METEOROLOGY (MT)

MT 5000 Meteorology Seminar (1)
This course focuses on the development of professional and technical oral communication skills. Students will lead weekly presentations of real-time meteorological analyses and forecasts and interdisciplinary scientific results from literature reviews, case studies, or research. Springs and Falls.

MT 5200 Transportation Meteorology (3)
Students will learn the various weather systems that affect different modes of transportation. In particular we will study road weather, aviation meteorology, and oceanic meteorology. Advanced weather analysis and forecasting skills will be applied in order to make forecasts tailored to various industries. Falls.

MT 5280 Synoptic Meteorology (3)
Intermediate and advanced weather analysis and forecasting techniques are used to understand synoptic-scale weather systems. Topics include applications of numerical weather prediction and forecast uncertainty, kinematic wind analysis, jet streak circulations, quasi-geostrophic equations, isentropic analysis, cross-section diagrams, potential vorticity thinking, life cycle of extratropical cyclones including frontal evolutions, and extratropical and tropical transition. Springs Even.

MT 5310 Dynamic Meteorology I (3)
This course is an introduction to geophysical fluid dynamics including the development of the fundamental equations governing atmospheric motion, basic approximations, simplified flows, and physical interpretation of the corresponding theory. This course is co-listed with MT 4310 in the undergraduate curriculum. Falls Odd.

MT 5320 Dynamic Meteorology II (3)
This course will cover the advanced topics in geophysical fluid dynamics including circulation theory, vorticity, planetary boundary layer, quasi-geostrophic theory, stratospheric dynamics and introductory numerical modeling concepts. This course is co-listed with MT 4320 in the undergraduate curriculum. Springs Even.

MT 5330 Satellite Meteorology (3)
This course will provide students with a broad overview of the theory and application of satellite data. Course begins with a short history of meteorological satellites. This will be followed by sections of satellite orbits and navigation, and types of currently operating satellites. Later sections discuss radiative transfer theory, meteorological sensor packages and types of data, image interpretation, wind measurements, and atmospheric soundings. Springs.

MT 5340 Radar Meteorology (3)
This course will provide a broad overview of the hardware/theory behind the application of meteorological radar data. The course will begin with a short history of radar meteorology, which will be followed by a brief summary of the radar hardware and theory applicable to meteorological use and interpretation - beam spreading, ducting, anomalous propagation, etc. The differences between reflectivity, Doppler, and polarimetric measurements will also be discussed. Much of the remainder of the course will be used to cover the different levels of Doppler radar data, the available products for each level, algorithms used to automatically analyze these data, and application to real world problems, such as quantitative precipitation estimates and severe local storms detection. Falls.

MT 5400 Numerical Weather Prediction (3)
Acquaints students with the concepts, procedures, theory, and problems associated with numerical weather prediction through discussion and by writing computer programs to process both real and simulated data. Covers the mathematical basis for various analysis and predictive techniques and their benefits and/or limitations. Students learn about the configuration and capabilities of current operational numerical analysis and prediction models. This course is co-listed as MT 4405 in the undergraduate curriculum. Falls Odd.

MT 5410 Atmospheric Physics (3)
This course will provide an application of the basic laws of physics to atmospheric processes. Topics discussed include gravitational effects, properties of atmospheric gases, cloud physics, solar and terrestrial radiation, atmospheric electricity and optical and acoustical phenomena. This course is co-listed as MT 4410 in the undergraduate curriculum. Falls Even.

MT 5420 Tropical Weather and Climate (3)
An in-depth view of various topics related to tropical weather and climate, including tropical climatology, easterly waves, tropical cyclones, monsoons, El Nino, La Nina and the Southern Oscillation (ENSO), and other types of tropical variability. This course is co-listed as MT 4425 in the undergraduate curriculum. Falls Even.

MT 5430 Climate Change (3)
This interdisciplinary course examines the physical science of our climate system, the processes and mechanisms governing how climate responds to drivers of change. Students will explore the interactions between the atmosphere, hydrosphere, biosphere, and lithosphere over various timescales and critically examine methods for reconstructing/predicting past and future climates. This course is co-listed as ESP 4441 in the undergraduate curriculum. Springs.

MT 5460 Climate Dynamics (3)
Introduction to the mean thermodynamic state of the atmosphere and connections to transient weather phenomena, including zonal and eddy flow interactions, energy and momentum flux, troposphere-stratosphere interactions, and subseasonal-to-interannual atmospheric interactions with the cryosphere, hydrosphere, and pedosphere. Falls Odd.

MT 5480 Mesoscale Meteorology (3)
Focuses on the detailed descriptive aspects of mesoscale phenomena and processes with an emphasis on the structure. Defines what is meant by the term 'mesoscale' and to what kinds of systems it applies. Deals with internally generated mesoscale circulations. Examines various mesoscale convective systems. Discusses externally forces mesoscale systems. Using observational cases, covers terminology, characteristics, and behavior of mesoscale events. This course is co-listed as MT 4480 in the undergraduate curriculum. Springs Odd.

MT 5560 Topics in Meteorology (1-3)
Covers material related to a major subdiscipline in Meteorology that is not covered in the regular curriculum. May be repeated with a different topic so that students can receive exposure to a variety of subject areas. These offerings may or may not be co-listed as MT 4550 in the undergraduate curriculum.

MT 5600 Computer Applications in Meteorology (3)
This course is designed as an introduction to the technological tools and techniques used by professional meteorologists in the analysis and display of meteorological and environmental data. Students will learn programming methodology and become proficient in the use of a number of open source and commercial software packages.

MT 5650 Research Methods in Meteorology (3)
This project-based course will utilize computer applications in meteorology and computer programming in order improve student's ability to conduct research with meteorological observations and datasets, visualize meteorological phenomena, and summarize results in written, oral, and poster presentation formats.

MT 5710 Internship (1-4)
An internship experience of either full-time work or equivalent part-time work in atmospheric or related sciences at a professional organization or government agency. The on-site experience is provided to give students an opportunity to become more familiar with work experiences in a professional setting. Compensation is not necessarily provided for intern time. One credit is given for each 40-hour week of participation. Students must submit a written report when the internship is completed. Pass/No Pass.

MT 5800 Thesis Research (1-6)
Students will develop and present a thesis research proposal, conduct detailed research, write a thesis and defend the research before a faculty committee. Pass/No Pass.

MT 5910 Independent Study/Research (1-3)
Studies undertaken will be defined by students and their instructor. Work may involve reading; conferences; historical, experimental or theoretical projects; field investigation; statistical surveys; combinations of the foregoing or other activities deemed appropriate. Students may work in a physical or biological science or in interdisciplinary areas. Instructor permission required.