

GEOG R103: INTRODUCTION TO WEATHER AND CLIMATE

Originator

jdanza

College

Oxnard College

Discipline (CB01A)

GEOG - Geography

Course Number (CB01B)

R103

Course Title (CB02)

Introduction to Weather and Climate

Banner/Short Title

Intro to Weather and Climate

Credit Type

Credit

Start Term

Fall 2021

Catalog Course Description

An introduction to the Earth's atmosphere, weather prediction, climate change, and the methods employed in analyzing and understanding weather phenomena are investigated in this course. Global changes in climate patterns, human influence on the atmosphere, and the impact of weather events are examined. C-ID: GEOG 130.

Taxonomy of Programs (TOP) Code (CB03)

1930.00 - Earth Science

Course Credit Status (CB04)

D (Credit - Degree Applicable)

Course Transfer Status (CB05) (select one only)

A (Transferable to both UC and CSU)

Course Basic Skills Status (CB08)

N - The Course is Not a Basic Skills Course

SAM Priority Code (CB09)

E - Non-Occupational

Course Cooperative Work Experience Education Status (CB10)

N - Is Not Part of a Cooperative Work Experience Education Program

Course Classification Status (CB11)

Y - Credit Course

Educational Assistance Class Instruction (Approved Special Class) (CB13)

N - The Course is Not an Approved Special Class

Course Prior to Transfer Level (CB21)

Y - Not Applicable

Course Noncredit Category (CB22)

Y - Credit Course

Funding Agency Category (CB23)

Y - Not Applicable (Funding Not Used)

Course Program Status (CB24)

1 - Program Applicable

General Education Status (CB25)

Y - Not Applicable

Support Course Status (CB26)

N - Course is not a support course

Field trips

May be required

Faculty notes on field trips; include possible destinations or other pertinent information

National Weather Service Office

Grading method

Letter Graded

Does this course require an instructional materials fee?

No

Repeatable for Credit

No

Is this course part of a family?

No

Units and Hours

Carnegie Unit Override

No

In-Class

Lecture

Minimum Contact/In-Class Lecture Hours

52.5

Maximum Contact/In-Class Lecture Hours

52.5

Activity

Minimum Contact/In-Class Activity Hours

0

Maximum Contact/In-Class Activity Hours

0

Laboratory

Minimum Contact/In-Class Laboratory Hours

0

Maximum Contact/In-Class Laboratory Hours

0

Total in-Class

Total in-Class

Total Minimum Contact/In-Class Hours

52.5

Total Maximum Contact/In-Class Hours

52.5

Outside-of-Class

Internship/Cooperative Work Experience

Paid

Minimum Paid Internship/Cooperative Work Experience Hours

0

Maximum Paid Internship/Cooperative Work Experience Hours

0

Unpaid

Minimum Unpaid Internship/Cooperative Work Experience Hours

0

Maximum Unpaid Internship/Cooperative Work Experience Hours

0

Total Outside-of-Class

Total Outside-of-Class

Minimum Outside-of-Class Hours

105

Maximum Outside-of-Class Hours

105

Total Student Learning

Total Student Learning

Total Minimum Student Learning Hours

157.5

Total Maximum Student Learning Hours

157.5

Minimum Units (CB07)

3

Maximum Units (CB06)

3

Advisories on Recommended Preparation

READ R095 or ESL R095 and ENGL R097 or ENGL R100 or eligibility for ENGL R101

Entrance Skills

Entrance Skills

Ability to read a college level text and write essays and documented papers

Prerequisite Course Objectives

ENGL R097-Write short essays of at least five paragraphs with effective introductory paragraphs; well-organized, coherent, and detailed support of thesis; and effective conclusions

ENGL R097-Write essays with acceptable college-level grammar, syntax, spelling, and idiomatic usage

ENGL R097-Analyze essay exam questions and organize and write effective responses

ENGL R097-Demonstrate familiarity with the principles of research and documentation

ENGL R097-Write a short paper incorporating documentation
ENGL R100-Use pre-writing techniques in thought/information gathering.
ENGL R100-Develop a thesis.
ENGL R100-Employ logical organizational strategies in writing essays.
ENGL R100-Write short (500-word) essays with effective introductory paragraphs; well-organized, coherent, and detailed support of thesis; and effective conclusions.
ENGL R100-Revise content and rewrite for fluent expression.
ENGL R100-Write essays with acceptable college-level grammar, syntax, spelling, and idiomatic usage.
ENGL R100-Analyze essay exam questions and organize and write effective responses.
ENGL R100-Successfully use principles of research and documentation systems.
ENGL R100-Read college-level materials and recognize the main idea.
ENGL R100-Summarize and paraphrase.

Requisite Justification

Requisite Type

Advisory

Requisite

READ R095

Requisite Description

Course not in a sequence

Level of Scrutiny/Justification

Content review

Requisite Type

Advisory

Requisite

ESL R095

Requisite Description

Course not in a sequence

Level of Scrutiny/Justification

Content review

Requisite Type

Advisory

Requisite

ENGL R097

Requisite Description

Course in a sequence

Level of Scrutiny/Justification

Content review

Requisite Type

Advisory

Requisite

ENGL R100

Requisite Description

Course not in a sequence

Level of Scrutiny/Justification

Content review

Student Learning Outcomes (CSLOs)**Upon satisfactory completion of the course, students will be able to:**

- | | |
|---|---|
| 1 | Analyze the effect of mountains on weather and climate for highlands and adjacent lowlands. |
| 2 | Select climate type of major regions, based on location and elevation, of the world following the Koppen Climate Classification System. |
| 3 | Calculate the rate of cooling and warming as air ascends and descends over a mountain. |
| 4 | Extract data to support an analysis of how Earth's climate is changing. |
| 5 | Diagram the phases of cyclogenesis. |

Course Objectives**Upon satisfactory completion of the course, students will be able to:**

- | | |
|----|---|
| 1 | Explain the behavior of the atmosphere in terms of thermodynamics, hydrostatic forces, the gas laws, and the energy balance of the Earth/atmosphere system. |
| 2 | Summarize the role humidity, water, and water vapor play in weather as part of the Earth's hydrosphere. |
| 3 | Recognize how the dynamics of wind and precipitation can develop into severe weather, environmental hazards, such as: tornadoes, hurricanes, and thunderstorms. |
| 4 | Analyze the basic principles and processes of weather forecasting using instrumentation, weather maps, and satellite imagery. |
| 5 | Describe the unique weather phenomena, which affects Southern California. |
| 6 | Develop a model for atmospheric circulation and the creation of mid-latitude cyclones for the North American continent. |
| 7 | Describe and explain El Niño and La Niña events and how they affect the weather patterns and marine ecosystems off the California coast. |
| 8 | Analyze the anthropogenic greenhouse effect that influences global warming and the world's changing climate. |
| 9 | Predict weather fronts from patterns depicted by isobars and cloud imagery on weather maps. |
| 10 | Explain the cause and mechanism of the natural greenhouse effect. |
| 11 | Analyze and interpret the global distribution of climate types following the Köppen climate classification system, including the general location, characteristics and controls of each major climate type. |
| 12 | Apply the scientific method to analyze and interpret basic atmospheric data and weather patterns using observations, measurements, maps, charts, graphs, and model results. |

Course Content**Lecture/Course Content**

1. Introduction to the Atmosphere's Composition and Structure
2. Scientific Method in Weather and Climate Science
3. Review the "Hole in the Ozone Layer" Phenomenon
4. Earth/Sun Relationship
5. Radiation laws
6. Energy balance into and out of the Earth-atmosphere energy budget
7. Air Pressure and Winds
 - a. Behavior of atmospheric gases and the gas law
 - b. Forces governing wind
 - c. Isobaric gradient, geostrophic and boundary layer winds
 - d. Planetary scale circulation
 - e. Monsoon cycle
8. Atmospheric Moisture
 - a. Water vapor measurement: specific and relative humidity
 - b. Water phase changes
 - c. Clouds

- d. Fog
- e. Forms of precipitation
- 9. Characteristics of Atmospheric Stability and Instability
- 10. Extra-Tropical Weather
 - a. Air mass behavior
 - b. Mid-latitude cyclones
 - c. Easterly waves
- 11. Tropical Weather
 - a. ITCZ (intertropical convergence zone)
 - b. Tropical depressions
 - c. Easterly waves
- 12. Causes of Severe Weather
 - a. Hurricanes
 - b. Typhoons
 - c. Tornadoes
- 13. California Weather
 - a. Major climate controls
 - b. Influence of El Niño
- 14. Global Climatic Change
 - a. Paleoclimatology
 - b. Dating techniques
 - c. Theories
 - d. Climate prediction for global warming: anthropogenic influence.
- 15. Effects of Human Induced Air Pollution on Air Quality
- 16. Weather Forecasting
 - a. Weather instrument and maps
 - b. Satellite imagery
 - c. Numerical prediction
 - d. Weather modification
- 17. Climate Classification System
 - a. Köppen climate classification system
 - b. Global location
 - c. Characteristics and controls of each major climate type.
- 18. Applied Meteorology
 - a. Agriculture
 - b. Fire weather
 - c. Transportation
 - d. Human health
 - e. Tapping into solar energy
 - f. Weather modification
 - g. Forest meteorology

Laboratory or Activity Content

None.

Methods of Evaluation

Which of these methods will students use to demonstrate proficiency in the subject matter of this course? (Check all that apply):

Written expression

Methods of Evaluation may include, but are not limited to, the following typical classroom assessment techniques/required assignments (check as many as are deemed appropriate):

Essay exams

Essays

Group projects

Individual projects

Journals

Oral analysis/critiques

Objective exams

Oral presentations

Problem-solving exams
Quizzes
Reports/papers
Research papers

Instructional Methodology

Specify the methods of instruction that may be employed in this course

Audio-visual presentations
Computer-aided presentations
Collaborative group work
Class activities
Class discussions
Case studies
Distance Education
Demonstrations
Field experience/internship
Field trips
Group discussions
Guest speakers
Instructor-guided interpretation and analysis
Instructor-guided use of technology
Internet research
Lecture
Practica
Small group activities

Describe specific examples of the methods the instructor will use:

1. Hands-on demonstration and measurement of weather.
2. In-class discussion on how humans through their activities have contributed to increasing greenhouse gases and enhancing global warming.
3. In-class problem solving where students work together on word problems, such as how to calculate the adiabatic rate of cooling in the atmosphere.
4. Critical thinking exercise on the various physical processes in the stages of cyclogenesis.
5. In-class viewing of PowerPoint, videos and Google Earth to analyze the factors that contribute to climate zones across the globe.
6. Instructor-led discussion on the affect mountains have on weather.

Representative Course Assignments

Writing Assignments

1. Essay assignment such as describing the local scale wind system. Explain how the development of the sea breeze over the Oxnard Plain affects local temperatures and provides an ocean air circulation for the Oxnard area
2. Summarize weather data collected to prepare a written weather forecast.
3. Describe the physical science steps of storm cloud formation starting with evaporation through precipitation.
4. A critical essay, based on severe weather. Students will sketch and describe the development of a severe thunderstorm. Students will have to explain how this mesocyclone evolves and the environmental hazards associated with it.
5. A take home essay assignment in partial fulfillment for the final exam asks the students to discuss the evidence that indicates that global climates have changed and also the current anthropogenic changes that have modified local weather systems.

Critical Thinking Assignments

1. Analyze the condition of the atmosphere based on cloud development.
2. Given an atmospheric process, determine which physical processes apply.
3. Describe how seemingly disparate weather processes are actually related.
4. Determine which environmental and atmospheric factors may reduce global warming.

Reading Assignments

1. Read forecast technical discussions from the National Weather Service
2. Selected articles on specific assigned topics using such periodicals as Journal of Climate, Atmosphere/Ocean, and Weatherwise
3. Read course text book and web links.

Other assignments (if applicable)

1. Observe and record weather parameters on a regular basis.
2. Students will be assigned to review Internet sources that deal with topics covered in class, such as: NOAA satellite imagery that can track a hurricane.
3. A field trip to the NOAA weather station in Oxnard to observe the state-of-the-art technology used in weather forecasting, such as: the national Doppler network which tracks severe weather, and issues warnings based on their potential to produce tornadoes.

Outside Assignments**Representative Outside Assignments**

1. Read forecast technical discussions from the National Weather Service
2. Selected articles on specific assigned topics using such periodicals as *Journal of Climate*, *Atmosphere/Ocean*, and *Weatherwise*
3. Essay assignment such as describing the local scale wind system. Explain how the development of the sea breeze over the Oxnard Plain affects local temperatures and provides an ocean air circulation for the Oxnard area
4. Summarize weather data collected to prepare a written weather forecast.
5. Describe the physical science steps of storm cloud formation starting with evaporation through precipitation.
6. A critical essay, based on severe weather. Students will sketch and describe the development of a severe thunderstorm. Students will have to explain how this mesocyclone evolves and the environmental hazards associated with it.
7. A take home essay assignment in partial fulfillment for the final exam asks the students to discuss the evidence that indicates that global climates have changed and also the current anthropogenic changes that have modified local weather systems.
8. Observe and record weather parameters on a regular basis.
9. Students will be assigned to review Internet sources that deal with topics covered in class, such as: NOAA satellite imagery that can track a hurricane.

Articulation**C-ID Descriptor Number**

GEOG 130

Status

Approved

Comparable Courses within the VCCCD

GEOG M05 - Introduction to Weather and Climate

GEOG V05 - Introduction to Weather and Climate

District General Education**A. Natural Sciences****B. Social and Behavioral Sciences****C. Humanities****D. Language and Rationality****E. Health and Physical Education/Kinesiology****F. Ethnic Studies/Gender Studies****CSU GE-Breadth****Area A: English Language Communication and Critical Thinking****Area B: Scientific Inquiry and Quantitative Reasoning****Area C: Arts and Humanities****Area D: Social Sciences****Area E: Lifelong Learning and Self-Development****CSU Graduation Requirement in U.S. History, Constitution and American Ideals:****IGETC****Area 1: English Communication****Area 2A: Mathematical Concepts & Quantitative Reasoning****Area 3: Arts and Humanities****Area 4: Social and Behavioral Sciences****Area 5: Physical and Biological Sciences****Area 6: Languages Other than English (LOTE)****Textbooks and Lab Manuals****Resource Type**

Textbook

DescriptionLutgens, Frederick (2019). *The Atmosphere* (14th). New Jersey Pearson**Resource Type**

Other Instructional Materials

Description

Digital slide presentations.

Resource Type

Other Instructional Materials

Description

PowerPoint presentations.

Resource Type

Other Instructional Materials

Description

Videotape and DVD presentations.

Resource Type

Other Instructional Materials

Description

Wall maps.

Distance Education Addendum**Definitions****Distance Education Modalities**

Hybrid (51%–99% online)

Hybrid (1%–50% online)

100% online

Faculty Certifications

Faculty assigned to teach Hybrid or Fully Online sections of this course will receive training in how to satisfy the Federal and state regulations governing regular effective/substantive contact for distance education. The training will include common elements in the district-supported learning management system (LMS), online teaching methods, regular effective/substantive contact, and best practices.

Yes

Faculty assigned to teach Hybrid or Fully Online sections of this course will meet with the EAC Alternate Media Specialist to ensure that the course content meets the required Federal and state accessibility standards for access by students with disabilities. Common areas for discussion include accessibility of PDF files, images, captioning of videos, Power Point presentations, math and scientific notation, and ensuring the use of style mark-up in Word documents.

Yes

Regular Effective/Substantive Contact**Hybrid (1%–50% online) Modality:**

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	After viewing a video, students post and reply on discussion board how to reduce the severe impacts of climate change while considering the responsibility of government, private industry, and the individual while maintaining or improving quality of life and economic sustainability.
Synchronous Dialog (e.g., online chat)	Live video discussion, which is recorded, with instructor on current weather events to demonstrate course material. Students will collaborate with other students on explanation of weather phenomena.
Other DE (e.g., recorded lectures)	Watch recorded lecture with PowerPoint, videos and Google Earth to classify and describe the climates of the world.

Hybrid (51%–99% online) Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	After viewing a video, students post and reply on discussion board how to reduce the severe impacts of climate change while considering the responsibility of government, private industry, and the individual while maintaining or improving quality of life and economic sustainability.
Synchronous Dialog (e.g., online chat)	Live video discussion, which is recorded, with instructor on current weather events to demonstrate course material. Students will collaborate with other students on explanation of weather phenomena.
Other DE (e.g., recorded lectures)	Watch recorded lecture with PowerPoint, videos and Google Earth to classify and describe the climates of the world.

100% online Modality:

Method of Instruction	Document typical activities or assignments for each method of instruction
Asynchronous Dialog (e.g., discussion board)	After viewing a video, students post and reply on discussion board how to reduce the severe impacts of climate change while considering the responsibility of government, private industry, and the individual while maintaining or improving quality of life and economic sustainability.
Synchronous Dialog (e.g., online chat)	Live video discussion, which is recorded, with instructor on current weather events to demonstrate course material. Students will collaborate with other students on explanation of weather phenomena.
Other DE (e.g., recorded lectures)	Watch recorded lecture with PowerPoint, videos and Google Earth to classify and describe the climates of the world.

Examinations**Hybrid (1%–50% online) Modality**

Online
On campus

Hybrid (51%–99% online) Modality

Online
On campus

Primary Minimum Qualification

GEOGRAPHY

Review and Approval Dates**Department Chair**

09/02/2020

Dean

09/02/2020

Technical Review

09/09/2020

Curriculum Committee

09/09/2020

Curriculum Committee

11/25/2020

CCCCO

MM/DD/YYYY

Control Number

CCC000574816

DOE/accreditation approval date

MM/DD/YYYY