ATMO - ATMOSPHERIC SCIENCES

ATMO 601 Fundamentals of Atmospheric Dynamics
Credits 3. 3 Lecture Hours.
Basic concepts of fluid dynamics; meteorological approximations and coordinate systems; simple models and wave motion; barotropic models.
Prerequisite: Approval of instructor.

ATMO 602 Atmospheric Physics I
Credits 3. 3 Lecture Hours.
Integrated treatment of the dry and moist thermodynamics of the atmosphere, and cloud and precipitation microphysics.

ATMO 603 Quantitative Methods for the Atmospheric Sciences
Credits 3. 3 Lecture Hours.
Mathematical and numerical methods applied to ODE’s, PDE’s and statistical methods; methods of analysis and modeling of atmospheric phenomena.
Prerequisites: Concurrent registration in ATMO 601 and CSCE 203 or equivalents.

ATMO 604 General Circulation and Climate
Credits 3. 3 Lecture Hours.
Observed large scale circulation and climate of the earth; physical processes which maintain relevant budgets; models and theories explaining mean observations.
Prerequisite: ATMO 601.

ATMO 606 Atmospheric Chemistry I
Credits 3. 3 Lecture Hours.
Fundamentals of atmospheric chemistry; tropospheric ozone, NOx and HOx cycling, sulfur chemistry, stratospheric chemistry, and aerosol composition; analytical measurement methods; review of chemical basics as needed.

ATMO 611 Atmospheric Dynamics II
Credits 3. 3 Lecture Hours.
Continuation of ATMO 601; flow in planetary boundary layer; balanced flows; atmospheric instabilities; tropical dynamics.
Prerequisite: ATMO 601 or approval of instructor.

ATMO 612 Atmospheric Physics II
Credits 3. 3 Lecture Hours.
Continuation of ATMO 602. Radiative transfer into the atmosphere.
Prerequisite: ATMO 602.

ATMO 613 Advanced Atmospheric Chemistry
Credits 3. 3 Lecture Hours.
An advanced survey of fundamental atmospheric processes involving biogeochemical cycles, air pollution, tropospheric chemistry, atmospheric aerosols and stratospheric chemistry.
Prerequisite: ATMO 606.

ATMO 618 Numerical Methods for the Geosciences
Credits 3. 3 Lecture Hours.
Mathematical theory and numerical techniques for modeling physical systems and processes in the Geosciences; discretization of continuum equations for solids and fluids; finite difference methods convergence, consistency, and stability; finite element and spectral methods in fluid dynamics and seismology; iterative solvers; implicit and explicit methods for diffusion and advection.
Prerequisite: Graduate classification or approval of instructor.
Cross Listing: GEOP 618 and OCNG 618.
ATMO 658 Synoptic Meteorology  
Credits 3. 3 Lecture Hours.  
Mechanism and energetics of general circulation. Structure of large-scale systems. Persons desiring practice in analysis techniques should enroll for 1 hour or more of ATMO 685.  
Prerequisite: ATMO 251 or approval of instructor.  

ATMO 659 Tropical Cyclones  
Credits 3. 3 Lecture Hours.  
Tropical climatology; structure evolution and motion of tropical cyclones; tropical cyclone hazards; large scale tropical phenomena.  
Prerequisite: ATMO 251.  

ATMO 661 Atmospheric Turbulence  
Credits 3. 3 Lecture Hours.  
Classical turbulence theories and statistical approaches; closure models; effects of rotation and stratification; interpretations of atmospheric observations.  
Prerequisite: ATMO 611 or suitable background in fluid dynamics.  

ATMO 664 Laboratory Methods in Atmospheric and Environmental Sciences  
Credits 3. 2 Lecture Hours. 4 Lab Hours.  
Classroom and laboratory course; introduction to chemical techniques used to monitor the atmosphere and environment; instrumentation, sampling strategies; survey of current literature focusing on development of new techniques.  
Prerequisite: Graduate classification.  

ATMO 677/OCNG 677 Geophysical Data Assimilation  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
Modern data assimilation methods applied to oceanic and atmospheric circulation models, as well as in other simple models; methods to interpolate one-, two-, and three-dimensional randomly spaced data to regular grids for use in numerical models of atmospheric and oceanic circulation.  
Prerequisites: OCNG 657, ATMO 632, STAT 601.  
Cross Listing: OCNG 677/ATMO 677.  

ATMO 681 Seminar  
Credit 1. 1 Other Hour.  
Presented by students and faculty based upon their research work and upon surveys of the literature.  

ATMO 685 Directed Studies  
Credits 1 to 16. 1 to 16 Other Hours.  
Offered to enable majors in meteorology to undertake and complete, with credit, in their particular fields of specialization, limited investigations not covered by any other courses in established curriculum.  

ATMO 689 Special Topics in...  
Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.  
Special topics in an identified area of meteorology. May be repeated for credit.  

ATMO 691 Research  
Credits 1 to 23. 1 to 23 Other Hours.  
For thesis or dissertation. Topic subject to approval of department head.