

EARTH AND ATMOSPHERIC SCIENCES (EAS)

EAS 1600. Introduction to Environmental Science. 4 Credit Hours.
Introduction to environmental field science. Case study approach. Exposure to basic field equipment and techniques, analysis of data.

EAS 1601. Habitable Planet. 4 Credit Hours.
Introduction to the origin and evolution of Planet Earth, creation of the universe and the elements, early history of Earth, radioisotope geochemistry and the timing of events in the universe, the galaxy, and on Earth. Formation of the atmosphere and oceans. Climate.

EAS 1XXX. Earth and Atmospheric Sciences Elective. 1-21 Credit Hours.

EAS 2420. Environmental Measures of Urban and Regional Change. 3 Credit Hours.

Identify and quantify nature's physical and chemical contributions to human-made urban environments, and measure the impacts of urban area feedback on these natural systems.

EAS 2551. Introduction to Meteorological Analysis. 1 Credit Hour.

An introduction to analysis of forecasting data and model output.

EAS 2600. Earth Processes. 4 Credit Hours.

An introduction to earth materials and processes.

EAS 2602. Earth Through Time. 3 Credit Hours.

Dynamic processes affecting the Earth system on all time scales.

EAS 2655. Quantitative Techniques in Earth and Atmospheric Sciences. 3 Credit Hours.

Integrated course in mathematical, physical, and computing techniques for applications in earth and atmospheric sciences.

EAS 2694. Internship Assistantship. 1-21 Credit Hours.

Earth & Atmospheric Sciences Undergraduate Internship for pay for freshmen and sophomores, by permit only. The internship experience must be at a unit or agency approved by the School of Earth & Atmospheric Sciences.

EAS 2695. Undergraduate Internship. 1-21 Credit Hours.

Earth & Atmospheric Sciences Undergraduate Internship for credit for freshmen and sophomores, by permit only. The internship experience must be at a unit or agency approved by the School of Earth & Atmospheric Sciences.

EAS 2698. Research Assistantship. 1-12 Credit Hours.

EAS 2699. Undergraduate Research. 1-12 Credit Hours.

Independent research conducted under the guidance of a faculty member.

EAS 2750. Physics of the Weather. 3 Credit Hours.

An introductory treatment of the application of the basic physical laws to the understanding of weather phenomena. Crosslisted with PHYS 2750.

EAS 2801. Special Topics. 1 Credit Hour.

EAS 2802. Special Topics. 2 Credit Hours.

EAS 2803. Special Topics. 3 Credit Hours.

EAS 2804. Special Topics. 4 Credit Hours.

EAS 2900. Special Problems. 1-21 Credit Hours.

EAS 2XXX. Earth and Atmospheric Sciences Elective. 1-21 Credit Hours.

EAS 3110. Energy, Environment, and Society. 3 Credit Hours.

This course analyzes the path towards alternative energy infrastructures for the 21st century with careful consideration of economic, environmental, technological, and political factors.

EAS 3603. Thermodynamics of Earth Systems. 3 Credit Hours.

Introduction to the principles of equilibrium thermodynamics and physical chemistry with applications to the atmosphere, ocean, and solid earth.

EAS 3610. Introduction to Geophysics. 3 Credit Hours.

An introduction to visualizing and understanding earth history, structure, and dynamics through geophysical methods including seismology, gravity, magnetism, heat flow, geochronology, and geodesy.

EAS 3620. Geochemistry. 4 Credit Hours.

A quantitative treatment of geochemical processes in the Earth and natural waters, with emphasis on chemical reactions among atmospheric gases, minerals, and aqueous solutions.

EAS 3803. Special Topics. 3 Credit Hours.

EAS 3XXX. Earth and Atmospheric Sciences Elective. 1-21 Credit Hours.

EAS 4110. Resources, Energy and the Environment. 3 Credit Hours.

Learn about the science behind the nature, occurrence and extraction of earth resources used by humans and the environmental impacts of that use.

EAS 4200. Structural Geology and Continuum Mechanics. 4 Credit Hours.

Structural geology and continuum mechanics for scientists and civil engineers. Stress and strain in rocks; faults, joints, and folds; basic field mapping; laboratory exercises.

EAS 4205. Geomorphology. 4 Credit Hours.

Overview of the mechanical, chemical, and biological processes that shape topography.

EAS 4220. Environmental Geochemistry. 3 Credit Hours.

An exploration of the chemical, biological, and geological processes controlling the distribution of chemical nutrients and pollutants in aquatic and soil environments.

EAS 4221. Environmental Geochemistry Lab. 1 Credit Hour.

Lab and field exploration of the chemical, biological, and geological processes controlling the distribution of chemical nutrients and pollutants in aquatic and soil environments.

EAS 4224. Mineral Surface Geochemistry. 3 Credit Hours.

Fundamental principles concerning mineral surface properties, element distribution at the mineral-water interface and analytical techniques relevant to interfacial reactions.

EAS 4300. Introduction to Physical and Chemical Oceanography. 3 Credit Hours.

Chemistry and physics of the ocean. Distributions of temperature, salinity, and density. Equations of state and motion. Surface and deep-water circulation. Waves and tides. Composition of seawater: dissolved salts, gases, and nutrients. Biological processes. Marine sediments.

EAS 4305. Physical and Chemical Oceanography. 3 Credit Hours.

Study of the dynamics of large-scale ocean circulation, air-sea interaction and their roles in biogeochemical cycling of carbon and nutrients.

EAS 4312. Geodynamics. 3 Credit Hours.

Quantitative discussion of dynamic processes in the solid Earth; lithospheric dynamics, continuum mechanics, lithospheric flexure and elasticity, heat transfer, viscous rheology, fluid mechanics, and earthquake dynamics. Credit not allowed for both EAS 4312 and EAS 6312.

EAS 4313. Tectonics, Climate, and Landscape Evolution. 3 Credit Hours.

Introduction to the interactions and feedbacks between tectonics and climate that act to shape landscapes. Includes field- and computer-based data collection and analysis. Credit not allowed for both EAS 4313 and EAS 6313.

EAS 4314. Seismology. 3 Credit Hours.

Introduction to elastic wave propagation, and studies of the solid Earth's interior and earthquake source from seismic waves. Credit not allowed for both EAS 4314 and EAS 6314.

EAS 4315. Geofluids. 3 Credit Hours.

This course focuses on the fundamental concepts of fluid dynamics merged with geophysical applications.

EAS 4316. Earthquake Physics. 3 Credit Hours.

Fundamental physics of processes that control fault slips and earthquakes with a focus on the latest emerging research topics in the field.

EAS 4331. Physical Volcanology. 3 Credit Hours.

This class examines the dynamics and thermodynamics of planetary volcanism. The course material covers the generation and transport of magma in the mantle and crust, and the fluid dynamics of eruptions and their impact on the landscape and atmosphere. Credit not allowed for both EAS 4331 and EAS 6331.

EAS 4350. Paleoclimatology and Paleoceanography. 3 Credit Hours.

This course will explore the history of the Earth's climate, covering methods for reconstructing past climate and the mechanisms behind these climate changes.

EAS 4360. Space Physics and Space Instrumentation. 3 Credit Hours.

This course will explore the interaction of the solar wind with the Earth's magnetosphere using a combination spacecraft observations and fundamental plasma physics. Credit not allowed for both EAS 4360 and EAS 6360.

EAS 4370. Physics of Planets. 3 Credit Hours.

In this course we will study the forces and influences that determine the composition, structure and evolution of the planets in our solar system.

EAS 4375. Earth and Planetary Materials. 3 Credit Hours.

Fundamental principles and applications of mineralogy and petrology for understanding the composition of surface and subsurface materials on Earth and other planetary bodies.

EAS 4380. Land Remote Sensing. 3 Credit Hours.

Techniques for making remote measurements of the composition, morphology, and thermophysical properties of solid surfaces on Earth and other planetary bodies.

EAS 4410. Climate and Global Change. 3 Credit Hours.

The physics behind the climate and its potential changes, as well as an introduction to the policy issues in global change.

EAS 4420. Environmental Field Methods. 4 Credit Hours.

Semester-long focus on single environmental project in the local area. Chemical and physical techniques for parameterizing environmental problems, data analysis, report writing, and interpretation of results in societal context.

EAS 4430. Remote Sensing and Data Analysis. 3 Credit Hours.

Introduction to the remote sensing of the atmosphere and the Earth. Laboratory examples of data and image analysis for remote sensing applications.

EAS 4450. Synoptic Meteorology. 3 Credit Hours.

A description of physical and mathematical procedures used in weather forecasting. Students will practice forecasting.

EAS 4460. Satellite and Radar Meteorology. 3 Credit Hours.

Interpretation of satellite and radar data for meteorological forecasting based on understanding radiative transfer and the resulting strengths and limitations of the imagery.

EAS 4470. Large-scale Atmospheric Circulations. 3 Credit Hours.

Structure and dynamics of phenomena including weather regimes, storm tracks, El Nino-Southern Oscillations, teleconnections, monsoons, Arctic Oscillation, stratospheric polar vortex, and stratosphere-troposphere coupling.

EAS 4480. Environmental Data Analysis. 3 Credit Hours.

Data Analysis methods used in environmental research are taught through examples. Students learn to implement these methods to areas of their own interests.

EAS 4510. Exploration Geophysics. 4 Credit Hours.

Methods of exploration geophysics, including refraction and reflection seismology, resistivity, gravity, magnetics, and ground penetrating radar. Includes laboratory work and introduction to operation of field equipment.

EAS 4515. Fluids in the Earth's Crust I. 3 Credit Hours.

Fundamentals of porosity and permeability in soils, sediments, and crystalline rocks; basic physics of fluid flow through interconnected pore spaces and cracks; introductory analysis of fluid flow as an agent of heat and chemical transport in geological systems.

EAS 4520. Seismic Methods in Exploration Geophysics. 3 Credit Hours.

A study of seismic reflection exploration methods and theory. Examples are taken from oil industry exploration and production and near-surface environmental imaging.

EAS 4525. Weather Risk and Catastrophe Modeling. 3 Credit Hours.

Overview of the physics and dynamics behind different types of hazardous weather and the mathematical tools to model the risks associated with these events.

EAS 4602. Biogeochemical Cycles. 3 Credit Hours.

An investigation of global change focusing on the chemical, physical, geological, and biological processes that cycle the elements through the Earth system.

EAS 4610. Earth System Modeling. 3 Credit Hours.

An introduction to computer modeling in Earth system science.

EAS 4625. Water Quality Modeling. 3 Credit Hours.

Gain hands-on experience using geochemical software and understanding governing geochemical principles pertaining to transformation of contaminants and other subsurface species through case studies.

EAS 4630. Physics of the Earth. 3 Credit Hours.

Introduction to methods and observational data used to determine solid Earth structure and to understand the dynamical processes driving surface deformation and plate tectonics.

EAS 4641. Atmospheric Chem Lab. 1 Credit Hour.

A hands-on laboratory course in which students will learn basic concepts and techniques used by atmospheric chemists including analysis, data quality and experimental design.

EAS 4651. Practical Internship. 3 Credit Hours.

Faculty-supervised and approved independent internship, employment, or research project related to earth and atmospheric sciences.

EAS 4655. Atmospheric Dynamics. 3 Credit Hours.

An introduction to the atmospheric physical and dynamic processes that control weather and climate.

EAS 4656. Atmospheric Dynamics Practicum. 1 Credit Hour.

Students learn to apply meteorological analysis tools to atmospheric observations to interpret the structure and dynamics of historical and real-time weather events.

EAS 4670. Atmospheric Dynamics II. 3 Credit Hours.

This course emphasizes physical concepts and analytic techniques for solving problems in atmospheric instabilities and wave dynamics at various temporal and spatial scales.

EAS 4694. Internship Assistantship. 1-21 Credit Hours.

Earth & Atmospheric Sciences Undergraduate Internship for pay for junior and seniors, by permit only. The internship experience must be at a unit or agency approved by the School of Earth & Atmospheric Sciences.

EAS 4695. Undergraduate Internship. 1-21 Credit Hours.

Earth & Atmospheric Sciences Undergraduate Internship for credit for juniors and seniors, by permit only. The internship experience must be at a unit or agency approved by the School of Earth & Atmospheric Sciences.

EAS 4698. Undergraduate Research Assistantship. 1-12 Credit Hours.

Independent research conducted under the guidance of a faculty member.

EAS 4699. Undergraduate Research. 1-12 Credit Hours.

Independent research conducted under the guidance of a faculty member.

EAS 4740. Atmospheric Chemistry Laboratory. 3 Credit Hours.

This course provides a general chemical description of the Earth's atmospheric system with a major focus on the two lowest layers of the atmosphere, i.e., the troposphere and the stratosphere. Crosslisted with CHEM 4740.

EAS 4795. Groundwater Hydrology. 3 Credit Hours.

Dynamics of flow and solute transport in groundwater, including theory, implementation, and case studies. Crosslisted with CEE 4795.

EAS 4801. Special Topics. 1 Credit Hour.**EAS 4802. Special Topics. 2 Credit Hours.****EAS 4803. Special Topics. 3 Credit Hours.****EAS 4804. Special Topics. 4 Credit Hours.****EAS 4813. Special Topics. 3 Credit Hours.**

Special Topics in Earth and Atmospheric Sciences.

EAS 4814. Special Topics-Lab. 4 Credit Hours.**EAS 4821. Special Topics. 1 Credit Hour.**

Special Topics in EAS (1-credit hour supervised lab).

EAS 4900. Special Problems. 1-21 Credit Hours.**EAS 4XXX. Earth and Atmospheric Sciences Elective. 1-21 Credit Hours.**