

# METEOROLOGY (METR)

## **METR 121 Meteorology 3 Hours** (repeatable max of 3 hrs)

An introduction to the elements of the atmosphere, severe storms, atmospheric environmental issues, the interdependence between human life and the atmosphere, and rudimentary forecasting of basic weather systems. A self-paced laboratory is required. (2 hour lecture; 1 hour lab)

**Colonnade/Statewide General Education Code E-NS, E-SL | NS, SL**

**Course Fee:** \$50

*Recent Term(s) Offered:* winter 2020; spring 2020; summer 2020; fall 2020; winter 2021; spring 2021; summer 2021; fall 2021; winter 2022; spring 2022; fall 2022

## **METR 122 Aviation Meteorology 3 Hours**

The emphasis of the course will be on weather elements and their measurements, weather instruments, weather codes needed by aviators, weather effects upon flying, and weather hazards of aviation.

*Recent Term(s) Offered:* spring 2020; spring 2021; spring 2022

## **METR 322 Global Climate Systems 4 Hours**

Analyzes the elements of climate and their world distribution with emphasis on the climatic controls and processes; surveys the influences of climates on environment; introduces climatic classification systems and climatological regions of the world. **Colonnade/Statewide General Education Code K-SY**

**Prerequisite(s):** 21 hours of Foundations and Explorations Courses, or junior status and METR 121

*Recent Term(s) Offered:* fall 2021

## **METR 324 Weather Analysis and Forecasting 3 Hours**

Analysis of the atmosphere using satellite and radar imagery. Weather forecasting techniques using surface and upper air data are also examined. Note: Permission of instructor may be required.

**Prerequisite(s):** METR 121

**Equivalent(s):** METR 424

**Course Fee:** \$50

*Recent Term(s) Offered:* spring 2020; spring 2021; spring 2022

## **METR 325 Meteorological Instrumentation and Measurement 3 Hours**

Introduces the purpose, operation, and application of meteorological instrumentation and the treatment of meteorological measurements.

**Prerequisite(s):** METR 121

**Course Fee:** \$50

*Recent Term(s) Offered:* fall 2020; fall 2022

## **METR 335 Satellite/Radar Meteorology 3 Hours**

An introduction to remote sensing specific to the atmospheric sciences. Specific attention is given to analysis, diagnostic, and prognostic determinations using various satellites, as well as surface and space-based active radar systems. Specific applications focus on synoptic and mesoscale phenomena, including large-scale kinematics and morphology, clouds, derived radar interpretation, precipitating systems, and precipitation measurement.

**Prerequisite(s):** METR 324

**Course Fee:** \$50

*Recent Term(s) Offered:* fall 2021

## **METR 422 Physical Climatology 3 Hours**

Addresses the complexity of climatic processes at various spatial and temporal scales. Budgets of energy, water, and momentum, and soil-plant-atmosphere interactions at the earth's surface are explored from both a theoretical and practical point of view.

**Prerequisite(s):** METR 324 with a minimum grade of C and MATH 237 with a minimum grade of C

*Recent Term(s) Offered:* None

## **METR 424 Severe Weather Analysis and Forecasting 2 Hours**

(repeatable max of 4 hrs)

Provides preparatory and debriefing in-class time for METR 425, Field Methods in Severe Weather Analysis and Forecasting. Students will use this in-class time prior to departure to learn about course expectations, travel logistics, and to practice forecasting current events. Students will use this in-class time upon return to debrief the field component, archive all data, and develop applied research projects for future use.

**Prerequisite(s):** METR 324 and permission of instructor

**Corequisite(s):** METR 425

*Recent Term(s) Offered:* None

## **METR 425 Field Methods in Severe Weather Analysis and Forecasting 4 Hours** (repeatable max of 8 hrs)

Provides an intensive, comprehensive field-based weather analysis and forecasting experience that focuses on all forms of severe weather, including tornadoes. Students will travel across the Great Plains collecting and analyzing weather data, predicting severe convective thunderstorms, and formulating logistical plans to document forecast outcomes each day. Students will also have the opportunity for applied learning approaches in leadership, collaborative team-building, and professional aptitude development.

**Prerequisite(s):** (METR 324 and permission of instructor)

**Corequisite(s):** METR 424

*Recent Term(s) Offered:* summer 2021

## **METR 426 Applied Meteorology / Climatology 3 Hours**

This course offers a practical insight into the influence of meteorology and climatology on everyday life. Environmental problems caused by changes in the atmosphere are also examined. Note: Permission of instructor may be required.

**Prerequisite(s):** METR 121

*Recent Term(s) Offered:* None

## **METR 430 Meteorological Computing 3 Hours**

Introduction to Python-based skills for meteorological data manipulation, processing, and visualization. Mainstream meteorological data sources and formats (e.g., ASCII, CSV, GRIB, NetCDF) will be involved in weather analysis and map generation.

**Prerequisite(s):** METR 324 and CS 170

*Recent Term(s) Offered:* fall 2020; fall 2022

## **METR 431 Dynamic Meteorology I 3 Hours**

Introduction to large-scale dynamics of the Earth's troposphere focusing on fundamental topics, the basic governing equations of motion in the atmosphere, and dry thermodynamics.

**Prerequisite(s):** METR 324 with a minimum grade of C and MATH 237 with a minimum grade of C

*Recent Term(s) Offered:* fall 2021

**METR 432 Synoptic Meteorology 3 Hours**

Addresses the analysis and prediction of large-scale weather systems, such as extra-tropical cyclones, fronts and jet streams through the application of fundamental dynamical concepts of meteorology.

**Prerequisite(s):** METR 324 with a minimum grade of C and MATH 237 with a minimum grade of C

**Course Fee:** \$50

*Recent Term(s) Offered: fall 2020; fall 2022*

**METR 433 Dynamic Meteorology II 3 Hours**

Analysis of phenomena related to large scale dynamics of the Earth's troposphere including thermodynamics, elementary applications of the basic equations, and circulation and vorticity.

**Prerequisite(s):** METR 431 with a minimum grade of C

*Recent Term(s) Offered: spring 2020; spring 2022*

**METR 437 Mesoscale Meteorology 3 Hours**

Addresses the analysis and prediction of convective and mesoscale phenomena, such as mesoscale convective systems, severe thunderstorms, tornadoes and hurricanes.

**Prerequisite(s):** METR 432 with a minimum grade of C

**Course Fee:** \$50

*Recent Term(s) Offered: spring 2021*

**METR 438 Physical Meteorology 3 Hours**

Addresses the microscopic processes related to cloud formation, radiative transfer, precipitation processes and dry and moist thermodynamics.

**Prerequisite(s):** METR 431 with a minimum grade of C

*Recent Term(s) Offered: spring 2020; spring 2022*

**METR 439 Atmospheric Modeling 3 Hours**

An introduction to numerical weather and climate modeling techniques and models, with focus on modeling fundamentals, including dynamics, physical parameterizations, grids and resolutions, model structures and components. Includes hands-on experience with designing numerical experiments, configuring and running model simulations, post-processing model outputs, and visualization.

**Prerequisite(s):** METR 324 with a minimum grade of C and CS 170 with a minimum grade of C

*Recent Term(s) Offered: None*

**METR 460 Climate Teleconnections 3 Hours**

Analysis of the climate impacts and physical mechanisms of atmospheric and oceanic teleconnections that commonly affect weather patterns in the northern hemisphere. Note: Permission of instructor may be required.

**Prerequisite(s):** (METR 322 or METR 324)

*Recent Term(s) Offered: spring 2021*

**METR 475 Selected Topics in Meteorology 1-3 Hours (repeatable max of 12 hrs)**

A study of a selected problem under the supervision of a faculty member.

**Prerequisite(s):** permission of instructor

*Recent Term(s) Offered: fall 2020; spring 2021; summer 2021; fall 2021; spring 2022; summer 2022; fall 2022*