

METRO 10 Course Outline as of Fall 2023**CATALOG INFORMATION**

Dept and Nbr: METRO 10 Title: WEATHER AND CLIMATE

Full Title: Introduction to Weather and Climate

Last Reviewed: 9/12/2022

| Units | Course Hours per Week | | Nbr of Weeks | | Course Hours Total | |
|---------|-----------------------|-------------------|--------------|------|--------------------|-------|
| Maximum | 3.00 | Lecture Scheduled | 3.00 | 17.5 | Lecture Scheduled | 52.50 |
| Minimum | 3.00 | Lab Scheduled | 0 | 6 | Lab Scheduled | 0 |
| | | Contact DHR | 0 | | Contact DHR | 0 |
| | | Contact Total | 3.00 | | Contact Total | 52.50 |
| | | Non-contact DHR | 0 | | Non-contact DHR | 0 |

Total Out of Class Hours: 105.00

Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable

Grading: Grade or P/NP

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As: GEOG 10

Formerly:

Catalog Description:

In this course, students will be given a descriptive introduction to the science of the atmosphere. Topics include relationships between Earth and Sun, temperature, moisture and stability, atmospheric pressure and wind, clouds and precipitation, weather systems, hurricanes and tornadoes, weather forecasting, climate patterns and climate change, air pollution, and atmospheric optics.

Prerequisites/Corequisites:**Recommended Preparation:**

Eligibility for ENGL 1A or equivalent

Limits on Enrollment:**Schedule of Classes Information:**

Description: In this course, students will be given a descriptive introduction to the science of the atmosphere. Topics include relationships between Earth and Sun, temperature, moisture and stability, atmospheric pressure and wind, clouds and precipitation, weather systems, hurricanes and tornadoes, weather forecasting, climate patterns and climate change, air pollution, and

atmospheric optics. (Grade or P/NP)

Prerequisites/Corequisites:

Recommended: Eligibility for ENGL 1A or equivalent

Limits on Enrollment:

Transfer Credit: CSU;UC.

Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

| | | | | |
|----------------------|----------------------|-------------------|------------|-----------|
| AS Degree: | Area | | Effective: | Inactive: |
| | C | Natural Sciences | Fall 1981 | |
| CSU GE: | Transfer Area | | Effective: | Inactive: |
| | B1 | Physical Science | Fall 1981 | |
| IGETC: | Transfer Area | | Effective: | Inactive: |
| | 5A | Physical Sciences | Fall 1981 | |
| CSU Transfer: | Transferable | Effective: | Fall 1981 | Inactive: |
| UC Transfer: | Transferable | Effective: | Fall 1981 | Inactive: |

CID:

Certificate/Major Applicable:

Both Certificate and Major Applicable

COURSE CONTENT

Student Learning Outcomes:

At the conclusion of this course, the student should be able to:

1. Describe fundamental meteorological concepts and the physical laws which govern atmospheric behavior.
2. Examine the relationships between Earth and Sun and the role each plays in shaping weather and climate.
3. Analyze and interpret weather maps, radar imagery, satellite data, and other remotely sensed data.
4. Examine various climate change scenarios.

Objectives:

At the conclusion of this course, the student should be able to:

1. Define the nature of meteorology as a science.
2. Identify and describe the elements of weather.
3. Explain the processes that generate weather phenomena.
4. Identify weather phenomena and patterns on weather maps, and radar and satellite images.
5. Explain Earth seasonality.
6. Describe the mechanisms of heat transfer and apply this knowledge to the Earth's radiation budget, greenhouse effect, and climate change.
7. Recognize and describe global climate patterns and the implications of climate change.
8. Examine and evaluate the merit of scientific claims.

Topics and Scope:

I. Introduction to Science, the Scientific Method, and Meteorology as a Science

II. Atmosphere

- A. Composition
- B. Vertical structure
- C. Weather and climate

III. Solar and Terrestrial Radiation

- A. Electromagnetic spectrum
- B. Insolation
- C. Mechanisms of heat transfer
- D. Earth and Sun relationships
- E. Geospheric energy budget

IV. Temperature

- A. Heat and temperature
- B. Measurement
- C. Controlling factors
- D. Global, regional, and seasonal patterns
- E. Atmospheric and oceanic circulation

V. Atmospheric Moisture

- A. Properties of water
- B. Hydrologic cycle
- C. Humidity and humidity measurement
- D. Adiabatic processes and stability
- E. Clouds and fog
- F. Precipitation
- G. Global, regional, and seasonal patterns

VI. Atmospheric Pressure

- A. Relationship between air density and temperature
- B. Measurement
- C. Mapping and analysis
- D. Global, regional, and seasonal patterns

VII. Wind

- A. Direction, speed, and measurement
- B. Surface and upper level
- C. Global, regional, and seasonal circulation patterns

VIII. Air Masses and Weather Systems

- A. Air masses
- B. Polar, mid-latitude and tropical patterns
 - 1. Fronts and mid-latitude cyclones
 - 2. Thunderstorms and tornadoes
 - 3. Tropical systems including hurricanes, typhoons, and cyclones
- C. Weather maps, radar imagery, and satellite images

IX. Weather Analysis

- A. Data acquisition and mapping
- B. Forecasting models

X. Climate and Climate Change

- A. Classification models
- B. Global patterns
- C. Global, regional, and local climate change

XI. Air Pollution

- A. Types
- B. Sources
- C. Contributing factors and trends

XII. Optical Phenomena

- A. Nature of light
- B. Examples

Assignment:

1. Assigned readings (20-40 pages per week)
2. Homework and/or in-class assignments (5-20)
3. Quizzes (2-17)
4. Paper(s) and/or project(s) (1-5)
5. Exams (2-5)

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Homework, paper(s) and/or project(s)

Writing
5 - 20%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework and/or in-class assignments

Problem solving
10 - 30%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None

Skill Demonstrations
0 - 0%

Exams: All forms of formal testing, other than skill performance exams.

Exams, Quizzes

Exams
50 - 80%

Other: Includes any assessment tools that do not logically fit into the above categories.

Participation

Other Category
0 - 10%

Representative Textbooks and Materials:

The Atmosphere: An Introduction to Meteorology. 14th ed. Lutgens, Frederick, Tarbuck, Edward, Herman, Redina and Tasa, Dennis. Pearson. 2019

Meteorology Today: An Introduction to Weather, Climate, and the Environment. 13th ed. Ahrens, C. Donald and Henson, Books. Cengage Learning. 2022

Essentials of Meteorology: An Invitation to the Atmosphere. 8th ed. Ahrens, C. Donald and Henson, Robert. Brooks and Cole. 2017 (classic)