An afternoon seminar may require scheduling the final defense on the following day.

Seminars play an important role in graduate education. Hence, regardless of whether the student is enrolled in Graduate Seminar, attendance at all departmental seminars is expected.

## **11. Preliminary Exam (Oral Comprehensive Exam & Defense of an Original Proposal)**

To be granted candidacy for the PhD Degree in the Department of C&B, a student must pass the Preliminary Examination process by successfully defending an original, written research proposal and demonstrating sufficient knowledge in their discipline. The proposal may be written on any appropriate topic. However, in order to fortify the student’s expertise and deepen their understanding of their research area, the topic may be aligned with, but not identical to the student’s dissertation research. If the proposal is to be along the lines of the student’s research project, it must constitute a significant outgrowth or expansion of the project that would be worthy of consideration by a private or federal granting agency. Judgement of such worthiness will be made by the A&E Committee following the student’s presentation of their mini-proposals.

### **11.1 Timing of the Proposal and Comprehensive Exam**

In the third semester of residence or early in the fourth (typically the fall or spring of the second year), written summaries of at least two prospective proposal topics (mini-proposals) shall be submitted to the student’s A&E Committee. The Committee will judge the acceptability of the mini-proposals following a presentation of the ideas in an A&E Committee meeting. Submission of the mini-proposals and the approval to proceed to the full written (maxi) proposal must be started and completed with enough time for the student to write, present and defend the maxi proposal by the end of the fourth semester in residence, typically the spring semester of the second year. If one of the initial two mini-proposals is not acceptable, the student will have the opportunity to submit more mini-proposals for acceptance. However, the submission and acceptance of additional attempts, should be targeted for the end of the fourth semester.

If a student cannot gain approval to proceed to the maxi-proposal by the end of the fourth semester, it will be at the discretion of the A&E Committee to push back the timeline by a semester to complete the mini-proposal step. It is also during the fourth

semester and the mini-proposal process that the A&E Committee should carefully consider if a student should proceed towards PhD candidacy, convert to the MS track, or be dismissed from the program, especially if progression to the maxi-proposal is not approved.

### **11.2 Mini-proposal Guidelines**

The goal of the mini-proposals is to determine if the student has a solid foundation for expanding a topic into a full-blown written (maxi-) proposal. Each mini-proposal should be no more than two pages (single-spaced), and should include an introduction to the problem/question (including relevance and significance), a hypothesis, tentative specific aims to address the hypothesis, and a summary paragraph describing how “if successful”, the proposal might contribute to the advancement of knowledge in the field. Each of these sections should only include pertinent information necessary for the A&E Committee to evaluate the potential for the topic to be successfully developed into a viable, full proposal. The mini-proposal is not the full proposal, and should not be treated as such.

Once a mini-proposal topic is approved, the candidate will proceed to the full, written (maxi-) proposal stage of the process. The candidate will (1) prepare a maxi-proposal on the chosen topic and (2) schedule a formal presentation of it to the department and their A&E Committee during the fourth semester in residence, immediately following the approval of the mini-proposal topic. The student will need to schedule a date, time, and room for the seminar, which is their public presentation of the original research proposal (*vide infra*) and which their A&E Committee members should attend. The student will also need to schedule a date, time, and room for the oral defense of the proposal with their A&E Committee. These two events (seminar and defense) do not have to occur on the same day, but the seminar should precede the oral defense. Care should be taken by the student to schedule the oral defense with all committee members such that they are available for at least three consecutive hours. In addition to the oral defense of the original proposal, students will also be examined on their coursework, as determined by their most recently approved Plan of Study (see Section 8 for further details) and on fundamental principles, concepts, and knowledge base applicable to their particular discipline.

### **11.3 Scheduling the Proposal Seminar and Oral Comprehensive Exam**

Registering for the seminar: At the beginning of the semester in which the proposal will be defended (*i.e.*, fourth semester in residence), the candidate must register for one credit of “CHEM/BIOC 790: Seminar” (for the proposal seminar). Following the presentation of the seminar, the student will be assigned a letter grade for their presentation by the A&E Committee. The seminar and grading must be completed within the semester in which the student registered for CHEM/BIOC 790.

Official scheduling of Preliminary Exam with the Graduate School: *At least two weeks prior to the proposal defense*, the student must file an official request to schedule

the Preliminary Exam with the Graduate School. The [“Notification of Scheduled Examination” form](#) must be obtained from the Graduate School, completed by the student, and then signed by the student's advisor and the Chair of the Department prior to being filed in the Graduate School office. The written proposal must then be distributed to the A&E Committee at least one week prior to the scheduled date of the oral defense. Prior to the defense, the candidate must also obtain and complete the [“Report of Preliminary Examination” form](#) for A&E Committee members to sign. This form must be turned into the Graduate School within seven days of the defense/exam. The oral defense and examination must be completed successfully at least eight months prior to the final dissertation defense.

#### **11.4 Evaluation of the Proposal and Oral Comprehensive Exam**

The proposal defense will be administered by the student's A&E Committee and will be open to any other faculty members who are requested or who wish to attend. Guest examiners will be considered temporary, non-voting members of the A&E Committee at this oral exam. Upon passing the preliminary oral exam, a copy of the signed Graduate School form will be placed in the student's file.

Feedback from the A&E Committee will be provided in two parts, the seminar report and grade (vide supra) and the comprehensive exam report, the forms for which are included in the appendix. The exam report includes evaluation of the student's command and continued growth in the areas of the didactic outcomes. Progress toward achieving non-didactic program outcomes, except for the creation of new knowledge through research, will also be evaluated. The scores of 0-4 for progress in each of these outcomes will be based on the quality of the written proposal, the quality of the seminar and the student's performance in the oral exam. Additionally, the quality of the written proposal will be scored separately in the Exam Evaluation and Program Recommendation section of the report.

Based on the seminar grade, the written proposal score and the oral exam score, the A&E Committee will determine whether the student passes the comprehensive exam. There are four possible determinations:

- 1) *Pass*: A recommendation to continue on the PhD path is a foregone conclusion of this determination.
- 2) *Fail, reattempt permitted*: This determination will require the student to either start with a new proposal or reattempt to defend the same proposal. The details of this recommendation will be explained in the Narrative Summary section of the report. In any case, the student must successfully pass the comprehensive exam by the end of the following semester (*i.e.* fifth semester in residence). Failure to schedule a second exam during the following semester will trigger dismissal from the program.
- 3) *Fail, exit with MS*: Transfer of the student to the MS degree track is a foregone conclusion of this determination. Of course, the student may or may not elect to follow this recommendation. If not, the student does not accept this recommendation, they are electing to exit the graduate program.

- 4) *Fail, terminate*: This determination requires a recommendation of terminate without a degree.

Within three days of the oral exam, copies of the Comprehensive Exam Report shall be provided to the student and deposited in the student's departmental file.

Following the candidacy exam, the A&E Committee shall also complete the Graduate School's Report of Preliminary Examination to officially report the outcome of the comprehensive exam. Regardless of the outcome, this report form should be filed with the Graduate School within fourteen days of the exam. See the Graduate School web site to download the pdf form ([http://www.ndsu.edu/gradschool/current\\_students](http://www.ndsu.edu/gradschool/current_students)).

### **11.5 Maxi-proposal Guidelines**

Key elements of any good proposal are the significance, scope and originality of the proposed research, the logical construction of the research plan, and the relationship of the research to what is already known. Common shortcomings of research proposals include choice of a topic that differs only slightly from work already published in the refereed literature. Such "derivative work" is generally considered to be of marginal importance, especially if the overarching problem is already considered solved. If the student chooses a topic about which much is already known, it is imperative that (1) the worth and unique features of the proposed project be emphasized and (2) a compelling case be made for the likelihood that new, worthwhile information will result.

Drafting of a research proposal is usually most efficient and effective when the scientific method is used. In general, the proposal begins with a statement of the observation(s) upon which the proposal is based and/or the problem that the proposal will address. Then the significance and technical background for the proposed research is articulated. At this point, a hypothesis based on the first two sections is constructed. The experimental approach to testing the hypothesis is then briefly described in the form of aims or goals of the proposed work. Finally, the research plan describes the course of experiments and how the results will be interpreted in the context of the hypothesis. A good research plan recognizes potential pitfalls of the proposed experiments, including the possibility that the results may be different than expected, and sets forth contingencies for those eventualities. The proposal document shall be presented in the format of a NIH-R01, or an NSF investigator-initiated grant proposal, including a project budget and budget justification. Forms and budget examples for the National Science Foundation and the National Institutes of Health may be found at <http://www.nsf.gov/funding/> and <http://grants1.nih.gov/grants/funding/phs398/phs398.html>. This information may be helpful in preparing the maxi proposal.

### **12. Residency Requirement**

The NDSU Department of C&B will not award any graduate degree without at least one academic year of full-time enrollment. The requirement may be met by residence at

the institution for two semesters on a full-time basis. Part-time students earn residence in proportion to the number of credits earned.

Advanced degrees in C&B are research intensive. The research components of both the Master's and Doctoral programs constitute the most singular requirement for graduate degrees. All graduate research must be performed under the close supervision of a member of the graduate faculty (or an approved adjunct faculty member) of the Department of C&B.

It is most desirable that the major portion of graduate research be performed while the student is in residence on the NDSU campus. A reasonable exception to this policy would involve the necessity to use instrumentation or facilities that are unavailable on the NDSU campus.

If the student is performing research for an employer other than the NDSU Department of C&B, and a portion of that research is to be applied to fulfill the research requirement, then it is the responsibility of the student's A&E Committee to decide whether that research meets the standards and requirements established for the C&B Degrees. This decision will usually require a written description of the student's outside research responsibilities to the chair of their A&E Committee. This delineation of responsibility should be worked out to the satisfaction of the student's A&E Committee during the first meeting.

### **13. Time Limitations**

All requirements for the MS Degree must be completed within a period of seven (7) consecutive years. Graduate credit for any course work that was completed more than seven calendar years prior to the time of the final defense will no longer satisfy degree requirements.

All requirements for the PhD Degree must be completed within a period of ten (10) consecutive years. Graduate credit for any course work, not included in a Master's Degree, which was completed more than ten calendar years prior to the time of the final defense will no longer satisfy degree requirements.

### **14. Teaching**

The Department of C&B regards the role of Teaching Assistant (TA) as crucial to its undergraduate teaching mission. The Department relies on TAs for the smooth functioning of laboratory sections. Typically, there is close contact between the TA and students in the laboratory. This means that the student's impression of the subjects of C&B in general, and the NDSU Department of C&B in particular, may stem from that contact. It is therefore important that the experience be a positive one.

To that end, all TAs are required to attend teaching sessions held in the fall during the week before classes begin, as well as any additional teaching sessions during the



initial weeks of each semester. Teaching Assistants also are required to coordinate with the instructor of record through weekly planning sessions. Minimum expectations of all TAs include:

- Fulfillment of all safety and other required training obligations and rigorous implementation of safe practices and safety protocols in the laboratory
- Reading and comprehension of the appropriate laboratory exercise prior to the lab session, recognizing what results the students should obtain and any issues they may have during the experiment
- Participation in any lab setup/prep prior to lab session as required by the instructor of record
- Arrival at scheduled laboratory sessions at least 5-10 min before class begins
- Delivery of a relevant introduction for the experiment to the students
- Tracking of student attendance and following of all grading policies as assigned by the instructor of record
- Interaction with students in a professional manner
- Treating student work and grades with confidentiality as required by FERPA
- Ensuring that the lab is clean and ready for the next lab section at the end of your scheduled lab session
- Perform exam proctoring and/or exam grading when assigned

TAs are expected to fulfill all assigned teaching duties and should not plan on absences that would prohibit the fulfillment of these duties. In cases of unanticipated absences (*i.e.*, illness), TAs are required to contact the instructor of record as soon as possible and work to find someone to cover all TA responsibilities during their absence.

In cases of anticipated leave (*e.g.*, to attend a conference), TAs need to complete the [TA Leave Request Form](#) available on the Department website. This form then needs to be approved by the instructor of record and the Department Chair before any travel. Failure to obtain proper approval for TA Leave could result in the loss of the assistantship.

Student evaluations are collected for every laboratory section. The process is usually organized by the instructor of record.

## **15. Assistantship Expectations, Outside Employment, and Leave**

Graduate study in the molecular sciences requires a high level of commitment and responsibility. As such, most graduate students make a full-time commitment to their programs of study. Students who receive full-support stipends, *i.e.* a Research Assistantship (RA) or a Teaching assistantship (TA), are required to pursue their training on a full-time basis, devoting each day of the normal work week, plus any additional time required by their research projects, academic courses, and/or teaching responsibilities. Minimum expectations of all students on assistantships include:

- Suitable progress in coursework, including the expectation of attendance at all classes and the taking of all exams as scheduled
- Suitable progress on research projects and fulfillment of all Departmental degree requirements as scheduled
- Fulfillment of all safety and other required training obligations (these obligations are conditions of employment by NDSU)
- Rigorous implementation of safe practices and laboratory safety protocols
- Annual fulfillment of all required University training
- Attendance at Departmental Seminars

Any student failing to fulfill these obligations may lose their assistantship.

Students on full assistantships are not allowed to work on a second assistantship, as part-time instructors, as student workers, or in any other capacity for NDSU, any other campus in the North Dakota University System (NDUS), or any State of North Dakota agency or office, unless an exception is approved by the Dean of the College of Graduate and Interdisciplinary Studies prior to the work being performed (see the policy on **Additional Employment at NDSU or in the NDUS** in the [NDSU Graduate Bulletin](#) for further information).

All students on full assistantships receive support for holidays and annual leave as follows:

- **Holidays.** Graduate students are entitled to observe University closings for Holidays and other recognized events. **The time periods between academic terms and over the summer are considered part of the active period of the assistantship and are not to be regarded as holidays or free time, unless approved on a special basis by the student's advisor and the Department Chair.**
- **Paid Leave (absence from work due to vacation, illness, etc).** NDSU does not permit paid leave for students who are supported by graduate assistantships.
- **Leave of Absence.** Students requiring leave due to extenuating circumstances may choose to take an unpaid leave of absence from their graduate program. International students will need to consult with the Office of International Student and Study Abroad Services to determine whether or not they are eligible for a leave of absence. Any such leave of absence must be arranged with the NDSU Graduate School.

## 16. Research Credits and Continuous Enrollment

Students carrying out research that requires or utilizes faculty direction or consultation and/or the use of University facilities must be registered for research

credits during each semester and summer session. In the summer session, students on assistantships should register for a minimum of six semester credits.

Students who are conducting research for their doctoral dissertation or masters thesis (hereinafter referred to in aggregate as disquisition) are to be enrolled in either Chemistry 798 (Master's Thesis), or Chemistry 899 (Doctoral Dissertation) for the number of credits specified on their Plan of Study. Research includes reviewing the scientific literature and writing of the disquisition. Should additional time be needed to complete the research after having already taken the number of disquisition credits specified in the Plan of Study, the student must register for either Chemistry 798-R, or Chemistry 899-R, respectively. Registration is required every semester, even if the student is in absentia, until the final copies of the disquisition have been received and accepted by the Graduate School.

Students who have completed all portions of their Plan of Study (including written any required written examinations) except for their disquisition are expected to maintain continuous enrollment until degree requirements are completed. If continuous enrollment has not been maintained, the Graduate School will not schedule a final examination until the student has registered for the appropriate number of credit hours for the intervening period following the last enrollment. The number of credits is determined by the Graduate Dean after consultation with the student and will amount to no less than one credit for each term not registered.

Students who must interrupt their research may obtain a leave of absence from the Graduate School which would exempt them from continuous enrollment. Prior to returning to the University, the student shall notify the Graduate School, which will restore the student's classification to active status. Students who move out of state may maintain their North Dakota residence status for a period of 12 months, after which it is assumed that out-of-state status applies. Clarification of status may be obtained by consulting the University Registrar.

Students who have been absent from the University for two consecutive years without having been granted a leave of absence must reapply for admission to the Graduate School.

## **17. Final Defense (Oral Examination) and Submission of the Disquisition**

The MS and PhD programs require that the student submit and defend a thesis and dissertation, respectively. It must show originality and demonstrate the student's capacity for independent research. It must comprise research results that constitute a substantive contribution to scientific knowledge.

### **17.1 Writing the Disquisition**

Upon mutual agreement between student, adviser and A&E Committee, each student will undertake the writing of their disquisition. Upon completion thereof, the

student will arrange a public seminar presentation of their research results, and the final defense of their work in a closed oral exam with their A&E Committee. The defense typically occurs near the end of the fifth year in residence. However, it can occur as early as the fourth year or as late as the seventh. Failure to defend by the end of the seventh year in residence will result in termination of any and all student financial support from NDSU and dismissal from the program.

The disquisition, prepared in accord with the [Graduate School's Web page on Writing Theses, Dissertations, and Papers](#), and in a nearly final form, must be submitted to the A&E Committee no less than seven days prior to the examination. If this stipulation cannot be met, the student must either have the approval of the A&E Committee to proceed with the scheduled examination, or reschedule the exam. The final examination must be scheduled at least two weeks before the date of the University's graduation exercises.

### **17.2 Scheduling the Final Defense**

Care should be taken by the student to schedule the seminar and examination such that all committee members can be present. Permission to schedule the examination must be requested by filing the *Request to Schedule Final Examination* form with the Graduate School. The request to schedule must be sent to the Graduate School two weeks prior to the examination. Also, the student must personally meet with the Registrar to verify that all courses on the Plan of Study have been completed, and that the required grade point average has been attained. The Request to Schedule Examination must be signed by the student, the advisor, the Chair of the Department, and the Dean of the College prior to being filed in the Graduate School office. The Dean of the Graduate School will formally notify all members of the A&E Committee and the student when the request to schedule the Final Examination has been approved.

It should be noted that for MS candidates, the final examination not only represents a defense of the thesis, but also an oral comprehensive examination of the courses taken in the candidate's approved Plan of Study. For PhD candidates, the final examination is only a defense of the dissertation and research therein, as the formal oral comprehensive examination was taken as part of the "maxi-proposal" defense.

### **17.3 Evaluation of the Final Defense**

The ability to communicate research findings to a community of peers is an important outcome of graduate education. To that end, students in the PhD track are expected to have at least one manuscript accepted for publication in a peer-reviewed journal by the time they defend their dissertation. In the event that the manuscript is either declined, or accepted with revisions, the student must present a strategy for publication at the final defense.

After the final oral defense, the A&E Committee will complete the departmental Final Disquisition Defense Report, which includes an overall score and a programmatic

recommendation. The Committee will make one of three possible recommendations: Submit disquisition to the Graduate School, Submit after making corrections, or Rewrite and redefend the disquisition. The latter must be recommended if the score in any category is <2 out of 4, or if the overall score is <3 out of 4, or if more than one Committee member selects the “disapprove” option on the Graduate School’s Report of Final Examination (vide infra). If the Committee recommends submission after correction, a detailed list of corrections will be provided. For a recommendation of rewrite and re-defend, the Narrative Summary section of the report will contain a detailed description of the deficiencies. The student will then have until the end of the following semester to successfully defend the disquisition. Exceptions to this time limit will be considered by the Dean of the Graduate School upon presentation of written justification from the A&E Committee. There is the possibility of financial support from or through the Department of Chemistry and Biochemistry during this extension, so long as the student has not exhausted the maximum of 14 semesters of support.

Following the final examination, the A&E Committee shall also complete the Graduate School’s Report of Final Examination to officially report whether or not it approves the dissertation, the defense and, for MS candidates, the comprehensive examination. Regardless of the outcome, this report form should be filed with the Graduate School within fourteen days of the exam. See the Graduate School web site to download the pdf form ([http://www.ndsu.edu/gradschool/current\\_students](http://www.ndsu.edu/gradschool/current_students)).

Should the examination be failed twice, the student will not be given a third examination, except by recommendation of the A&E Committee and the Department Chair, and special approval of the Dean of the Graduate School, following consultation with the NDSU Graduate Council.

#### **17.4 Submitting the Disquisition**

After the disquisition has been approved by the student’s Advisor and their A&E Committee, the student should deliver a digital, pdf copy of it to the Graduate School to be approved for format and style.

Submission of the disquisition in approved form to the Graduate School constitutes the final requirement, which must be satisfied prior to the awarding of the degree. The student will have a maximum of one year following the final examination to deposit the disquisition with the Graduate School to completion the degree requirements. Should the disquisition not be submitted as specified, the student must repeat the final examination.

#### **17.5 Checking Out Prior to Graduation**

Students must meet check-out requirements prior to departure from campus or the final defense, whichever is later. Building and laboratory keys should be returned to the Department of C&B stockroom. Proper disposal of all research chemicals is the responsibility of the student, in consultation with the major Advisor. If there are

hazardous chemicals that will not be used by other researchers in the group, then arrangements for disposal must be made with the campus Safety Officer. All Library books should be returned. The check-out form must be signed by the student, Major Advisor, Stockroom Supervisor, OSL Manager and Library Liaison for the College of Science and Mathematics. *This completed form must be on file before the Department Chair will sign the disquisition approval page.* The Departmental Check-out Form is available in electronic format on the C&B web site. If the student will continue to work in the Department after graduation, the check-out procedure may be postponed until they leave the Department.

## **18. Graduate Records and Student Progress**

The student will be apprised of timetables and regulations at the beginning of their studies. Subsequently, it is the responsibility of the student and the major advisor to meet the timeliness for the degree program, including the scheduling of annual meetings of the A&E Committee. Time table reports will be sent to students annually to remind them of graduate requirement deadlines that must be satisfied to remain in Good Standing. Each student and their advisor must sign and return this form to the Department Chair within one month of receiving it.

## 19. Typical Time Line for MS Degree Candidates

<b>Relative Timing</b>	<b>Requirement to be Completed</b>
Prior to registration for first semester	- Academic Evaluation Test (AET)
First academic semester	- Remove academic deficiencies
End of first semester	- Select thesis advisor
End of second semester	- Establish A&E Committee - Hold first A&E Committee meeting - File Plan of Study - Pass 3 of 6 sections of the AET, or equivalent
Third semester	- Give first departmental seminar
End of fourth semester	- Hold second A&E Committee meeting or - Give thesis seminar and pass final defense and oral comprehensive examination
Third-seventh year	- Hold annual A&E Committee meeting or - Give thesis seminar and pass final defense and oral comprehensive examination

## 20. Typical Time Line for Doctoral Degree Candidates

Relative Timing	Requirement to be Completed
Prior to registration for first semester	- Academic Evaluation Test (AET)
First academic semester	- Remove academic deficiencies
End of first semester	- Select dissertation advisor
Second semester	- Establish A&E Committee - Hold first A&E Committee meeting - File Plan of Study - Complete or nearly complete the six core courses - Pass 3 of 6 sections of the AET, or equivalent
Third semester	- Give first departmental seminar
Fourth semester	- Submit mini proposals to A&E Committee members and present them for approval at a Committee meeting - Submit and present a public seminar on the maxi proposal - Defend the maxi proposal in a meeting with the A&E Committee
Fifth semester	- Redefend maxi-proposal and comprehensive exam (if necessary)
Sixth semester	- Hold annual A&E Committee meeting
Fourth-tenth years	- Hold annual A&E Committee meetings - Give dissertation seminar - Pass final defense - NOTE: financial support ends after 14 semesters

*Final Note:* Failure to stay on the time line prescribed herein is grounds for dismissal from the degree program. In order to continue in the program, approval of the A&E Committee will be required. Even if the student is granted permission to continue, the A&E Committee may impose other sanctions (*vide supra*).



## **21. Appendix**

Department report forms for the Annual Meeting of the Graduate A&E Committee, Graduate Seminars, Graduate Comprehensive Exam, Final Dissertation Defense, and Department Check Out are available for download on the Department of Chemistry and Biochemistry web site. They are fillable pdf forms. Before each A&E Committee meeting, seminar and oral exam, students should complete the top of the relevant form, save it and send it as an email attachment to the chair of their A&E Committee.