

Graduate Handbook: Chemical Engineering, New Mexico Tech

A. Things You Need to Know at the Start

Welcome to the Department of Chemical Engineering. This handbook contains essential information for all graduate students in the Department of Chemical Engineering.

All students are responsible for understanding and following the information and policies contained in this document. They are also responsible to follow the [guidelines and policies](#) outlined by graduate school.

Some names and contact information:

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B. Financial Support

***Please understand that full time support is called a ½ time assistantship**

- i. Teaching Assistantships, TAs
 - a. Expectations: contact instructor for course to understand roles, responsibilities, deadlines, grading scale, attend TA training for all NMT TAs, address safety concerns, understand instructor grading policy, academic dishonesty policy, (Add links from NMT Graduate Studies Page)
- ii. Research Assistantships, RAs

- a. Expectations: understand the aims of the grant/funding source. The continuation of your funding is usually contingent upon your performance towards the goal of your research project.
- iii. Leave and/or Vacation (policy): You must work with your research adviser to arrange vacation and time off prior to taking time off.
- iv. Bi-weekly pay is tied to each contract's start and end date. Please pay attention to your contract start and end dates to know when you will get paid. There are periods between semesters, e.g. the break between fall and spring semesters, where you may not receive a paycheck.

C. Requirements

i. Major Programs and Degree Requirements

The chemical engineering department confers the Master of Science (M.S.), Master of Engineering (M. Eng. – coursework only) and Doctor of Philosophy (Ph.D.) in Chemical Engineering with Specialization/ Dissertation in Surface Engineering.

CHEMICAL ENGINEERING M.S.

M.S. in Chemical Engineering with Specialization in Surface Engineering

The M.S. Program has the following requirements:

- 1) The student must select a committee of at least three faculty members, where the majority of the faculty members are from inside the department. The committee must include the student's research advisor and academic advisor, which may be the same faculty member.
- 2) The M.S. degree requires 30 credit hours beyond the B.S. with the following requirements:
 - a. Completion of at least 24 credit hours of approved course work, with at least 12 credit hours of 5000-level ChE courses, which must include at least 9 hours of core courses, exclusive of research credits
 - b. A maximum of 3 hours of directed study
 - c. Completion of 6 thesis credits

- 3) The student's graduate committee, the department chair, and the graduate dean must approve the course work used for the degree.
- 4) The student must write and successfully defend a thesis of their research in an oral public defense before their graduate committee.
- 5) The student must successfully pass a proposal defense preferably at least one semester before the thesis defense.
- 6) Students should make a public announcement of his/her proposal/final defense with abstract at least one week before the presentation.
- 7) Thesis advisor needs to notify the department chair and admin after successful proposal defense.
- 8) Students must take CHE 5085: Graduate Seminar each semester offered (for a maximum of two times). Students may and are encouraged to take CHE 5085 even if it is not a degree requirement.

CHEMICAL ENGINEERING M. Eng.

M. Eng. in Chemical Engineering with Specialization in Surface Engineering

The M. Eng. Program has the following requirements:

1. The M. Eng. degree requires 30 credit hours beyond the B.S. with the following requirements:
 - a. a minimum of 12 hours of 5000-level ChE courses, which must include at least 9 hours of core courses
 - b. a minimum of 6 hours outside of chemical engineering
 - c. a maximum of 3 hours of directed study
2. Students must take CHE 5085: Graduate Seminar each semester offered (for a maximum of two times). Students may and are encouraged to take CHE 5085 even if it is not a degree requirement.

Accelerated M.S. and M. Eng.

Qualified undergraduate students may apply for admission to the Accelerated Master of Science or Master of Engineering program in Chemical Engineering. In

fulfillment of the requirements for both B.S and M.S./M.Eng. degrees, as outlined in their respective sections, accepted students may apply nine credits of 5000-level courses to either degree.

CHEMICAL ENGINEERING Ph.D.

Ph.D. in Chemical Engineering with Dissertation in Surface Engineering

The Ph.D. requirements include the following:

- 1) Select a graduate committee that shall consist of a minimum of **four** members:
 - (a) an academic advisor from the Chemical Engineering department, and (b) at least three other members, one of which must be from outside the department assigned. The research advisor may be the academic advisor or another member of the committee.
- 2) The Ph.D. degree requires 48 credit hours beyond the M.S. degree with the following requirements:
 - a. a minimum of 24 hours of dissertation after the research proposal defense
 - b. a maximum of 6 hours of directed study
 - c. a minimum of 12 hours of 5000-level ChE courses, which must include 9 hours of core courses.
 - d. a minimum of 6 hours outside of chemical engineering
 - e. passing a preliminary exam prior to the end of their 2nd year of residency (detailed below)
- 3) 72 credit hours beyond the B.S. degree with the following requirements:
 - a. a minimum of 24 hours of dissertation after the research proposal defense
 - b. a maximum of 9 hours of directed study
 - c. a minimum of 6 hours outside of chemical engineering
 - d. a minimum of 24 hours of 5000-level ChE courses, which must include 18 hours of core courses
 - e. passing a preliminary exam prior to the end of their 2nd year of residency (detailed below)

- 4) All course work must be approved by the student's graduate committee, the Chemical Engineering Department Chair, and the Dean of Graduate Studies.
- 5) Pass a preliminary exam composed of two parts. **Part 1 (Courses)** - GPA requirement on 5/6 core courses is 3.3 GPA. If 3.3 is not met, take an exam or take a specific course decided by the dissertation committee, who will identify the problem area. **Part 2 (Research)** - Students will present and write a literature review on their research. The committee will make the decision for passing. If the student fails, the student may retake the exam or a portion of the exam within one year. If the student fails the retake, the student must exit with a terminal MS or MEng. All preliminary exam activities must be completed within 2 years. If a student has a core GPA between 3.0 and 3.3, the student must file a petition, with approval of their advisor, to be able to take the Qualifying Examination. If a student has a core GPA below 3.0, the student will not be allowed to proceed in the Ph.D. program.

Options after preliminary exam:

- A. Admit the student for further work toward the doctorate degree.
 - B. Recommend that the student limit his or her program to the Master's degree.
 - C. Recommend re-evaluation of the student's program after the lapse of a semester.
 - D. Recommend that the student discontinue graduate work.
 - E. If the committee votes for Option C, the student would be allowed either to retake the qualifying exam the next time it is offered or to retake it after waiting a year.
- 6) After passing the preliminary exam, the student must present a proposal of their research in the candidacy exam to their committee in a public forum and satisfactorily, to the committee, answer questions regarding their research. The research proposal must be attempted only after passing the preliminary exam. If a student fails, they may have one attempt to pass the exam taken the semester after the first attempt. If the student fails the exam, they may appeal to the department chair and/or graduate dean. The candidacy exam must be completed within 3 years.

- 7) The admission to candidacy to the Ph.D. degree requires that the preliminary and candidacy examinations be passed and approved by the graduate committee; after which the student may enroll in CHE 5095: Dissertation.
- 8) The student must write a final dissertation and defend it in an oral public defense before the student's graduate committee.
- 9) Students should make a public announcement of his/her proposal/final defense with abstract at least one week before the presentation.
- 10) Students must take CHE 5085: Graduate Seminar each semester offered.
- 11) Additional requirements include the New Mexico Institute of Mining and Technology Graduate Program requirements.

ii. Chemical Engineering Core Courses

- 1) Heterogeneous catalysis (CHE 5066)
- 2) Surfaces, interfaces, and colloids (CHE 5068)
- 3) Design and analysis of experiments (CHE 5063)
- 4) Interfacial transport phenomena (CHE 5072)
- 5) Advanced mathematical modeling (CHE 5051)
- 6) Advanced separation processes (CHE 5053)
- 7) Surface characterization techniques (CHE 5052)

iii. Chemical Engineering Elective Courses

- 1) Catalyst Characterization Techniques (CHE 5065)
- 2) Drug Delivery Techniques (CHE 5076)
- 3) Transport Process Modeling (CHE 5074)
- 4) Nanostructures and Nanotechnology (CHE 5049)
- 5) Modeling in Advanced Materials (CHE 5071)
- 6) Conjugated Polymers (CHE 5077)
- 7) Graduate Seminar (CHE 5085)

iv. Thesis/Dissertation Credit Requirements

1. M.S. students: 6 thesis credits (CHE 5091)
2. Ph.D. students: 24 Dissertation credits (CHE 5095)

v. Sample schedule for distribution of credits after BS degree

Doctoral Students	YEAR – 1		YEAR – 2		YEAR – 3 through YEAR – X	
	Course	Dissertation	Course	Dissertation	Course	Dissertation
Fall	12	0	12	0	0	12
Spring	12	0	12	0	0	12
Summer	3	0	3	0	0	1

MS Thesis Students	YEAR – 1		YEAR – 2	
	Course	Thesis	Course	Thesis
Fall	12	0	0	0
Spring	12	0	0	0
Summer	0	6		

vi. Typical Program Sequence for the Ph.D.

<p>Year-1, Fall Semester</p> <ul style="list-style-type: none"> ✓ Meet your advisor. ✓ Department orientation ✓ Safety and Ethics seminar (Mandatory) ✓ Registrar 12 credit hours (minimum) ✓ Graduate Seminar - register for the Seminar. ✓ Start your research work 	<p>Year-2, Fall Semester</p> <ul style="list-style-type: none"> ✓ Registrar 12 credit hours (minimum) ✓ Graduate Seminar - register for the Seminar. ✓ Continue your research work. 	<p>Year-3, Fall Semester</p> <ul style="list-style-type: none"> ✓ Registrar 12 credit dissertation hours ✓ Graduate Seminar - register for the Seminar. ✓ Continue your research work.
<p>Year-1, Spring Semester</p> <ul style="list-style-type: none"> ✓ Registrar 12 credit hours ✓ Continue your research work. ✓ Form your committee. 	<p>Year-2, Spring Semester</p> <ul style="list-style-type: none"> ✓ Registrar 12 credit hours (minimum) ✓ Continue your research work. ✓ Complete your Qualifying Exam – part 1 	<p>Year-3, Spring Semester</p> <ul style="list-style-type: none"> ✓ Registrar 12 credit dissertation hours ✓ Continue your research work.
<p>Year-1, Summer Semester</p> <ul style="list-style-type: none"> ✓ Continue your research work. ✓ Plan on completing your Qualifying Exam – part 2 	<p>Year-2, Summer Semester</p> <ul style="list-style-type: none"> ✓ Continue your research work. ✓ Complete your proposal defense. ✓ Approve course works from your committee 	<p>Year-3, Summer Semester</p> <ul style="list-style-type: none"> ✓ Continue your research work to fulfillment of Ph.D. degree. ✓ Complete your final defense

vii. Thesis/Ph.D. proposal guidelines

MS & PhD Students are required to write a thesis or dissertation proposal and defend it in a public oral defense before the advisory committee before the final defense. Outline below lists the items that should be included in the MS Thesis Proposal.

1. Project Title with Thesis Advisor and Committee members (Cover Page)

2. Abstract (Limit to one page)

- What is the general topic area?
- Why is this topic relevant/important (how important to sociologists, to the broader community, etc.)?
- What is the specific scope of your research? State your specific research objectives and results to date.

3. Project narrative

A. Introduction (background/literature review) (7-8 pages)

- The literature review should be a well-organized overview of the research most closely related to your work.
- This might likely include the dominant debates, theoretical approaches, methodological research designs that have been used to understand your topic
- You are trying to demonstrate two things:
 - a. You are familiar with the research that has been done in this area and can explain to audiences who might not be familiar with this specific literature, what is out there
 - b. You have found a gap or “lacunae” in the literature...something that has not been well researched or not been researched

B. Detailed Project Description Explaining Goals (research question that you are addressing, objective, tasks, etc.)

C. Methodology

- What is your theoretical and/or experimental approach? (Include instrumentation, techniques, etc. and justify)
- Other considerations specific to your approach

- Will your **analysis** be qualitative, quantitative or both?

D. Preliminary Data/Results (if any)

- Discuss with proper results and discussion

4. Proposed Project Timeline

- list specific tasks/experiments, with objectives
- Discuss what part of the specific tasks completed and what is yet to be done, when will they be done

5. Relevant References Cited

- Bibliography -List only those papers included in your proposal text (use endnote or similar citation software)

Format: It is preferable to use the M.S. Thesis/Ph.D. dissertation formatting template from Graduate Studies.

*** Procedure - all materials must be submitted and reviewed by the thesis adviser prior to the presentation (proposal defense)

*** Public announcement should be advertised for a minimum of 1 week

*** The written proposal document must be submitted to all thesis committee members at least 1 week prior to the proposal defense.

Note: Thesis advisor needs to notify the department chair and admin after successful proposal defense.

viii. Transfer Guide for students from other major to chemical engineering

Here is "the list" for out of major transfer into our program - this might be put on our website or serve as an unofficial guide for advisers in our program:

B.S. in Petroleum Engineering

Deficiency Courses - ChE 3026, ES 3050

Recommended - Chemistry courses fitting to the research topic

B.S. in Mechanical Engineering

Deficiency Courses - ChE 3026

Recommended - Chemistry courses fitting to the research topic

B.S. in Materials Engineering

Deficiency Courses - ChE 3026 (MTLS 314 or equivalent covers transport phenomena)

Recommended - Chemistry courses fitting to the research topic

B.S. in Environmental Engineering

Deficiency Courses - ChE 3026, ES 3050

Recommended - Chemistry courses fitting to the research topic

B.S. in Chemistry

Deficiency Courses - ChE 3026, Math 3035, ES 2016, ES 3050

B.S. in Biomedical Science

Deficiency Courses - ChE 3026, ES 3050

Recommended - Chemistry courses fitting to the research topic

ix. Transfer courses at graduate level for students coming in with a MS in CHE or other related engineering field

The committee or department will decide on which courses meet the requirement, example courses that count for CORE courses:

- Advanced Thermodynamics - Surfaces, interfaces, and colloids
- Adv. Reaction Engineering - Heterogeneous Catalysis
- Adv. Eng. Mathematics – Adv. Mathematical Modeling
- Adv. Fluids/Heat/Mass – Interfacial Transport Phenomena

x. Mandatory safety and ethics training

Students need to go through mandatory safety training before they start working in the laboratory. Ask your advisor for the details.

D. Qualifying for and Obtaining Graduate Degrees

i. PH.D. CANDIDACY

- a. Pass a preliminary exam composed of two parts. **Part 1 (Courses)** - GPA requirement on 5/6 core courses is 3.3 GPA. **Part 2 (Research)** - Students will present and write a literature review on their research. The committee will make the decision for passing. All preliminary exam activities must be completed within 2 years.
- b. After passing the preliminary exam, the student must present a proposal of their research in the candidacy exam to their committee in a public forum and satisfactorily, to the committee, answer questions regarding their research. The candidacy exam must be completed within 3 years.
- c. The admission to candidacy to the Ph.D. degree requires that the preliminary and candidacy examinations be passed and approved by the graduate committee.

E. Useful General Information

i. Timetable of Graduate Requirements

To graduate on time, follow the [graduate school link](#) for the thesis due date, templates, checklist, and other relevant information.

F. Conference Presentations and Travel for graduate students

- i. Get approval from your advisor before you submit your abstract to any conferences.
- ii. Once your abstract is accepted, check with your advisor before making any travel plans.
- iii. Apply to the GSA for travel funding.
- iv. Attending conference (encouraged to apply for GSA travel fund)

- v. Get approval from your advisor before you submit your abstract to any conferences.
- vi. Your presentation/poster must be checked and approved by your advisor before you present to any conference.