

based spatial analysis. Principles of geographic information systems will be implemented in a wide variety of applications using Spatial Analyst. This course fulfills the second-level Computer Competency requirement in the core curriculum. Usually offered fall semester.
Prerequisite: 321

430 North American City

This course will focus on themes in the development of contemporary cities with special attention to patterns and trends within the Twin Cities metropolitan area. Usually offered alternate years.
Prerequisite: 111 or 113 or consent of instructor

475, 476, 477, 478 Experiential Learning

See the description of these courses at the beginning of the “Departments and Curricula” section of this catalog.

480 Seminar in Geography

In this seminar, we will explore the nature of geography as a discipline. The areas to be covered: history of geographic thought, the position of geography relative to the arts and sciences, different ways of interpreting geographical phenomena, and geography as a vocational and academic career. Research projects will cover these themes and be tailored to the student’s interests. Usually offered alternate years.

Prerequisite: four geography courses, including one methods course

481 Advanced Field Study in Geography (formerly 484)

A geographic analysis through field experience. Designed for advanced students in geography. Includes study-abroad courses.

Prerequisite: consent of instructor

483, 484, 485, 486 Seminar

See the description of these courses at the beginning of the “Departments and Curricula” section of this catalog.

487, 488, 489, 490 Topics

The subject matter of these courses, announced in the annual *Class Schedule*, will vary from year to year, but will not duplicate existing courses. See the description of these courses at the beginning of the “Departments and Curricula” section of this catalog.

491, 492, 493, 494 Research

See the description of these courses at the beginning of the “Departments and Curricula” section of this catalog.

495, 496, 497, 498 Individual Study

See the description of these courses at the beginning of the “Departments and Curricula” section of this catalog.

Geology (GEOL)

Farnham (chair), Brownstein

Geology is the science of the earth, and, like other disciplines, it is subdivided into specific studies. The department offers a variety of courses basic to an undergraduate geology curriculum in order to provide the student with a sound foundation.

Those majoring in geology are required to take courses in the allied sciences (biology, chemistry and physics) and in mathematics because of their importance to the study of earth science.

The aims of the Department of Geology are to provide a major program for students who will continue their study of geology in graduate school; to prepare students to do geological work in industry and government; to offer a program that prepares students to teach earth science at the secondary-school level; and to permit interested students to broaden their liberal arts education.

Major in Geology

111 Introductory Geology I
112 Introductory Geology II
211 Mineralogy
252 Geomorphology
311 Petrology
322 Structural Geology
421 Geophysics

Plus:

MATH 113 Calculus I
MATH 114 Calculus II

Geology

Plus two of the sequences:

BIOL 201 Ecology, Adaptation and Diversity
and

BIOL 202 Genetics and Evolution
or

CHEM 111 General Chemistry I
and

CHEM 112 General Chemistry II
or

PHYS 111 Introduction to Classical Physics I
and

PHYS 112 Introduction to Classical Physics II

The department recommends that students planning to do graduate work take additional courses in the allied sciences and in mathematics. The department also recommends that students take a summer field course at a recognized geology field camp, preferably between the junior and senior years.

Earth Science with a Concentration in Geology

See Department of Teacher Education.

Minor in Geology

111 Introductory Geology I

112 Introductory Geology II

252 Geomorphology

322 Structural Geology*

*Prerequisite of 311 is waived for students minoring in geology.

Plus one of:

211 Mineralogy

311 Petrology*

421 Geophysics

*Prerequisite of 211 is waived for students minoring in geology.

Teaching Minor in Geology

See Department of Teacher Education.

102 Origins and Methods (111)

A study of the basic concepts of geology that were first developed by James Hutton in the late 18th century and their application today. This is an introductory science course specifically designed to reduce the mystique that often is associated with the scientific method. Following Hutton's example, the study will focus on the materials which make up the earth and on the geologic processes that operate on these materials. This course includes a four-hour-per-week laboratory component. Offered in January Term.

110 Geology of the National Parks

The course begins with an examination of the national park system. A review of the conflicts associated with the use of public lands, including environment-influencing geological factors, follows. The next segment involves an overview of geologic concepts, processes and materials utilizing examples from the national parks. This course closes with a study of the specific geologic materials, natural processes, landforms and sequence of events responsible for the outstanding scenery in selected U.S. national parks. Laboratories will be integrated with lecture and will include study of the rocks common to the national parks; analysis of geomorphic, topographic and geologic maps of the national parks; environment-related geologic exercise and field studies of local sites. Lecture and two laboratory hours per week.

111 Introductory Geology I (102)

A study of the Earth's properties; the formation and classification of minerals, rocks, ore deposits, and fuels; and the nature and origin of the Earth's surface and interior. Emphasis will be placed upon a changing Earth, the constructive and destructive forces, and the geologic processes operating at the surface and in the interior. Lecture and two laboratory hours per week.

112 Introductory Geology II

The application of geologic principles to an interpretation of the physical and biological changes that have occurred on and within the earth. Lecture and two laboratory hours per week.

Prerequisite: 111

211 Mineralogy

A systematic approach to mineral study involving crystallography, analysis of physical and chemical

Health and Human Performance

properties, mineral formation, and methods of identification and classification. Lecture and three laboratory hours per week.

Prerequisite: 111

252 Geomorphology

The study of landforms, the geologic processes that produce them, their evolution, and their distribution over the Earth's surface. Aerial photographs introduced for purposes of geomorphic analysis. Lecture and three laboratory hours per week.

Prerequisite: 111

295, 296, 297, 298 Topics

The subject matter of these courses, announced in the annual *Class Schedule*, will vary from year to year, but will not duplicate existing courses. See the description of these courses at the beginning of the "Departments and Curricula" section of this catalog.

311 Petrology

A study of the physical and chemical factors that relate to the environment of formation for igneous, sedimentary and metamorphic rocks. A systematic approach to rock analysis, identification and classification. The petrographic microscope introduced in the laboratory. Lecture and three laboratory hours per week.

Prerequisite: 211

322 Structural Geology

An analysis of the structures within the Earth's crust, their origin and classification, the principles of rock deformation, and an introductory study of the Earth's mantle and core. Lecture and three laboratory hours per week.

Prerequisite: 311

421 Geophysics

Fundamental principles of geophysical methods commonly used for subsurface exploration, including: gravity, magnetic, seismic and electrical measurements. Emphasis on field procedures and interpretation techniques used for geologic investigations. Lecture and three laboratory hours per week.

Prerequisite: 311

475, 476, 477, 478 Experiential Learning

See the description of these courses at the beginning of the "Departments and Curricula" section of this catalog.

483, 484, 485, 486 Seminar

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German Greek

See Department of Modern and Classical Languages.

Health and Human Performance

Parsley (chair), Carey, Duoos, Grochowski, Andregg*, Casey*, Hodgson*, Mathre*, Ofstead*, Skrypek*, Stenzel*, Sweeney*

The Department of Health and Human Performance offers the following undergraduate professional programs of study including a basic instructional program:

1. A major in physical education which leads to licensure at both the elementary and secondary levels;
2. A major in health education, which leads to licensure at the elementary, middle, and secondary school level;