I. Catalog Description

A survey of the application of chemical principles to problems of geology. Topics include the origin and distribution of the elements and exploration of the behavior and distribution of various elements in igneous, metamorphic, and sedimentary rocks. Basic concepts of thermodynamics, solution chemistry, and isotope geochemistry will be discussed. Credit for both GEOL 3143 and CHEM 3143 will not be awarded. Prerequisite: CHEM 1084. Lab fee $10.

II. Prerequisites

CHEM 1084

III. Expanded Course Description

Geochemistry is the study of the origin and distribution of elements in the Universe, in the Solar System, and in the Earth. The course begins with a study of element and isotope formation during the Big Bang event, and during stellar evolution. The distribution of elements and isotopes in the Solar system is examined. The distribution of elements within the Earth is a major topic. Stable and radioactive isotopic systems, and their geological applications are covered. The final portion of the class examines the low temperature geochemistry of Earth’s surface environment.

IV. Intended Student Learning Outcomes

Knowledge outcomes

Upon completion of this course students will:

* understand the formation of and the distribution of the elements and isotopes in the Universe, Solar System, and Earth
* understand stable and radioactive isotope systematics
* understand the surficial geochemical cycles

Skill outcomes

Upon completion of the course students will:

* be able to use chemical data to characterize stellar and terrestrial systems
be able to extract dates from radioactive isotope data
be able to utilize stable isotope data

Value outcomes
Upon completion of this course students will:
* be able to understand the critical importance of geochemical processes in the Universe and Solar System

V. Unless stipulated in this master syllabus by the department, the following items are subject to faculty discretion in each faculty member’s individual course outline/syllabus:

Course Requirements (grading/evaluation procedures; class attendance policy; term papers; projects; field assignments; examinations; class participation; etc)

A combination of lecture exams (2 to 4), lab exams (2 to 4), lab exercises (8-12), and field trips (1-3).

Required texts
A lecture text or texts on geochemistry.

Department Head Signature/Date

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Signature       Date