

The University of New Mexico

**Department of Chemistry &
Chemical Biology**

Graduate Handbook

Fall 2025

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I. INTRODUCTION

Graduate study of chemistry is more than a continuation of undergraduate study. It involves obtaining a mastery of the current state of knowledge and techniques, as well as making substantive contributions to advance the field through the generation of new knowledge.

The CCB graduate program offers a Doctor of Philosophy (PhD) and a Master of Science (MS; with or without a thesis) degree. The PhD is a research-oriented degree that prepares students for scientific careers as independent investigators and group leaders in academia, research institutes, national laboratories, and various industries. The thesis MS is a research degree of lesser scope and independence, intended to prepare students for scientific careers including research; the non-thesis MS is intended as a preparation for professional chemists who will not conduct research.

This handbook describes the graduate program and degree requirements for the Department of Chemistry & Chemical Biology (CCB) at The University of New Mexico (UNM). Specific academic requirements may be found in the current [UNM Catalog](#) and employment policies in the collective bargaining agreement (CBA). Students are responsible for knowing and understanding both UNM-wide and departmental requirements and for making satisfactory progress toward fulfilling them. This document outlines the specific and additional requirements for obtaining a graduate degree in CCB. Questions about requirements should be directed to the Graduate Coordinator and/or the chair of the Graduate Studies Committee.

II. GENERAL POLICIES

The PhD typically requires full-time effort and only full-time students will be supported on assistantships. Full-time PhD students must register for at least 12 credits in their first semester of graduate school and 12 credits each subsequent fall and spring semester until advancing to candidacy. MS students may be full or part-time, but do not have priority for assistantships. All students are expected to maintain good academic standing and to make good annual progress toward their degree.

The CCB graduate program is overseen by the Graduate Studies Committee (GSC), a standing committee of tenure-track faculty appointed by the department chair. The GSC is responsible for advising first-year students, overseeing the graduate program, and evaluating graduate students' performance throughout their tenure in the CCB graduate program. The Graduate Studies Committee advises incoming students and recommends courses for the first year of study. In the student's second semester, a faculty research adviser will be assigned by the GSC and a committee on studies (COS) headed by that faculty member will be formed to advise the student on further coursework, conduct the candidacy examination and evaluate the student's academic standing and annual progress toward the degree.

To maintain good academic standing, students must maintain a cumulative GPA of 3.0 or higher during their graduate studies at UNM. If a student's cumulative GPA drops below 3.0 they are not eligible for financial support through assistantships and are not allowed to take master's examinations, defend their research proposal, defend their dissertations, or graduate. If the student's GPA does not reach 3.0 after completion of 18 hours of graduate coursework or 4 semesters (not including summer), whichever happens first, the student is dismissed from the graduate program. A student is not considered to be in good standing if they receive 2 grades of NC or F in graduate courses, even if their cumulative GPA remains above 3.0; the student must maintain a GPA of 3.5 for 2 consecutive semesters afterwards to reinstate good academic standing. A student who receives three grades of NC or F in a graduate course will be dismissed from the graduate program.

Good annual progress consists of 1) good performance in coursework, including completing required departmental coursework within 2 years for full-time students, 2) timely passing of required examinations, and 3) research progress which can be expected to produce a dissertation or thesis within the normal timeframe of 6 years for a full-time PhD student and 3 years for a full-time MS student. A student's COS may extend these timeframes for part-time students or in exceptional circumstances, with the concurrence of the GSC. A student who receives 6 or more credit hours of "Incomplete" grades in graduate-level courses is not considered to be making good annual progress until the credit hours of "Incompletes" are removed and replaced by a grade B or better.

After advancing to candidacy, PhD students are expected to work intensively on their dissertation research. Their degree is completed by the creation of new knowledge, its dissemination through reviewed publications and oral presentations, and the public defense of their dissertation.

III. STUDENT ASSISTANTSHIPS

Graduate assistantships are financial support given to students in good academic standing, typically in return for teaching or research duties. In CCB, both teaching assistantships (TA-ships) and research assistantships (RA-ships) are available. Graduate assistantships typically provide a stipend, a tuition waiver for up to 12 CH per term in the Spring and Fall semesters (not summer), and benefits. The CBA provides more detailed information on this support. Graduate students may also be available for additional awards and stipends for special contributions that are not considered outside employment.

Graduate assistantships typically obligate the student to work 20 hours per week at the discretion of the instructor in charge of the TA-ship or the research adviser in charge of the RA-ship.

The duties of Teaching Assistants (TAs) may include but are not limited to preparation of experiments, supervision of lab sections, holding recitation sections and office hours, and grading. TAs report to the instructor in charge of their assigned course/s and obtain specific assignments from that instructor.

TA contracts begin with class preparation the week before the beginning of the term and continue through the end of final exams. Exceptions to this policy require written approval of the instructor in charge and violations may lead to serious penalties, including the loss of your TA-ship.

The performance of all TAs will be reviewed every semester. The Undergraduate Laboratory Supervisor, the instructor in charge, and the Graduate Studies Committee are responsible for reviewing the Teaching Assistant's performance and the Graduate Studies Committee has the power to change Teaching Assistant status. Consistently poor or irresponsible performance by Teaching Assistants may result in the student being placed on probationary status, or in extreme cases, losing their financial aid altogether.

Research assistants (RAs) typically participate in research relevant to the student thesis or dissertation. The RA is supervised by an adviser, who both directs the research and evaluates the RA's performance. Typically, students are expected to carry out research during the entire year including the summer. RAs should discuss and coordinate plans for vacation or leave with their research advisers.

CCB restricts departmental financial aid in the form of Research and Teaching Assistantships to a maximum of six calendar years from the date of entrance. For PhD students in good standing and making good annual progress, support is assured for the first five years. At the end of the fifth year, the student's overall progress will be evaluated by the COS and the GSC to determine their eligibility for a sixth year of support. If at any point the COS and the GSC conclude that a student shows little promise of completing the degree program, the Department will notify the student and the Graduate School in writing that the student is suspended from further work in the program.

IV. DOCTOR OF PHILOSOPHY (PhD) PROGRAM

The PhD program requires coursework, writing and defense of a dissertation proposal, and the successful writing and defense of a dissertation. Completion typically requires *a minimum* of 4 years of full-time study, assuming normal progress. In general, first-year activities focus on teaching, coursework and selecting an adviser, while the second year focuses on completing coursework, passing the candidacy exam, and proposing and initiating dissertation research. The years remaining to obtain the degree focus almost exclusively on research and writing and defending the dissertation.

First-year PhD students typically take 3 graded 5xx level classes per semester, take any required introductory classes, attend departmental colloquium, and teach undergraduate laboratory sections. Students are expected to investigate the research programs of departmental faculty and choose a laboratory and advisor in which to carry out their dissertation research. In consultation with their Research Adviser, students choose the members of their Committee on Studies (COS) before the end of the second semester (typically spring term). Most first-year students are on TA-ship during the first academic year (students are required to be on TA-ship for at least two semesters as part of the PhD program), and assessment of student progress by the GSC relies primarily on coursework performance and evaluation of teaching performance.

Second-year PhD students typically complete their coursework requirement, participate in graduate seminars, and attend group meetings, begin research on their dissertation project, and write and defend their dissertation research proposal. In doing so, these students begin to accrue a collection of experimental techniques and protocols necessary to carry out successful dissertation research. Student progress is evaluated by the COS, which will monitor student progress toward synthesizing background material and experimental approaches relevant to the dissertation project and will provide the student with constructive feedback.

Students who have fulfilled the 48-credit hour requirement and passed the oral candidacy exam are considered admitted to candidacy for the PhD and are expected to concentrate their efforts on their dissertation research. After admission to candidacy students have a maximum of five years to defend and submit their dissertations. Progress toward this goal is evaluated annually by the adviser and COS. NOTE: Financial support from the department (TA-ship or RA-ship) is guaranteed only for students in good standing (making good progress) for five years from the date the student entered the department.

IV-A. PhD COURSEWORK

48 hours of graduate coursework including 18 hours of graded courses are needed to advance to candidacy.

Required Standard Graded Courses

CHEM 501. Molecular Structure Theory. (3 credit hours)

General introduction to quantum mechanics with emphasis on chemical applications. Topics covered include basic postulates of quantum mechanics, standard analytically solvable quantum systems (free electrons, particle in a box, harmonic oscillator, rigid rotor, hydrogen atom), approximation methods (perturbation theory and the variational method) as well as an introduction to molecular quantum mechanics, molecular spectroscopy, and time-dependent perturbation theory.

CHEM 511. Mechanisms in Organic Chemistry (3 credit hours)

An introduction to the methods used for determining reaction mechanisms in organic chemistry and the application of those methods for determining the mechanisms of reactions based on ionic processes.

CHEM 521. Biological Chemistry (3 credit hours)

Brings the fundamentals of general and organic chemistry to bear on the complex array of structures and chemical processes that occur in living organisms.

CHEM 536. Synthesis and Mechanism in Inorganic Chemistry (3 credit hours)

A general outline of synthesis methodologies and approaches for main group elements and transition metal compounds is provided. In addition, the reactivity of these compounds is explored with particular emphasis on systematics in reaction mechanisms.

Students must take at least two courses selected from the Elective Standard Graded Courses in order to meet the 18 credit hour minimum requirement.

Elective Standard Graded Courses

CHEM 503. Optical Properties of Materials (3 credit hours)

CHEM 504. Chemical Dynamics (3 credit hours)

CHEM 505. Molecular Simulation (3 credit hours)

CHEM 514. Organic Synthesis (3 credit hours)

CHEM 523. Introduction to Synthetic Biology (3 credit hours)

CHEM 525. Structural Biology (3 credit hours)

CHEM 526. Genome Technologies and Bioinformatics (3 credit hours)

CHEM 573. Introduction to Quantum Technology for Chemists and Engineers (3 credit hours)

In addition to the minimum 18-credit hour requirement, students are encouraged to take topics courses in consultation with their research advisors. The available topics courses are listed below.

Topics Courses

CHEM 500. Scientific Teaching in Chemistry (3 credit hours)

CHEM 515/516. Topics in Organic Chemistry (1 – 3 credit hours)

CHEM 537/538. Topics in Inorganic Chemistry (3, maybe repeated twice Δ)

CHEM 545/546. Topics in Analytical Chemistry (3, maybe repeated twice Δ)

CHEM 567. Topics in Physical Chemistry (3, maybe repeated twice Δ)

CHEM 587. Advanced Topics in Biological Chemistry (3, maybe repeated twice Δ)

Required CR/NC Courses

All graduate students must also take these courses, demonstrating due diligence to receive CR grades.

CHEM 502. Introduction to Graduate Studies and Career Preparation (1 credit hour)

CHEM 623. Research Colloquium (four semesters, total 4 credit hours)

CHEM 625. CCB Topical Seminars (four semesters, total 4 credit hours).

CHEM 650. Research Readings (2 credit hours or more per semester until the total credit hours is 48).

CHEM 699. Dissertation (18 credit hours minimum)

After advancing to candidacy, graduate students should register only for dissertation (Chem 699) unless a faculty approves a certain course relevant to the research area.

Course Credit Hour Transfer

Students who have completed graduate-level coursework at an accredited institution other than the University of New Mexico, whether they were in graduate or non-degree status, may request that these credit hours be used toward their degree program. Such credit hours may be transferred into a degree program by listing them on the Program of Studies or the Application for Candidacy, within the limits described in the Catalog sections on Master's and doctoral degrees. The transfer of credit hours can be approved by the GSC and if they are approved, they can count towards the elective courses.

The student must have earned a grade of "B" or better in the courses for which transfer credit hours are requested. Courses taken on a Pass/Fail basis and/or courses taken as extension credit at other universities are not accepted for graduate credit at the University of New Mexico.

NOTE: Coursework that has been counted toward a previous degree may not be counted again toward any other degree except master's coursework for a doctoral degree.

<https://registrar.unm.edu/faculty--staff-resources/schedule-type-glossary-08-15-23.pdf>

IV-B. SUGGESTED TIMELINE FOR PhD PROGRAM

Graduate students are required to submit a progress report yearly to the GSC. The following breakdown of tasks by semester is a general guideline for successful progress toward graduation.

Year 1, First Semester

Take 12 credit hours (assigned by the Graduate Studies Committee) including

Two standard courses (two out of Chem 501, 511, 521 and 536).

Chem 502 (1)

- Chem 623 (1)
- Chem 625 (1)
- Chem 650 (3 credit hours, rotations in at least three research groups)
- Explore potential research groups
- Select a research group to join before the end of the semester and start your research
- Year 1, Second semester
 - Take 12 credit hours including three regular courses
 - Two or Three standard courses (6 or 9 credit hours)
 - Chem 623 (1)
 - Chem 625 (1)
 - Chem 650 (variable credit hours to make total 12)
 - Select a Committee on Studies
- Year 2, Third Semester
 - Take 12 credit hours including the following
 - Standard classes if you have not reached the required 18 credit hours of graded courses
 - Chem 623 (1)
 - Chem 625 (1)
 - Chem 650 (you may take up 10 credit hours if you have fulfilled the 18 credit hour requirement of standard graded courses)
 - Present research or literature talk in Chem 625 (topical seminars)
 - Continue your research
- Year 2, Fourth Semester
 - Take 12 credit hours including the following
 - Regular classes if you have not reached the required 18 credit hours of graded courses
 - Chem 623 (1)
 - Chem 625 (1)
 - Chem 650
 - Present research or literature talk in Chem 625 (topical seminars)
 - Continue your research
 - Take your qualification exam
 - Form your committee members in consultation with your research advisor
 - Set the exam date in consultation with the committee members
 - Submit your written research proposal two weeks in advance of the exam date
 - Continue your research
- Years 3, Fifth Semester
 - If you have not taken your qualifying exam, please do so. This should be the last semester to take your qualifying exam. For students needing to take the qualifying exam beyond the fifth semester, a petition to GSC is required to request an extension.
 - Register for CHEM 699
 - Continue your research
 - You are encouraged to give a presentation in the divisional seminar as many as you would like.
 - Meet annually with the Committee on Studies to assess progress toward the dissertation
- Year 3, Sixth semester
 - Continue taking Chem 699
 - Continue your research and prepare your results to publish peer-reviewed articles
 - Present research talk(s) in the Topical Seminar series
- Year 4 and after
 - Register for CHEM 699
 - Continue your research

Present research talk(s) in Chem 625
Meet annually with the Committee on Studies to assess progress toward the dissertation
Write your dissertation
Present your dissertation work
Defend your dissertation work

IV-C. ANNUAL PROGRESS REPORT

The Annual Progress Report is a summary that tracks the progress of a graduate student. It includes sections for academic details, committee members, progress toward the degree, and research progress. The student records the completion of coursework and the passing of the research proposal, along with the respective dates. The research progress section details the number of manuscripts published within the academic year, ongoing manuscript work, and additional educational outreach efforts. Important milestones, such as the semester in which the research proposal was passed and the anticipated graduation date, should also be included. Signatures from both the graduate student and the research adviser are mandatory for the validation of the report. The report is due at the end of the fall semester each year. A template for the report is available in Appendix I.

IV-D. SELECTING A RESEARCH ADVISOR

All PhD students must have an assigned research adviser by the end of the first semester the student starts the graduate program. Your research adviser should be a tenured or tenure-track faculty member or a research professor (with approval of the Department Chair) with their primary appointment in the Department of Chemistry and Chemical Biology (CCB). A tenured or tenure-track faculty member with a primary appointment in another department may serve as a co-adviser with *tenured or tenure-track* professors in CCB. Faculty members with secondary appointments in CCB may, under certain circumstances, serve as CCB graduate student research advisers. If you desire a faculty member with a secondary appointment to serve as your research adviser, you must discuss this with the chair of the Graduate Studies Committee (GSC). Faculty with no affiliation with CCB may not serve as research advisers independently.

The selection of an adviser is based on mutual preference (both student and faculty), the availability of departmental and PI funding, and current faculty needs. Two GSC meetings are scheduled to discuss student distribution and assignments. Official assignment of a student to an adviser requires the signatures of the student and the prospective adviser. Information on potential advisers and their research is available from the CCB website, formal research presentations, and individual meetings with faculty (encouraged).

All research adviser assignments must be made by the GSC. No informal agreements should be entered into between students and potential advisers prior to the GSC decisions.

TIMETABLE:

By November 20 of the fall semester, first-year students should have met with at least three different potential research advisers to discuss PhD research projects. Each student must submit a ranked list of three potential research advisers to the GSC (use the form in Appendix II). The GSC, in consultation with CCB faculty, will use these lists, students' preferences, and information on RA support and faculty needs to match students with suitable advisers.

By November 30, the GSC will inform each student of his or her research adviser match. Any requests for a different adviser must be made to the GSC by December 6 of the fall semester. Before the end of the fall semester, the adviser assignment form, signed by the student and the adviser, must be submitted to the GSC for approval by the GSC chair.

Change of Research Adviser

In rare cases, a student must select a new research adviser. This must be done formally by filling out the form in Appendix III. This selection of a new research adviser requires the mutual agreement of the student, the new adviser, and the GSC chair. Once a new adviser has been selected, the student should notify the Graduate Coordinator and, with the advice of the new adviser, select a new Committee on Studies (COS) by the end of the semester. The new COS will then decide what portion of the student's completed work can be used toward their PhD dissertation. The student must make all the arrangements to join a new group within one month. The COS will examine the student's progress and assess whether the student has the appropriate skills and background to undertake a PhD level research project in the newly selected research group. In the situation where a student cannot find another adviser, the student must leave the department possibly with a

Master's degree (see section V) since it will not be possible to meet all of the requirements for the PhD degree in Chemistry and Chemical Biology.

IV-E. COMMITTEE ON STUDIES

Following the selection of a Research Adviser, a PhD student must select a Committee on Studies (COS) in consultation with and approval of the research adviser. The composition of this committee is outlined in The University of New Mexico catalog under "Graduate Program Composition of the Dissertation Committee." The COS has a minimum of four members, including at least one external member who does not have a primary appointment in CCB. The student's adviser chairs the COS. A pre-PhD "data meeting" should be scheduled one year before the expected defense date to make sure the candidate is on track to complete the dissertation work. After the report is submitted, either the COS or the GSC may recommend an in-person meeting with the student to discuss research progress. Depending on the field of research, the COS may require the student to exhibit competence in additional areas such as mathematics, physics, computer programming, electronics, etc.

IV-F. DISSERTATION RESEARCH PROPOSAL

Defense of the dissertation research proposal (RP) must be completed by the last day of the student's fourth semester in the program (not including summer), unless an extension is approved by the COS and the GSC. If a student fails the RP proposal defense, they may be allowed one additional attempt pending approval by the COS. This attempt must be completed no later than the end of the fifth semester. The COS may require students to repeat any or all parts of the proposal and defense. A second failure on any part of the requirement will prevent the student from continuing in the PhD program.

All students must contact the Advisement Coordinator at least one month prior to their desired date to schedule the RP.

DISSERTATION RESEARCH PROPOSAL RULES AND GUIDELINES: The dissertation research proposal represents a thoroughly documented summary of the research that the student expects to perform before writing their Dissertation. The written version of the proposal should consist of a concise narrative describing the intended doctoral research project. The written proposal should be fully documented, with appropriate references to the primary chemical literature. It should state clearly and concisely the objective(s) of the research and provide sufficient background to convey the rationale for undertaking the research. Particular emphasis should be on the motivation and background for the work as well as alternative approaches for carrying out the proposed project. Finally, key aspects of the planned method should be described briefly, and their viability documented and justified. The fully referenced proposal with an abstract will be distributed to the students' COS two weeks before the defense.

RESEARCH PROPOSAL GUIDELINES: These are only guidelines as are the sample templates at the end of this document (Appendices IV-A & IV-B) - it will ultimately be between the student and their Research Advisor to determine how the RP will be written and orally presented.

- Abstract - approximately 250 words which states your objectives and goals
- Introduction - approximately 1½ - 2 pages of a brief literature overview
- Statement of Research Problem - not more than ½ of a page long
- Statement of Goals and Objectives - not more than ½ of a page long
- Research Plan - approximately 3 - 4 pages
- Conclusion - approximately ½ of a page long
- References

The total length of the RP should not exceed 10 pages, including references, figures, schemes, and equations. The style should be 12 pt. Times or Times Roman font, single-spaced with 1" margins all around. A cover page should be included which has the title of the RP, the student's name, and the names of the committee members listed.

ORAL PRESENTATION GUIDELINES: The organization of the oral RP should be similar to the written presentation and should include the same subheadings. The oral presentation should be approximately 30-50 minutes in length, excluding the question period.

IV-G. DEFENSE OF DISSERTATION

PhD degree candidates are required to perform significant and independent research that culminates in the preparation and defense of a Dissertation. Each student's research is conducted under the supervision and direction of the Research Adviser

and COS. Oral defense of the Dissertation begins with a public seminar in which the student presents and summarizes the research and the student answers questions from the audience (moderated by the adviser). This public seminar is followed by a private oral examination by the COS.

Students completing a PhD must submit a Dissertation in approved UNM format. The Dissertation must be distributed to the COS at least two weeks before the defense. Students should consult the graduate bulletin and/or obtain detailed format guidelines from the Office of Graduate Studies. Electronic copies of the finished and approved Dissertation must be submitted to the graduate school, the CCB Advisement Coordinator and members of the examining committee.

Continuous enrollment in Dissertation (CHEM 699) hours is required in subsequent semesters (exclusive of summer) after initial enrollment in CHEM 699 until the Dissertation is accepted by the Dean of Graduate Studies. This rule applies whether or not the candidate is enrolled for other credit hours. Candidates who fail to register for CHEM 699 or CHEM 599 in any semester must pay tuition and late fees for each missed semester and petition the Office of Graduate Studies for reinstatement. In extraordinary circumstances, the Dean of Graduate Studies may waive the requirement for continuous enrollment upon presentation of a written request from the Dissertation Director and the graduate unit. Doctoral candidates must be enrolled for a minimum of 3 hours of CHEM 699 during the semester in which they complete their degree requirements, including the summer session.

All students must consult with their research advisers at least one month before their desired date to schedule the dissertation defense. A public announcement of the Dissertation defense should be made by posting announcements within the Department at least one week ahead of the scheduled defense.

V. MASTER OF SCIENCE PROGRAM

The Department of Chemistry and Chemical Biology offers a Master of Science degree with two options: Plan I and Plan II. Plan I MS program emphasizes coursework and successful defense of a Thesis. Plan II is based entirely on coursework. Completion should require 2 years of full-time study, assuming normal progress. MS students may follow a path similar to first-year PhD students, typically taking 2-3 graded 5xx level classes per term. Additionally, they will take any required introductory classes and attend departmental colloquia and Topical Seminars. In certain cases, it may be possible for MS students to teach undergraduate laboratory sections. Students are expected to investigate the research programs of departmental faculty and choose a laboratory in which to carry out their thesis research (if Plan I). In consultation with their Research Advisers, students choose the members of their Committee on Studies (COS) before the end of the second semester (typically spring term). In Plan II, assessment of student progress by the GSC relies on coursework performance and evaluation of teaching performance.

The requirements for completion of the two Plans are listed below:

V.A. PLAN I – THESIS MASTERS

24 total hours including the following:

- ✓ 18 hours of graded (A, B...) coursework at the 500 level or above + 6 credit hours of Thesis
- ✓ Required core courses:
 - ☐ **CHEM 501. Molecular Structure Theory.** (3 credit hours)
 - ☐ **CHEM 511. Mechanisms in Organic Chemistry.** (3 credit hours)
 - ☐ **CHEM 521. Biological Chemistry.** (3 credit hours)
 - ☐ **CHEM 536. Synthesis and Mechanism in Inorganic Chemistry.** (3 credit hours)
- ✓ Two elective courses from the following
 - ☐ **CHEM 502. Optical Properties of Materials** (3 credit hours)
 - ☐ **CHEM 504. Chemical Dynamics** (3 credit hours)
 - ☐ **CHEM 505. Molecular Simulation** (3 credit hours)
 - ☐ **CHEM 514. Organic Synthesis** (3 credit hours)

- ☐ **CHEM 517. Molecular Characterization** (3 credit hours)
- ☐ **CHEM 525. Structural Biology** (3 credit hours)
- ☐ **CHEM 538. Solid State Chemistry** (3 credit hours)
- ☐ **CHEM 573. Introduction to Quantum Technology for Chemists and Engineers** (3 credit hours)

✓ 6 hours Thesis (599)

✓ Chem 623 (3)

✓ Chem 625 (3)

V.B. PLAN III - COURSEWORK MASTERS

30 total hours including the following:

✓ 24 hours of graded (A, B...) coursework

✓ Required core courses:

- ☐ **CHEM 501. Molecular Structure Theory.** (3 credit hours)
- ☐ **CHEM 511. Mechanisms in Organic Chemistry.** (3 credit hours)
- ☐ **CHEM 521. Biological Chemistry.** (3 credit hours)
- ☐ **CHEM 536. Synthesis and Mechanism in Inorganic Chemistry.** (3 credit hours)

✓ Four elective courses from the following

- ☐ **CHEM 502. Optical Properties of Materials** (3 credit hours)
- ☐ **CHEM 504. Chemical Dynamics** (3 credit hours)
- ☐ **CHEM 505. Molecular Simulation** (3 credit hours)
- ☐ **CHEM 514. Organic Synthesis** (3 credit hours)
- ☐ **CHEM 517. Molecular Characterization** (3 credit hours)
- ☐ **CHEM 525. Structural Biology** (3 credit hours)
- ☐ **CHEM 538. Solid State Chemistry** (3 credit hours)
- ☐ **CHEM 573. Introduction to Quantum Technology for Chemists and Engineers** (3 credit hours)

✓ Chem 623 (three semesters, total 3 credit hours)

✓ Chem 625 (three semesters, total 3 credit hours)

VI. SEMINARS

The Department of Chemistry & Chemical Biology has a two-part seminar program:

VI.A. Chemistry and Chemical Biology Topical Seminar (CHEM 625) highlights ongoing research efforts in each of the three thrust areas of the department: Biological Chemistry/Chemical Biology/Medicinal Chemistry; Physical Chemistry/Energy/Materials, and Catalysis/Synthesis. PhD students must register for Chem 625 for at least four semesters (until they advance to candidacy). While students do not need to register for the Topical Seminar after advancing to candidacy, it is highly encouraged and expected that all graduate students attend the seminar in particular when the topic is related to their respective research. Similarly, MS students must register for Chem. 625 for at least three semesters.

Grades (CR or NC) are assigned by the instructor, who is in charge of the seminar course.

For a PhD degree, the student must present at least one seminar in the 2nd year. For an MS degree, attendance is required and presentation is encouraged. The presentation materials can be based on results from students' research or based on original current literature. The current literature does not include review articles. The faculty will evaluate the presentation with a score of merit, pass or no pass. The failure of the presentations requires redoing it.

VI.B. Departmental Colloquia consists of lectures given by a variety of invited speakers on timely topics in chemistry, chemical biology, and allied research areas. All graduate students must register for CHEM 623 (department colloquium) for at least 4 semesters. After four semesters, attendance is required but registration for the course is not. Missing more than two Departmental Seminars in one semester will result in an NC being given. Students and faculty are expected to pay attention to the speaker and occasionally ask questions related to the seminar.

VIII. ACADEMIC INTEGRITY

Every student is expected to maintain the highest standards of honesty and integrity in academic and professional matters at UNM. The University reserves the right to take disciplinary action, up to and including dismissal, against any student who is found guilty of academic dishonesty or otherwise fails to meet UNM standards. Any student judged to have engaged in academic dishonesty in coursework may receive a reduced or failing grade for the work in question and/or for the course.

Academic dishonesty includes, but is not limited to, dishonesty in quizzes, tests, or assignments; claiming credit for work not done or done by others; hindering the academic work of other students; misrepresenting academic or professional qualifications within or outside of the University; and nondisclosure or misrepresentation in filling out applications or other University records.

CCB Graduate Student Annual Progress Report

Student Name: _____

Academic Year: _____

Faculty Advisor: _____

Committee on Studies

Member 2: _____

Member 3: _____

Member 4 (external): _____

Member 5 (optional): _____

Degree progress

I have completed all coursework (Fall/Spring 20??) and passed my research proposal (Fall/Spring 20??).

Research progress

I have published X manuscripts during the 20??-20?? academic year ...

I have X additional manuscripts in current progress ...

In addition to research, I have focused on educational outreach...

Semester Research Proposal Passed (or anticipated): _____

Anticipated Graduation Date: _____

Graduate Student Signature: _____ Date: _____

Research Adviser Signature: _____ Date: _____

Graduate Studies Chair Signature: _____ Date: _____

Appendix II.

Ranked List for Joining a Research Group

By November 22 of the fall semester, first year students should have met with at least three different potential research advisers to discuss PhD research projects; each student must submit a ranked list of three potential research advisers to the GSC. The GSC, in consultation with CCB faculty, will use these lists, students' preferences, and information on RA support and faculty needs to match students with suitable advisers. By November 30, the GSC will inform each student of his or her research adviser match. Any requests for a different adviser must be made to the GSC by December 6 of the fall semester. Before the end of the fall semester, the adviser assignment form, signed by the student and the adviser, must be submitted to the GSC for approval by the GSC chair.

Student Name: _____ **Date:** _____

Potential research advisor you have discussed about research interest with

Faculty Name: _____ **Signature:** _____ **Date:** _____

Faculty Name: _____ **Signature:** _____ **Date:** _____

Faculty Name: _____ **Signature:** _____ **Date:** _____

Faculty Name: _____ **Signature:** _____ **Date:** _____

List three groups in order of preference that you would like to join.

1) Name of 1st Group you would like to join: _____

2) Name of 2nd Group you would like to join: _____

3) Name of 3rd Group you would like to join: _____

Return this form to the Graduate Coordinator by November 15.

Following notification of your Research Adviser Match, obtain the signatures below and submit the completed form to the Research Adviser and Graduate Coordinator by January 15.

Research Adviser Match: _____

Graduate Student Signature: _____ **Date:** _____

Research Adviser Signature: _____ **Date:** _____

Research Group Transfer Form

In rare cases a student must select a new research adviser by filling in the form in Appendix III. This selection process must be undertaken under the direction of the GSC chair, and requires the mutual agreement of the student, the new adviser, and the GSC chair. Once a new adviser has been selected, the student should notify the Graduate Coordinator and, with the advice of the new adviser, select a new committee of studies (COS) by the end of the semester. The new COS will then decide what portion of the student's completed work can be used towards their PhD dissertation. The student must make all the arrangements to settle in with the new group in less than three months. The COS will examine the student's progress and assess whether the student has the appropriate skills and background to undertake a PhD level research project in the newly selected research group. In the situation where a student cannot find another adviser, the student must leave the department possibly with a Master's degree (see section V) since it will not be possible to meet all of the requirements for the PhD degree in Chemistry and Chemical Biology.

Students are allowed (1) group change during their tenure as a PhD student in Chemistry & Chemical Biology.

Name of Student: _____

Signature of Student: _____ Date: _____

Name of Current Advisor: _____

Signature of Current Advisor: _____ Date: _____

Name of New Advisor: _____

Signature of New Advisor: _____ Date: _____

GSC Chair Signature: _____ Date: _____

Appendix IV-A

NIH FORMATTED RESEARCH PROPOSAL TEMPLATE

RESEARCH STRATEGY 1 page

A. Significance. 0.5 page

Background detailing the significance of the project.

Our contribution is expected to provide a detailed understanding of list items here. *This contribution is significant since it will XXX.* We *expect* this research to have a positive impact on list items here.

B. Innovation. 0.5 page

What have been the prior approaches to your problem?

What information have they yielded?

Our proposed research is innovative because it 1) XXX, 2) XXX, 3) XXX, 4) XXX, and 5) XXX. The studies we present in the Approach subsections provide compelling evidence that our approach represents a significant departure from earlier work and will enable us to XXX.

C. Approach 7 pages

C.1 Specific Aim 1. *Relist Aim 1.*

Introduction. We do not understand XXX. We will address this issue by XXX. The *objective* of this Aim is to understand XXX. In order to attain the objective of this Aim, we will test the following *hypotheses*: 1) XXX, and 2) XXX. Our *approach* will test these hypotheses and reveal XXX. This will enable us to XXX. The *rationale* for this Aim is that the successful completion of this research will allow us to understand XXX, without which we will not be able to XXX. Upon completion of the work proposed under the Aim we *expect* that it will be possible to understand XXX. This understanding will have a positive impact on XXX and enable a comprehensive understanding of XXX.

Justification and Feasibility. Prior XXX studies related to XXX have largely focused on XXX. Considering XXX, this greatly affects our understanding of *how* XXX, and thus defines a critical gap in the knowledge base. Obtaining this information is important if we are to fully understand XXX.

This discussion clearly shows the need for XXX, which is the focus of this Aim. Our approach to this problem requires that we be able to (1) XXX, and (2) XXX. Here we provide new data that strongly support the feasibility of our approach. We XXX

Research Design.

1. Eg. Low-frequency vibrational modes probe how the PDT is coupled into ET processes in XO family enzymes. What will you do under this topic. We *expect* that the results obtained under this Aim will provide added support for our hypothesis that XXX.

2. Eg. Low-frequency vibrational modes probe how the PDT is coupled into ET processes in XO family enzymes. What will you do under this topic. We *expect* that the results obtained under this Aim will provide added support for our hypothesis that XXX.

3. Eg. Low-frequency vibrational modes probe how the PDT is coupled into ET processes in XO family enzymes. What will you do under this topic. We *expect* that the results obtained under this Aim will provide added support for our hypothesis that XXX.

C.2 Specific Aim 2. XXX. Repeat for 2-3 Aims.

References Cited

Appendix IV-B.

NSF FORMATTED RESEARCH PROPOSAL TEMPLATE

I. ABSTRACT

II. INTRODUCTION

Basic Background 1 page

Background. What is known and what is not known.

III. STATEMENT OF THE PROBLEM

Rationale 0.5 page

Define the knowledge gap and why this project is important.

IV. STATEMENT OF GOALS AND OBJECTIVES 0.5 page

Our long-term goal is to XXX. Our primary objectives are to XXX. The central hypothesis is that XXX. The rationale for this research is that XXX.

We will test our central hypothesis in order to accomplish the objectives of this proposal through the successful pursuit of the following Objectives:

1. *List Objective 1* 1. We hypothesize that XXX.

2. *List Objective 2*. We hypothesize that XXX.

3. *List Objective 3*. We hypothesize that XXX.

We expect that the results of work performed under these Aims will contribute greatly to our understanding of XXX. Our research effort will have a positive impact, since understanding XXX will provide a basis for developing a greater understanding of XXX.

V. RESEARCH PLAN 7 pages

V.A Objective 1

Introduction. We do not understand XXX. We will address this issue by XXX. The objective of this Aim is to understand XXX. In order to attain the objective of this Aim, we will test the following hypotheses: 1) XXX, and 2) XXX. Our approach will test these hypotheses and reveal XXX. This will enable us to XXX. The rationale for this Aim is that the successful completion of this research will allow us to understand XXX, without which we will not be able to XXX. Upon completion of the work proposed under the Aim we expect that it will be possible to understand XXX. This understanding will have a positive impact on XXX and enable a comprehensive understanding of XXX.

Research Design.

1. Eg. Low-frequency vibrational modes probe how this molecule is coupled into electron transport processes in polymer materials. What will you do under this topic. We expect that the results obtained under this Aim will provide added support for our hypothesis that XXX.

2. Eg. Low-frequency vibrational modes probe how this molecule is coupled into electron transport processes in polymer materials. What will you do under this topic. We expect that the results obtained under this Aim will provide added support for our hypothesis that XXX.

3. Eg. Low-frequency vibrational modes probe how this molecule is coupled into electron transport processes in polymer materials. What will you do under this topic. We expect that the results obtained under this Aim will provide added support for our hypothesis that XXX.

V.B Objective 2

Introduction. We do not understand XXX. We will address this issue by XXX. The objective of this Aim is to understand XXX. In order to attain the objective of this Aim, we will test the following hypotheses: 1) XXX, and 2) XXX. Our approach will test these hypotheses and reveal XXX. This will enable us to XXX. The rationale for this Aim is that the successful completion of this research will allow us to understand XXX, without which we will not be able to XXX. Upon completion of the work proposed under the Aim we expect that it will be possible to understand XXX. This understanding will have a positive impact on XXX and enable a comprehensive understanding of XXX.

Research Design.

1. Eg. Low-frequency vibrational modes probe how this molecule is coupled into electron transport processes in polymer materials. What will you do under this topic. We *expect* that the results obtained under this Aim will provide added support for our hypothesis that XXX.

2. Eg. Low-frequency vibrational modes probe how this molecule is coupled into electron transport processes in polymer materials. What will you do under this topic. We *expect* that the results obtained under this Aim will provide added support for our hypothesis that XXX.

3. Eg. Low-frequency vibrational modes probe how this molecule is coupled into electron transport processes in polymer materials. What will you do under this topic. We *expect* that the results obtained under this Aim will provide added support for our hypothesis that XXX.

V.C. Objective 3

Introduction. We do not understand XXX. We will address this issue by XXX. The *objective* of this Aim is to understand XXX. In order to attain the objective of this Aim, we will test the following *hypotheses*: 1) XXX, and 2) XXX. Our *approach* will test these hypotheses and reveal XXX. This will enable us to XXX. The *rationale* for this Aim is that the successful completion of this research will allow us to understanding XXX, without which we will not be able to XXX. Upon completion of the work proposed under the Aim we *expect* that it will be possible to understand XXX. This understanding will have a positive impact on XXX and enable a comprehensive understanding of XXX.

Research Design.

1. Eg. Low-frequency vibrational modes probe how this molecule is coupled into electron transport processes in polymer materials. What will you do under this topic. We *expect* that the results obtained under this Aim will provide added support for our hypothesis that XXX.

2. Eg. Low-frequency vibrational modes probe how this molecule is coupled into electron transport processes in polymer materials. What will you do under this topic. We *expect* that the results obtained under this Aim will provide added support for our hypothesis that XXX.

3. Eg. Low-frequency vibrational modes probe how this molecule is coupled into electron transport processes in polymer materials. What will you do under this topic. We *expect* that the results obtained under this Aim will provide added support for our hypothesis that XXX.