

Graduate Certificate in Analytical Geochemistry

This program offers an opportunity for working professionals to complete graduate level coursework leading to a Graduate Certificate in a short time. The program focuses on providing instruction in a.) the fundamentals of geochemical analysis, which give students the flexibility to respond to changing opportunities in earth and environmental science, and b.) the mechanics of common techniques (sample collection and preparation, XRF, SEM, and ICP), which prepare students for immediate entry into the jobs market. The Certificate program is comprised of 12.0 credit hours of coursework. Up to 3.0 credit hours can be at the 400-level and the remainder will be 500- or 600-level as listed below.

Students working towards a Graduate Certificate of Analytical Geochemistry are required to take at least 6.0 credits out of the following core courses, courses cannot be used in fulfilling the requirements of other Certificates:

CORE COURSES:

CHGC504	METHODS OF GEOCHEMISTRY	3.0
CHGC508	ANALYTICAL GEOCHEMISTRY	3.0
GEGN532	GEOLOGICAL DATA ANALYSIS	3.0
GEOL523	REFLECTED LIGHT AND ELECTRON MICROSCOPY	2.0
GEOL540	ISOTOPE GEOCHEMISTRY AND GEOCHRONOLOGY	3.0

Students working towards a Graduate Certificate of Analytical Geochemistry can choose up to 6.0 credits out of the following elective courses, courses cannot be used in fulfilling the requirements of other Certificates:

ELECTIVES:

CHGC503	INTRODUCTION TO GEOCHEMISTRY	3.0
GEGN587	HYDROGEOCHEMICAL PROCESSES	3.0
GEGN530	CLAY CHARACTERIZATION	2.0
GEGN586	NUMERICAL MODELING OF GEOCHEMICAL SYSTEMS	3.0
GEGX571	GEOCHEMICAL EXPLORATION	3.0
CHGN507	ADV ANALYTICAL CHEM	3.0
CHGN583	PRINCIPLES AND APPLICATIONS OF SURFACE ANALYSIS TECHNIQUES	3.0

GEOL513	HYDROTHERMAL GEOCHEMISTRY	3.0
PHGN504	RADIATION DETECTION/MEASUREMENTS	3.0
GEOL628	ADVANCED IGNEOUS PETROLOGY	3.0
MNGN556	MINE WATER AND ENVIRONMENT	3.0
CEEN560	MOLECULAR ECOLOGY	3.0

Program Details for Professional Masters Degrees

A minimum of 30 credit hours are required, with an overall GPA of at least 3.0. The overall course requirements will depend on the background of the individual, but may be tailored to professional objectives.

Application

Undergraduate students at Mines must declare an interest during their third year to allow for planning of coursework that will apply towards the program. These students must have an overall GPA of at least 3.0. Students majoring in other departments besides the Department of Geology and Geological Engineering and the Department of Chemistry and Geochemistry may want to decide on the combined degree program option earlier to be sure prerequisites are satisfied. Applicants other than Mines undergraduates who are applying for this non-thesis Master degree program must follow the same procedures that all prospective graduate students follow.

Prerequisites

Each entering student will have an entrance interview with members of the Geochemistry faculty. Each department recognizes that entering students may not be proficient in both areas. A placement examination in geology and/or chemistry may be required upon the discretion of the interviewing faculty. If a placement examination is given, the results may be used to establish deficiency requirements. Credit toward a graduate degree will not be granted for courses taken to fulfill deficiencies.

Professional Masters' Degree in Analytical Geochemistry

This program is designed for both full time students and working professionals who want to increase their knowledge and skills, while gaining a thorough up-date of advances across the spectrum of geochemical analysis.

A minimum of 30 credit hours are required for the PM degree. Students working towards a PM in Analytical Geochemistry are required to take a minimum of 9.0 credits from courses in the Certificate in Analytical Geochemistry core and a minimum of 3.0 credits from the Certificate in Analytical Geochemistry electives. Up to 12 credit hours can also be selected from this list.

CEEN560	MOLECULAR MICROBIAL ECOLOGY AND THE ENVIRONMENT	3.0
CHGN555	ENVIRONMENTAL ORGANIC CHEMISTRY	3.0
CHGN503	ADV PHYSICAL CHEMISTRY I	3.0
CHGN507	ADV ANALYTICAL CHEM	3.0
GEGN575	APPLICATIONS OF GEOGRAPHIC INFORMATION SYSTEMS	3.0
GEGN581	ANALYTICAL HYDROLOGY	3.0
GEGN583	MATHEMATICAL MODELING OF GROUNDWATER SYSTEMS	3.0

An additional 6 credit hours of free electives may be selected to complete the 30 credit hour requirement. Free electives may be selected from the graduate course offerings of the Department of Geology and Geological Engineering, the Department of Chemistry and Geochemistry, or the Department of Civil and Environmental Engineering. Up to 6 credits of the additional electives can include an independent study project (CHGC 599) at CSM, federal agencies, or industry, and is highly encouraged.

The Certificate in Analytical Geochemistry can be combined with the 12-credit Certificate in Exploration Methods to be used towards the Professional Masters in Analytical Geochemistry (Non-thesis), which will allow part-time students to stack their education. When stacking the Certificates, the additional 6 credits of free electives can include an independent study project (CHGC 599) at CSM, federal agencies, or industry, and is highly encouraged. Independent study projects that connect students with local entities will be a priority and will establish a network of future employers for the students and collaborations for CSM.