

Spring Even Course Offerings

Core Courses

ATMO 541B Dynamic Meteorology II

Description: Thermodynamics and its application to planetary atmospheres, hydrostatics, fundamental concepts and laws of dynamic meteorology. Graduate-level requirements include a more quantitative and thorough understanding of the subject matter.

Units: 3.00

Typically Offered: *Spring*

Cross listed: PTYS 541B

ATMO 551B Physical Meteorology II

Description: Introduction to atmospheric physics that includes the composition and chemistry of the atmosphere, kinetic theory, the mechanics of ideal and real fluids, aerosol mechanics, atmospheric acoustics, atmospheric radiation, scattering, radiative transfer, atmospheric optics, cloud physics, and atmospheric electricity. Graduate-level requirements include a more quantitative and thorough understanding of the subject matter.

Units: 3.00

Typically Offered: *Spring*

ATMO 596A Progress in Atmospheric Sciences* (Seminar)

Description: This is a seminar course that all graduate students are required to take each academic semester. The course consists of invited speakers that will overview progress in different sub-disciplines.

Units: 1.00

Typically Offered: *Fall, Spring*

*Students in the atmospheric sciences programs are required to register for a minimum of 2.00 units or 2 semesters.

Electives

ATMO 523 Hydrology

Description: Discussion and analysis of major topics of the hydrologic cycle and their interrelationship, such as rainfall, infiltration, evaporation, and runoff. Statistical and probabilistic methods in water supply and flood hydrology. Graduate-level requirements include a project paper.

Units: 3.00

Typically Offered: *Spring Even (2014, 2016, 2018)*

Home Department: Civil Engr & Egr Mechanics

Cross listed: CE 523, HWRS 523, ARL 523

ATMO 524 Hydroclimatology

Description: Precipitation formation processes, the surface and atmospheric branch of the hydrologic cycle, land surface-atmosphere interaction, surface energy balance, evapotranspiration, heat and moisture fluxes into the soil and atmospheric boundary layer.

Units: 3.00

Typically Offered: *Spring*

Home Department: Hydrology & Water Resources

Cross listed: HWRS 524

ATMO 536A Fundamentals of the Atmospheric Sciences

Description: Broadly covers fundamental topics in the atmospheric sciences. Topics include composition of the atmosphere, atmospheric thermodynamics, atmospheric chemistry, cloud physics, radiative transfer, atmospheric dynamics, and climate. Graduate-level requirements include additional questions on homework and exams plus a term paper on a specialized research topic.

Units: 3.00

Typically Offered: *Spring*

Cross listed: GEOG 536A, HWRS 536A, SWES 536A, PHYS 536A

ATMO 558 Mesoscale Meteorological Modeling

Description: This course provides an overview of mesoscale meteorological modeling, emphasizing limited area models. It is a modified version of a course originally developed by Professor Roger Pielke, Sr., and currently taught at the University of Colorado. The objective is to provide students a framework for understanding limited area models commonly used in the atmospheric science community, either as numerical weather prediction models or regional climate models. Topics include conservation equations of the atmosphere; methods of solution; boundary and initial conditions; coordinate systems; parameterization schemes; and model application and evaluation. Particular emphasis will be placed on the Weather Research and Forecasting (WRF) model, as this is used in the UA Department of Atmospheric Sciences.

Units: 3.00

Typically Offered: *Spring Even (2014, 2016, 2018)*

Cross listed: HWRS 558

ATMO 579 Boundary Layer Meteorology & Surface Processes

Description: Designed for students in the atmospheric sciences, hydrology and related fields. It provides a framework for understanding the basic physical processes that govern mass and heat transfer in the atmospheric boundary layer and the vegetated land surface. In addition to the theoretical part of the course, there is a strong focus on modeling and students will be required to program numerical codes to represent these physical processes.

Units: 3.00

Typically Offered: *Spring Even (2014, 2016, 2018)*

Cross listed: HWRS 579, SWES 579, WSM 579

Course Requisites: MATH 223, PHYS 141, PHYS 253

GEOG 530 The Climate System

Description: Systematic examination of processes and circulations comprising Earth's climate. Emphasis on circulations influencing geographic processes using examples of atmospheric environmental issues. Graduate-level requirements include the completion of a term paper.

Units: 3.00

Typically Offered: *Spring Even (2014, 2016, 2018)*

Home Department: Geography & Development

Cross listed: ARL 530, GC 530

GEOS 547 Global and Regional Climatology

Description: Description and analysis of the atmospheric circulation process that produces differences in climates throughout the world. Emphasis on the earth's problem climates and climatically sensitive zones most susceptible to floods, droughts, and other environmental stresses due to global change. Graduate-level requirements include an additional term paper.

Units: 3.00

Typically Offered: *Spring Even (2014, 2016, 2018)*

Home Department: Geography & Development

Cross listed: GEOG 547

PTYS 517 Atmospheres and Remote Sensing

Description: Structure, composition, and evolution of atmospheres; atomic and molecular spectroscopy; radiative transfer and spectral line formatting.

Units: 3.00

Typically Offered: *Spring Even (2014, 2016, 2018)*

Home Department: Planetary Sciences

WSM 502 Air and Water: Physics of Environmental Fluids

Description: Understanding the dynamics of air and water is fundamental for addressing important issues concerning environmental science, natural resources, and our watersheds. In this class we will develop a strong comprehension of the basic properties of air and water, critical to addressing almost any environmental issue. Additionally, we will discover differences between fluids at rest and in motion. This will help us become skilled at realizing what can be transported by air and water can transport and how it is transported. Graduate-level requirements include following an environmental problem by completing a scientific literature review on an instructor approved topic relating to air or water.

Units: 3.00

Typically Offered: *Spring*

Home Department: Watershed Management

WSM 696M Using MATLAB for Environmental Data Processing

Description: The processing and analysis of some scientific data sets data sets often require the use of technical tools capable of handling large volumes of information and the possibility of programming routines to analyze and model processes associated with the data. For the past couple of years, University of Arizona has offered a free license to the MATLAB® programming language which has these capabilities. This course is designed to help students make better use this great resource. While not a requirement, students are encouraged to bring

their own data sets to the course, so that they can make progress with their own data over the semester. Topics will be largely based on the needs of the students, but are anticipated to include: the MATLAB® environment, types of data sets and their processing, matrix operations, image analysis, statistics, differential equations and graphical presentation, all in MATLAB®.

Units: 1.00-3.00

Typically Offered: *Spring Even (2014, 2016, 2018)*

Home Department: Watershed Management

Cross listed: SWES 696M

Independent Study, Research, Thesis, Dissertation

ATMO 599 Independent Study

Description: Qualified students working on an individual basis with professors who have agreed to supervise such work. Graduate students doing independent work which cannot be classified as actual research will register for credit under course number 599, 699, or 799.

Units: 1.00-6.00

Typically Offered: *Fall, Spring, Summer*

ATMO 900 Research

Description: Individual research, not related to thesis or dissertation preparation, by graduate students.

Units: 1.00-6.00

Typically Offered: *Fall, Spring, Summer*

ATMO 910 Thesis

Description: Research for the master's thesis (whether library research, laboratory or field observation or research, artistic creation, or thesis writing). Maximum total credit permitted varies with the major department.

Units: 1.00-6.00

Typically Offered: *Fall, Spring, Summer*

ATMO 920 Dissertation

Description: Research for the doctoral dissertation (whether library research, laboratory or field observation or research, artistic creation, or dissertation writing).

Units: 1.00-9.00

Typically Offered: *Fall, Spring, Summer*