

March 6, 2023

UNIVERSITY OF NORTH TEXAS
Department of Chemistry
GRADUATE POLICIES

Page Numbers

Typical Sequence for M.S. Students (Thesis Option).....	1
Typical Sequence for Ph.D. Students.....	2
I. INTRODUCTION AND PHILOSOPHY OF GRADUATE STUDY	3
II. ADMISSION PROCEDURES.....	4
III. CHEMISTRY PROFICIENCY REQUIREMENTS.....	4
IV. GRADUATE CURRICULUM AND PROGRAM REQUIREMENTS.....	6
A. Core Requirements.....	6
B. Other Course Requirements.....	7
1. M.S. Students	7
2. Ph.D. Students.....	7
3. Graduate Orientation Course and Seminar	7
4. Degree Plan	8
5. Concentration in Chemistry Education	8
C. Selection of a Research Advisor and Advisory Committee.....	9
D. Functions of the Graduate Advisory Committee	10
E. Records	10
F. Thesis or Dissertation Defense/Final Comprehensive Examination	10
G. Other General Policies	12
1. Seminar Program.....	12
2. Course Enrollment and Grade Requirements.....	12
3. Responsible Conduct of Research (RCR) Training	12
4. Financial Assistance.....	13
5. English Language Proficiency Requirements for Teaching Assistants	14
6. Changing Degree Programs.....	15
V. SPECIFIC DEGREE REQUIREMENTS	15
A. Master's Degrees	15
1. M.S. in Chemistry	15
2. M.S. in Professional Chemistry (Professional Science Master's).....	15
3. Non-Thesis M.S. in Chemistry Education.....	16
B. Ph.D. Degree	16
1. CHEM 6010: Qualifying Examination and Admission to Ph.D. Candidacy.....	16
2. Third-Year Research Seminar.....	19
3. Dissertation Enrollment.....	19
VI. POLICIES AND PROCEDURES FOR TERMINATION OF A STUDENT FROM THE CHEMISTRY GRADUATE PROGRAM.....	19
APPENDIX A - DIVISIONAL QUALIFYING EXAMINATION (CHEM 6010) RULES.....	21
A. Analytical Chemistry	21
B. Inorganic Chemistry.....	24
C. Organic Chemistry	26
D. Physical Chemistry	28
E. Chemistry Education.....	30
F. Chemical Biology.....	34
APPENDIX B - PROCEDURE FOR SELECTION OF A RESEARCH ADVISOR	36

Typical Sequence for M.S. Students (Thesis Option)

Week before classes begin	Attend orientation for new graduate students Take Proficiency exams
First Year	Take any required Proficiency courses and CHEM 5010 Begin Core courses Choose Major Professor (middle of 1 st semester) Begin research Choose Masters Advisory Committee (end of 2nd semester) File Degree Plan (end of 2nd semester)
Second Year	Finish taking Core and Special Topics courses Begin writing Thesis
Semester of Graduation	File for graduation with the Graduate School Defend Thesis

Details of sequence and timing will depend on your progress and will be arranged between you and your major professor.

Typical Sequence for Ph.D. Students

Week before classes begin	Attend orientation for new graduate students Take Proficiency exams
First Year	Take any required Proficiency courses and CHEM 5010 Begin Core courses Choose Major Professor (middle of 1 st semester) Begin research Choose Ph.D. Advisory Committee (end of 2 nd semester) File Degree Plan (end of 2 nd semester)
Second Year	Finish taking Core and Special Topics courses Take written portion of Ph.D. Qualifying Exam (CHEM 6010 Cumes)
Third Year	Take Oral Ph.D. Qualifying Exam (CHEM 6010) Shift major focus of effort toward research progress Give 25 minute seminar (Third Year Talk)
Fourth Year to Fifth Year	Engage in research projects leading to peer-reviewed papers Choose External Advisory Committee Member (no later than 2 months before defense) Begin writing Dissertation
Semester of Graduation	File for graduation with the Graduate School Defend Dissertation

Details of sequence and timing will depend on your progress and will be arranged between you and your major professor.

I. INTRODUCTION AND PHILOSOPHY OF GRADUATE STUDY

Completion of a graduate degree in the sciences is one of the most intellectually demanding endeavors that one can choose to pursue. It is not merely a continuation of undergraduate studies. Although excellent performance in advanced coursework is expected, the true purpose of graduate study is to transform students into active participants in the scientific research enterprise. Successful M.S. and Ph.D. graduates are expected to know the current state of knowledge in their chosen fields of research and to have begun making significant original contributions to these fields. This requires a significant commitment of time and energy on the part of both the student and the graduate program.

The purpose of this document is to set out the policies, practices, and expectations for students pursuing M.S. and Ph.D. degrees in the Chemistry Department at the University of North Texas. All graduate students in our Department are expected to familiarize themselves with the Graduate Policies and to abide by these policies as they pursue their degrees. The Chemistry Student Services Office, the Graduate Advisor, and all Graduate Faculty in the Chemistry Department are available to provide guidance and assistance as students work toward their intended degrees. However, each student is ultimately responsible for fulfilling the degree requirements described in these Policies within the expected timeline.

Graduate programs within the UNT Chemistry Department are also governed by the general guidelines of the Toulouse Graduate School, which can be found in the online UNT Graduate Catalog. Graduate students in Chemistry are advised to familiarize themselves with these guidelines in addition to the department-specific policies in this document.

The Department of Chemistry offers four graduate degree options: Ph.D. (Doctor of Philosophy) in Chemistry, M.S. (Master of Science) in Chemistry, M.S. in Chemistry specializing in Professional Chemistry, and Non-Thesis M.S. in Chemistry Education. Where not otherwise specified, a "Master's Degree" referred to below will include all three Master's Degree options. In addition, the Department is organized into six formal Divisions corresponding to the traditional subdisciplines of Analytical, Organic, Inorganic, Physical Chemistry, Chemistry Education and Chemical Biology. Faculty members belong to one or more Divisions according to their teaching and research interests. Students working in interdisciplinary research areas must choose a home Division but are allowed considerable flexibility in developing their degree plans.

The Graduate Affairs Committee (GAC) is the faculty committee directly responsible for overseeing all aspects of graduate study in the UNT Chemistry Department, as well as for developing and enforcing the Graduate Policies. The Chair of the GAC serves as the Graduate Advisor for the Chemistry Department. The Graduate Advisor works closely with the Toulouse Graduate School and the Chemistry Student Services Office to ensure the smooth functioning of the Graduate Program in Chemistry. Graduate students with specific problems or concerns may bring them to the Graduate Advisor or the Student Services Office if there is not another avenue specified in these Policies.

II. ADMISSION PROCEDURES

Those interested in our graduate program are encouraged to submit an application directly to the Chemistry Department. This can be done through our Graduate Program Web site (<http://chemistry.unt.edu/graduate-program>) or by contacting the Graduate Student Services Office (chemistry@unt.edu; phone 940-565-3554).

Applications Requirements:

1. Transcripts from all prior universities attended
2. Statement of Purpose
3. C.V. or resume
4. Three letters of recommendation, with at least two of them coming from faculty in Chemistry or closely related fields
5. Proof of English Language proficiency (international students without a degree from a U.S. institution only)
6. Official application through the Toulouse Graduate School

*Please note that GRE General Test scores are no longer required.

Once a completed application has been received, it is forwarded to the Chemistry Graduate Affairs Committee for review. Admission decisions are made on an ongoing basis until the number of available positions has been filled. Applicants will be informed of the decision on their application by mail and/or by email. In addition to the Departmental application, students must apply to and be accepted by the Toulouse Graduate School before they can begin graduate studies.

All admitted students will be considered for graduate assistantships. Assistantships and other forms of financial support will be specified in the admission offer letter sent to each admitted applicant.

III. CHEMISTRY PROFICIENCY REQUIREMENTS

Entering graduate students must demonstrate proficiency at the undergraduate level in a designated number of the traditional areas of chemistry—Analytical Chemistry, Inorganic Chemistry, Organic Chemistry, Physical Chemistry, and Chemical Biology—before beginning advanced graduate coursework. Proficiency is demonstrated either by passing proficiency examinations or by completion of appropriate courses.

All incoming students are required to take the proficiency examinations administered during orientation week (i.e., the week before classes each Fall and Spring semester). These examinations have important consequences for each student's academic and research activities during graduate studies. Proficiency examination results determine which courses are taken in a student's first year, and the exam scores are also sent to all research faculty for informational purposes.

The Proficiency Examinations are two-hour multiple choice tests developed by the American Chemical Society and comprise material taught in standard undergraduate courses in each area of chemistry. The exams are administered and graded by designated faculty belonging to the departmental Divisions representing Analytical Chemistry, Inorganic Chemistry, Organic

Chemistry, Physical Chemistry, and Chemical Biology. For each test, a percentile grade is calculated from standardized tables supplied by the ACS. The percentile score considered passing is decided by the faculty member administering the exam; typical values in previous years have been between 55%ile and 65%ile. Calculators may be used in the exams when permitted by the ACS, but no notes or other materials are permitted. Students are notified of their proficiency examination results by the Graduate Student Services Office.

If the proficiency examination in a given area is not passed, students can satisfy proficiency requirements by taking the corresponding proficiency course and earning an “A” or “B”. Ph.D students are allowed one “C” grade in a proficiency course provided that the student receives an “A” in another proficiency course.

Proof of proficiency is required in three of the five areas for Ph.D. students and in two of the five areas for students in any of the M.S. programs. The chosen areas must include the student’s primary area of research specialization. For Ph.D. students, one of the three areas must be Physical Chemistry. Proficiency requirements must be met by the end of a student’s second long semester in the program. A student who has not met the proficiency requirements within 12 months of beginning graduate studies will be removed from the program.

Students are allowed no more than two attempts to pass the proficiency examination in each area, and one attempt to pass each proficiency course. Failure to take an examination at the beginning of a semester will be counted as one of the two attempts.

For students beginning in the Fall term, the exam and course sequence is as follows:

<u>Area</u>	<u>1st Attempt</u> (Orientation Week)	<u>2nd Attempt</u> (1 st Fall semester)	<u>3rd Attempt</u> (1 st Spring semester)
Inorganic	Examination	CHEM 5560	Examination*
Physical	Examination	CHEM 5200	Examination*
Chemical Biology	Examination	BIOC 5540	Examination*
Analytical	Examination	Examination*	CHEM 5460
Organic	Examination	Examination*	CHEM 5380

For students beginning in the Spring term, the exam and course sequence would be as follows:

<u>Area</u>	<u>1st Attempt</u> (Orientation Week)	<u>2nd Attempt</u> (1 st Spring semester)	<u>3rd Attempt</u> (1 st Fall semester)
Analytical	Examination	CHEM 5460	Examination*
Organic	Examination	CHEM 5380	Examination*
Inorganic	Examination	Examination*	CHEM 5560
Physical	Examination	Examination*	CHEM 5200
Chemical Biology	Examination	Examination*	BIOC 5540

*If required due to making a “C” or below in the class or from not passing the proficiency exam during orientation week.

Students will be notified of their progress in satisfying proficiency requirements at the end of each of their first two long semesters. Students who satisfy only two proficiency requirements (including their own area of research specialization) will be notified in writing by the GAC Chair that they are limited to a M.S. degree. Students satisfying fewer than two proficiency requirements will be notified that they are no longer in the Chemistry graduate program.

IV. GRADUATE CURRICULUM AND PROGRAM REQUIREMENTS

A. Core Requirements

Except for students in Professional Science Master's program, all M.S. students must take the Core Chemistry courses in the two areas in which they have demonstrated proficiency, including their primary area of research. Ph.D. students must take at least two Core courses, including the course in their primary area of research (i.e., the division in which they will take their CHEM 6010 Oral Qualifying Examination).

The Core courses consist of:

Chemistry 5570 - Advanced Analytical Chemistry
 Chemistry 5710 - Advanced Inorganic Chemistry
 Chemistry 5500 - Advanced Organic Chemistry
 Chemistry 5210 - Advanced Physical Chemistry
 Chemistry 6540 - Chemical Biology Design & Instrumentation
 Chemistry 5880 - Learning Theories in Chemistry Education

Core courses are scheduled to be offered in alternate semesters to the Proficiency courses in the same area. The Proficiency/Core course schedule is as follows:

<u>Fall</u>	<u>Spring</u>
Analytical Core (CHEM 5570)	Analytical Proficiency (CHEM 5460)
Inorganic Proficiency (CHEM 5560)	Inorganic Core (CHEM 5710)
Organic Core (CHEM 5500)	Organic Proficiency (CHEM 5380)
Physical Proficiency (CHEM 5200)	Physical Core (CHEM 5210)
Chemical Biology Proficiency (BIOC 5540)	Chemical Biology Core (CHEM 6540)
	Chemistry Education Core (CHEM 5880)

B. Other Course Requirements

1. M.S. Students:

A minimum of 12 hours of formal (lecture) courses are required above the proficiency level, i.e. the two required Core courses plus two other three-hour advanced* course. These could be two Core courses, or some other advanced graduate chemistry courses. Students must maintain a G.P.A. of at least 3.0 G.P.A. in their 12 hours of advanced courses.

2. Ph.D. Students:

A minimum of 18 hours of formal (lecture) courses are required above the proficiency level, which includes a minimum of two Core courses and four additional advanced* courses. Up to two of the advanced courses may be the third or fourth Core course. Up to two of the six advanced courses may be in another department if the student's Ph.D. advisor and advisory committee approve. Students must maintain a G.P.A. of at least 3.0 in their 18 hours of advanced courses.

*An "advanced" course means one above the proficiency level in the department, and excludes seminar and research courses. A student is expected to demonstrate proficiency in a given area prior to taking additional graduate courses in that area. If a student does take such an additional course without first satisfying the proficiency requirement, then this additional class does not itself satisfy the proficiency requirement and cannot be counted toward the number of Core courses completed, until proficiency is demonstrated.

M.S. or Ph.D. students who have completed graduate coursework elsewhere may use these courses to fulfill the above requirements with the approval of the student's Advisory Committee and the appropriate Chemistry division. Typically, graduate courses with grades of B or better are eligible for transfer. For courses to count toward a doctoral program at UNT, they must have been taken from an accredited degree-granting institution. The maximum number of semester credit hours associate with coursework that are usable from a previously conferred master's degree is 6 hours. The formal transfer of graduate course credits from another institution is subject to the approval of the Toulouse Graduate School.

3. Graduate Orientation Course and Seminar

All graduate students must enroll in CHEM 5010: Introduction to Graduate Teaching and Research (2 credit hours) in the Fall semester of their first year. CHEM 5010 is meant to prepare new Chemistry graduate students for success in their graduate studies and future careers. It includes classes on effective teaching, library resources, scientific presentations, scientific writing, data analysis, scientific ethics, and many other topics, as well as research presentations by Chemistry faculty.

Students are also required to enroll in Seminar (CHEM 5940, 1 credit hour) each semester. See Section IV.G.1. for more details.

4. Degree Plan

All graduate students are required to file a Degree Plan specifying the graduate courses to be taken during their graduate studies. Degree plans should be filed with the Chemistry Student Services Office and the Toulouse Graduate School shortly after selection of an Advisory Committee (see Section IV.C.), and this must be completed before the start of the third long semester of study. Students should consult with their Research Advisor (major professor) and Advisory Committee in selecting an appropriate course of study. After the degree plan is filed, any changes must be submitted to the Toulouse Graduate School in writing, after obtaining the approval of the student's major professor and the Chemistry Graduate Advisor.

5. Concentration in Chemistry Education*

M.S. or Ph.D. students may choose to pursue their thesis or dissertation research with a concentration in Chemistry Education. Chemistry Education Research (CER) focuses on understanding and improving the learning of chemistry. Students pursuing the Chemistry Education concentration must also choose an *Area of Specialization* in any of the five traditional areas of Inorganic, Organic, Physical, Analytical Chemistry or Chemical Biology.

* The recommended Advanced/Special Topics Courses in Chemistry Education and the specific requirements for Ph.D. and M.S. degrees with concentrations in Chemistry Education can be found in Appendix A, Section E.

C. Selection of a Research Advisor and Advisory Committee

Selection of a Research Advisor, also known as a major professor, is a very important decision that will influence the entire course of a student's career. Therefore, students are encouraged to carefully consider various possibilities and learn as much as possible about the research activities of each faculty member in the Chemistry Department.

Students are allowed several months to choose a Research Advisor—until April 1 for students beginning in the Fall term, and until June 1 for students beginning in the Spring term. However, most students make this choice in the middle of their first semester in the program.

Students are expected to meet with several faculty members whose research is of interest to them to discuss opportunities within the faculty members' research groups. Each student must attend research group meetings of at least three faculty members before selecting an advisor. Individual meetings with faculty may be done instead, if attending a group meeting is not possible. In addition, students beginning in the Fall semester will be required to listen to research presentations by several research active

faculty members as a part of CHEM 5010 before selecting a Research Advisor. The earliest date that students may select a Research Advisor is November 1 for students beginning in the Fall term, and April 1 for students beginning in the Spring term. The Chemistry Graduate Advisor may adjust these dates if warranted by circumstances.

Selection of a Research Advisor must be a mutual decision between the student and the faculty member. The process is completed by turning in a signed Graduate Research Advisor Selection Form (see p. 30). This form must also be initialed by other faculty members who met with the student to discuss research. Once this selection has been made, the Research Advisor/major professor assumes primary responsibility for directing the student's research activities and monitoring progress toward completion of the degree.

A next important step is selection of the student's Advisory Committee, which must be completed by the end of the second semester of study. The student must work closely with the major professor in selecting committee members who can most effectively advise the student and monitor their academic and research progress. A Committee Selection Form must be turned in to the Student Services Office for approval by the departmental Graduate Affairs Committee.

The Advisory Committee for a M.S. student must include at least three tenured or tenure-track faculty members from the Department of Chemistry, including the major professor. The Advisory Committee for a Ph.D. student must include at least four faculty members, of which three (including the major professor) must be from the Department of Chemistry. Two members of the committee should be from the division corresponding to the student's main area of research, and two should be from outside the student's area of research. For students working in highly interdisciplinary areas, this criterion may be relaxed if appropriate, with approval of the major professor. When appropriate to the student's research area and when approved by the major professor, UNT faculty from outside the Chemistry Department may also serve on a student's Advisory Committee.

Ph.D. Advisory Committees are also required to include one individual from outside UNT who is knowledgeable in the student's area of research, to serve as an external examiner for the committee during the final Dissertation Defense. The external examiner should be capable of impartially evaluating the student's research progress and qualifications for receiving the Ph.D. degree. The selected individual must be approved by the candidate's Ph.D. Advisory Committee. If the committee and external examiner so choose, he/she may be made a formal fifth member of the committee. This would require that the person be granted Graduate Faculty status by the Toulouse Graduate School.

D. Functions of the Graduate Advisory Committee

The Research Advisor/major professor and Advisory Committee have primary responsibility for monitoring the student's progress toward the degree. The major professor and Advisory Committee must approve any changes made to the student's Degree Plan. To help in oversight of student progress, the Graduate Affairs Committee

(GAC) and Student Services Office will also monitor each student's progress to ensure that minimal standards are being met.

As part of this process, each graduate student must schedule a yearly meeting with the Graduate Student Services Office to review specific progress made in research and coursework. Any deficiencies will be reported to the Graduate Advisor and the student's Research Advisor. The Student Services Office will keep written records of these yearly assessments in each student's permanent file.

If desired, either the student or the major professor may call a meeting of all UNT members of the student's Advisory Committee once per year to discuss progress toward the degree. Optionally, the external committee member may also be invited to participate in these meetings, electronically or in person.

The most important function of the Advisory Committee is to advise students as they plan, complete, and defend their Master's thesis or doctoral dissertation. This important component of graduate study is discussed in more detail in Section IV.F.

E. Records

It is the responsibility of the student, together with the major professor, to report all additions and changes to a student's record to the Student Services Office to ensure that the student's record is current. These reports should include:

- (a) Choice of a major professor/Research Advisor
- (b) Formation of the Advisory Committee, and any changes to the Committee
- (c) Initial degree plan and any changes or updates to this plan
- (d) Results of divisional Qualifying Examinations (CHEM 6010)
- (e) Results of the Final Comprehensive Examination/Defense and the date of the student's departure

Grades need not be reported, since they can be accessed by the Student Services Office.

F. Thesis or Dissertation Defense/Final Comprehensive Examination

A Final Comprehensive Examination is required by the University for all graduate students at the completion of their graduate studies. This examination is administered by the student's Advisory Committee, and the results are reported to the Dean of the Toulouse Graduate School. Each student should check the University calendar well in advance of the intended graduation date to meet required deadlines for thesis/dissertation submission and completion of the oral defense/final examination.

Ph.D. dissertations and Master's theses must contain research that is scientifically significant and suitable for publication in refereed scientific journals. In addition, the thesis or dissertation must conform to University guidelines for formatting and content. Students should consult the *UNT Dissertation and Thesis Manual*, available on the Toulouse Graduate School Web site or upon request from the Thesis/Dissertation

Reader, before they start writing. Additionally, students are strongly encouraged to follow the scientific writing guidelines described in the *ACS Style Guide*. Of particular importance is proper citation of related work in the scientific literature. Literature references in the thesis or dissertation should follow ACS journal format, as described in the *ACS Style Guide*.

Students are strongly advised to meet with their Research Advisor to discuss the organization and content of their thesis or dissertation before beginning to write.

The required final oral examination will be primarily a defense of the thesis or dissertation. For a Ph.D. candidate, it is required that at least one paper on a topic related to the dissertation will have been accepted in or submitted to a refereed journal by the time of the oral defense. A copy of the manuscript published or under consideration should be submitted to the student's Advisory Committee along with the dissertation. The thesis or dissertation must be submitted to the student's Advisory Committee at least two weeks prior to the oral examination.

The Final Comprehensive Examination will begin with a concise presentation (typically 25-35 minutes) summarizing the research contained in the student's thesis or dissertation. This portion of the examination is open to the public and will be followed by an open question-and-answer period.

After members of the public have had opportunity to ask questions, the examination will proceed to a closed-door session in which only the defending student and the Advisory Committee are present. In this phase of the examination, the committee members will ask questions that gauge the student's depth of knowledge in their chosen field as well as their intellectual contributions to their own research project. Students will be expected to demonstrate a level of research knowledge and intellectual independence appropriate to the degree being sought. The ability to communicate scientific knowledge at a high intellectual level, and the ability to respond effectively and professionally to questions and criticism, are important criteria for a successful defense.

Following the oral examination, the committee will discuss the student's performance and will decide, by majority vote, whether the student has passed the defense. The committee may request revisions to the thesis or dissertation. All revisions must be completed and approved by the Advisory Committee before the final version of the dissertation is submitted to the Toulouse Graduate School.

If a student does not pass the oral examination, the Advisory Committee may grant the student one more opportunity to defend the thesis or dissertation. A clearly deficient defense, or failure to pass a second defense when allowed, will result in the student becoming ineligible to receive their intended degree.

G. Other General Policies

1. Seminar Program

The seminar program is a vital part of a student's training, as it gives direct exposure to topical research areas, including those outside the student's immediate interest. All full-time students who receive departmental or research support are required to enroll in the Seminar course (CHEM 5940, 1 credit hour) each semester until completion of the degree. This typically amounts to a total of 8-10 credit hours of CHEM 5940 during a typical Ph.D. degree and 4-6 credit hours for a M.S. degree.

Attendance at Departmental Seminars (defined as any class period of CHEM 5940, as well as Special Seminars outside the regular seminar time) is compulsory unless the student has a conflict with a class or teaching assignment, in which case the Seminar Chair should be informed in advance.

2. Course Enrollment and Grade Requirements

All full-time graduate students are required to maintain a full course load, as determined by University policy and the Chemistry Department. Full-time enrollment corresponds to 9 credits hours of courses, including research (CHEM 6940) and Seminar (CHEM 5940). Students receiving departmental assistantships or grant support (i.e., as RAs) must be full-time students.

A "B" average must be maintained in all formal graduate-level chemistry courses taken by graduate students. Special Problems, Seminar, Thesis, or Dissertation courses are not included in computing the grade point average. Graduate School policy states that a student who does not maintain a "B" average (as defined above) may be suspended. Such a decision is made by the Toulouse Graduate School, after consultation with the Chemistry Department. The Chemistry Department further stipulates that a student cannot graduate with two semesters of "F" grades in any pass-fail graded courses (e.g., research or seminar courses.)

3. Responsible Conduct of Research (RCR) Training

An understanding of the ethical aspects of scientific research is an indispensable part of scientific training. All graduate students will receive training in Responsible Conduct of Research (RCR) through four classes of CHEM 5010 devoted to Scientific Ethics. Topics will include plagiarism, misrepresentation or fabrication of data, and research involving human subjects, among many others. As part of these CHEM 5010 classes, students will be required to research a topic related to scientific ethics and make a short presentation to the class.

In addition, all first-year students will be required to complete online RCR training through the CITI Basic Course in Responsible Conduct of Research. Access to this course is provided through the UNT Office of Research Integrity and

Compliance, and will be facilitated by the instructor of CHEM 5010. The CITI course must be completed by the end of the semester in which the student takes CHEM 5010—i.e., the first Fall semester that the student is enrolled. Each student must print a Certificate of Completion and provide it to the Chemistry Student Services Office as proof that RCR training was completed.

Note that some granting agencies may require more extensive training in RCR. In such cases, the Graduate Affairs Committee and the Student Services Office will work with students to arrange the appropriate training.

4. Financial Assistance

Financial support for graduate students is provided in a number of ways:

(a) Chemistry Department Assistantships, which include: teaching assistantships (TAs), lab preparatory (prepper) positions, grader positions, Chemistry Resource Center (CRC) tutor positions, and Computational Chemistry Instructional Laboratory (CCIL) attendant positions; (b) research assistantships (RAs) funded through research grants to individual faculty members; (c) individual student scholarships or fellowships available to qualified students from a variety of agencies, both governmental and private; and (d) fellowships and scholarships awarded through the College of Arts and Sciences (CAS), Toulouse Graduate School and the Department of Chemistry.

Typically, all incoming first year graduate students are offered financial support for their first year as part of their admission offer. Specific details and conditions are provided in the admission offer letters. Students must be enrolled full-time (9 credit hours or equivalent) and making satisfactory progress towards their degree to remain eligible for departmental assistantships.

In the second year and beyond, students are encouraged to seek research assistantship (RA) support through their research advisor, although the advisor's willingness to provide RA support may depend on the availability of funds and how far the student has progressed in coursework. After the second year of study, it is common for many students to be supported on research assistantships.

The Department makes every reasonable effort to provide TA and other assistantship support to students who need it after their first 12 months of graduate study. However, such support is dependent on the number of available teaching positions, and therefore cannot be guaranteed. Continued TA support is also contingent upon the student remaining in good academic standing and making satisfactory research progress, as well as on satisfactory past performance in TA and related positions.

Assistantships are considered 50% of Full Time Employment (FTE). Combined with a student's required course enrollment, a student on an assistantship is considered to have a full time commitment. Therefore, students employed through department assistantships are not permitted to have other simultaneous outside

employment unless prior approval has been obtained from the Department. Students employed through research assistantships (RAs) are normally also expected to comply with this policy, although exceptions may be granted by the research advisor in some circumstances.

All graduate students employed on assistantships by the Chemistry Department are required to attend a TA Meeting, historically scheduled the Friday before classes begin. The TA Meeting will address departmental teaching standards, duties and responsibilities, and individual teaching and other assistantship assignments will be announced. Failure to attend the TA Meeting may result in loss of the assistantship and/or prohibition from receiving future support from the department.

Following are descriptions of the types of assistantships typically available to graduate students in the UNT Chemistry Department:

- **Teaching Assistant (TA):** Teaching lab instruction under the supervision of laboratory course instructors.
- **Super TA:** Graduate student assigned to assist in large-enrollment courses, typically General and Organic Chemistry. Super TAs are required to attend all course lectures and recitations, must maintain regular office hours, and may be asked to lecture at the request of their assigned course instructor.
- **Lab Prepper:** Assist teaching lab coordinators in preparation of supplies for General and Organic Chemistry labs.
- **Course Grader:** Assigned to large enrollment course to assist in homework and exam grading and grade entering. Grading must be done at the direction of the course instructor and should be completed within the timelines specified by the instructor. Graders are required to maintain weekly communication with course instructors.
- **CRC Tutor:** Assist undergraduate students visiting the Chemistry Resource Center (CRC) with questions, primarily in General and Organic Chemistry courses. CRC Tutors work 20 hours per week and report to the Department Chair.
- **CCIL Attendant:** Oversee operations in the Computational Chemistry Instructional Laboratory (CCIL). Duties include printing authorization and assistance with computational chemistry software questions. Attendants are scheduled for 20 hours per week and report to Dr. Dave Hrovat, Manager of Computational Facilities.

5. English Language Proficiency Requirements for Teaching Assistants

International students, as well as U.S. citizens or permanent residents whose first language is not English, are required to pass the Diagnostic English Language Screening Exam (DELSE) before being allowed to work as a laboratory Teaching Assistant or in the Chemistry Resource Center (tutoring lab). The DELSE exam is administered during orientation week, which is the week before classes begin in the Fall and Spring semesters. Graduate students who were guaranteed departmental assistantship support but do not pass the DELSE upon entrance to the program, when required, will typically receive a lab prepper or grader position during their first semester at UNT. During this first semester, students will be required to attend

English proficiency training through the Intensive English Language Institute (IELI) and will take the DELSE again at the end of the semester. Students who do not pass the DELSE a second time are not guaranteed any type of assistantship support after the first semester. In addition, all international students must pass the DELSE within 2 years of entering the program to be considered for any type of department financial assistance.

Note that the DELSE requirement for Teaching Assistants is in addition to the English language proficiency requirements for admission to the graduate program (i.e. TOEFL or IELTS test scores). A high TOEFL or IELTS score does not exempt students from taking the DELSE.

6. Changing Degree Programs

If a student in good academic standing wishes to switch from the Ph.D. program to the M.S. program or vice versa, the student may do so with the approval of the Research Advisor and the Chemistry Graduate Advisor. The student will not need to reapply to the Chemistry Graduate Program. However, a formal change of degree plan must be filed with the Toulouse Graduate School.

V. SPECIFIC DEGREE REQUIREMENTS

A. Master's Degrees

1. M.S. in Chemistry

The M.S. in Chemistry is a research-based degree which requires a grade point average of "B" or better in formal coursework for which letter grades rather than pass-fail grades are given (i.e., excluding Research and Seminar). A minimum of 12 credits hours of formal coursework beyond the Proficiency level is required, to include the two required Core courses. A minimum of 30 total hours of coursework must be completed, including Research (CHEM 6940) and Seminar (CHEM 5940). This must also include six credit hours of CHEM 5950, Master's Thesis, to be completed at the end of the student's graduate studies and before the Thesis Defense.

Students pursuing a research-based M.S. degree in Chemistry may choose a concentration in Analytical, Inorganic, Organic, Physical Chemistry, Chemistry Education or Chemical Biology by joining the relevant division.

2. M.S. in Professional Chemistry (Professional Science Master's)

This degree is designed for students pursuing careers in industry. It incorporates graduate coursework in Chemistry, as well as providing broader exposure to other fields relevant to industrial careers. The program leads to a non-thesis degree requiring 36 semester hours of coursework, at least one-half of which (18 semester hours) must be in Chemistry. Non-Chemistry courses must total at least 12 hours and may include courses in business administration, economics, computer science,

political science, environmental science, and other areas as deemed appropriate by the student's Advisory Committee. Seminar courses may be counted toward the degree. Either 3 or 6 hours of the total 36 hours must comprise on-the-job research training in an industrial position (or equivalent research environment). Research conducted at UNT cannot be used for this training. To receive credit for this training, the student should sign up for CHEM 5900 (Special Problems). The student must receive approval from their Advisory Committee and the GAC before enrolling for credit for on-the-job training. The remaining 30-33 required hours for this degree must be in formal courses.

In order to qualify for the M.S. in Professional Chemistry, a student must meet proficiency requirements in two of the five areas (see Section III).

Students who would like to switch from another degree track into the Professional Chemistry M.S. program must give written notice to the Student Services Office of their intention to switch at least one week before the first day of class of the semester in which they plan to switch to the program.

3. Non-Thesis M.S. in Chemistry Education

This degree is designed for students pursuing a career in K-12 education. It incorporates graduate coursework in Chemistry. The program leads to a non-thesis degree requiring 36 hours of formal graduate courses, which may include seminar courses, but which cannot include CHEM 6940 (Individual Research) or CHEM 5950 (Thesis), if no thesis is to be written. A minimum of 18 hours beyond Proficiencies must be formal graduate courses, not including seminar courses.

B. Ph.D. Degree

A Ph.D. degree attests that an individual has gained mastery of the current state of knowledge in a particular area of chemistry and has demonstrated the ability to make independent, original research contributions to that area. Consequently, the Ph.D. degree has substantially greater requirements than a M.S. degree.

Each Ph.D. student must choose a concentration by joining one of the formal divisions: Analytical, Inorganic, Organic, Physical Chemistry, Chemistry Education, or Chemical Biology.

1. CHEM 6010: Qualifying Examination and Admission to Ph.D. Candidacy

A student becomes a Candidate for the Ph.D. degree after successful completion of the Qualifying Examination sequence (CHEM 6010). This sequence consists of a series of written Cumulative Examinations, a written research proposal/research progress report, and an oral examination. The purpose of the Qualifying Examination sequence is to ascertain that the student 1) has achieved a doctoral-level knowledge of chemistry, especially in the student's area of expertise; 2) has demonstrated the potential to conduct independent research; and 3) can effectively

communicate their knowledge of chemistry and their research contributions, both in writing and orally. All three of these criteria must be met before a student may enter Doctoral Candidacy.

The CHEM 6010 sequence is conducted by each formal division (Organic, Inorganic, Physical, Analytical, Chemistry Education, and Chemical Biology) within the Chemistry department, with the head of the respective division serving as the instructor of record for enrolled students within that division. Students working in interdisciplinary areas that span two or more divisions should choose a home division for the purpose of completing the CHEM 6010 sequence, in consultation with their Research Advisor and Advisory Committee.

All Ph.D. students should enroll in 3 credit hours of CHEM 6010, Seminar for Doctoral Candidates, in Spring semester of their second year in the program, and usually again in the Fall semester of the third year. The entire CHEM 6010 sequence must be completed no later than the end of the first semester of the third year of graduate study. Any exceptions to this timeline must be approved by the Research Advisor, the Division Chair, and the Graduate Affairs Committee. Students must have completed the Core course in their major area, or be currently enrolled in the Core course, at the time they begin the CHEM 6010 sequence.

The Cumulative Examinations (“cumes”) constitute the written portion of the Qualifying Examination. Cumes will be administered according to the following guidelines:

1. A total of five written Cumulative Examinations will be offered by each formal division each year. Students must pass three cumes out of a maximum of five attempts before they may proceed to the oral examination.
2. The Cumulative Exams will be taken during the third week of each month from January through May.
3. At the beginning of the Spring semester, the Division Chair will send enrolled students a schedule of the monthly exams, including a list of faculty members who will administer each exam and specific exam dates.
4. Each student is responsible for contacting the faculty member giving an exam at least one month prior to the exam date to announce their intention to take the exam.
5. The faculty member will provide all students taking the exam with a topic (see below) and recommended study materials at least two weeks prior to the exam date.
6. Cume exams will be graded on a pass/fail basis. Faculty will complete grading of each cume exam within a reasonable time (~2 weeks), and the grades will be communicated to students by the faculty member or Division Head.
7. If a student decides not to take a Cumulative exam or misses the exam, it will be counted as one of the five attempts.

An important purpose of the CHEM 6010 sequence is to prepare students for independent research. Whenever appropriate and at the instructor’s discretion, Cumulative Exam topics will be literature based and drawn primarily from

published papers in peer-reviewed journals. Students will be expected to apply knowledge gained in graduate coursework, but an important goal of the Cumulative Examinations is to test the ability to critically analyze and interpret research findings, including those recently published. The faculty member administering each Cumulative Exam should provide students with the topic and specific literature references (typically 2-3 papers) at least two weeks prior to the exam, to provide sufficient time for studying. The faculty member will develop appropriate criteria for grading the examination. Students who demonstrate a marginal performance on a cumulative exam may be given a grade of “half pass” at the instructor’s discretion. Two grades of “half pass” will add to one “pass” in the final grading scheme.

If a Division so chooses, an ACS Standardized Exam may be used as the first written exam in the Cumulative Exam sequence, but this must be done uniformly for all students in the division.

Normally, it is expected that each student will pass at least two Cumulative Exams in their home division. Exams may be taken in other divisions only with prior approval by the student’s Research Advisor and Advisory Committee, and only when this is appropriate to the student’s dissertation research. For students working in highly interdisciplinary research areas, it may be appropriate for the student to pass up to two exams in other divisions, again with approval of the Research Advisor and Advisory Committee.

Once a student has passed three Cumulative Examinations, they should begin preparing for the Oral Qualifying Examination. Oral examination guidelines vary somewhat by division (see Appendix A), but all have key requirements in common. The student should propose a research project that builds on the knowledge they have gained in their graduate studies. This may be an extension of the student’s current research project, or it may be an original research proposal unrelated to their dissertation research, depending on the requirements of the student’s home division. An oral summary of the student’s research progress to date may also be included if required by the division.

At least two weeks prior to the examination date, the student should submit a written report to all members of their home division. This should include a concise summary of research progress to date (1-2 pages, single-spaced) as well as the required research proposal. The proposal should be prepared according to the specifications of each Division. If not otherwise specified by a Division, the recommended length is 6-12 pages, single-spaced. Appropriate citations to the scientific literature should be included, and these references do not fall within the page limit.

The Oral Qualifying Examination will consist of a concise presentation by the student before the faculty of their home division (20-30 minutes), followed by a lengthy question and answer/defense period. In order to pass the examination, the student will be expected to demonstrate familiarity with the current state of

knowledge of their research area, an ability to communicate scientific data and concepts clearly, and potential for original and independent scientific thought.

After successful completion of the CHEM 6010 Oral Qualifying Examination and formal coursework, a student is admitted to Candidacy for the Ph.D degree. Candidacy must precede graduation by at least one year.

Students who do not pass three Cumulative Examinations within five attempts, and students who do not pass the Oral Qualifying Examination, are not eligible for Doctoral Candidacy in the Department of Chemistry. Upon agreement with the Research Advisor and Advisory Committee, the student may choose to switch to the M.S. program and complete a research-based thesis.

2. Third-Year Research Seminar

All Ph.D. students are required to give a departmental seminar during their third year, with faculty and other graduate students attending. The seminar should present the student's research progress to date and will be allotted approximately 25 minutes plus questions. These seminars take place on Graduate Student Seminar Day, which is typically a Friday in late Spring, as part of the CHEM 5940 seminar program. The Graduate Advisor and Seminar Chair will arrange details of the event each year.

3. Dissertation Enrollment

Enrollment in Doctoral Dissertation credits (CHEM 6950) is not allowed until after a student has successfully completed all of the CHEM 6010 requirements. A total of 9 credit hours of dissertation enrollment is required and must be completed over 2 consecutive semesters. Once enrollment in dissertation credits has begun, students must remain enrolled in CHEM 6950 until the dissertation has been accepted by the Graduate School. If there is a break in dissertation enrollment, the 9 credit hours of dissertation enrollment must begin again. See the UNT Graduate Catalog for detailed rules regarding the continuous enrollment policy.

VI. POLICIES AND PROCEDURES FOR TERMINATION OF A STUDENT FROM THE CHEMISTRY GRADUATE PROGRAM

There are several circumstances under which a student may be removed from the M.S. or Ph.D program in Chemistry.

1. Did not meet Proficiency Requirements: If a student does not satisfy proficiency requirements by examination or course within 12 months of beginning the program (for full-time students), the student will not be eligible to continue in either the M.S. or Ph.D. program. A student who demonstrates proficiency in only three of the five areas (including their own area of research) will be eligible to continue in the M.S., but not the Ph.D., program. Details of the proficiency requirements are given in Section III, above.

Students who have not met proficiency requirements will be notified by the GAC that they are no longer eligible to remain in the graduate program.

2. Student with no Research Advisor: If a student fails to join a research group by the specified deadline (see Section IV.C.), the student will be notified that they will no longer be in the program after the end of the current academic term. If a student leaves or is expelled from a research group, the student must find a new Research Advisor within the current academic term, or the student will be released from the program.
3. Did not pass CHEM 6010: Doctoral students who do not satisfactorily complete the written and oral qualifying examination sequence will be terminated from the Ph.D. program. Students will be notified by the head of their home division if they have not passed the CHEM 6010 sequence. General requirements for qualifying examinations are given above in Section V.B., and division-specific requirements are detailed in Appendix A.
4. Did not pass Thesis or Dissertation Defense: If the student's Advisory Committee votes that the student has not passed the Final Comprehensive Exam/Oral Defense, the Research Advisor will so notify the student and the Toulouse Graduate School. Requirements for successful thesis and dissertation defenses are described above in Section IV.F.

Students may appeal any decision to terminate them from the graduate program through the appropriate committee or faculty group: (a) Proficiency requirements: Graduate Affairs Committee; (b) Lack of a Research Advisor: Graduate Affairs Committee; (c) CHEM 6010 Qualifying Examinations: faculty members in the student's home division within Chemistry; (d) Thesis or Dissertation Defense: the student's Advisory Committee.

Updated 8/30/2021

APPENDIX A - DIVISIONAL RULES FOR DOCTORAL QUALIFYING EXAMINATION (CHEM 6010) AND OTHER SPECIFIC REQUIREMENTS

A. Analytical Chemistry

The Analytical Chemistry Division's CHEM 6010 sequence consists of a series of written examinations (called cumulative examinations) plus the oral defense of an original research proposal on a topic either related to or not related to the student's Ph.D. dissertation research.

Since CHEM 6010 is a formal course, the student enters the examination sequence by enrolling in CHEM 6010. Five written examinations are given during the Spring semester of each academic year. No written examinations are given during the summer. It is the responsibility of all students enrolled in CHEM 6010 to notify the Analytical Division Chair if they wish to take the Analytical cumulative examinations for that semester. Written cumulative examinations will be given during the third week of each month from January through May. Specific dates and times are determined by the individual faculty member responsible for administering the examination, who may consult with students to find a mutually agreeable time.

For the CHEM 6010 oral qualifying examination, it is the responsibility of the graduate student to make all arrangements for the examination, including finding a date and time which is convenient to over 50% of the faculty members in the Analytical Division plus the graduate student's research advisor (the established examination committee). An effort must be made to be inclusive of all of the divisional faculty. The graduate student must also make arrangements for the room. At least two weeks prior to the CHEM 6010 oral examination, the graduate student must distribute their research proposal to all members of the Analytical Division. The original research proposal must be written up in a form suitable for submission to the National Science Foundation (with proposed budget). The recommended length and format are to follow the NSF guidelines for the year the student will defend based on the NSF "Proposal & Award Policies and Procedures Guide" within CHE. The student will also follow the solicitation rules for the sub-section and discipline within CHE that best fits their proposal.

The 6010 cumulative exams are to begin in the Spring semester of the 2nd years. This will typically be the January after a divisional student completes the Analytical Core course (CHEM 5570). A student enters the oral examination portion of the Chem 6010 requirements after he/she passes three of five written examinations. Once a student begins the written examination sequence, he/she must take all subsequent examinations until either passing three written examinations or until failing three written examinations. Exams must be taken on the date specified by the instructor; however, if circumstances arise that force a student to miss an exam due to illness, death in the family, or excused conflict, the student must contact both the proctoring faculty member and Analytical Division head. If the conflict is deemed valid under university policy, the faculty proctor and division head can either offer a reschedule date, or give a grade of

“I” and allow the student to continue the 6010 sequence without taking the missed examination.

In the oral portion of the CHEM 6010 examination, the student must write an original research proposal either related to or not related to their doctoral research, and must successfully defend the research proposal (see guidelines above). A graduate student is given only two opportunities to pass the oral examination.

The subject of the written examinations, as well as a reading list, is distributed to graduate students at least two weeks prior to the examination. The reading list will identify articles and material from the chemical literature and/or chapters from books that the student should read and will be responsible for knowing on the examination. The time that the student will be given to complete each written examination varies according to the nature of the examination questions. Students will be informed at the time the examination is scheduled how many hours will be required. As a general "rule-of-thumb," the examination will typically last about three hours.

Calculators may be brought to all written examinations. If for any reason additional items are needed, then graduate students will be informed of this at the time the topic is announced and the reading list is distributed.

One faculty member, as selected by the Analytical Division, is responsible for writing, proctoring and scoring a given written examination. The faculty member assigns an actual numerical score to the examination, and a grade of either Pass or Fail. In assigning grades, the faculty member may consult with other faculty members in the Analytical Division.

The oral examination proposal is presented and defended before an examination committee comprising at least 50% of the Analytical Division and the student's research advisor, who collectively decide if the research proposal was successfully defended.

On the written cumulative examinations, the grading scheme or protocol will be comparable with those used in formal lecture classes. Partial credit is based upon the work shown and the completeness of the student's response. Only "Pass" and "Fail" grades are assigned. [So-called "Half-Passes" are not used by the Analytical Division.]

Graduate students are informed in writing of their examination outcome. Any student may examine their examination, if requested, and discuss the grading with the individual faculty member responsible for administering and scoring the examination.

A student must pass three out of five written examinations. If a student fails three written examinations or fails to successfully defend their original research proposal after two attempts, then the student fails CHEM 6010.

Except in unusual circumstances, the written portion of the CHEM 6010 is completed during the Spring semester of a student's 2nd year of graduate study. Except in unusual

circumstances, the oral defense of the original research proposal is to be completed by the end of the Fall semester after the student has passed three written cumulative exams. **When a graduate student fails CHEM 6010, either the written or oral portion, the Analytical Division Chair notifies both the graduate student and Chair of the Graduate Affairs Committee.**

Chemistry 6010 is a formal course, and the Analytical Division's appeal procedure is in accordance with written University policy concerning grade appeals.

(Analytical Division CHEM 6010 rules updated 7/21/18)

B. Inorganic Chemistry

The Inorganic CHEM 6010 Exam sequence is composed of two parts: (1) a series of five written cumulative exams, administered by individual faculty members on a rotating basis; (2) an oral presentation and proposal defense. Specific rules for each examination are given below.

Cumulative Examinations

A student will take a maximum of five cumulative exams. These examinations are offered once per month from January through May, in the third week of each month, and will be administered by individual members of the Inorganic Division. Cumulative exams may cover any aspect of Inorganic Chemistry. The faculty member in charge of the exam will inform students at least two weeks in advance if there are particular study materials (*i.e.*, journal articles or book chapters) that the student should review—besides background material comprising Inorganic Proficiency and Core coursework/equivalent thereof—and whether the student may bring additional materials to the examination room. The faculty member will arrange a specific date and time for the exam.

The time allowed for the exam depends upon the individual instructor and is typically 2 - 5 hours.

The examination will be graded by the faculty member administering the test. The faculty member will assign a grade of pass, half-pass, or fail. A student must pass three of the five examinations; two grades of half-pass count as one passed exam.

A student who does not pass three out of the five cumulative examinations will not be permitted to continue in the Chemistry Ph.D. program, and the student will be so informed by the Research Advisor.

Oral Presentation and Proposal Defense

The student will give an oral presentation and proposal defense following successful completion of the written cumulative exam sequence. This oral examination is scheduled on an individual basis, usually within the next Fall semester following completion of the written cumulative exams. An appeal by the student, with their research advisor's recommendation, to extend the oral defense deadline by an additional long semester may be considered by the Inorganic Division in exceptional circumstances, but this also requires the approval of the Graduate Affairs Committee as stated in the general CHEM 6010 policies.

The student will prepare a written report that includes a brief summary of research progress to date (1-2 pages, single spaced) and a proposal for future research plans (6-12 pages, single spaced, plus references). The student must provide electronic or written copies of the report to all faculty in the Inorganic Division at least two weeks prior to the oral examination date. The student is responsible for finding a suitable date for the

examination and for reserving a room for the presentation and defense. The student will give an oral presentation lasting 20 - 30 minutes to a committee consisting of all members of the Inorganic Division. The student will then be required to answer questions related to the report and presentation, which may also extend to other pertinent aspects of Inorganic Chemistry.

The student is permitted to bring a notebook computer containing the presentation, the printed report, and other written notes to the presentation. This oral examination/proposal defense will be graded after a discussion by all members of the Inorganic Division in attendance. Two grades will be assigned to account for the written and oral components of the Inorganic CHEM 6010. The grades will be based upon the content of the presentation, the student's performance in the written examinations (i.e., any half passes or failed cumulative exams will lead to a lower assigned grade), the thoroughness and quality of the written report, the student's ability to answer questions effectively, and the student's overall oral communication skills.

After the faculty discussion, the student will be informed of the committee's decision by the Research Advisor. The advisor may share the comments of the committee with the student if appropriate in order to counsel the student toward better preparation for future career steps.

Students will be allowed two attempts to pass the oral qualifying examination. If the presentation is considered passing, but the written report is deficient, the student will be allowed to rewrite and resubmit the report, but will not be required to give a second presentation.

If the student fails both attempts at the oral examination, the student will not be permitted to continue in the Ph.D. program and will be so informed by the Research Advisor.

Appeal Policy

Appeals of a failing grade in either the written cumulative examination sequence or the oral qualifying examination will be considered by the divisional faculty on an individual basis. The student's right to such an appeal is subject to the relevant Departmental and University policies.

(Inorganic Division Appendix rules updated 8/06/2018)

C. Organic Chemistry

The written cumulative examination sequence is given each Spring semester. The Organic Division Chair must be contacted by each student wishing to take the cumulative exam sequence, and a date in the third week of January is then scheduled to best accommodate the student(s) and the Division Chair for the first cumulative exam. This first exam is a multiple choice test based on material from a comprehensive undergraduate course.

The remaining four cumulative exams will cover organic topics based on recent literature, as decided by the faculty member giving the exam. The length of the exam, materials required for the exam, and specific exam date and time (in the third week of each month) will also be decided by the individual faculty member giving the exam. The topic and any study materials required for the exam will be released to the students at least two weeks ahead of the exam.

The cumulative exams will be graded on a pass, half pass, or fail basis by the faculty member responsible for giving the exam. Two half passes will be counted as one full pass. After each exam has been graded, the Organic Division members view the exam before the results are reported to the student. After the Division members have reviewed the exam, the grade is transmitted, in writing, to the Division Chair, after which the exam is returned to the student. Typically, an answer sheet accompanies each returned exam. The examining faculty member will meet with the student to discuss any deficiencies in the student's performance.

A student may not repeat an exam after receiving a failing grade.

While there are no specific consequences for a single unsatisfactory performance, the student will be notified by the Chair in the event that three full passes have not been achieved after five attempts.

The student may appeal any individual exam grade by contacting the faculty member responsible for the exam in question. After the student has received written notification of failure to qualify for admission to doctoral candidacy through the written portion of the 6010 sequence, a formal appeal may be made to the Organic Division Chair. All grade appeals are subject to relevant UNT policies.

Additional Information

1. After a student has accumulated three full passes on the monthly written examinations, an oral examination will be scheduled. At this examination, the student will present to the Organic Division an oral presentation on the progress of their research, and plans for the completion of their dissertation work. In order to pass the oral examination and complete the 6010 sequence both concrete demonstration of research progress and the ability to correctly answer questions asked by the Division members are required. Questions are not limited by

material contained in the student's presentation. Two attempts are allowed for the oral portion of the 6010 sequence. The oral examination should be completed no later than the end of the Fall semester following completion of the written cumulative exam sequence.

2. All organic students will be required to prepare and defend an original research proposal at the time of their CHEM 6010 oral examination. This proposal, which cannot be based on the student's current dissertation work, must be submitted to the members of the organic division at least two weeks before the oral examination. The format of the written project should follow the guidelines that are recommended by the National Science Foundation or other relevant federal agencies for the preparation of research proposals. The recommended length is 6-12 pages, single spaced, with appropriate font size. Literature references are required and do not fall within the 6-12 page limit. The written report should also include a brief summary of the student's research progress to date (1-2 pages).

3. For each semester in which a student is participating in the 6010 sequence, the Organic Division will meet to discuss the progress of the student, and will assign grades when the sequence has been completed. The student will be informed in writing of the results of this evaluation.

(Organic Division Appendix rules updated 7/28/18)

D. Physical Chemistry

The Physical CHEM 6010 Exam sequence is composed of (a) written cumulative examinations, and (b) an oral presentation accompanied by a report, and is administered according to the department's guidelines (section V.B.1). Specific rules are given below:

Written Cumulative Examinations

Five cumulative examinations will be offered in the Spring semester of each year. Each examination is scheduled by the faculty member writing the exam within the third week of the month in which the exam will take place. The topic for each exam is announced to the student at least two weeks in advance and may be broad in its coverage (e.g. chemical kinetics or quantum mechanics) or narrow (e.g. Fourier-transform NMR of Organometallic Complexes). Faculty members may assign specific study materials at their option. These references are provided at the time of the exam announcement.

The testing environment is decided by the faculty member in charge of the exam being administered. This includes matters such as amount of time allowed for completion of the exam, time and site of exam, materials and other aids needed or recommended.

Each exam is graded by the faculty member who compiled it. Partial credit is generally given for multi-section problems, but this is a fully discretionary matter for the faculty member in charge of the exam.

In general, grades are pass, no-pass and half pass. Two grades of half pass add to one full pass.

Exam results are generally reported to students within one or two weeks following the completion of the exam. After satisfactory completion of a specific exam, a student is then provided information about the next exam as described above.

This stage of CHEM 6010 is completed when the student has satisfactorily passed the equivalent of three cumulative exams offered by the division members within departmental time limits. If not, he or she will not be admitted into Ph.D. candidacy and will receive a grade of C, D, or F in CHEM 6010.

The student may appeal a non-passing grade on an exam to the faculty member who administered the exam.

Oral Presentation/Report

Once a student has completed the written cumulative examination sequence, the student will prepare a presentation, accompanied by a written report, encompassing the student's research progress to date and a research proposal. The proposal component may be either (a) an original research proposal on any topic in physical chemistry, or

(b) a proposal for future research related to the student's current research project. The oral examination should take place no later than the Fall semester following completion of the written CHEM 6010 exam sequence.

The written research proposal should be 5-10 pages, single spaced, including figures. Literature references are also required and do not fall within the 5-10 page limit. 60% of the written report should be the proposal, and 40% should be a summary of the student's research progress to date. The written report should be submitted to the Physical Chemistry Division faculty at least two weeks prior to the scheduled oral examination date.

The oral presentation will be given to a committee consisting of members of the Physical Chemistry Division. The presentation will last 20-30 minutes and will be followed by questions by members of the committee. The questions may concern the report, the presentation, and any other aspects of graduate-level Physical Chemistry.

This oral examination/report will be graded by all members of the committee. The grade will be based upon the content of the presentation, the report, and answers to questions.

After faculty discussion, the student will be informed of the decision, and provided with the comments of the committee, by the Physical Chemistry Division Chair.

Two attempts will be permitted to pass the presentation. If the presentation is acceptable, but the written report is deficient, the student will be allowed to rewrite the report, but will not be required to give a second presentation.

If the student fails both attempts at the oral examination, he or she will have failed the 6010 sequence and will not be permitted to continue in the Ph.D. program, and will be so informed by the Physical Chemistry Division Chair.

The student may appeal an overall non-passing grade in CHEM 6010 (C or lower) to the Physical Chemistry Division Chair. All grade appeals are subject to relevant UNT policies.

(Physical Division Appendix rules updated 7/21/18)

E. Chemistry Education

Proficiency Course Requirements

Proficiency requirements are the same as for other concentrations: students must pass the exam or take the proficiency course in 2 of the 5 areas for the M.S. degree; and in 3 of the 5 areas for the Ph.D. degree, with proficiency in Physical Chemistry required for Ph.D. students. M.S. and Ph.D. students completing a Chemistry Education concentration must show proficiency in their *Area of Specialization*.

Core Course Requirements

M.S. students – 2 courses (6 credit hours)

One must be CHEM 5880 (Learning Theories), and one must be in the student's *Area of Specialization*.

Ph.D. students – typically 3 courses (9 credit hours)

At least two Core Courses must be taken: one must be CHEM 5880 (Learning Theories), and one must be in the student's *Area of Specialization*. The remainder of the 18 hours of advanced courses may come from Special Topics courses (see below) and/or additional Core Courses.

Advanced/Special Topics Courses

M.S. Students – 2 courses (6 credit hours)

One should be related to Chemistry Education and should be chosen from the list below, and one must be in Chemistry in the student's *Area of Specialization*. If it makes sense for the student's specific interests, a third Core Course may be taken in place of the Special Topics course in the area of specialization, but this must be approved by the student's advisor and advisory committee. Any additional courses not on the list below that a student is interested in taking related to Chemistry Education must first be approved by the student's research advisor and advisory committee.

Ph.D. Students – Typically 3 courses (9 credit hours)

A minimum of two Advanced/Special Topics courses should be taken. Two should be related to Chemistry Education and should be chosen from the list below. Typically, a third Special Topics course in Chemistry in the student's *Area of Specialization* will be taken. As many as 4 Special Topics courses may be taken, with approval of your advisor and advisory committee. Any additional courses not on the list below that a student is interested in taking related to Chemistry Education must first be approved by the student's research advisor.

EPSY 5210	Educational Statistics (if necessary)
EPSY 6010	Statistics for Educational Research
EPSY 6020	Research Methods in Education
EPSY 6280	Qualitative Research in Education
EPSY 6285	Qualitative Data Analysis in Education
EDHE 5210	Student Demographics
EDHE 5220	Cultural Pluralism in Higher Education

CHEM 6010 – Qualifying Examination and Admission to Ph.D. Candidacy (6 credit hours)

The Chemistry Education Division's CHEM 6010 qualifying examination sequence consists of two main components: 1) a series of five written cumulative examinations, administered individually on a rotating basis; 2) a written Original Research Proposal (ORP) / research progress report and an oral presentation defense.

Except in unusual circumstances, the first component of CHEM 6010 is completed during the Spring semester of a student's second year of graduate study, and the second component of CHEM 6010 is to be completed by the end of the Fall semester of the student's third year of study, after the student has passed three of the five cumulative examinations. Specific rules for each component are detailed below.

Cumulative Examinations

A student will take a maximum of five cumulative examinations, and they must pass one exam in their *Area of Specialization* and must pass two exams in Chemistry Education. It is required that students must pass the one exam in their *Area of Specialization* before moving on to begin any exam in Chemistry Education. It is the responsibility of all students enrolled in CHEM 6010 to notify the Division Chair for their *Area of Specialization* and the Chemistry Education Division Chair if they wish to take the cumulative examinations for that semester. These examinations are offered once per month from January through May, typically in the third week of each month, and will be administered by individual members of the respective Divisions on a rotating basis.

Please see the Division policies for details related to cumulative examinations occurring within the *Area of Specialization*.

For Chemistry Education, the cumulative examinations may cover any aspect of Chemistry Education. The faculty member in charge of each examination will inform students at least two weeks in advance if there are study materials (i.e., journal articles or book chapters) that the student should review. The testing environment will be decided by the faculty member in charge of the exam being administered. This includes matters such as amount of time allowed for completion of the exam, time and site of exam, and materials required or recommended. The examination will be graded by the faculty member administering the test, and the faculty member will assign a grade of Pass/No Pass. Graduate students will be informed in writing of their examination outcomes, generally reported to students within 1-2 weeks following the completion of the examination.

A student must pass three of the five cumulative examinations, with one examination passed in the *Area of Specialization* and two examinations passed in Chemistry Education. A student who does not pass these cumulative examinations will not be permitted to continue in the Chemistry Ph.D. program, and the student will be so

informed by the Research Advisor.

Original Research Proposal/Research Progress Report and Oral Presentation Defense

Following successful completion of the Cumulative Examinations, the student will prepare a written report that includes the following:

- 1) An Original Research Proposal (ORP), focused on a Chemistry Education Research topic that is not related to their planned research agenda at UNT and differs from their dissertation work. The ORP must be written in a form suitable for submission to the National Science Foundation (with proposed budget and budget justification). The recommended length and format are to follow the NSF guidelines for the year the student will defend based on the NSF "Proposal & Award Policies and Procedures Guide" within the Division of Undergraduate Education (DUE).
- 2) A Research Progress report containing a summary of the Chemistry Education Research progress to date (1-2 pages, single spaced, plus any necessary references).

The student must successfully defend the ORP through an oral presentation. The oral presentation / examination is scheduled on an individual basis, usually within the next Fall semester following completion of the Cumulative Examinations. An appeal by the student, with their Research Advisor's recommendation, to extend the oral defense deadline by an additional long semester may be considered by the Chemistry Education Division in exceptional circumstances, but this also requires the approval of the Graduate Affairs Committee as stated in the general CHEM 6010 policies.

The student must provide electronic or printed copies of the written report containing the ORP and Research Progress to the Chemistry Education Division faculty and their *Area of Specialization* advisor at least two weeks prior to the oral examination date. For the oral examination, it is the responsibility of the graduate student to make all arrangements for the examination, including finding a date and time that is convenient to all faculty members, and for reserving a room for the presentation.

The student will give an oral presentation defending the ORP, approximately 20-30 minutes in length, to a committee consisting of members of the Chemistry Education Division, as well as the student's *Area of Specialization* advisor. The student will be required to answer questions by members of the committee related to the report and presentation, which may also extend to other pertinent aspects of Chemistry Education. For the oral examination, the student is permitted to bring a computer containing the presentation, the printed report, and any written notes.

This oral examination will be graded after a discussion by all members of the committee in attendance. The grade will be based upon the oral presentation of the ORP, the thoroughness and quality of the written report containing the ORP and Research Progress, and the student's ability to answer questions effectively / overall communication skills. After the faculty discussion, the student will be informed of the

committee's decision by the Research Advisor. The advisor may share the comments of the committee with the student if appropriate to provide direct feedback to the student.

Students will be allowed two attempts to pass the oral examination. If the presentation is considered passing, but the written report is deficient, the student will be allowed to revise and resubmit the report, but the student will not be required to give a second presentation. If the student fails both of their two attempts at the oral examination, the student will not be permitted to continue in the Ph.D. program and will be so informed by the Research Advisor.

Appeal Policy

CHEM 6010 is a formal course, and the Chemistry Education Division's appeal procedure is in accordance with written University policy concerning grade appeals. Appeals of a failing grade on any of the written examinations or oral presentations and reports in the candidacy sequence will be considered on an individual basis. The student's right to such an appeal is subject to the relevant Departmental and University policies.

CHEM 6940 – Research (minimum 12 credit hours)

The research credits must include both research in Chemistry Education, as well as research in Traditional Chemistry (in the student's *Area of Specialization*).

For Research in Traditional Chemistry (in the student's *Area of Specialization*), students must complete a minimum of two semesters (6 credit hours) of traditional chemistry research with a research-active faculty member who will serve as the student's *Area of Specialization* advisor. This research can either be a Traditional Bench Project or a Curriculum Development (Cognate) Project.

For a Cognate Project, students are expected to develop (semester 1), implement (semester 2), and evaluate (semester 2) one teaching laboratory experiment or classroom intervention at UNT. Cognate projects should enhance chemistry subject matter expertise as well as contribute to a better understanding of effective construction and implementation of curricular materials; these projects will be mentored by the student's Chemistry Education research advisor, *Area of Specialization* research advisor, and the laboratory/classroom instructor if necessary.

Written documentation of satisfactory completion of this Research in Traditional Chemistry project is required, and it is expected that involvement in this project will lead to published work. Students with a recent research-based M.S. degree in Chemistry (within 3 years of entrance into the Ph.D. program; if beyond 3 years of entrance into the program, must have significant professional experience) may seek a waiver of this requirement in the form of written permission from the Graduate Affairs Committee.

(Chemistry Education Division Appendix rules updated 8/30/21)

F. Chemical Biology

The Chemical Biology CHEM 6010 Exam sequence is composed of two parts: (1) a series of five written cumulative exams, administered by individual faculty members on a rotating basis; (2) an oral presentation and proposal defense on a topic related to the student's dissertation research. Specific rules for each examination are given below.

Cumulative Examinations

The written cumulative examination sequence is given each Spring semester and students are eligible to take them in the Spring semester of their 2nd year, after completing the Chemical Biology core course (CHEM 6540). The Chemical Biology Division Chair must be contacted by each student wishing to take the cume exam sequence, and a date in the third week of January is then scheduled to best accommodate the student(s) and the Division Chair for the first cume exam. This first exam is a multiple choice test based on material from a comprehensive undergraduate course i.e. the ACS Biochemistry exam. A student will take a maximum of five exams running from January through May, administered by individual members of the Chemical Biology Division. Cumulative exams may cover any aspect of Chemical Biology.

The faculty member in charge of the exam will inform students at least two weeks in advance if there are particular study materials (*i.e.*, journal articles or book chapters) that the student should review—besides background material comprising Chemical Biology Proficiency and Core coursework/equivalent thereof—and whether the student may bring additional materials to the examination room. The faculty member will arrange a specific date and time for the exam. Exams must be taken on the date specified by the instructor; however, if circumstances arise that force a student to miss an exam due to illness, death in the family, or excused conflict, the student must contact both the proctoring faculty member and Chemical Biology Division head. If the conflict is deemed valid under university policy, the faculty proctor and division head can either offer a reschedule date, or give a grade of “I” and allow the student to continue the 6010 sequence without taking the missed examination.

The examination will be graded by the faculty member administering the test. The faculty member will assign a grade of pass or fail; a student must pass three of the five examinations. A student who does not pass three out of the five cumulative examinations will not be permitted to continue in the Chemistry Ph.D. program, and the student will be so informed by the Research Advisor.

Oral Presentation and Proposal Defense

Once a student has completed the written cumulative examination sequence, the student will prepare a presentation, accompanied by a written report, on a project in their current area of research, which must demonstrate originality. Except for unusual circumstances, the oral defense of the original research proposal is to be completed by the end of the Fall semester after the student has passed three written cumulative exams.

The student will prepare a written report that includes a brief summary of research progress to date (1-2 pages, single spaced) and a proposal for future research plans (6-12 pages, single spaced, plus references). The format of the written proposal should follow the guidelines recommended by the National Institutes of Health (e.g. an R01 style proposal), National Science Foundation, or other relevant federal agencies for the preparation of research proposals. The student must provide electronic or written copies of the report to all faculty in the Chemical Biology Division at least two weeks prior to the oral examination date.

The oral presentation will be given to a committee consisting of members of the Chemical Biology Division. The presentation will last 20-30 minutes and will be followed by questions by members of the committee. The questions may concern the report, the presentation, and any other aspects of graduate Chemical Biology. The student is responsible for finding a suitable date for the examination and for reserving a room for the presentation and defense.

This oral examination/report will be graded by all members of the committee. The grade will be based upon the content of the presentation, the report, and answers to questions. After faculty discussion, the student will be informed of the decision, and comments of the committee, by the Chemical Biology Division

Two attempts will be permitted to pass the presentation. If the presentation is acceptable, but the report is poor, the student will be allowed to rewrite the report, and not be required to give a second presentation. If the student fails both attempts, he or she will have failed the 6010 sequence and not be permitted to continue in the Ph.D. program, and will be so informed by the Chemical Biology Division. The student may appeal a non-passing grade to a committee consisting of all members of the Chemical Biology Division

(Chemical Biology Division Appendix rules updated 2/17/2023)

**APPENDIX B - PROCEDURE FOR SELECTION OF A RESEARCH ADVISOR
(MAJOR PROFESSOR)**

During the first long semester of graduate studies, students should meet with at least three faculty members to discuss available research opportunities in the faculty members' research groups. This is important for ensuring that the student makes an informed decision when choosing a Research Advisor. The Research Advisor selection procedure is as follows:

1. Contact at least three faculty members whose research is of interest to you. These do not necessarily have to be limited to one area of chemistry (e.g., Analytical). For students starting in the Fall semester, a good time to do this is while the faculty research presentations are taking place in CHEM 5010.
2. Arrange for an individual meeting with each faculty member to discuss research opportunities within their group. You should also attend at least one research group meeting of each faculty research group that you are considering.
3. After attending the group meeting, have the faculty member initial next to their name on the Research Advisor Selection Form (p. 35). If attending a group meeting is not possible, the faculty member may initial the sheet after an individual meeting with the student.
4. When you have decided on your first choice for Research Advisor, contact the faculty member to inform them and ask whether they will agree to serve as your advisor. If the faculty member agrees, obtain their signature on the Selection Form. Note that all advisor selection decisions must be made by mutual agreement between the student and the faculty member and approved by the Chemistry Graduate Advisor. **For students starting in the Fall semester, the earliest date they may choose a Research Advisor is November 1. For students starting in the Spring semester, the earliest advisor selection date is April 1.**
5. Return the Research Advisor Selection Form to the Student Services office. It will be kept in your permanent file.

**DEPARTMENT OF CHEMISTRY
RESEARCH ADVISOR SELECTION FORM 2021-2022**

Graduate Student Name

GROUP MEETINGS/INTERVIEWS WITH GRADUATE FACULTY[†]

<u>Faculty Member (area)</u>	<u>Date</u>	<u>Initials[§]</u>
William E. Acree (analytical)	_____	_____
Molly B. Atkinson (chemistry education)	_____	_____
Oliver Chyan (analytical, materials science)	_____	_____
Tom Cundari (computational, inorganic)	_____	_____
Francis D'Souza (analytical, organic, materials science)	_____	_____
Teresa D. Golden (analytical, forensics)	_____	_____
Jeffrey A. Kelber (analytical, materials science)	_____	_____
Shengqian Ma (inorganic, materials)	_____	_____
Paul Marshall (physical, computational)	_____	_____
Mohammad A. Omary (inorganic)	_____	_____
Michael G. Richmond (organic, organometallic)	_____	_____
Elizabeth Skellam (organic, chemical biology)	_____	_____
Lee M. Slaughter (inorganic, organic, organometallic)	_____	_____
Omar Valsson (computational and theoretical)	_____	_____
Guido F. Verbeck (analytical, forensics, chemical biology)	_____	_____
Hong Wang (organic, materials)	_____	_____
Hao Yan (physical, materials, organic)	_____	_____

[†]All new graduate students are required to attend group meetings of at least three faculty members before they may choose a research advisor. Individual (one-on-one) meetings with faculty may be done instead, if attending a group meeting is not possible. These meetings may be virtual or in person.

[§]In place of a signature, you may attach an email from the faculty member confirming that you attended a group meeting or had a one-on-one interview, or the faculty member may email chemistry@unt.edu confirming the meeting.

I request that the following be appointed as my Research Advisor:

1st Choice: _____

2nd Choice: _____

3rd Choice: : _____

Graduate Student Signature

Research Advisor Signature

Graduate Advisor Signature (to be obtained by the Student's Services Office)

Note: The first date that advisor selections may be turned in is November 1, 2023 for students starting in fall 2023, and April 1, 2024 for students starting in spring 2024.