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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Phone: 303-315-7644

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

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>CHEM 5610</td>
<td>Understanding &amp; Presenting Chemical Research</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 6950</td>
<td>Master’s Thesis</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total Hours</td>
<td>4</td>
</tr>
</tbody>
</table>

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.

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 1 credit of CHEM 5610 Understanding & Presenting Chemical Research
- 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

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>Biochemistry (p. 2)</td>
<td>Complete the coursework for one of the following content emphasis tracks</td>
<td></td>
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<tr>
<td>Synthesis and Measurement (p. 2)</td>
<td></td>
<td></td>
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<tr>
<td>Molecular Modeling (p. 2)</td>
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<td></td>
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<tr>
<td>Traditional Chemistry (p. 2)</td>
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</tbody>
</table>
Content Emphasis Tracks

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

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<tr>
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<tbody>
<tr>
<td>CHEM 5810</td>
<td>Graduate Biochemistry I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 5310</td>
<td>Advanced Organic Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>or CHEM 5530</td>
<td>Advanced Physical Chemistry</td>
<td></td>
</tr>
</tbody>
</table>

Elective Courses
Select two of the following:

- CHEM 5600 Graduate Topics in Chemistry
- 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

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

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

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

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<tr>
<td>CHEM 5010</td>
<td>Advanced Inorganic Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>or CHEM 5310</td>
<td>Advanced Organic Chemistry</td>
<td></td>
</tr>
<tr>
<td>CHEM 5110</td>
<td>Advanced Analytical Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>or CHEM 5221</td>
<td>Practical Applications of Spectroscopy</td>
<td></td>
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</table>

Elective Courses
Select two of the following:

- CHEM 5421 Cannabis Chemistry
- CHEM 5510 Computational Chemistry
- CHEM 5530 Advanced Physical Chemistry
- CHEM 5600 Graduate Topics in Chemistry
- CHEM 5700 Environmental Chemistry

Total Hours: 13

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

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.

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<td>3</td>
</tr>
<tr>
<td>CHEM 5530</td>
<td>Advanced Physical Chemistry</td>
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</tr>
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Electives
Select two of the following:

- CHEM 5010 Advanced Inorganic Chemistry
- CHEM 5310 Advanced Organic Chemistry
- CHEM 5845 Molecular Modeling and Drug Design
- CHEM 5600 Graduate Topics in Chemistry
- 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:

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.
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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/).