

Requirements for the Degree

A total of 30-31 units are required for MS in Chemistry degree, of which 16 units are core requirements and 12-15 units are option-based requirements, and 0-2 units are required for the culminating experience.

The program offers four options:

- **Option 1: Physical and Analytical Chemistry**
- **Option 2: Inorganic and Organic Chemistry**
- **Option 3: Biochemistry**
- **Option 4: Chemical Education**

At the start of the first semester of residence, all incoming graduate students will

1. declare an option; and
2. take placement examinations in chemistry. The purpose of these examinations is for advisement only. Students can choose one of the two culminating experiences: thesis or comprehensive examination.

Each student's program is designed with the assistance of a faculty advisor and the student's advisory committee.

Core Requirements (16 units)

Core Courses (9 units)

- CHEM 5000 - Interdisciplinary Discoveries in Chemistry and Biochemistry [3]
- CHEM 5100 - Introduction to Research [3]
- CHEM 5110 - Graduate Seminar: Chemistry I [2]
- CHEM 5120 - Graduate Seminar: Chemistry II [1]

Research Requirements (7 units)

- CHEM 5910 - Advanced Laboratory [1] (complete 2 units)
- CHEM 5970 - Graduate Research [1-3] (complete 5 units)

Option Requirements (12-15 units)

Select one option.

Option I: Physical and Analytical Chemistry (12-15 units)

Directed Elective within Option (8-10 units)

Note: [1] Comprehensive Exam (CHEM 5960) students select 8 or 9 units; [2] Thesis (CHEM 5990) students select 9 or 10 units.

- CHEM 4450 - Introduction to Atmospheric Chemistry [3]
- CHEM 4460 - Drug Delivery [3]
- CHEM 4510 - Advanced Analytical Chemistry: Optical Spectroscopy [2]
- CHEM 4520 - Advanced Analytical Chemistry: Analytical Separations and Mass Spectrometry [2]
- CHEM 4530 - Advanced Analytical Chemistry: Electrochemistry and Surface Techniques [2]
- CHEM 5400 - Quantum Chemistry [3]
- CHEM 5410 - Nuclear Magnetic Resonance Spectroscopy [3]
- CHEM 5510 - Thermodynamics and Kinetics of Materials (also listed as MSE 5510) [3]

Electives outside Option (3 or 6 units)

- Select courses from the directed electives in options II and III.
- Comprehensive Exam (CHEM 5960) students must complete 6 units.
- Thesis (CHEM 5990) students complete 3 units.

Option II: Inorganic & Organic Chemistry Option (12-15 units)

Directed Elective Requirements (9 units)

- CHEM 4200 - Advanced Organic Chemistry I [3]
- CHEM 4210 - Polymer Chemistry [3]
- CHEM 4840 - Drug Discovery and Development (also listed as BIOL 4440) [3]
- CHEM 4850 - Bioinorganic and Bioorganic Chemistry [3]
- CHEM 5200 - Synthetic Organic Chemistry: Analysis, Design, and Methodology [3]
- CHEM 5210 - Organic Structure Determination [3]
- CHEM 5600 - Advanced Inorganic Chemistry [3]

Electives outside Option (3-6 units)

- Select from the directed electives in options I and III.
- Comprehensive Examination (CHEM 5960) students select 5 or 6 units.
- Thesis (CHEM 5990) students select 3 or 4 units.

Option III: Biochemistry Option (12-15 units)

Directed Elective within Option (9 units)

- CHEM 4860 - Bioinformatics (also listed as BINF 4000) [3]
- CHEM 5320 - Protein Structure [3]

- CHEM 5330 - Transcriptional Control of Gene Expression [3]
- CHEM 5340 - Signal Transduction [3]
- CHEM 5350 - RNA Structure and Function [3]
- CHEM 5360 - Posttranslational Modifications of Proteins [3]

Electives outside Option (3-6 units)

- Select from the directed electives in options I and II.
- Comprehensive Examination (CHEM 5960) students select 5 or 6 units.
- Thesis (CHEM 5990) students select 3 or 4 units.

Option IV: Chemical Education Option (12-15 units)

Directed Electives from Option (8-10 units)

- Select the directed elective courses from either Option I, II, or III.
- Comprehensive Exam (CHEM 5960) students select 8 or 9 units of directed elective courses within Option I, II, or III.
- Thesis (CHEM 5990) students select 9 or 10 units of directed elective courses within Option I, II, or III.

Electives outside Department (3 or 6 units)

- With approval from the principal graduate advisor, select 4000-5000 level courses offered by the Department of Psychology, Department of Sociology, or the College of Education. Selected courses should focus on topics pertinent to education theory, curriculum design, and assessment, or education research methods.
- Comprehensive Exam (CHEM 5960) students must complete 6 units.
- Thesis (CHEM 5990) students complete 3 units.

Cumulating Experience (0 or 2 units)

Select one course.

- CHEM 5960 - Comprehensive Examination [0]
- CHEM 5990 - Thesis [1-3] (complete 2 units)