Cerro Coso College

Course Outline of Record Report

10/07/2021

PHSCC135 : Introduction to Meteorology

General Information

Author:	• Sarah King
Course Code (CB01) :	PHSCC135
Course Title (CB02) :	Introduction to Meteorology
Department:	Science
Proposal Start:	Fall 2020
TOP Code (CB03) :	(1930.00) Earth Science
SAM Code (CB09) :	Non-occupational
Distance Education Approved:	Yes
Course Control Number (CB00) :	CCC000569442
Curriculum Committee Approval Date:	10/16/2015
Board of Trustees Approval Date:	12/17/2015
External Review Approval Date:	12/30/2015
Course Description:	This lecture and laboratory course in introductory meteorology emphasizes meteorology's interdisciplinary physical science basis and methods. Concepts covered include atmospheric composition and structure, solar-terrestrial relations, radiation, heat, temperature, seasons, air pressure, humidity, atmospheric stability, clouds and cloud systems, precipitation, wind and circulation, thunderstorms, tornadoes, hurricanes, weather analysis and forecasting, climate, and climate change.
Submission Type:	No value
Author:	No value

Faculty Minimum Qualifications

Master Discipline Preferred:	• Earth Science
Alternate Master Discipline Preferred:	• Geography • Physical Sciences • Physics/Astronomy
Bachelors or Associates Discipline Preferred:	No value
Additional Bachelors or Associates Discipline Preferred:	No value

Course Development Options

Basic Skills Status (CB08)

Course is not a basic skills course.

Course Special Class Status (CB13)

Course is not a special class.

Grade Options

- Letter Grade Methods
- Pass/No Pass

☐ Allow Students to Gain Credit by Exam/Challenge

Allowed Number of Retakes

0

Course Prior To College Level (CB21)

Not applicable.

Rationale For Credit By Exam/Challenge

No value

Retake Policy Description

Type:|Non-Repeatable Credit

☑ Allow Students To Audit Course

Course Support Course Status (CB26)

No value

Associated Programs

☑ Course is part of a program (CB24)

Associated Program	Award Type	Active
CC Liberal Arts: Mathematics & Science	A.A. Degree Major	Summer 2018 to Fall 2020
CSU General Education (CSU GE Breadth) (In Development)	Certificate of Achievement	Fall 2021
Intersegmental General Education Transfer Curriculum Certificate of Achievement (In Development)	Certificate of Achievement	Fall 2021
CSU General Education (CSU GE Breadth)	Certificate of Achievement	Fall 2020
Intersegmental General Education Transfer Curriculum Certificate of Achievement	Certificate of Achievement	Fall 2020
Liberal Arts: Mathematics & Science Associate in Arts Degree	A.A. Degree Major	Fall 2020

Transferability & Gen. Ed. Options

Course General Education Status (CB25)

No value

Transferability

Transferable to both UC and CSU

Transferability Status

Approved

Cerro Coso General Education Requirements	Categories	Status	Approval Date	Comparable Course
Area 1.2	Natural Science Physical Sciences	Approved	No value	No Comparable Course defined.

CSU General Education Certification	Categories	Status	Approval Date	Comparable Course
Area B.1	Scientific Inquiry & Quantitative Reasoning Physical Sciences	Approved	No value	No Comparable Course defined.
Area B.3	Scientific Inquiry & Quantitative Reasoning Laboratory	Approved	No value	

Intersegmental General Education Transfer Curriculum	Categories	Status	Approval Date	Comparable Course
Area 5.A	Physical & Biological Sciences Physical Science	Approved	No value	No Comparable Course defined.
Area 5.C	Physical & Biological Sciences Laboratory/Activity	Approved	No value	

Units and Hours

Summary

Minimum Credit Units (CB07)	4
Maximum Credit Units (CB06)	4
Total Course In-Class (Contact) Hours	108
Total Course Out-of-Class Hours	108
Total Student Learning Hours	216
Faculty Load	0

Credit / Non-Credit Options

Course Credit Status (CB04)	Course Non Credit Category (CB22)	Non-Credit Characteristic
Credit - Degree Applicable	Credit Course.	No Value

Course Classification Status (CB11)	Funding Agency Category (CB23)

Credit Course.

Not Applicable.

Cooperative Work Experience Education Status (CB10)

Variable Credit Course

Weekly Student Hours

	In Class	Out of Classs
Lecture Hours	3	6
Laboratory Hours	3	0
Activity Hours	0	0

Course Student Hours

Course Duration (Weeks)	18
Hours per unit divisor	0
Course In-Class (Contact) Hours	
Lecture	54
Laboratory	54
Activity	0
Total	108
Course Out-of-Class Hours	
Lecture	108
Laboratory	0
Activity	0
Total	108

Time Commitment Notes for Students

No value

Faculty Load

Extra Duties: 0

Faculty Load: 0

Units and Hours - Weekly Specialty Hours

Activity Name	Type	In Class	Out of Class
No Value	No Value	No Value	No Value

Pre-requisites, Co-requisites, Anti-requisites and Advisories

Prerequisite

ENGLC070 - Introductory Composition

Students taking PHSC C135 are expected to be able to read college level textbook, understand written laboratory instructions, and draw conclusions from multiple written data sources. Students are required to write research reports based on the conclusions they draw from complex data. ENGL C070 provides those

skills.

Entrance Skills

Entrance Skills	Description
No value	No value

Limitations on Enrollment

Limitations on Enrollment	Description
No value	No value

Specifications

Methods of Instruction

Methods of Instruction	Written work
Rationale	No value
Methods of Instruction	Laboratory
Rationale	No value
Methods of Instruction	Lecture
Rationale	No value
Methods of Instruction	Outside reading
Rationale	No value
Methods of Instruction	Problem Solving
Rationale	No value

Methods of Instruction	Project-based learning
Rationale	No value
Methods of Instruction	Instruction through examination or quizzing
Rationale	No value
Methods of Instruction	Group Work
Rationale	No value
Methods of Instruction	Discussion
Rationale	No value
Methods of Instruction	Demonstration
Rationale	No value
Methods of Instruction	Computational Work
Rationale	No value

Assignments

A. Homework assignments from the relevant textbook chapters. Example: The student is expected to answer instructor assigned questions from the relevant textbook chapters. B. Readings from the assigned textbook. Example: The student is expected to read the textbook chapter covered in each week's lecture. C. Readings and written summaries of weather related articles or news reports. Example: The student is expected to self-select and read a meteorologically relevant article or news report and write a one-page summary. D. Data analysis. Example: The student is required to analyze weather data in order to produce hypothetical weather forecasts. E. Written laboratory summaries. Example: The student is required to write a lab report that summarizes the laboratory methods performed, data collected, and data analysis for each week's lab activity.

Methods of Evaluation	Rationale
Tests	A. Exams evaluate the students' ability to apply concepts and material taught in class. Example: One question on the midterm requires the students to apply their knowledge of middle latitude cyclones to predict what specific types of weather would be expected along the cyclone's path.
Homework	B. Regular homework assignments reinforce concepts and material taught in class. Example: The student is expected to answer instructor assigned questions from the relevant textbook chapters. C. Readings from the assigned textbook. Example: The student is expected to read the textbook chapter covered in each week's lecture. D. Readings and written summaries of weather related articles or news reports. Example: The student is expected to self-select and read a meteorologically relevant article or news report and student is expected to self-select and read a meteorologically relevant article or news report and write a one-page summary.
Participation	E. Laboratory activities that reinforce concepts and material taught in class. Example: The student is required to analyze weather data in order to produce hypothetical weather forecasts. F. Laboratory reports measure the student's ability to perform techniques and assess the student's understanding of the relevant concepts. Example: The student presents the results from a

laboratory activity, including purpose, procedure, materials, observations, and discussion of the results.

Equipment

No Value

Textbooks

Author	Title	Publisher	Date	ISBN
	Aguado, E. & Burt, J. E. . (2012) Understanding Weather and Climate, 6th, Prentice Hall			
	Ahrens, C. D. . (2012) Meteorology Today, 10th, Brooks Cole			
	Moran, J. M.. (2012) Weather Studies, 5th, American Meteorological Society			
	Ackerman, S. A. & Knox, J. A.. (2013) Meteorology: Understanding the Atmosphere, 4th Ed., Jones & Bartlett Learning			
	Lutgens, F. K., E. J. Tarbuck, and D. G. Tasa. (2015) Atmosphere: An Introduction to Meteorology, 13th Ed., Prentice Hall			

Other Instructional Materials

Description	Manuals: Carbone, G.. (2015-01-01 00:00:00.0) Exercises for Weather and Climate, Prentice Hall
Author	
Citation	Introduction to Meteorology

Materials Fee

No

Learning Outcomes and Objectives

Course Objectives

No value

CSLOs

Explain the energy balance of the Earth-atmosphere system. Expected SLO Performance: 70.0

Describe forces that cause atmospheric motion and the resultant pressure patterns, wind systems, and global circulation. Expected SLO Performance: 70.0

Describe moisture, clouds, and precipitation processes, and their distributions. Expected SLO Performance: 70.0

Explain weather systems, their geographical distribution, and extreme weather events. Expected SLO Performance: 70.0

Classify and interpret atmospheric data through weather maps, radar imagery, and satellite data. Expected SLO Performance: 70.0

Describe global climate distribution and the causes and implications of climate change. Expected SLO Performance: 70.0

Utilize the scientific method in problem solving. Expected SLO Performance: 70.0

Science Liberal Arts: Mathematics & Science AA Degree	Describe the nature of science, the methods applied in scientific investigations, and the value of those methods in developing a rigorous understanding of the physical world.

Effectively communicate scientific results graphically and in writing. Expected SLO Performance: 70.0

Social Science PLOs for CSU GE COA	Communicate scientific results by applying the appropriate scientific method, including experimental and empirical methodologies characteristic of science and modern methods and tools used in scientific inquiry through the use of graphs, oral communications, and writings.
Science Liberal Arts: Mathematics & Science AA Degree	Apply algebraic, graphical, numerical, and other methods to solve applied problems in the areas of mathematics, natural sciences, computer graphics, and computer animation.
Social Science IGETC PLOs	Communicate scientific results by applying the appropriate scientific method, including experimental and empirical methodologies characteristic of science and modern methods and tools used in scientific inquiry through the use of graphs, oral communications, and writings.

Outline

Course Outline

A. Introduction
1. Definition of Meteorology
2. Scientific Method
3. Scientific Basis of Meteorology
4. Branches of Meteorology
5. Sources of weather information
6. Meteorological instruments and measurements
7. Information on weather maps

B. The Earth and Its Atmosphere
1. Atmospheric origin; composition and structure
2. Distinction between meteorology; weather; and climate
3. Evolution of the earth's atmosphere
4. Atmospheric constituents
5. Methods of probing the atmosphere
6. Atmospheric vertical temperature profile
7. Ionosphere
8. Solar-terrestrial relations

C. Energy
1. Electromagnetic radiation spectrum
2. Energy; temperature; and heat
3. Heat transfer in the atmosphere
4. Solar radiation and albedo
5. Solar constant
6. Earth's energy budget

D. Seasons and Temperature
1. Seasonality
2. Temperature variation
3. Temperature scales
4. Heat transport
5. Specific heat
6. Heating/cooling degree days
7. Wind-chill

E. Atmospheric Humidity
1. Hydrologic cycle
2. Evaporation; condensation; and saturation
3. Relative humidity and dew point
4. Measuring humidity

F. Condensation: Dew; Fog; and Clouds
1. Condensation nuclei
2. Dew and frost
3. Fog
4. Clouds

G. Stability and Cloud Development
1. Atmospheric stability and instability
2. Convection
3. Topography
4. Changing cloud forms

H. Precipitation
1. Precipitation processes
2. Precipitation types
3. Measuring precipitation

I. Air Pressure and Winds
1. Atmospheric pressure
2. Forces that influence the winds
3. Winds and vertical air motions

J. Wind: Small Scale and Local Systems
1. Interactions with the environment
2. Wind direction and speed
3. Local wind systems

K. Wind: Global Systems
1. General circulation of the atmosphere
2. Jet streams
3. Atmosphere-ocean interactions

L. Air Masses and Fronts
1. Air mass source regions and classification

2. Fronts

M. Middle-Latitude Cyclones
1. The polar front
2. Vertical structure of mid-latitude cyclones
3. Upper level waves and mid-latitude cyclones
4. Developing mid-latitude cyclones
5. Polar lows

N. Weather Forecasting
1. Weather forecasting tools and methods
2. Weather forecasting using surface charts
3. Weather predictions

O. Thunderstorms and Tornadoes
1. Thunderstorm types and characteristics
2. Thunderstorm distribution
3. Lightning
4. Tornado distribution and formation
5. Doppler radar

P. Hurricanes
1. Hurricane characteristics
2. Life cycle of a hurricane
3. Winds and rain
4. Notable hurricanes

Q. The Earth's Changing Climate
1. Past climates
2. Causes of climate change
3. Global warming

R. Global Climates
1. Climate classification
2. Global climate patterns and variability

S. Air Pollution
1. Types and sources of air pollution
2. Factors that affect air pollution
3. Air pollution and the urban environment

Lab Outline

Laboratory activities may include; but are not limited to; the following topics:

1. Vertical Structure of the Atmosphere

2. Earth-Sun Geometry

3. The Surface Energy Budget

4. The Global Energy Budget

5. Atmospheric Moisture

6. Saturation and Atmospheric Stability

7. Cloud Droplets and Raindrops

8. Atmospheric Motion

9. Weather Map Analysis

10. Mid-Latitude Cyclones

11. Weather Forecasting

12. Thunderstorms and Tornadoes

13. Hurricanes

14. Climate Controls

15. Climate Classification

16. Climate Variability and Change

17. Simulating Climate Change

OLD Delivery Methods and Distance Education

Delivery Method: Please list all that apply -Face to face -Online (purely online no face-to-face contact) -Online with some required face-to-face meetings ("Hybrid") -Online course with on ground testing -iTV – Interactive video = Face to face course with significant required activities in a distance modality -Other

Face 2 Face
Online
Hybrid
Interactive

Rigor Statement: Assignments and evaluations should be of the same rigor as those used in the on-ground course. If they are not the same as those noted in the COR on the Methods of Evaluation and out-of-class assignments pages, indicate what the differences are and why they are being used. For instance, if labs, field trips, or site visits are required in the face to face section of this course, how will these requirements be met with the same rigor in the Distance Education section?

iTV: All assignments, labs, and exams are identical to those in a regular onsite class. Lectures and class discussions are conducted through iTV. Labs are conducted at each student's respective site. The instructor is responsible for providing feedback either through iTV conferences, e-mail, phone conferences, regular mail, or office hours. The instructor must provide substantive grading of all assignments, labs, and exams, as well as some assessment of iTV class participation. Online: Course content is identical to those in an onsite class, except that they take the form of written lecture notes, written lab notes, and/or online videos. All lecture and lab assignments are identical to those in an onsite class, except that they are submitted within Moodle. All labs take the form of analyzing: (1.) self-contained data sets that are provided in the course's laboratory manual, or (2.) data sets constructed by the students using online resources (e.g. the National Oceanic and Atmospheric Administration websites). All exams must be taken as proctored exams, and they are identical in content to those in an onsite class. Weekly class discussions are conducted by means of online discussion forums within Moodle. The instructor is responsible for providing feedback both in online discussion forums and through e-mail. The instructor must provide substantive grading of all assignments, exams, and at least general responses to discussion posts.

Effective Student-Instructor Contact: Good practice requires both asynchronous and synchronous contact for effective contact. List the methods expected of all instructors teaching the course. -Learning Management System -Discussion Forums -Message -Other Contact -Chat/Instant Messaging -E-mail -Face-to-face meeting(s) -Newsgroup/Discussion Board -Proctored Exam -Telephone -iTV - Interactive Video -Other (specify)

forums
message
chat
email
discussion
proctored
itv

Software and Equipment: What additional software or hardware, if any, is required for this course purely because of its delivery mode? How is technical support to be provided?

No Value

Accessibility: Section 508 of the Rehabilitation Act requires access to the Federal government's electronic and information technology. The law covers all types of electronic and information technology in the Federal sector and is not limited to assistive technologies used by people with disabilities. It applies to all Federal agencies when they develop, procure, maintain, or use such technology. Federal agencies must ensure that this technology is accessible to employees and the public to the extent it does not pose an "undue burden". I am using -iTV—Interactive Video only -Learning management system -Publisher course with learning management system interface.

itv
moodle
publisher

Class Size: Good practice is that section size should be no greater in distance ed modes than in regular face-to-face versions of the course. Will the recommended section size be lower than in on-ground sections? If so, explain why.

class_size 45