Earth Science Courses (EARTHSCI)

Courses

EARTHSCI 1100 (870:010). Astronomy — 3-4 hrs.
Introduction to the Universe, solar system, stars, and galaxies, including apparent motions of bodies in the sky; development of astronomy and its impact on humankind. Discussion, 3 periods; lab, 2 periods. Also offered as a 3-hour course without lab. Prerequisite(s): student must have satisfied university entrance requirements in English and Mathematics. (Fall, Spring, Summer)

EARTHSCI 1110 (870:011). Astronomy Laboratory — 1 hr.
Exploration of astronomical phenomena through the use of telescopes, charts, almanacs, computer simulations, and other laboratory equipment. Students will gain experience in methods of observing the night sky and become familiar with celestial objects. Lab, 2 periods. Prerequisite(s): consent of instructor. Prerequisite(s) or corequisite(s): EARTHSCI 1100 (870:010). (Fall, Spring, Summer)

EARTHSCI 1200 (870:021). Elements of Weather — 3 hrs.
Meteorological elements and their applications to environment; interpretation of weather maps and weather data; forecasting and briefing on daily weather. Discussion, 3 periods. No credit for those who have completed EARTHSCI 3210/5210 (870:121g). Prerequisite(s): student must have satisfied university entrance requirements in English and Mathematics. (Fall, Spring, Summer)

EARTHSCI 1210 (870:022). Elements of Weather Laboratory — 1 hr.
Fundamentals of meteorological observation, use of basic meteorological instruments, and applications of maps and charts to understanding forecasts. Intended for science teaching majors and minors. Lab, 2 periods. Prerequisite(s) or corequisite(s): EARTHSCI 1200 (870:021). (Fall and Spring)

EARTHSCI 1300 (870:031). Introduction to Geology — 4 hrs.
Introduction to the physical environment, emphasizing materials of the Earth and processes that lead to changes within and on the Earth. Lab emphasis includes rocks and minerals, geologic processes, and landscape development. Discussion, 3 periods; lab, 2 periods. Prerequisite(s): student must have satisfied university entrance requirements in English and Mathematics. (Fall and Spring)

EARTHSCI 1320 (870:035). Earth History — 4 hrs.
Methods and principles used in deciphering the 4.6 billion-year history of our planet; discussion of history and evolution of life on Earth and examination of major physical and plate-tectonic events through geologic time. Discussion, 3 periods; lab, 2 periods. Prerequisite(s): EARTHSCI 1300 (870:031) or equivalent. (Fall and Spring)

EARTHSCI 1410 (870:037). Field Studies in ____________ — 1-4 hrs.
Field studies in various areas of Earth Science: geology, oceanography, paleontology, meteorology, and astronomy. To be preceded by seminars on proposed study area. Student collection of data in the field and reports on their findings. May be repeated in different study area. Only 4 hours may be applied to the Earth Science minor. Prerequisite(s): consent of instructor. (Variable)

Basic principles of astronomy intended primarily for inservice teachers. No credit for students with credit in EARTHSCI 1100 (870:010) or its equivalent. Prerequisite(s): junior standing; consent of department head. (Fall, Spring, Summer)

EARTHSCI 3110/5110 (870:154g). Observational Astronomy — 2 hrs.
Use of astronomical instruments (telescopes, cameras, and digital cameras), along with observing aids (charts, catalogs, and ephemerides), for collection, analysis, and interpretation of astronomical data. Discussion, 1 period; lab, 2 periods. Prerequisite(s): EARTHSCI 1100 (870:010) (4 semester hours) or equivalent; junior standing. (Fall)

Examination of the Sun’s family of planets, satellites, asteroids, and comets, including formation and evolution; processes currently at work in the Solar System; search for exoplanets. Discussion, 2 periods. Prerequisite(s): EARTHSCI 1100 (870:010) or equivalent. (Variable)

Study of structure and the evolution of stars; the Sun, protostars, red giants, white dwarfs, variable stars, supernovae, pulsars, and black holes. Discussion, 2 periods. Prerequisite(s): EARTHSCI 1100 (870:010) or equivalent. (Odd Springs)

Study of the Milky Way Galaxy and other galaxies. Examination of active galaxies and radio galaxies, galaxy clusters, quasars, and galactic black holes. Discussion of the structure, origin, evolution, and fate of the Universe. Discussion, 2 periods. Prerequisite(s): EARTHSCI 1100 (870:010) or equivalent. (Even Springs)

EARTHSCI 3196. Natural History Interpretation Colloquium — 1 hr.
Upon completion of the rest of the requirements of the Natural History Interpretation minor, enrollees refine and present an exemplary component of the portfolio - an interpretive display or program. Completed portfolio also submitted for evaluation. Prerequisite(s): LYHS 2551 (430:050) or LYHS 4554/5554 (430:146g) or LYHS 4776/5776 (430:170g); BIOL 4180/5180 (840:180g) or ANTH 3440/5440 (990:125g); BIOL 4184/5184 (840:184g). Prerequisite(s) or corequisite(s): BIOL 3179 (840:179) or EARTHSCI 3430 (870:195). (Same as BIOL 3196 (840:196)) (Variable)

EARTHSCI 3200/5200 (870:111g). Fundamentals of Weather — 3 hrs.
Basic principles of meteorology intended primarily for inservice teachers. Prerequisite(s): junior standing; consent of department head. (Fall and Spring)

EARTHSCI 3210/5210 (870:121g). Meteorology — 4 hrs.
Topics of weather observation and prediction; physical basis of cloud formation; radiational heating and cooling; the Earth's energy budget; wind circulation; precipitation processes; storm systems; and maps and charts. Discussion, 3 periods; lab, 2 periods. Prerequisite(s): EARTHSCI 1200 (870:021); junior standing. (Odd Springs)

EARTHSCI 3220/5220 (870:122g). Weather Analysis and Forecasting — 3 hrs.
Focus on middle latitude weather systems, principally those of the cold season. Topics include discussion of historical conceptions and models of extratropical cyclones, present understanding of these weather systems, and techniques of analysis and prediction. Important component is hands-on forecasting. Discussion/lab, 4
Earth Science Courses (EARTHSCI)

periods. Prerequisite(s): EARTHSCI 3210/5210 (870:121g); junior standing. (Odd Springs)

EARTHSCI 3230/5230 (870:123g). Air Quality — 4 hrs.
Topics from atmospheric dynamics, atmospheric chemistry, physical meteorology, and micrometeorology; atmospheric transport processes in time and space; local and regional concentrations of pollutants; implications of air pollution control strategies; numerical modeling techniques with application to air quality issues; field studies and remote sensing of atmospheric transport. Discussion, 3 periods; lab, 2 periods. Prerequisite(s): EARTHSCI 1200 (870:021); junior standing. (Fall)

Gaussian plume models; modeling point, area, volume and line sources of air pollution; dispersion models for air pollution regulation in the U.S. Discussion, 1 period; lab, 2 periods. Prerequisite(s): EARTHSCI 1200 (870:021); EARTHSCI 3230/5230 (870:123g); junior standing. (Even Springs)

EARTHSCI 3250/5250 (870:177g). Measurement and Analysis of Air Quality — 2 hrs.
Collection and analysis of gases and particulates; olfactometry; remote sensing with lidar and sodar; determining compliance with air quality regulations; indoor air quality. Discussion, 1 period; lab, 2 periods. Prerequisite(s): EARTHSCI 1200 (870:021); EARTHSCI 3230/5230 (870:123g); junior standing. (Even Springs)

Basic principles of physical geology intended primarily for inservice teachers. Prerequisite(s): junior standing; consent of department head. (Fall and Spring)

EARTHSCI 3305/5305 (870:115g). Volcanology — 3 hrs.
Origin, classification, eruptive mechanisms, and hazards of volcanoes, and related phenomena. Discussion, 2 periods; lab, 2 periods. Prerequisite(s): EARTHSCI 1300 (870:031) or equivalent; junior standing. (Odd Springs)

EARTHSCI 3310/5310 (870:129g). Structural Geology — 4 hrs.
Origins and mechanics of rock deformation. Plate tectonics and the deformation of Earth's crust. Field trip. Discussion, 2 periods; lab, 4 periods. Prerequisite(s): EARTHSCI 1300 (870:031); EARTHSCI 1320 (870:035); junior standing. (Spring)

Study of the causes, measurements, prediction, and preparation for earthquakes and tsunamis and the effects of earthquakes and tsunamis on civilization. Discussion, 1 period; lab, 2 periods. Prerequisite(s): Student must have satisfied university entrance requirements in English and Mathematics. (Variable)

EARTHSCI 3318 (870:130). Crystallography — 2 hrs.
Morphologic, structural, and x-ray crystallography. Laboratory exercises emphasize identification of unknown compounds, determination of space lattices, space groups, and cell parameters by x-ray diffraction. Discussion, 2 periods; lab, 6 periods (half-semester course). (Fall)

Crystal chemistry, determinative methods, and systematic description of naturally-occurring compounds with emphasis on rock-forming minerals. Laboratory exercises emphasize determinative techniques. Discussion, 2 periods; lab, 6 periods (half-semester course).

Prerequisite(s): EARTHSCI 1300 (870:031). Corequisite(s): EARTHSCI 3318 (870:130) or consent of instructor. (Fall)

EARTHSCI 3320 (870:135). Optical Mineralogy-Petrography — 4 hrs.
Optical properties of minerals and use of the petrographic microscope with emphasis on identification of minerals in thin section. Introduction to the description and classification of igneous, metamorphic, and sedimentary rocks. Discussion, 2 periods; lab, 6 periods. Prerequisite(s): EARTHSCI 3319 (870:131). (Spring)

Investigation of layered rocks, sedimentary processes, sedimentation, environments of deposition, correlation procedures, and classification and description of common sedimentary rocks. Field trips. Discussion, 2 periods; lab, 4 periods. Prerequisite(s): junior standing. Prerequisite(s) or corequisite(s): EARTHSCI 1320 (870:035). (Fall)

EARTHSCI 3328 (870:125). Fossils and Evolution — 4 hrs.
Topics in paleontology, including fossil preservation, systematics, functional morphology, paleoecology, paleobiogeography, and biostratigraphy, with special emphasis on mass extinctions and the role of paleontology in reconstructing evolutionary history. Laboratory studies of major groups of fossil invertebrates. Discussion, 3 periods; lab, 3 periods. (Spring)

EARTHSCI 3330/5330 (870:141g). Geomorphology — 3 hrs.
Classification, description, origin, and development of landforms and their relationship to underlying structure and lithology; emphasis on geomorphic processes. Includes fluvial, glacial, periglacial, eolian, karstic, weathering, and mass-movement processes and features. Discussion, 2 periods; labs and field trips, 2 periods. Prerequisite(s): EARTHSCI 1300 (870:031) or GEGO 1210 (970:026); junior standing. (Fall)

EARTHSCI 3335/5335 (870:142g). Igneous Petrology — 4 hrs.
Description, classification, and genesis of igneous rocks. Discussion, 2 periods; lab, 6 periods. Field trip. Prerequisite(s): EARTHSCI 3320 (870:135); junior standing. (Even Falls)

EARTHSCI 3340/5340 (870:165g). Oceanography — 3 hrs.
Basic principles of geological, biological, chemical, and physical oceanography; emphasis on marine geology. Physiographic features of ocean basins, coastal features and processes, oceanic sediments, biological and geological resources, and ocean management. Discussion, 3 periods. Prerequisite(s): EARTHSCI 1300 (870:031) or equivalent; junior standing. (Even Springs)

EARTHSCI 3345/5345 (870:171g). Environmental Geology — 3 hrs.
Recognition and remediation of natural and human induced geologic hazards. Analysis of issues or problems of local concern where possible. Discussion, 2 periods; lab and field trips, 2 periods. Prerequisite(s): EARTHSCI 1300 (870:031) or equivalent; junior standing. (Odd Falls)

EARTHSCI 3350/5350 (870:173g). Environmental Hydrology — 3 hrs.
Introduction to environmental aspects of watershed hydrology. Surface water hydrologic processes, pollution of surface water resources, surface water - ground water interactions, unsaturated zone hydrologic processes, movement of chemicals in soils, site characterization, and soil remediation techniques. Discussion, 3 periods. Prerequisite(s): EARTHSCI 1300 (870:031); junior standing. (Even Springs)
EARTHSCI 3355/5355 (870:175g). Hydrogeology — 3 hrs.
Principles and applications of hydrogeology including study of runoff, stream flow, soil moisture, and ground water flow. Examination and analysis of ground water flow to wells, regional ground water flow, geology of ground water occurrence, water chemistry of ground water, water quality and ground water contamination, ground water development and management, field methods, and ground water models. Discussion, 3 periods. Prerequisite(s): EARTHSCI 1300 (870:031); junior standing. (Odd Springs)

EARTHSCI 3360/5360. Field and Laboratory Methods in Hydrology — 3 hrs.
Methods of data collection, laboratory procedures and error analysis associated with water in the geo-hydrologic systems. Develop skills in using hydrologic equipment, including ion chromatograph, spectrophotometers, water monitoring sondes, and well purging systems. Field trips; Discussion/lab, 4 periods. Prerequisite(s): junior standing. (Odd Falls)

EARTHSCI 3400/5400 (870:113g). Topics in Earth Science — 1-3 hrs.
Offered both on- and off-campus in flexible format. May include plate tectonics, geomagnetism, naked-eye astronomy, telescope usage, weather forecasting, or other topics of current interest. Topics listed in Schedule of Classes. May be repeated on different topic. Application to major requires consent of department head. Prerequisite(s): junior standing. (Fall, Spring, Summer)

EARTHSCI 3410/5410 (870:137g). Field Studies in ____________ — 1-4 hrs.
Field studies in various areas of Earth Science including geology, oceanography, paleontology, meteorology, and astronomy. To be preceded by seminars on the proposed study area. Student collection of data in the field and reports on their findings. May be repeated in different study area. Only 4 hours may be applied to the Earth Science minor. Prerequisite(s) or corequisite(s): an EARTHSCI 3000/4000-level (870:1xx) course appropriate to the specific field studies and approved by department head; junior standing; consent of instructor. (Variable)

EARTHSCI 3420/5420 (870:189g). Readings in Earth Science — 1-3 hrs.
Maximum of 3 hours may be applied to earth science or geology majors or minors. Prerequisite(s): junior standing; consent of instructor and department head. (Variable)

Supervised work experience in approved work situation. Offered on credit/no credit basis only. Prerequisite(s): consent of department head. (Fall, Spring, Summer)

Introduction to significant concepts and theories of earth science and a model of effective teaching strategies related to elementary school level. Topics include geologic materials and processes acting on them and fundamentals of earth history, weather, and astronomy. Discussion and/or lab, 5 periods plus arranged. Prerequisite(s): SCI ED 1100 (820:033). (Spring)

Research activities under direct supervision of Earth Science faculty member. Credit to be determined at registration. May be repeated for maximum of 6 hours. Prerequisite(s): consent of instructor and department head. (Fall, Spring, Summer)