

Introductory courses in earth sciences, including half-term mini courses, and 300-level courses that do not require prereqs. All these courses satisfy the Natural Science requirement for LSA undergrads.

Half-term Mini Courses

GEOSCI	100	Coral Reefs	Coral Reefs is an in-depth tour of the biological and physical processes active in modern reef systems to provide a detailed understanding of the ecology of the individual organisms and the complex nature of their interactions within the reef community. Evolution of the reef community is examined, ranging from the crude framework structures formed over one billion years ago by primitive algae to luxuriant and diversified reefs of the modern-day oceans. The implications of man's intervention in the Earth's hydrosphere and atmosphere on the character of future reef communities are also considered.	1 credit
GEOSCI	102	Energy from the Earth	The nature, mode of occurrence, and the technology of exploration and exploitation of energy resources, and their relevance to the present and future world energy needs. Special attention is given to oil, gas, oil shale, tar sands, coal, uranium, and geothermal resources.	1 credit
GEOSCI	103	Dinosaurs and Other Failures	Broad features of the evolutionary history of dinosaurs, methods of reconstructing dinosaur behavior and ecology, new developments in our interpretation of the biology of dinosaurs, and possible causes for the extinction of dinosaurs.	1 credit
GEOSCI	104	Ice Ages, Past and Future	Effects of past glaciations on the landscape and on life, and on man in particular. Speculation on the causes of the ice ages that have dominated the Earth for the past million years and predictions of future ice ages, based on current geological research, are examined.	1 credit
GEOSCI	105	Continents Adrift	The seemingly stable land masses of the world are in motion. Continental collision and fragmentation are only a few of the attendant processes associated with these motions. This course deals with the modern concept of plate tectonics and continental drift, the processes, and the products of this dynamic system.	1 credit
GEOSCI	106	Fossils, Primates, and Human Evolution	Anatomical and behavioral characteristics of living primates are reviewed, and the fossil record is used to document the course of human evolution through the past 60 million years. Students will understand how a paleontologist approaches primate and human history through geological time.	1 credit
GEOSCI	107	Volcanoes and Earthquakes	The earth in action; geography of earthquakes and volcanoes and catastrophic events in historic times; size and frequency of occurrence of earthquakes and volcanic eruptions; the products of volcanism, volcanic rocks, and volcanic and geologic activity through geologic time; volcanic exhalations and the evolution of the earth's atmosphere and oceans; the relationship of earthquakes and volcanoes to plate tectonics and the internal dynamics of the earth; and volcanism and geothermal energy, man-made earthquakes, and earthquake prediction and control.	1 credit
GEOSCI	108	When Earth Attacks: The Science Behind Natural Disasters	Natural disasters, such as earthquakes, volcanic eruptions, tsunamis, landslides, floods, hurricanes, and tornados, can lead to thousands of fatalities and billions of dollars in economic damage. This course explores the science behind natural disasters, concentrating on our ability, or inability, to predict them, and how this affects public perception and policy. The course also addresses how natural disasters can lead to changes in both science and public policy.	1 credit

GEOSCI 109	Water and Society	An overview of problems encountered through the unwise use of water resources and the resultant impact on society through the analysis of case studies. An introduction to the hydrological cycle and principles of surface and groundwater hydrology will be provided.	1 credit
GEOSCI 110	History of the Oceans	The history of past oceanic life, events, and environments as recorded in seafloor sediments is examined and discussed.	1 credit
GEOSCI 111	Climate and Mankind	Weather and climate factors, specifically how climate affects humans and how humans affect climate.	1 credit
GEOSCI 113	Planets and Moons	A current survey of the geology of the solar system in light of the extraordinary advances in planetary exploration during the past decade. Historical development of geological ideas about the solar system, including processes on earth and those of other bodies in the solar system.	1 credit
GEOSCI 114	Global Warming	Review of the geological evidence for global warming including geochemistry of natural and anthropogenic greenhouse gases, global radiation balance, sediment and ice core records, and ancient hot climates with discussion of possible remediation methods and their economic and political context.	1 credit
GEOSCI 115	Earth and Life Through Time	General survey of geologic time, its measurement, dimensions and implications for rates of geological change. A review of the geological history of the earth and the solar system to provide a framework for discussions of the evolution of life and development of the continents through time.	1 credit

Introductory Courses

GEOSCI 116	Introductory Geology in the Field (offered Summer half-term at Camp Davis, Jackson, Wyoming)	An introduction to geology in the field, this course is the equivalent of GEOSCI/ENVIRON 119/118 but is taught at Camp Davis, the University's Rocky Mountain Field Station near Jackson, Wyoming. Principles and processes involved in the evolution of the earth are stressed. The course includes rigorous laboratory exercises in which students study minerals, rocks, fossils and structures in their natural settings. Lectures are given both in camp and in the field, but much time is spent outdoors in the nearby Teton, Hoback, Gros Ventre, and Snake River Ranges. Other trips of special significance include the Wind River Range, Craters of the Moon, and Yellowstone Park.	5 credits
GEOSCI 119	Introductory Geology Lectures & Discussion	A basic single-term course in introductory geology concentrating on the evolution of the Earth in physical and chemical terms. Reference to the interaction of the external biosphere—atmosphere—hydrosphere with the earth's interior is an essential component of the course. Topics covered include: plate tectonics: continental collision and fragmentation; tsunamis, earthquakes and volcanoes; evolution and extinction: dinosaurs and the fossil record; glaciers, global warming and climate change; geologic time.	4 credits
GEOSCI 118	Introductory Geology Laboratory	A one-term laboratory course covering the laboratory portion of Introduction to Geology. The laboratory provides hands-on experience with minerals, rocks, and maps. Participants will learn to identify common minerals and rocks, use topographic and geologic maps, and draw and interpret geologic cross sections. Examples will be drawn from areas of recent glaciation, volcanism, and earthquakes to show how these features are depicted in maps. One two-hour lab each week.	1 credits

GEOSCI	222	Introductory Oceanography	The oceans of earth, their circulation, biology, chemistry, geology of the sea floor, and marine resources. Emphasis is on understanding the oceans as a single ecosystem.	3 credits
GEOSCI	223	Introductory Oceanography, Laboratory	Laboratory course to be elected concurrently with Geology 222/Environ 232. One two-hour lab each week.	1 credits
GEOSCI	120	Geology of National Parks and Monuments	This course approaches Earth history by examining the geology of places rather than by taking a process approach. Lecture material deals with the geologic history of selected national parks and monuments, which are chosen and scheduled so that those in which the oldest rocks are exposed (thus relating to the earliest portions of Earth history) are covered first. In so doing, we cover Earth history in a temporal progression, but do so by discussing different geographic areas. The demonstration-laboratory portion of the course will give you first-hand experience with rocks, minerals, and fossils; and an opportunity to discuss these in small groups. Three hours of lecture and one two-hour lab per week.	4 credits

Focused Introductory Courses

GEOSCI	125	Evolution and Extinction	This course examines the concepts of evolution and extinction, stressing the role that the fossil record has played in their development. The broad patterns in the history of life are presented starting with earliest evidence of life on earth. Basic geological principles necessary for reconstructing earth history are introduced. Readings are drawn from a variety of sources, including primary scientific literature.	3 credits
GEOSCI	130	The Physical World	The physics, chemistry, and pre-calculus (algebraic) concepts of comprehensive Earth and planetary science will be covered for those students who feel less than fully prepared for existing college-level science classes. This course is aimed at students in need of a science course, particularly those who will not readily select more than one physical science course as undergraduates at UM.	4 credits
GEOSCI	175	The Microbial World: How Unseen Organisms Shape Our Planet	This course examines how microorganisms shape the world around us, both throughout the Earth's history and today. Major topics include the origin and evolution of life, the interplay between microbes and the environment, roles of microbes in global warming, and applications of microbiology in biotechnology and energy.	4 credits
GEOSCI	201	Introduction to Physical Geography: The Earth System	This introduction to physical geography emphasizes the nature and dynamics of the Earth system including the atmosphere, hydrosphere, and solid Earth, and their interactions. Topics include seasons, heat balance, global warming, ozone destruction and circulation, moisture, precipitation, clouds, groundwater, ocean circulation, waves and tides, plate tectonics, landform evolution and soil development, the biosphere, climate evolution, and global change.	4 credits
GEOSCI	205	How the Earth Works: The Dynamic Planet	An integrated look at the dynamic Earth, with an emphasis on processes involved in its formation 4.56 billion years ago, the early development of its atmosphere, oceans and crust, and the subsequent evolution of its continents and ocean basins.	2 credits

GEOSCI 206	How the Earth Works: The Water Cycle and Environment	This course describes behavior of Earth materials in the surficial environment. Water is the main transport agent in the geological cycle; its unique properties and exchange rates among oceans, lakes, rivers, and groundwater are one focus. Interaction between water reservoirs and physical and chemical weathering of soils, sediments, and rocks also are discussed. Impact of humans on the surficial environment is a unifying theme because we can affect hydrologic and geochemical cycles.	2 credits
GEOSCI 210	Scientific Discovery in Earth Sciences: A Research Experience	This course allows students to participate in scientific discovery by collecting and analyzing data, testing hypotheses, reaching potential conclusions, and writing the prototype of a scientific paper within a research topic of their interest (e.g., study of helium in the crust, lakes in Antarctica, reconstruction of past climate).	3 credits
GEOSCI 284	Environmental Geology	This course examines the interactions between today's human society and our dynamic planet. It begins with geologic materials and processes, and goes on to specific topics that include soils, ground water, natural hazards (volcanism, landslides, earthquakes, floods), land surface and sea level, coasts, deserts, pollution and global warming, energy resources and waste.	4 credits
300-level Courses for non-majors:			
GEOSCI 311	Geology of Michigan (offered Spring half-term)	Basic principles of geology are outlined in the course and used to explore the 4 billion years of geologic evolution of the Upper Great Lakes region by way of lectures and interpretation of geologic maps. This course is suitable for students with a limited background in science and geology.	3 credits
GEOSCI 331	Climate and Climate Change	This course examines the physical and chemical processes influencing Earth's climate, and methods for quantifying past and present climate change. Emphasis will be placed on understanding the mechanisms of climate change from ice ages through the near future. The evidence of human-caused changes in climate will also be discussed. Students with interests in global change and the environment are encouraged to enroll. A background in college science is not required.	4 credits
GEOSCI 341	Ecosystem Science in the Rockies (offered Summer half-term at Camp Davis, Jackson, Wyoming)	This is a 4-week course taught at Camp Davis, WY using the Rocky Mountains as a field laboratory to gain field-based knowledge and experience while developing an understanding of geological and meteorological processes and the distribution and function of grasslands, forests, and alpine ecosystems of the region. This course is designed for majors in geological and environmental sciences, natural resources and other students who have a general interest in this subject matter.	5 credits
GEOSCI 344	Sustainable and Fossil Energy: Options and Consequences (offered Summer half-term at Camp Davis, Jackson, Wyoming)	This course taught at Camp Davis, WY introduces students to concepts and environmental consequences of sustainable and fossil energy sources. Students conduct hands-on experiments using alternate energy systems at Camp Davis. In addition, the class travels throughout Wyoming and Idaho visiting and investigating facilities important for power generation.	3 credits

GEOSCI 380	Mineral Resources, Economics, and the Environment	This course deals with mineral resource-related problems in a complex society. The course discusses the origin, distribution, and remaining supplies of oil, coal, uranium, copper, gold, diamonds, potash, sulfur, gravel, water, soil, and other important mineral resources in terms of the economic, engineering, political, and environmental factors that govern their recovery, processing, and use. Topics discussed include ore-forming processes, mineral exploration methods, mineral land access, strip mining, nuclear power, recycling, smelting methods, money and gold, mercury poisoning, and taxation vs. corporate profit.	4 credits ULWR
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