METROPOLITAN STATE UNIVERSITY OF DENVER
Department of Chemistry and Biochemistry

Requirements for B.S. in Biochemistry

Major Requirements

120 credit hours total (of which 33 are general studies degree requirements). A grade of "C-" or better is required for each course in this program to count toward the bachelor's degree. Students should note that programs differ in the minimum grade required.

- 40 credits required major courses
- 25 credits required biology, physics, and math courses
- 10 credits STEM electives
- 3 credits senior experience
- 6-18 credits other electives

Your first year

College algebra is a prerequisite for beginning the Chemistry sequence, so in your first year you need to do one of the following:

- Get an Advanced Algebra and Function (AAF) score of at least 280 on the Accuplacer exam

or

- Complete college algebra (fulfills general studies requirement)
    - Note: calculus is required later, so you must take algebra with that path in mind! Talk to an advisor about which algebra is right for you!

Also recommended for your first year of studies are written and oral communication classes (fulfills general studies requirements).

The Major Course sequence

Main Sequence

Semester 1	❑ CHE 1800 – General Chemistry I (4 credits) ❑ CHE 1801 – General Chemistry I Lab (1 credit) Suggested: Precalculus (MTH 1400) or Trigonometry (MTH 1120)
Semester 2	❑ CHE 1810 – General Chemistry II (4 credits) ❑ CHE 1811 – General Chemistry II Lab (1 credit) Suggested: Physics I (PHY 2010 or PHY 2311) and lab (PHY 2030 or PHY 2321)
Semester 3	❑ CHE 3000 – Analytical Chemistry (3 credits) ❑ CHE 3010 – Analytical Chemistry Lab (2 credits) Suggested: Calculus I (MTH 1410)
Semester 4	❑ CHE 3100 – Organic Chemistry I (4 credits) ❑ CHE 3120 – Organic Chemistry I Lab (1 credit) Suggested: General Biology I (BIO 1080) and Lab (BIO 1090) and STEM elective

Semester 5	❑ CHE 3110 – Organic Chemistry II (3 credits) ❑ CHE 3130 – Organic Chemistry II Lab (2 credits) Suggested: General Biology II (BIO 1081) and Lab (BIO 1091) and STEM elective
Semester 6+	❑ 5-6 credits required upper division courses ❑ 3 or 4 credits of STEM electives

Required Upper Division – Check with an advisor, not offered every semester

- ❑ CHE 3190 – Survey of Physical Chemistry (4 credits)
- ❑ CHE 3200 – Survey of Physical Chemistry Laboratory (1 credit)
- ❑ CHE 4310 - Biochemistry I (4 credits)
- ❑ CHE 4320 - Biochemistry II (4 credits)
- ❑ CHE 4350 - Biochemistry Laboratory (2 credits)

STEM Electives – 10 credits required. Check with an advisor, not all courses are offered every semester.

See last page for full list of STEM electives!

Senior Experience

CHE 4960 - Senior Experience in Biochemistry (3 credits)

Required Biology, Physics, and Math Courses

Biology

- ❑ BIO 1080 - General Biology I (3 credits)
- ❑ BIO 1081 - General Biology II (3 credits)
- ❑ BIO 1090 - General Biology Laboratory I (1 credit)
- ❑ BIO 1091 - General Biology Laboratory II (1 credit)
- ❑ BIO 3050 - Cell Biology (4 credits)
- ❑ Genetics (4 credits)
    - o either BIO 3600 - General Genetics **OR** BIO 3610 - Genetics: Principles and Analysis

Math

- ❑ MTH 1410 – Calculus I (4 cr. – fulfills general studies requirement)

Physics – choose one lecture/lab sequence:

- ❑ PHY 2010 - College Physics I (4 cr. – fulfills general studies requirement)

OR

- ❑ PHY 2311 - General Physics I (4 cr. – fulfills general studies requirement)

Are you ready for graduation?

- ❑ Completed ancillary courses? (1 math, 2 physics)
- ❑ Completed all 12 required major courses?
- ❑ 6 credits of chemistry electives?
- ❑ Senior Experience?
- ❑ General degree requirements met?
- ❑ 120 credit hours total?
- ❑ Final advising appointment?
- ❑ Submitted application for graduation?

STEM Electives List

Chemistry

- CHE 3700 - Forensic Chemistry
- CHE 3710 - Forensic Biochemistry
- CHE 4010 - Advanced Organic Chemistry
- CHE 4100 - Instrumental Analysis
- CHE 4110 - Instrumental Analysis Laboratory
- CHE 4130 - Quality in the Chemical Industry
- CHE 4160 - QA/QC Methods Laboratory
- CHE 4300 - Advanced Inorganic Chemistry
- CHE 4370 - Undergraduate Research in Chemistry

Biology

- BIO 2310 - Human Anatomy and Physiology I
- BIO 2320 - Human Anatomy and Physiology II
- BIO 2400 - General Microbiology
- BIO 3140 - Plant Physiology
- BIO 3160 - Plant Anatomy and Morphology
- BIO 3170 - Paleobotany
- BIO 3200 - Invertebrate Zoology
- BIO 3210 - Histology
- BIO 3220 - Comparative Vertebrate Anatomy
- BIO 3260 - Vertebrate Zoology
- BIO 3320 - Advanced Human Physiology
- BIO 3330 - Advanced Human Cadaver Anatomy
- BIO 3340 - Endocrinology
- BIO 3350 - Immunology
- BIO 3351 - Immunology Laboratory
- BIO 3360 - Animal Physiology
- BIO 3400 - Microbial Physiology
- BIO 3471 - Biology of Women
- BIO 4050 - Advanced Cell and Molecular Biology
- BIO 4060 - Cellular and Molecular Biology Laboratory
- BIO 4070 - Biology of Cancer
- BIO 4200 - General Mycology
- BIO 4271 - Parasitology
- *BIO 4300 - Neurobiology*
- BIO 4350 - Clinical Immunology
- BIO 4440 - Virology
- BIO 4450 - Pathogenic Microbiology
- BIO 4470 - Microbial Genetics
- BIO 4850 - Evolution

Anthropology

- ANT 3000 - Quantitative Methods in Anthropology
- ANT 3100 - Human Evolution
- ANT 3800 - Forensic Anthropology
- ANT 3820 - Forensic Archaeology
- ANT 3840 - Introduction to Bioarchaeology
- ANT 3860 - Paleopathology

Computer Science

- CS 1050 - Computer Science 1
- CS 2050 - Computer Science 2
- CS 3120 - Machine Learning

Environmental Science

- ENV 2100 - Environmental Sampling and Analysis
- ENV 3422 - Methods of Soil Analysis and Sampling
- ENV 4500 - Environmental Biogeochemistry

Geography

- GEG 3410 - Biogeography
- GEG 3422 - Methods of Soil Analysis and Sampling

Math

- MTH 2410 - Calculus II
- MTH 2420 - Calculus III
- MTH 2520 - R Programming
- MTH 2540 - Scientific Computing with Python
- MTH 3210 - Probability and Statistics
- MTH 3270 - Data Science
- MTH 3430 - Mathematical Modeling

Physics

- PHY 2020 - College Physics II
- PHY 2040 - College Physics II Laboratory
- PHY 2331 - General Physics II
- PHY 2341 - General Physics II Laboratory
- PHY 2821 - Sophomore Physics Laboratory
- PHY 3111 - Modern Physics I
- PHY 3121 - Modern Physics II
- PHY 4810 - Quantum Physics II

Psychology

- PSY 2120 - Brain and Behavior
- PSY 3380 - Clinical Neuropsychology
- PSY 3410 - Health Psychology
- PSY 3440 - Cravings and Addictions
- PSY 3560 - Psychopharmacology
- PSY 4540 - Behavioral Neuroscience