METRO 10 Course Outline as of Spring 2019

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:
A descriptive introduction to the science of the atmosphere. Topics include Earth/Sun relationships, temperature, atmospheric pressure and wind, clouds and precipitation, storm fronts, hurricanes and tornadoes, weather forecasting, climate patterns and climate change, and atmospheric optics. California weather patterns and climate will be emphasized.

Prerequisites/Corequisites:

Recommended Preparation:
Eligibility for ENGL 1A or equivalent

Limits on Enrollment:

Schedule of Classes Information:
Description: A descriptive introduction to the science of the atmosphere. Topics include Earth/Sun relationships, temperature, atmospheric pressure and wind, clouds and precipitation, storm fronts, hurricanes and tornadoes, weather forecasting, climate patterns and climate change, and atmospheric optics. California weather patterns and climate will be emphasized. (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. Explain the interactions between the atmosphere, biosphere, hydrosphere and lithosphere.
3. Examine Earth/Sun relationships and recognize the role each plays in shaping weather and climate.
4. Analyze and interpret weather maps, radar imagery and satellite data.

Objectives:
During this course students will:
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. 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/Sun relationships
E. Energy budget

IV. Temperature
A. Heat and temperature
B. Measurement
C. Controlling factors
D. Global, regional and seasonal patterns

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. Pressure gradient force, direction, speed, and measurement
B. Surface and upper level
C. Global, regional, and seasonal circulation patterns
D. Effects on oceanic circulation

VIII. Air Masses and Weather Systems
A. Air masses
B. Polar, mid-latitude and tropical patterns
i. Fronts and mid-latitude cyclones
ii. Thunderstorms and tornadoes
iii. Tropical cyclones (hurricanes, typhoons, and cyclones)

IX. Weather Analysis
A. Data acquisition and mapping
B. Forecasting

X. Climate and Climate Change
A. Classification
B. Global patterns
C. Global and regional climate change

XI. Air Pollution
A. Types
B. Sources
C. Contributing factors

XII. Optical Phenomena
A. Nature of light
B. Types

Assignment:

1. Assigned readings (20-40 pages per week)
2. Assignments: written homework, problem solving homework, in-class activities (5-15)
3. Quizzes (2-15)
4. Current event and/or other papers/projects (1-3)
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.

Written homework; current event or other papers/projects	Writing 5 - 20%

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

Problem solving homework; in class activities	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, including objective questions and essays; quizzes	Exams 50 - 80%

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

Participation and attendance	Other Category 0 - 10%

Representative Textbooks and Materials:

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

The Atmosphere: An Introduction to Meteorology. 13th ed. Lutgens, Frederick and Tarbuck, Edward and Tasa, Dennis. Pearson. 2015

Meteorology Today: An Introduction to Weather, Climate, and the Environment. 9th ed. Ahrens, C. Donald. Cengage Leanring. 2012 (classic)