

CHEMISTRY, MS

Graduate School (<http://catalog.ucdenver.edu/cu-denver/graduate/graduate-school-policies-procedures/>) Policies and Procedures (<http://catalog.ucdenver.edu/cu-denver/graduate/graduate-school-policies-procedures/>) apply to this program.

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Introduction

The MS program in chemistry focuses on providing students with the skills and knowledge necessary to conduct specialized research in preparation for careers in chemistry and related disciplines. Completing an MS in Chemistry at CU Denver can provide valuable experience that can help students land a job in the pharmaceutical, biotechnological, or other industry or can serve as a stepping stone for admission to a competitive PhD or health sciences program. Our faculty serve as mentors and advisors and assist students on the path to a more satisfying career in science. Prospective students are encouraged to contact the Graduate Program Director visit the Department of Chemistry website for additional details concerning the chemistry program, admission procedures, financial assistance and faculty research interests.

Completing an MS in Chemistry - Graduation Requirements

All Chemistry MS students must meet the following requirements for graduation:

- Students must complete a total of 30 credits. A minimum of 20 semester hours must be earned in formal lecture courses in the Department of Chemistry. Additional credits can be acquired through research, internships, thesis work, independent study, transfer credits, etc. within the department and in other departments. Course selections outside of the department must be approved by the Graduate Program Director.
- A cumulative GPA of 3.0 or better at the time of graduation
- A grade of B- (2.7) or better in all courses to be counted toward the degree.
- Compliance with all Graduate School Policies and Procedures (<http://catalog.ucdenver.edu/cu-denver/graduate/graduate-school-policies-procedures/>)
- Every student must select a thesis or non-thesis plan. As most of the requirements overlap, a student may switch between these plans with permission from the Graduate Program Director.
- In addition to choosing a plan, every student must select a content emphasis track. Each track has separate placement examinations, therefore switching between tracks requires approval from the Graduate Program Director.
- Although degrees can be completed in as little as one year, all work must be completed within five years after enrolling in the first graduate class in the department unless an exception is granted by the program director.
- Students are eligible to apply for a research assistantship or a teaching assistantship positions. Students who are interested in

improving teaching skills can enroll in CHEM 5655 Teaching Assistant Bootcamp. This course is required for all students who are interested in working as a teaching assistant in the department.

Plan I-Thesis

Plan I is a research oriented program involving a minimum of 30 semester hours with the following requirements:

- Successful completion of a content emphasis track.
- An acceptable formal thesis consistent with the Graduate School Policies and Procedures.
- Successful oral defense of the master's thesis before a committee of at least three Regular Graduate Faculty, two of whom must be tenure track faculty members and have an appointment with the Graduate School through the Department of Chemistry.
- Completion of a high quality research project suitable for publication in a peer-reviewed journal.

Required courses

Code	Title	Hours
<i>Complete all of the following</i>		
CHEM 5610	Understanding & Presenting Chemical Research ¹	1
CHEM 6950	Master's Thesis	3
Total Hours		4

¹ CHEM 5610 Understanding & Presenting Chemical Research must be completed no later than the semester before students defend their thesis.

Content Emphasis Tracks

Code	Title	Hours
<i>Complete the coursework for one of the following content emphasis tracks</i>		
	Biochemistry (p. 2)	
	Synthesis and Measurement (p. 2)	
	Molecular Modeling (p. 2)	
	Traditional Chemistry (p. 2)	

Plan II- Coursework

Plan II is a coursework oriented program involving a minimum of 30 semester hours with the following requirements:

- All Plan II students are required to take a final written examination about primary research articles in their discipline. This exam may be taken any semester after 20 semester hours of graduate course work have been completed. Students may attempt the exam once per semester a maximum of three times and must be registered during the semester that they attempt the final examination.
- All non-thesis students are encouraged to take 1 credit of CHEM 5610 Understanding & Presenting Chemical Research
- Plan II students may arrange for an internship at a local company that employs Chemists and take up to 6 credits of CHEM 5939 Internship must be in good academic standing and have completed 6 graduate semester hours at CU Denver before starting an internship. Approval of the graduate program director is required prior to selecting an internship and enrolling for credit.

Content Emphasis Tracks

Code	Title	Hours
<i>Complete the coursework for one of the following content emphasis tracks</i>		
Biochemistry (p. 2)		
Synthesis and Measurement (p. 2)		
Molecular Modeling (p. 2)		
Traditional Chemistry (p. 2)		

Content Emphasis Tracks

Biochemistry

Understanding of biochemical principles governing metabolic diseases, cancer and neurodegenerative diseases.

Code	Title	Hours
Required Courses		
CHEM 5810	Graduate Biochemistry I	4
CHEM 5310	Advanced Organic Chemistry	3
	or CHEM 5530 Advanced Physical Chemistry	
Elective Courses		
Select two of the following:		6
CHEM 5600	Graduate Topics in Chemistry ¹	
CHEM 5815	Structural Biology of Neurodegenerative Diseases	
CHEM 5825	Biochemistry of Metabolic Disease	
CHEM 5830	Graduate Biochemistry II	
CHEM 5835	Biochemistry of Gene Regulation and Cancer	
CHEM 5845	Molecular Modeling and Drug Design	
CHEM 5860	Bioinorganic Chemistry: Bioinorganic compounds in medicine	
Total Hours		13

¹ Course topic must match to the topic area of the track and be preapproved by the Graduate Program Director

CHEM 5310 Advanced Organic Chemistry or CHEM 5530 Advanced Physical Chemistry may be taken as electives, if not used as a required course above.

Synthesis and Measurement

Students in this track will learn how to prepare and characterize molecules and materials and how to measure their properties.

Code	Title	Hours
Required Courses		
CHEM 5010	Advanced Inorganic Chemistry	3
	or CHEM 5310 Advanced Organic Chemistry	
CHEM 5110	Advanced Analytical Chemistry	3
	or CHEM 5221 Practical Applications of Spectroscopy	
Elective Courses		
Select two of the following:		6
CHEM 5421	Cannabis Chemistry	
CHEM 5510	Computational Chemistry	
CHEM 5530	Advanced Physical Chemistry	
CHEM 5600	Graduate Topics in Chemistry ¹	
CHEM 5700	Environmental Chemistry	

CHEM 5810	Graduate Biochemistry I	
CHEM 5815	Structural Biology of Neurodegenerative Diseases	
CHEM 5845	Molecular Modeling and Drug Design	
BIOE 5420	Special Topics in Bioengineering ²	
Total Hours		12

¹ course topic must match to the topic area of the track and be preapproved by the Graduate Program Director

² course topic must be preapproved by the Graduate Director

CHEM 5010 Advanced Inorganic Chemistry, CHEM 5110 Advanced Analytical Chemistry, CHEM 5221 Practical Applications of Spectroscopy or CHEM 5310 Advanced Organic Chemistry may be taken as electives if not used as a required course above.

Molecular Modeling

Students in this track will learn fundamental principles and modern techniques in computer modeling and apply the acquired knowledge to solve practical problems in chemistry, biochemistry, biophysics, and material sciences.

Code	Title	Hours
Required Courses		
CHEM 5510	Computational Chemistry	3
CHEM 5530	Advanced Physical Chemistry	3
Electives		
Select two of the following:		6-7
CHEM 5010	Advanced Inorganic Chemistry	
CHEM 5310	Advanced Organic Chemistry	
CHEM 5845	Molecular Modeling and Drug Design	
CHEM 5600	Graduate Topics in Chemistry ¹	
CHEM 5815	Structural Biology of Neurodegenerative Diseases	
CHEM 5810	Graduate Biochemistry I	
Total Hours		12-13

¹ course topic must match to the topic area of the track and be preapproved by the Graduate Program Director

Additionally, students are recommended to take one or two courses from other departments:

Code	Title	Hours
MATH 3191	Applied Linear Algebra	3
MATH 4387	Applied Regression Analysis	3
MATH 5310	Probability	3
MATH 5387	Applied Regression Analysis	3
MATH 5660	Numerical Analysis I	3
CSCI 1410	Fundamentals of Computing	3
CSCI 2312	Object Oriented Programming	3
CSCI 4650	Numerical Analysis I	3
CSCI 5660	Numerical Analysis I	3

Traditional Chemistry

Students that are interested in gaining experience in a broad range of chemistry including the critical sub-disciplines of organic, inorganic, analytical, and physical chemistry are encouraged to consider the traditional track.

Code	Title	Hours
CHEM 5010	Advanced Inorganic Chemistry	3
CHEM 5110	Advanced Analytical Chemistry	3
CHEM 5310	Advanced Organic Chemistry	3
CHEM 5530	Advanced Physical Chemistry	3
Total Hours		12

To learn more about the Student Learning Outcomes for this program, please visit our website (<https://clas.ucdenver.edu/chemistry/graduate-students/program-learning-goals/>).