

Meteorology

MET 140L Intro to Meteorology Lab

1 cr

Laboratory exercises associated with MET 140. Fee.
Co-requisite: MET 140

MET 140 Introduction to Meteorology

3 cr

This course focuses on introducing the student to the basic concepts of meteorology. Major topics include the structure of our atmosphere, heat balance, meteorological measurements, atmospheric stability, atmospheric motion, and wind circulations on both the global and local scales. Other areas covered may include an introduction to air masses, fronts, and precipitation processes. The analysis of US Government weather charts is also introduced. Core course.

Co-requisite: MET 140L

MET 191 Tropical Weather Discussion

1 cr

Tropical Weather Discussion is an introductory course in current or recently-active tropical weather systems. This course mainly reviews the structure, behavior, history and potential forecasts of tropical cyclones in the Atlantic, Pacific, and Indian Ocean basins from a meteorological perspective with special emphasis on activity in the Atlantic basin. The course is taught during the Fall Semester because it overlaps with the most active period of the Atlantic Hurricane Season. Other tropical weather topics such as El Nino, La Nina, monsoon troughs, tropical upper-tropospheric troughs, Madden Julian Oscillation, and hurricane climatology are discussed during weeks of inactivity when no tropical cyclones may be occurring. This course may be repeated for credit up to two times for a total of three hours; however, the course may only count once toward a meteorology elective.

MET 342 Severe Weather

3 cr

A study of the causes, structure and impact of tornadoes, hurricanes, thunderstorms and severe weather systems (Identical to GEO 342).

Pre-requisite: MET 353 Minimum Grade of C or GEO 353 Minimum Grade of C.

MET 353 General Meteorology

4 cr

An overall view of the field of meteorology for science majors and minors. This course uses a quantitative approach to study the composition of the atmosphere, atmospheric processes, global circulation, and storm development. Laboratory exercises pay particular attention to hands-on analysis of meteorological charts (identical to GEO 353.) Fee.

Pre-requisite: (MET 140 Minimum Grade of D and MET 140L Minimum Grade of D) and ((MA 112 Minimum Grade of C or MA 171 Minimum Grade of C) or (MA 113 Minimum Grade of C or MA 172 Minimum Grade of C) or (MA 125 Minimum Grade of C or MA 132 Minimum Grade of C)).

MET 354 Dynamic Meteorology I

3 cr

Dynamic meteorology is the study of atmospheric motions that control our weather and climate. Using fundamental laws of physics (fluid dynamics and thermodynamics), a set of mathematical equations that describe how the atmosphere behaves, is derived. These equations are too complex to solve analytically, but with certain assumptions they can be simplified so that approximate solutions can be found. Even though approximate, these solutions still give useful information about the current state of the atmosphere and its evolution into the future. The theories derived in dynamic meteorology underlie all forecasting rules and techniques. Thorough understanding of these theories is invaluable to becoming a skilled forecaster.

Pre-requisite: (MA 126 Minimum Grade of C or MA 233 Minimum Grade of C) and (PH 201 Minimum Grade of C or PH 216 Minimum Grade of C).

MET 355 Dynamic Meteorology II

3 cr

The circulation of the atmosphere and the structure of storms is quantitatively analyzed using equations of atmospheric flow. The jet stream, atmospheric waves, mid-latitude cyclones, and the concept of vorticity are given considerable attention.

Pre-requisite: MET 354 Minimum Grade of C or GEO 344 Minimum Grade of C or GEO 354 Minimum Grade of C.

MET 356 Physical Meteorology

3 cr

A detailed investigation of adiabatic processes, thermodynamic diagrams, atmospheric stability, and precipitation processes. Additional topics include atmospheric composition and aerosols, radiation and electricity.

Pre-requisite: (MET 353 Minimum Grade of C or GEO 353 Minimum Grade of C) and (MA 126 Minimum Grade of C or MA 233 Minimum Grade of C) and (PH 201 Minimum Grade of C or PH 216 Minimum Grade of C). MET 353 and GEO 353 and MA 126 and MA 233 and PH 201 and PH 216 can be taken concurrently with this course.

MET 357 Meteorological Instrumentation

2 cr

Design, calibration, use and maintenance of existing and newly developed meteorological instruments and instrumentation systems. Analysis of data collected by instruments and instrument systems.

Pre-requisite: (MET 353 Minimum Grade of C or GEO 353 Minimum Grade of C).

MET 358 Radar Meteorology 4 cr

This course is designed to give the student a three-fold introduction to weather radar and its value in the workplace. Basic radar principles and assumptions applicable to all radars are presented; the Doppler function and limitations are covered in depth with final emphasis on properly utilizing weather radar in an operations setting.

Pre-requisite: (MET 354 Minimum Grade of C or GEO 344 Minimum Grade of C or GEO 354 Minimum Grade of C) and (PH 202 Minimum Grade of C or PH 217 Minimum Grade of C).

MET 359 Introduction to TV Weather 2 cr

This course gives the students the basic skills necessary for broadcasting weather information on TV. This course will focus on the basic principles and techniques of effective TV weather broadcasting.

Pre-requisite: (MET 353 Minimum Grade of C or GEO 353 Minimum Grade of C).

MET 360 Atmospheric Analysis 1 cr

Analysis of meteorological charts. Provides additional preparation prior to Synoptic. Fee.

Pre-requisite: (MET 353 Minimum Grade of C or GEO 353 Minimum Grade of C) and (MET 354 Minimum Grade of C or GEO 344 Minimum Grade of C or GEO 354 Minimum Grade of C).

MET 370 Satellite Meteorology 3 cr

This course is an introduction to the weather satellite and its influence on meteorological observations and forecasting. Both radiative propagation theory and satellite interpretation of meteorological features will be covered extensively.

Pre-requisite: MET 356 Minimum Grade of C and (PH 202 Minimum Grade of C or PH 217 Minimum Grade of C).

MET 401 Weather Forecasting I 2 cr

A course specifically designed for students minoring in Meteorology. Students are introduced to weather forecasting concepts and methods.

Pre-requisite: (MET 353 Minimum Grade of C or GEO 353 Minimum Grade of C).

MET 402 Weather Forecasting II 2 cr

A course specifically designed for students minoring in Meteorology. Weather forecasting techniques are discussed with an emphasis on the use of meteorological models and severe weather forecasting.

Pre-requisite: MET 401 Minimum Grade of C.

MET 410 MET Phenomenology - W 3 cr

This class is an introduction to reading meteorological journal and professional writings and to writing some of the standard scientific forms common in both operational and research meteorology: summaries, conference abstracts, and scientific journal articles. The students will engage in brief examination of some of the fundamental phenomena in the atmosphere through selected journal articles and write about these topics in an appropriate manner as inquisitive meteorologists.

Pre-requisite: (EH 102 Minimum Grade of C or EH 105 Minimum Grade of C) and (MET 353 Minimum Grade of C or GEO 353 Minimum Grade of C) and (MET 354 Minimum Grade of C or GEO 344 Minimum Grade of C or GEO 354 Minimum Grade of C) or MET 401 Minimum Grade of C).

MET 420 Computer Apps in Earth Science 4 cr

An introduction to basic Python programming, with examples and exercises pertinent to Earth Science and GIS applications.

Pre-requisite: MA 112 Minimum Grade of D or MA 110 Minimum Grade of C.

MET 430 Mesoscale Meteorology 3 cr

Assessment of mesoscale phenomena, including frontogenesis and frontolysis, low-level jet streams, nocturnal boundary layer wind maxima, sea and land breezes, gravity waves, dry lines, lake-effect snow, and deep moist convection. Emphasis on scale analysis, subsynoptic-scale dynamics, interactions with larger-scale processes, and case study examples.

Pre-requisite: (MET 355 Minimum Grade of C or GEO 345 Minimum Grade of C or GEO 355 Minimum Grade of C).

MET 440 Air Pollution Meteorology 2 cr

Air Pollution Meteorology is a survey course in air pollution topics taught primarily from an atmospheric perspective. This course covers topics on air pollution history, methods of measuring air quality, sources of air pollution, basic atmospheric pollution dispersion concepts, basic principles of air pollution modeling and prediction, and an overview of the impacts of polluted air on human health and the environment.

Pre-requisite: MET 140 Minimum Grade of C or GEO 101 Minimum Grade of C and MA 110 Minimum Grade of C.

MET 442 Tropical Meteorology 2 cr

This course presents an overview of meteorology in the tropics. The tropical realm is defined and the importance of solar radiation and distribution of temperature, moisture and precipitation in driving tropical weather systems is discussed. The general circulation in the tropics is explored along with seasonal and non-seasonal variations, including the Monsoon and El Nino/La Nina. Certain mesoscale and local circulations common to the tropics are also discussed. Several weeks will be spent investigating tropical cyclones. Pre-requisite: MET 353 Minimum Grade of C or GEO 353 Minimum Grade of C.

- MET 443 Climatology - W** 3 cr
Analysis of global climate as aggregate weather. Component elements, factors controlling distribution, resulting area patterns, and climatic classification are studied (identical to GEO 443). Fee
Pre-requisite: MET 140 Minimum Grade of C or GEO 101 Minimum Grade of C.
- MET 454 Synoptic Meteorology I** 6 cr
Principles of dynamic and physical meteorology are applied to current surface and upper air analyses of frontal cyclones. An emphasis is placed on forecasting techniques, daily weather discussions, continuity and analysis.
Pre-requisite: MET 355 Minimum Grade of C and MET 356 Minimum Grade of C.
- MET 455 Synoptic Meteorology II** 6 cr
This course continues the development of principles learned in MET 454. Principles of atmospheric dynamics and conceptual models will be studied and employed through the use of surface and upper air analyses, satellite and radar data. A multi-week overview of numerical weather prediction principles and concepts will be accomplished along with the integration and interpretation of model guidance of actual modeling simulations using basic concepts of numerical weather prediction. Topics on mid-latitude cyclones and fronts will continue to be expanded beyond Synoptic I. Ensemble prediction and atmospheric oscillations will be discussed along with intrinsic predictability limitations. This course serves as the capstone class for meteorology majors.
Pre-requisite: MET 454 Minimum Grade of C.
- MET 456 Applied Climatology - W** 3 cr
Training in the application of climatology to solve real world problems. In addition to an examination of present day climate patterns, their causes, and mechanisms, the course focuses on the El Nino, recent and past climates, the natural and human impact on the Earth's energy balance, global warming, ozone hole and the chaos theory.
Pre-requisite: (EH 102 Minimum Grade of C or EH 105 Minimum Grade of C) and (MET 353 Minimum Grade of C or GEO 353 Minimum Grade of C) and (MET 341 Minimum Grade of C or GEO 341 Minimum Grade of C). EH 102 and MET 353 can be taken concurrently with this course.
- MET 490 Sp Top -** 1 TO 4 cr
Meteorological topics not covered in current meteorology courses. May be repeated when content varies for a maximum of four hours. May require permission of instructor.
- MET 492 Seminar -** 1 TO 4 cr
Departmental seminar investigating a special field of meteorology. (Topic announced prior to registration.) May be repeated when content varies for a maximum of eight hours. Requires permission of instructor.
- MET 494 Directed Studies** 1 TO 4 cr
Independent research in field, laboratory, or library under the direction of a member of the meteorology faculty.
Prerequisite: Requires permission of instructor. May be taken for a total of eight hours.
- MET 495 Mesonet Internship** 1 cr
Students will learn various aspects of mesonet (mesoscale weather station network) operation and maintenance. Students will take part in routine weather station site visits, emergency site visits when a sensor malfunctions, and quality control of incoming data. Once a year every weather station receives a complete retrofit where all sensors are replaced with freshly calibrated sensors. If such a retrofit occurs during the semester of a student's internship, the student will be given the opportunity to take part in this process as well. A large component of this course will consist of field work. Depending on student schedules and mesonet behavior, time will also be spent in the lab performing manual data quality control using the USA Mesonet website.
Pre-requisite: (MET 353 Minimum Grade of C or GEO 353 Minimum Grade of C).
- MET 496 Internship in Meteorology** 1 TO 3 cr
On-the-job learning through occupational, professional, or research work with an approved firm, agency, or meteorology faculty member. Open only to meteorology majors. Prerequisite: Permission of department chair.
- MET 497 Broadcast Meteorology Pract I** 3 cr
This course focuses on introducing the student to the ever evolving technology in broadcast meteorology. Emphasis is placed on the application of meteorological data through the use of professional television weather graphics systems in order to develop a "weather story". Particular attention is given to the use of chroma key mechanics/techniques for public viewing.
Pre-requisite: MET 359 Minimum Grade of C.
- MET 498 Broadcast Meteorology Prac II** 3 cr
This course focuses on communicating accurate forecasts and other important weather information to the public. Attention is given to fine-tuning the on-air weather presentation style, as well as developing a professional resume tape of weather shows in order to gain employment as a broadcast meteorologist. Special attention is given to severe weather cut-ins and accurately conveying severe weather threats to the public.
Pre-requisite: (MET 355 Minimum Grade of C or GEO 345 Minimum Grade of C or GEO 355 Minimum Grade of C) and MET 497 Minimum Grade of C. MET 355 can be taken concurrently with this course.

MET 540 Topics in Air Pollution MET 3 cr

Topics in Air Pollution Meteorology is a graduate course on advanced air pollution topics taught primarily from an atmospheric perspective. This course provides an overview of "dry" meteorological processes, such as temperature, pressure, wind, and general circulation combined with topics on air pollution history, methods of measuring air quality, sources of air pollution, atmospheric pollution dispersion concepts, principles of air pollution modeling and prediction, and the impacts of polluted air on human health and the environment.

MET 590 Meteorology 1 TO 6 cr

An in-depth course for advanced students in meteorology. Topics and titles will be selected to examine the subject matter in an area of current interest to students and in an area of particular faculty expertise. Includes specialized topics not currently listed in the Bulletin.

MET 594 Grad Dir St in Meteorology- 1 TO 4 cr

Graduate level independent study in Meteorology under the direction of a member of Meteorology's Graduate Faculty. Student must have an approved topic and must be accepted by a Graduate Faculty mentor before registering for this class. Prerequisite: Graduate standing.