

## PROGRAM OVERVIEW

Chemistry is the study of matter and its transformations, from the smallest scale – atoms and subatomic particles – to the macromolecules that provide structure and function to living organisms. Chemistry is often called the “central science” because it touches on other STEM disciplines including physics, biology, medicine, environmental science, geology, mathematics, materials science, technology, and many others. A degree in Chemistry can prepare you for a wide range of meaningful careers discovering and applying scientific knowledge, critical thinking, and problem-solving skills. Modern chemistry combines computer modeling and experimental observation using procedures that are much safer and more environment-friendly than in past generations.

## ACADEMIC ADVISING

The College of Liberal Arts and Sciences (CLAS) supports students to graduation using a shared advising system. CLAS students have two academic advisors with whom they should meet regularly to discuss academic and degree progress: a CLAS Academic Advisor and a major/faculty advisor.

*For questions related to CU Denver Core Curriculum, CLAS, general graduation requirements, university/college academic policies, or campus resources contact:*

### CLAS Academic Advising

[clas\\_advising@ucdenver.edu](mailto:clas_advising@ucdenver.edu)

Find your CLAS Advisor [here](#)

North Classroom (NC) Building 1030

303-315-7100

*For questions related to major requirements, major course prerequisites, or evaluation of transfer coursework in your major contact:*

### Marta Maroń

[marta.maron@ucdenver.edu](mailto:marta.maron@ucdenver.edu)

Visit the department website [here](#)

Science Building (SI) 3071 C

303-315-7637

## GENERAL GRADUATION REQUIREMENTS & POLICIES

*All CU Denver CLAS students are required to complete the following minimum general graduation requirements to be eligible to apply for graduation:*

1. Complete a minimum of 120 semester hours
2. Achieve a minimum 2.0 CU cumulative grade point average (GPA)
3. Complete a minimum of 45 upper-division (3000- to 4000-level) semester hours
4. Complete all CU Denver Core, CLAS, and major requirements
5. Complete a minimum of 30 hours in CLAS at CU Denver

*The following are **maximum** semester hours that can apply toward the minimum 120 hours required for graduation:*

- 56 semester hours in major department/prefix courses
- 16 semester hours Pass/Fail
- 12 semester hours of Independent Study/Directed Research
- 12 semester hours of internship credit
- 8 semester hours of physical education credit

## PROGRAM REQUIREMENTS & POLICIES

**Students are responsible for meeting with the major/faculty advisor in the department to confirm major requirements.** Students completing the Chemistry B.S. Degree are required to complete the following minimum program requirements:

1. Students must complete a minimum of 67 credit hours, including a minimum of 45 CHEM credit hours and a minimum of 22 credit hours in ancillary (supporting math and science) coursework.
2. Students must complete a minimum of 16 upper-division level (3000-level and above) CHEM credit hours.
3. Students must earn a minimum grade of C-(1.7) in all major courses taken at CU Denver and must achieve a minimum cumulative major GPA of 2.0. All graded attempts in required and elective courses are calculated in the major GPA. Students cannot complete major or ancillary course requirements as pass/fail. **Note: students completing the American Chemical Society (ACS) Certified degree must earn a minimum grade of C (2.0) in all major courses taken at CU Denver.**
4. Students must complete a minimum of 14 CHEM credit hours with CU Denver faculty, including CHEM 4128, 4518, and 4538.
5. A student who has declared a Chemistry major at CU Denver may not take additional chemistry courses outside of the Department for the purpose of applying those credits toward meeting the requirements of the major without prior written approval of the undergraduate Chemistry/Biochemistry advisor. No more than 3 additional hours of such pre-approved transfer credits will be allowed.
6. All courses applied to the Chemistry major need to be taken within ten years of the graduation date.
7. Intro Experimental Physics labs I and II (PHYS 2321 and PHYS 2341) are specifically designed for students in non-Physics majors and can be paired with either College Physics (PHYS 2010 and PHYS 2020) or General Physics (PHYS 2311 and PHYS 2331) lectures. Students pursuing a second major in Physics should complete General Physics lectures (PHYS 2311 and PHYS 2331) and Applied Physics Labs (PHYS 2351 and PHYS 2361).

## LYNX CONNECT RESOURCES

Are you interested in learning about internship, study abroad, career, and research opportunities for this major? Visit the CU Denver Lynx Connect, located in Tivoli Student Union (TV) Suite 339, and browse the Lynx Connect [website](#) for more information.

Degree Requirements	Credits	Notes
<b>* Course prerequisites change regularly. Students are responsible for consulting advisors and the class schedule in the student portal for prerequisite information. *</b>		
<b>CU Denver Core Curriculum Requirements</b>	<b>34 - 40</b>	<a href="#">CU Denver Core Curriculum Requirements</a>
<b>CLAS Graduation Requirements</b>	<b>15 - 29</b>	<a href="#">CLAS Graduation Requirements</a>
<b>CHEM Major Requirements</b>	<b>67 - 71</b>	At least 16 CHEM semester hours must be upper-division
CHEM 2031 General Chemistry I <b>or</b> CHEM 2081 Honors General Chemistry I <sup>FA</sup>	3	*Prerequisite: Placement. If AP and IB credit for General Chemistry see Chemistry Advisor before registering for first chemistry class. See CHEM advisor for CHEM 2081.
CHEM 2038 General Chemistry I Lab <b>or</b> CHEM 2088 Honors General Chemistry I Lab <sup>FA</sup>	1	*Prerequisite/Corequisite: C- or higher in CHEM 2031 or 2081 See CHEM advisor for CHEM 2088.
CHEM 2061 General Chemistry II <b>or</b> CHEM 2091 Honors General Chemistry II <sup>SP</sup>	3	*Prerequisite: C- or higher in CHEM 2031 or 2081. See CHEM advisor for CHEM 2091.
CHEM 2068 General Chemistry II Lab <b>or</b> CHEM 2098 Honors General Chemistry II Lab <sup>SP</sup>	2	*Prerequisite: C- or higher in CHEM 2038 or 2088. *Prerequisite/Corequisite: CHEM 2061 or CHEM 2091 See CHEM advisor for CHEM 2098.
CHEM 3111 Analytical Chemistry <sup>FA</sup>	3	*Prerequisite: C- or higher in CHEM 2061 or 2091
CHEM 3118 Analytical Chemistry Lab <sup>FA</sup>	2	*Prerequisite: C- or higher in CHEM 2068 or 2098 *Prerequisite/Corequisite: CHEM 3111 or 3481
CHEM 3411 Organic Chemistry I <b>or</b> CHEM 3481 Honors Organic Chemistry I <sup>FA</sup>	4	*Prerequisite: C- or higher in CHEM 2061 or 2091. See CHEM advisor for CHEM 3481.
CHEM 3418 Organic Chemistry I Lab <b>or</b> CHEM 3488 Honors Organic Chemistry I Lab <sup>FA</sup>	1 - 2	*Prerequisite: C- or higher in CHEM 2068 or 2098. *Prerequisite/Corequisite: CHEM 3411 See CHEM advisor for CHEM 3488.
CHEM 3421 Organic Chemistry II <b>or</b> CHEM 3491 Honors Organic Chemistry II <sup>SP</sup>	4	*Prerequisite: C- or higher in CHEM 3411 or 3481. See CHEM advisor for CHEM 3491.
CHEM 3498 Honors Organic Chemistry II Lab <sup>FA, SP</sup>	2	*Prerequisite: C- or higher in CHEM 3411 or 3481 and 3418 or 3488. *Prerequisite/Corequisite: CHEM 3421 or 3491 Students need permission from CHEM advisor to enroll in CHEM 3498.
CHEM 4500 Foundations of Physical Chemistry <sup>SP</sup> <b>Required for students on an algebra-based physics track.</b> <b>Recommended for students on a calculus-based physics track.</b>	3	*Prerequisite: C- or higher in MATH 2411 and PHYS 2020 *Prerequisite/Corequisite: PHYS 2331 and CHEM 3421 or 3491
CHEM 4521 Physical Chemistry: Quantum Mechanics & Spectroscopy <sup>FA</sup>	3	*Prerequisite: C- or higher in PHYS 2331 or 2020 *Prerequisite/Corequisite: MATH 3511 or MATH 2421 (if PHYS 2331 was completed) or CHEM 4500 (if PHYS 2020 or 2331 was completed)
CHEM 4538 Physical Chemistry Lab: Molecular Structure <sup>FA</sup>	2	*Prerequisite/Corequisite: CHEM 4521
CHEM 4511 Physical Chemistry: Thermodynamics and Kinetics <sup>SP</sup>	3	*Prerequisite: C- or higher in PHYS 2331 or 2020 *Prerequisite/Corequisite: MATH 3511 or MATH 2421 (if PHYS 2331 was completed) or CHEM 4500 (if PHYS 2020 or 2331 was completed)
CHEM 4518 Physical Chemistry Lab: Reaction Analysis <sup>SP</sup>	2	*Prerequisite/Corequisite: CHEM 4511
CHEM 3011 Inorganic Chemistry <sup>SP</sup>	3	*Prerequisite/Corequisite: C- or higher in CHEM 3421 or CHEM 3491
CHEM 4121 Instrumental Analysis <sup>SP</sup>	3	*Prerequisite: C- or higher in CHEM 3111, 3421 or 3491 and CHEM 4521 and PHYS 2331 or 2020
CHEM 4128 Instrumental Analysis Lab <sup>SP</sup>	2	*Prerequisite: C- or higher in CHEM 3118 and 4538
CHEM 3018 Inorganic Lab <sup>SP</sup> <b>or</b> CHEM 4828 Biochemistry Lab <sup>SP</sup>	2	*Prerequisite: CHEM 3011 (for 3018) *Prerequisite: C- or higher in CHEM 3810 or CHEM 4810 (for 4828)
<b>Ancillary (Supporting Math and Science) Courses:</b>		
PHYS 2311 & 2321 General Physics I & Intro to Experimental Phys Lab I <i>and</i> PHYS 2331 & 2341 General Physics II & Intro Experimental Phys Lab II <b>or</b> PHYS 2010 & 2321 College Physics I & Intro to Experimental Phys Lab I <i>and</i> PHYS 2020 & 2341 College Physics II & Intro to Experimental Phys Lab II	10	*Prerequisite: MATH 1401 for PHYS 2311 *Prerequisite: C- or higher in PHYS 2311 and MATH 2411 (for 2331) *Prerequisite: C- or higher in PHYS 2010 or 2311 (for 2020) *Prerequisite: C- or higher in PHYS 2030, 2321, or 2351 with (for 2341)
MATH 1401 Calculus I	4	*Prerequisite: C- or higher in MATH 1109, 1070, or 1110 and MATH 1120; or C- or higher in MATH 1130; or C- or higher in MATH 1401; or entry into the MA01 Student Group OR ALEKS PPL score 76-100.
MATH 2411 Calculus II	4	*Prerequisite: C- or higher in MATH 1401
MATH 3511 Mathematics of Chemistry or MATH 2421 Calculus III <b>Recommended for students on a calculus-based physics track.</b> <b>Not required for students on an algebra-based physics track.</b>	4	*Prerequisite: C- or higher in MATH 2411 and CHEM 2031 or 2081 and CHEM 2061 or 2091 (for MATH 3511) *Prerequisite: C- or higher in MATH 2411 (for MATH 2421)
<b>Optional American Chemistry Society (ACS) Certified Degree Requirements:</b>		
CHEM 3810 Biochemistry <b>or</b> CHEM 4810 General Biochemistry I <sup>SP</sup>	3 - 4	*Prerequisite (for 3810): C- or higher in BIOL 2061 or 2097 and CHEM 3411 or 3481 *Prerequisite/Corequisite (for 4810): C- or higher in CHEM 3421, 3491
CHEM 3018 Inorganic Lab <b>or</b> CHEM 4828 Biochemistry Lab <sup>SP</sup>	2	*Prerequisite/Corequisite: C- or higher in CHEM 3011 (for CHEM 3018) *Prerequisite/Corequisite: C- or higher in CHEM 3810/4810/5810 (for 4828)
Advanced Elective Course – See CHEM Advisor	3	*Check individual courses for prerequisites.
<b>Estimated General Electives</b>	<b>0 - 5</b>	General Elective credits vary based on Core & CLAS Requirements. Consult with CLAS Advisor.
<b>Total Minimum Program Hours:</b>	<b>120</b>	45 semester hours must be upper-division

### SUGGESTED ACADEMIC PLAN OF STUDY

The following academic plan is a *suggested* pathway to completing degree requirements for this major. Students should tailor this plan based on previously completed college coursework (e.g., AP, IB, CLEP, dual/concurrent enrollment, and transfer credit) and individual preferences related to course load, schedules, or add-on programs such as minors or double-majors.

**Note:** Students should be aware that certain graduate programs do not accept AP, IB and CLEP credits. Students must have a plan on file with the Chemistry Major Advisor. **Additionally, the sample plan below includes the calculus-based physics option, which is the recommended option for students. Students can choose to complete the algebra-based physics option, but must meet with the CHEM advisor to amend this sample plan.**

<b>Year One</b>	<b>Fall</b>	CRS
	ENGL 1020 – Core Composition I	3
	CHEM 2031 & 2038 <sup>C</sup> or CHEM 2081 & 2088	4
	MATH 1401 <sup>PE C</sup>	4
	CU Denver Core Behavioral Science / First-Year Seminar	3
	<b>Total Credit Hours</b>	<b>14</b>

<b>Spring</b>	CRS
ENGL 2030 – Core Composition II	3
CHEM 2061 & 2068 <sup>C</sup> or CHEM 2091 & 2098 <sup>PE</sup>	5
MATH 2411 <sup>C</sup>	4
CU Denver Core Humanities	3
<b>Total Credit Hours</b>	<b>15</b>

<b>Year Two</b>	<b>Fall</b>	CRS
	CHEM 3411 & 3418 or CHEM 3481 & 3488 <sup>PE</sup>	5-6
	PHYS 2311 & 2321 <sup>PE C</sup>	5
	CHEM 3111 <sup>PE</sup> & 3118 <sup>PE</sup>	5
	<b>Total Credit Hours</b>	<b>15-16</b>

<b>Spring</b>	CRS
CHEM 3421 or CHEM 3491 <sup>PE</sup>	4
CHEM 3498	2
PHYS 2331 & 2341 <sup>PE C</sup>	5
CLAS Communicative Skills	3
<b>Total Credit Hours</b>	<b>14</b>

<b>Year Three</b>	<b>Fall</b>	CRS
	CHEM 4521 & 4538 <sup>PE</sup>	5
	MATH 3511 <sup>PE</sup> or 2421 <sup>PE</sup> (see CHEM advisor)	4
	CLAS Foreign Language Semester I	5
	CLAS Behavioral Science	3
	<b>Total Credit Hours</b>	<b>17</b>

<b>Spring</b>	CRS
CHEM 4511 & 4518 <sup>PE</sup>	5
CU Denver Core Arts	3
CLAS Foreign Language Semester II	5
CU Denver Core International Perspectives	3
<b>Total Credit Hours</b>	<b>16</b>

<b>Year Four</b>	<b>Fall</b>	CRS
	CU Denver Core Social Science	3
	CU Denver Core Cultural Diversity	3
	CLAS Humanities	3
	Upper-Division General Elective	3
	General Elective	1
	<b>Total Credit Hours</b>	<b>13</b>

<b>Spring</b>	CRS
CHEM 3011 <sup>PE</sup>	3
CHEM 4121 & 4128 <sup>PE</sup>	5
CLAS Social Science	3
Upper-Division General Elective	3
CHEM 3018 <sup>PE</sup> or CHEM 4828 <sup>PE</sup>	2
<b>Total Credit Hours</b>	<b>16</b>

<sup>M</sup> Major Course Available    <sup>C</sup> CU Denver Core Course    <sup>PE</sup> Prerequisite Enforced    <sup>PR</sup> Prerequisite Recommended