

Description of Courses

GEOL 100. Earth: Exploring a Dynamic

Planet (1). Introduction to the study of the Earth, including its structure, composition, and processes that act upon it. Focus is placed on how scientific methods can be used to decipher complex interactive processes, developing skills for observation and analysis in the field and laboratory. Lecture, laboratory, field study. One Saturday or Sunday field trip. Students who have credit for Geology 110 may not take this course for credit. (4U) *Offered yearly.*

GEOL 105. Evolution of the Earth (1). The recent revolution in geologic thinking that was brought about by the ideas of sea-floor spreading, heat flow through the Earth's crust, reversals of the Earth's magnetic field, and earthquake studies allows a synthesis of the Earth's evolution. Information from rock associations, fossils, stratigraphic correlations, and radioactive-age determinations forms a logical picture of the co-evolution of the Earth's lithosphere, hydrosphere, atmosphere, and biosphere. The human dimension of historical geology is revealed in tracing the development of the concept of time. Lecture, discussion, laboratory, field study. One Saturday or Sunday field trip. (4U) *Offered yearly.*

GEOL 110. Environmental Geology and Geologic Hazards (1). Application of geologic principles to help in understanding the response of our environment to natural and anthropogenic forces of change, and proper constraints we should exercise in being good stewards of the Earth. Natural resources, floods, volcanic activity, earthquakes, landslides, coastal processes, and pollution are among topics considered, with emphasis on current events. Lecture, discussion, laboratory, field study. One Saturday or Sunday field trip. Students who have credit for Geology 100 may not take this course for credit. (4U) *Offered yearly.*

GEOL 171. Field Excursion Seminar (1/4, 1/2). The geology, geography, history, and environment of a region to be studied during an extended field excursion. A student may take the seminar for credit more than once. *Graded credit/no credit at discretion of instructor. Offered yearly. Prerequisite or co-requisite: Geology 100 or 105 or 110.*

GEOL 200. Mineralogy (1). The study of minerals, including their composition, properties, occurrence, and classification. Lectures and laboratory include discussion of basic crystallography and crystal chemistry, and introduction to optical mineralogy and the properties and occurrences of common rock-forming minerals. Lecture, laboratory, field study. (4U) *Offered each fall. Prerequisite or co-requisite: Geology 100 or 110.*

GEOL 205. Petrology (1). The study of rocks, including their composition, classification, and tectonic setting. Lectures and laboratory focus on the processes that control the formation of rocks in the context of plate tectonics and planetary evolution. Lecture, laboratory, field study. *Offered alternate spring semesters. Prerequisite: Geology 200.*

GEOL 210. Paleontology (1). The history of life from its origins to the present. The preservation, distribution, and identification of invertebrate fossils and of selected vertebrate and plant fossils. Competing evolutionary theories are evaluated in the perspective of geologic time. Fossils are studied as once-living organisms adapting to changing ecosystems. Lecture, discussion, laboratory, field study. (Also listed as Biology 210.) *Offered alternate fall semesters. Prerequisite: Geology 105 or Anthropology 120 or 1 course in biology. Geology 100 or 110 recommended.*

GEOL 215. Field Geology (1 1/4). Techniques of collecting, recording, and presenting geologic data. The use of the Brunton compass, magnetometer, GPS, surveying techniques, and surface and groundwater hydrogeology field methods. The interpretation of data as plotted on maps, sections, and aerial photographs. Field observations and measurements are synthesized with maps and cross-sections in written reports. Lecture, laboratory, field study. *Five-week course offered alternate summer terms. Prerequisite: 2 units in geology.*

GEOL 220. Structural Geology (1). Mechanical principles applied to folds, faults, joints, igneous plutons, and secondary structural features of the Earth. Laboratory study of deformative processes by models and experiments, and analysis of structures by graphical, mathematical, and computer techniques. Lecture, laboratory, field study. *Offered alternate spring semesters. Prerequisite: Geology 100 or 110 and 200.*

GEOL 230. Sedimentology (1). The origin, distribution, deposition, and lithification of common rock-forming sediments. Lectures, laboratories, and field work consist of collecting and analyzing data and determining the geologic history and significance of sediments and sedimentary rocks by means of the binocular and petrographic microscopes and various mechanical and computer techniques. *Offered alternate fall semesters. Prerequisite: Geology 100 or 110; Geology 105 and 200 highly recommended.*

GEOL 235. Surface Processes and Landforms (1). This course focuses on the origin and development of landforms created by fluvial, glacial, eolian, and karst processes. In addition, the relationships of landforms to underlying geologic structures and the history of geologic and climate changes as recorded by surface features are explored. Landscapes and surface processes are analyzed using air photos and topographic maps as well as field-mapping techniques and geographic information systems. (4U) *Offered alternate fall semesters. Prerequisite: Geology 100 or 110.*

GEOL 240. Hydrogeology (1). An introduction to the components of the hydrologic cycle with an emphasis on the movement of water through geologic media. Field-monitoring methods and analysis of hydrogeologic data through graphical, mathematical, and computer-modeling techniques. Applications to issues of water quality, water supply, and water resources management. Lecture, laboratory, field study. *Offered alternate spring semesters. Prerequisite: Geology 100 or 110; Mathematics 110 highly recommended.*

GEOL 250, 251. Advanced Topics in Geology (½, 1). Topics of current interest or of special importance in the field of geology chosen to take advantage of the expertise of either the regular faculty or of visiting lecturers. *Offered occasionally. Prerequisite: dependent upon subject matter.*

GEOL 325. Tectonics (1). The structural and chemical evolution of the continental lithosphere from the Archean to present. Lectures and laboratory focus on the kinematics of plate motions, continental growth, geochronology, geo-thermobarometry, and thermal modeling. Mountain belts from Earth, Venus, and Mars are used as case studies. Basic computer and mathematical skills, including calculus, are

expected. *Offered occasionally. Prerequisite: Geology 205, 220; Mathematics 110; or consent of instructor.*

GEOL 331. Stratigraphy (½). Historical development of stratigraphy, principles of correlation, use of fossils as time and environmental indicators, facies, regional lithologic associations, construction and interpretation of paleogeologic maps and cross-sections using surface and subsurface data. *Offered occasionally. Prerequisite or co-requisite: Geology 105 or 230.*

GEOL 380. Departmental Seminar (¼). This seminar consists of discussions, exercises, and presentations designed to prepare students for independent research, professional work in the geosciences, and life after Beloit College. Topics covered include information literacy, data representation and presentation, and preparation for field and laboratory research. In addition, participants learn how to select a thesis topic and how to write geologic manuscripts. *Offered each spring. Prerequisite: sophomore standing.*

GEOL 385. Thesis Research-Geology (½, 1). Individual field and/or laboratory research problems in geology. May be elected by the student in consultation with the department chair and staff members either during the regular school year or during the vacation periods. Research programs may lead to consideration for the Walter S. Haven prizes in geology. *Prerequisite: sophomore standing and consent of the faculty supervisor and department chair.*

GEOL 390. Special Projects (¼ - 1). Individual study under faculty supervision; evaluation based on appropriate evidence of achievement. *Prerequisite: sophomore standing.*