SCHOOL OF EARTH AND ATMOSPHERIC SCIENCES

Established in 1970

The School of Earth and Atmospheric Sciences (EAS) is an interdisciplinary program that studies Earth's physical and chemical environment. EAS takes an integrated Earth system science approach in which all components of Earth's system are studied and analyzed as parts of the larger coupled system. The curriculum is designed to provide its graduates with the intellectual insights needed to understand the evolution of Earth's environment and its possible future changes. This integrated approach provides the context for professional training in environmental science and meteorology, as well as specialization for research careers in atmospheric chemistry, aerosols, and clouds; dynamics of weather and climate; geochemistry; geophysics; oceanography; paleoclimate; planetary science; and remote sensing.

Minor

- Minor in Earth and Atmospheric Sciences

Bachelor's Degrees

- Bachelor of Science in Earth and Atmospheric Sciences

Master's Degree

- Master of Science in Earth and Atmospheric Sciences

Doctoral Degrees

- Doctor of Philosophy with a Major in Earth and Atmospheric Sciences
- Doctor of Philosophy with a Major in Ocean Science and Engineering
- Doctor of Philosophy with a Major in Quantitative Biosciences

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 moel 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 equilinrium 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 sales, 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 processs 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.

EAS 6000. Intro Research & Ethics. 1 Credit Hour.
Identify and discuss ethical challenges that will be confronted in research, and give an overview of the research areas of the faculty in EAS.

EAS 6053. Preparing Future Faculty. 1 Credit Hour.
A guide to a career in academia for scientists. Learn about getting a faculty position, establishing a successful research.

EAS 6111. The Earth System. 2 Credit Hours.
Exploration of processes linking the Earth and atmosphere.

EAS 6120. Environmental Field Methods. 4 Credit Hours.
Environmental site characterization through a field-based project that advances student's research. Theory, field data acquisition, and data fusion using geochemical, geophysical, hydrologic, and related methods.

EAS 6121. Modeling and Computer Programming for Geosciences. 3 Credit Hours.
This course gives students first-hand experience on the development process of problem solving in Earth and Atmospheric Sciences from mathematically describing a problem to solving it by parallel programming on a high performance computer.

EAS 6122. Biogeochemical Cycles. 3 Credit Hours.
A multidisciplinary exploration of the chemical, physical, geological, and biological processes that cycle the nutrient elements through the Earth system and thereby maintain a habitable planet.

EAS 6124. Principles of Oceanography. 3 Credit Hours.
Chemistry and physics of the ocean. Distributions of temperatures, 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 6125. 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 6128. Fluids in the Earth's Crust. 3 Credit Hours.
Advanced treatment of fluid flow, heat transfer, and reactive transport in porous and cracked rocks; stability of flow; double-diffusive systems; evolution of permeability in geologic systems; introduction to multiphase flow.

EAS 6130. Earth System Modeling. 3 Credit Hours.
An introduction to computer modeling in earth system science.

EAS 6131. Ocean Modeling. 3 Credit Hours.
Developing and using ocean models from the simple shallow water to the full primitive equation model. Includes hands-on programming.

EAS 6132. Introduction to Climate Change. 3 Credit Hours.
The climate of the Earth, its radiation budget, greenhouse gases and their sources and sinks, potential changes due to anthropogenic activities, detection of climate changes.

EAS 6133. Marine Ecosystem Modeling. 3 Credit Hours.
Modeling population dynamics in the context of ocean circulation. Numerical techniques and simulation development.

EAS 6134. Inverse Methods and Time Series Analysis in Earth and Atmospheric Sciences. 3 Credit Hours.
Theory of data acquisition, time series analysis, and discrete inverse theory, with applications in the earth and atmospheric sciences.

EAS 6135. Introduction to Complex Environmental Systems. 3 Credit Hours.
Introduction to the concepts of environmental complexity through the inter-relationships between natural, human, and built systems.

EAS 6136. 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 6140. Thermodynamics of Atmospheres and Oceans. 3 Credit Hours.
The instabilities and flows created by exchanges of heat.

EAS 6142. Atmospheric Radiative Tranfser. 3 Credit Hours.
Fundamentals of the interaction of electromagnetic radiation with atmospheric constituents, including absorption and scattering processes by the atmospheric gases, aerosols, and clouds.

EAS 6145. Remote Sensing of the Atmosphere and Oceans. 3 Credit Hours.
Provides a foundation for understanding the physical principles of remote sensing and its applications to the study of atmospheric gases, clouds, and ocean surfaces.

EAS 6155. Advanced Geophysical Fluid Dynamics. 3 Credit Hours.
Fundamental mathematical tools for graduate students interested in Geophysical Fluid Dynamics (GFD) and related disciplines.

EAS 6200. 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 6201. 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 6211. Geochemical Thermodynamics. 3 Credit Hours.
Fundamental principles of chemical equilibria in geochemical systems with emphasis on solution properties and mineral water equilibria.

EAS 6212. Geochemical Kinetics. 3 Credit Hours.
Fundamental principles of biogeochemical kinetics and mathematical treatment of coupled transport and reaction in natural environments. Interpretation of field and experimental data using kinetic theory.

EAS 6214. Aqueous Geochemistry. 3 Credit Hours.
Chemical processes that regulate compositions of natural waters at or near the Earth's surface, with emphasis on quantitative calculations of acid-base, solubility, and redox equilibria.

EAS 6216. Isotope Geochemistry. 3 Credit Hours.
Biogeochemical significance of nuclear isotopes, both radioactive and stable.

EAS 6224. 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 6240. Organic Geochemistry. 3 Credit Hours.
Origin and transformation of organic matter in the Earth's environments, with emphasis on properties and reactions of highly complex mixtures such as humic substances.

EAS 6305. 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 6311. Physics of the Earth. 3 Credit Hours.
Physics of the Earth's interior. Composition and structure of core, mantle, crust. Introduction to seismic wave propagation, gravitational, geomagnetic, and temperature fields.

EAS 6312. Geodynamics. 3 Credit Hours.
Quantitative discussion of dynamical processes in the solid Earth; viscous flow, glacial rebound, fluid dynamical instabilities, thermal convection; lithospheric dynamics; evolution of the core.

EAS 6313. 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 6313 and EAS 4313.

EAS 6314. Seismology. 3 Credit Hours.
The propagation of seismic waves, the description of earthquake motion, and evaluation of earthquake damage. Examples provide experience in the interpretation of seismic data.

EAS 6315. Geofluids. 3 Credit Hours.
This course focuses on the fundamental concepts of fluid dynamics merged with geophysical applications.

EAS 6316. 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 6320. 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 6325. Geomorphology. 4 Credit Hours.
Overview of the mechanical, chemical, and biological processes that shape the topography.

EAS 6331. 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 6331 and EAS 4331.

EAS 6333. Field Methods in Volcanic Terrain. 3 Credit Hours.
A field based course to connect process-based models and field observations related to volcanic, eruptions, subsurface magma interaction, and crustal heat flow and tectonics.

EAS 6360. Space Physics and Space Instrumentation. 3 Credit Hours.
This course will explore the interaction of the solar wind with the Earth's magnestophere using a combination spacecraft observation and fundamental plasma physics. Credit not allowed for both EAS 6360 and EAS 4360.

EAS 6370. Physics of Planets. 3 Credit Hours.
In this course we will study the forces and influences that determine the compostition, structure, and evolution of the planets of our solar system.

EAS 6375. Earth and Planetary Materials. 3 Credit Hours.
Fundamental principles and application of mineralogy and petrology for understanding the composition of surface and subsurface materials on Earth and other planetary bodies.

EAS 6380. 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 6401. Introduction to Atmospheric Chemistry. 2 Credit Hours.
Introduction to basic chemical principles related to chemical processes in the atmosphere.

EAS 6405. Introduction to Atmospheric and Aqueous Chemistry. 3 Credit Hours.
An introduction to the basics of atmospheric and aqueous chemistry for first semester graduate students. The class goes over photochemistry, thermodynamics, kinetics, redox systems, carbon chemistry, radioactive and stable isotopes, and gas/solid reactions.

EAS 6410. Atmospheric Chemistry. 3 Credit Hours.
Application of fundamental principles of chemistry to understanding the critical factors controlling the levels and distributions of atmospheric trace gases and their variation in time.

EAS 6412. Introduction to Physical Meteorology. 3 Credit Hours.
Application of the fundamental principles of thermodynamics to the atmosphere; including hydrostatic equilibrium and static stability, derivation of Claussius-Clapeyron Equation, cloud microphysics, radiative transfer, and the Earth's energy budget.

EAS 6420. Introduction to Principles of Atmospheric Chemical. 4 Credit Hours.
Introduction to the mechanical, electrical, and optical aspects of modern instrumentation used in atmospheric chemical research.

EAS 6430. Experimental Methods in Air Quality. 3 Credit Hours.
Presents experimental and field methods through a focus on measurements of atmospheric gases and particulates associated with poor air quality. Experiments will involve laboratory measurements and an air quality filed experiment on the order of one week duration.

EAS 6490. Advanced Environmental Data Analysis. 3 Credit Hours.
A unified view of the theories and applications underlying the statistical analysis of environmental data in the space, time and spectral domain.

EAS 6500. 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 6501. Introduction to Atmospheric Dynamics. 2 Credit Hours.
Introduction to the basic fundamental fluid dynamics that control atmospheric motions.

EAS 6502. Introductory Fluid Dynamics and Synoptic Meteorology. 3 Credit Hours.
Fundamental principles of atmospheric fluid dynamics, analysis of meteorological codes, weather data and patterns, and numerical weather prediction.

EAS 6512. Dynamic Meteorology. 3 Credit Hours.
An introduction to the use of geophysical fluid dynamics in describing and modeling the atmosphere.

EAS 6522. Dynamics of the Tropical Atmosphere and Oceans. 3 Credit Hours.
Explores the dynamics of the tropical atmosphere and ocean and how they interact to produce climatic features such as the monsoons, El Nino, and La Nina.

EAS 6525. Weather Risk and Modeling. 3 Credit Hours.
Overview of the physics and dynamics behind different types of hazardous weather and the mathematical tools to model the risks associate with these events.

EAS 6532. Large-scale Atmospheric Circulations. 3 Credit Hours.
Structure and dynamics of phenomena including weather regimes, storm tracks, El Nino-Southern Oscillation, teleconnections, monsoons, Artic Oscillation, stratospheric polar vortex, and stratosphere-troposphere coupling.

EAS 6670. Atmospheric Dyanmics 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 6672. Ocean Dynamics. 3 Credit Hours.
An advanced class on the ocean circulation as a dynamical system to understand the basic equations governing it, together with its variability.

EAS 6751. Physical Properties and Rheology of Rocks. 3 Credit Hours.
Structure, physical properties, and rheology of minerals and rocks with applications to engineering structures and natural phenomena in the Earth. Fundamentals of rock mechanics and crack propagation. Crosslisted with CEE 6751.

EAS 6761. Contaminated Sediment Geochemistry. 3 Credit Hours.
Acquaints students with fate of major pollutants, nutrients, organic compounds such as pesticides, PAH's, and trace metals in sedimentary systems. Crosslisted with CEE 6761.

EAS 6765. Geomicrobiology. 3 Credit Hours.
Interactions between microorganisms and the geosphere; microbial energetics and genetics; geochemical controls on microbial diversity and activity; redox and acid-base balances; biogeochemical cycles; evolution. Crosslisted with BIOL 6765.

EAS 6790. Air Pollution Physics and Chemistry. 3 Credit Hours.
Interaction to the physical and chemical processes affecting the dynamics and fate of air pollutants at the local, regional, and global scales. Particular emphasis is on tropospheric pollutant chemistry and transport. Crosslisted with CEE 6790.

EAS 6792. Air Pollution Meteorology and Chemistry. 3 Credit Hours.
Air pollution history, atmospheric stability and boundary layer dynamics, atmospheric dispersion, atmospheric transport, air pollution modeling. Crosslisted with CEE 6792.

EAS 6793. Atmospheric Boundary Layer. 3 Credit Hours.
Structure and dynamics of atmospheric boundary layers. Introduction to turbulence and turbulent transport. Crosslisted with CEE 6793.

EAS 6794. Atmospheric Chemical Modeling. 3 Credit Hours.
Application of modern numerical methods to the prediction of atmospheric chemical and physical compositions; specific applications using computer models developed by the students are included. Crosslisted with CEE 6794.

EAS 6795. Atmospheric Aerosols. 3 Credit Hours.
Chemical and physical properties of natural and anthropogenic aerosols. Sources, transport, transformation, and fate of primary/secondary, organic/inorganic, atmospheric semi-volatiles and aerosols. Crosslisted with CEE 6795.

EAS 6XXX. Earth and Atmospheric Sciences Elective. 1-21 Credit Hours.

EAS 7000. Master's Thesis. 1-21 Credit Hours.

EAS 7999. Preparation for Ph.D. Qualifying Exam. 1-21 Credit Hours.

EAS 8001. Seminar. 1 Credit Hour.
A forum for graduate students in earth and atmospheric sciences to present and discuss topics related to their research interests.

EAS 8011. Seminar. 1 Credit Hour.
A forum for graduate students in earth and atmospheric sciences to present and discuss topics related to their research interests.

EAS 8012. Seminar. 2 Credit Hours.
A forum for graduate students in earth and atmospheric sciences to present and discuss topics related to their research interests.

EAS 8013. Seminar. 3 Credit Hours.
A forum for graduate students in earth and atmospheric sciences to present and discuss topics related to their research interests.

EAS 8801. Special Topics. 1 Credit Hour.

EAS 8802. Special Topics. 2 Credit Hours.

EAS 8803. Special Topics. 3 Credit Hours.

EAS 8804. Special Topics. 4 Credit Hours.

EAS 8805. Special Topics. 5 Credit Hours.

EAS 8806. Special Topics. 6 Credit Hours.

EAS 8811. Special Topics. 1 Credit Hour.
Special Topics in EAS (1-credit hour supervised lab)

EAS 8813. Special Topics. 3 Credit Hours.
Special Topics in Earth and Atmospheric Sciences.

EAS 8821. Special Topics. 1 Credit Hour.
Special Topics in EAS (1-credit hour supervised lab).

EAS 8823. Special Topics with a Laboratory. 3 Credit Hours.

EAS 8824. Special Topics with a Laboratory. 4 Credit Hours.

EAS 8825. Special Topics with a Laboratory. 5 Credit Hours.

EAS 8826. Special Topics-Lab. 4 Credit Hours.

EAS 8901. Special Problems. 1-21 Credit Hours.

EAS 8902. Special Problems. 1-21 Credit Hours.

EAS 8903. Special Problems. 1-21 Credit Hours.

EAS 8904. Special Problems. 1-21 Credit Hours.

EAS 8997. Teaching Assistantship. 1-9 Credit Hours.

EAS 8998. Research Assistantship. 1-9 Credit Hours.

EAS 8999. Preparation for Doctoral Dissertation. 1-21 Credit Hours.

EAS 9000. Doctoral Thesis. 1-21 Credit Hours.