

Relevant Graduate Courses Taken at the University of Maryland

Updated September, 2014, Stefan Cecelski

AOSC 600: Synoptic Meteorology

Atmospheric properties and observations, meteorological analysis and charts, operational numerical forecasts. Application of quasigeostrophic theory, baroclinic instability, midlatitude and mesoscale weather systems. Tropical meteorology

AOSC 602: Mesoscale Meteorology

Mesoscale approximations, cyclones and fronts, quasi- versus semi-geostrophic theory, piece-wise PV inversion, waves and instability, isolated convection, organized convective systems, numerical modeling and convective parameterization.

AOSC 610: Dynamics of the Atmosphere and Ocean I

Equations of motion and their approximation, scale analysis for the atmosphere and the ocean. Conservation properties. Fluid motion in the atmosphere and oceans. Circulation and vorticity, geostrophic motion and the gradient wind balance. Turbulence and Ekman Layers.

AOSC 611: Dynamics of the Atmosphere and Oceans II

Waves and instabilities in the atmosphere and the ocean. Gravity, Rossby, coastal and equatorial waves. Flow over topography. Dynamic instabilities including barotropic, baroclinic, inertial, and instabilities of the coupled ocean-atmosphere system. Stationary waves and multiple equilibria.

AOSC 614: Atmospheric Modeling, Data Assimilation and Predictability

foundation for atmospheric and oceanic modeling and numerical weather prediction: numerical methods for partial differential equations, an introduction to physical parameterizations, modern data assimilation, and predictability.

AOSC 617: Atmospheric and Oceanic Climate

The general circulation of the atmosphere and oceans, historical perspective, observations, and conceptual models; wind-driven and thermohaline circulation of the oceans. Seasonal cycle and monsoon circulations; interannual to interdecadal climate variability; climate change.

AOSC 620: Physics and Chemistry of the Atmosphere I

Air parcel thermodynamics and stability; constituent thermodynamics and chemical kinetics. Cloud and aerosol physics and precipitation processes.

AOSC 621: Physics and Chemistry of the Atmosphere II

Spectroscopy; basic concepts in radiative transfer and atmospheric chemistry; photolysis rates for atmospheric molecules.

AOSC 630: Statistical Methods in Meteorology and Oceanography

Parametric and non-parametric tests; time series analysis and filtering; wavelets. Multiple regression and screening; neural networks. Empirical orthogonal functions and teleconnections. Statistical weather and climate prediction, including MOS, constructed analogs. Ensemble forecasting and verification.

AOSC 680: Introduction to Earth System Science

An introduction to the study of the earth as a system: atmosphere, oceans, land, cryosphere, solid earth, and humans. Cycling of materials and energy in the earth system: the energy cycle, the hydrologic cycle, the carbon cycle, the nitrogen cycle. Climate processes and variability: land-atmosphere, ocean-atmosphere, biosphere-climate, and human interactions, short- and long-term variability in climate.