

# GEOG M05: INTRODUCTION TO WEATHER AND CLIMATE

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**Originator**

rputnam

**College**

Moorpark College

**Discipline (CB01A)**

GEOG - Geography

**Course Number (CB01B)**

M05

**Course Title (CB02)**

Introduction to Weather and Climate

**Banner/Short Title**

Weather and Climate

**Credit Type**

Credit

**Start Term**

Fall 2022

**Catalog Course Description**

Introduces meteorological phenomena, including atmospheric circulation and behavior, clouds, precipitation, wind systems, storms, and air pollution. Focuses on interrelationships between land, ocean, and atmosphere as well as weather instruments and their roles in reporting general and aviation weather conditions.

**Taxonomy of Programs (TOP) Code (CB03)**

2206.00 - Geography

**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**

Will not be required

**Grading method**

(L) Letter Graded

**Alternate grading methods**

(O) Student Option- Letter/Pass

(P) Pass/No Pass Grading

**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**

**Laboratory**

**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****Unpaid****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

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

- |   |   |
|---|---|
| 1 | explain short and medium term weather forecasts based on sound meteorological principles.   |
| 2 | explain climate phenomena including global circulations, past and current climate, and basic physical mechanisms, responsible for climate change. |

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

- |    |   |
|----|---|
| 1  | explain the significance of earth's orbital parameters with respect to seasonality and climate. |
| 2  | explain the origin, composition and behavior of earth's atmosphere.                             |
| 3  | describe the basic weather elements and how they are measured.                                  |
| 4  | identify cloud types and associated weather systems.  |
| 5  | explain the earth's atmospheric circulation patterns, jet streams and local winds.              |
| 6  | explain air masses, weather fronts and cyclonic circulation.                                    |
| 7  | describe the causes and effects of severe weather systems.                                      |
| 8  | describe adiabatic processes, stability and instability.  |
| 9  | describe ocean/atmosphere interactions; El Nino and La Nina.                                    |
| 10 | define and map the distribution of Mediterranean climate zones.                                 |
| 11 | explain the basics of weather forecasting.  |
| 12 | explain Koppen's climate classification scheme.   |

**Course Content****Lecture/Course Content**

- (5%) - **Composition and structure of the atmosphere**
  - Thickness of the atmosphere and changing density
  - The vertical profile based on temperature
  - Permanent gases, variable gases, and aerosols
  - Evolution of the atmosphere; historical and daily

- **(5%) - Insolation**
  - Sun angles
  - Why we have seasons
  - Kinds of energy and energy transfer mechanisms
  - Global temperature distributions
- **(10%) - Energy balance and temperature**
  - Energy transfer between the surface and the atmosphere
  - Absorption, reflection, scattering, and transmission of electromagnetic radiation (light)
  - Greenhouse effect
  - Change of phase of H<sub>2</sub>O and temperature
- **(12%) - Atmospheric pressure and wind**
  - What pressure is and how it is measured
  - Vertical and horizontal pressure changes
  - Pressure gradients and hydrostatic equilibrium
  - Forces affecting the speed and direction of the wind
  - Surface winds, upper atmosphere winds, and large air mass winds
- **(12%) - Atmospheric moisture**
  - Evaporation and condensation
  - Absolute and relative humidity
  - Distribution of water vapor
- **(12%) - Condensation and precipitation**
  - Lifting mechanisms and environmental lapse rate
  - Inversions
  - Cloud types and what they tell you about the atmosphere
  - Forms of precipitation
- **(9%) - Global atmospheric circulation**
  - The three cell model
  - Winds in the upper troposphere and major wind systems
  - Air masses and fronts
  - Wind/ocean interactions
- **(10%) - Extreme weather**
  - Mid-latitude cyclones
  - Lightning, thunder, and tornadoes
  - Tropical storms and hurricanes
- **(5%) - Human effects on weather**
  - Atmospheric pollutants
  - Heat islands
- **(20%) - Earth's climate**
  - Defining climate
  - Parameters used to classify different climates
  - Factors that can force climate change
  - Feedback mechanisms and tipping points
  - Tools of climatology
  - Past climates and correlations with their atmospheres
  - Current conditions and projections of the future

#### Laboratory or Activity Content

N/A

#### 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  
Skills demonstrations

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  
Group projects  
Individual projects

Journals  
 Laboratory activities  
 Objective exams  
 Portfolios  
 Quizzes  
 Reports/papers  
 Research papers  
 Skills demonstrations  
 Skills tests or practical examinations  
 Classroom Discussion  
 Projects  
 Participation  
 Reports/Papers/Journals

## **Instructional Methodology**

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

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

### **Describe specific examples of the methods the instructor will use:**

- Under the instructor's guidance, students look at real-time atmospheric conditions and then the class will predict what the weather will do over the next several days on a local and regional-scale.
- Assess historic weather data gathered by our college's weather station to determine historic conditions and changes in those conditions over time.
- Guest speakers to class to discuss the weather and climate conditions of the community.

## **Representative Course Assignments**

### **Writing Assignments**

- Write summaries of weekly readings from newspaper and journal articles relating to meteorology.
- Write essays on assigned topics of meteorology.
- Write a term paper involving research and analysis of a particular topic relative to El Niño and La Niño.

### **Critical Thinking Assignments**

- Analyze the historical development of different regions of the world based on climate.
- Write a position paper on the best policy responses to anthropogenic climate change.

### **Reading Assignments**

- Read anecdotal historic weather reports (e.g., ship's logs) and extrapolate past conditions.
- Read the day's weather report and suggest what conditions led to them.
- Read relevant papers and books discussing changes in California's climate.

### **Skills Demonstrations**

- Interpret weather maps and atmospheric data.
- Predict storm movement patterns based on atmospheric conditions.

## Outside Assignments

### Representative Outside Assignments

- Readings from newspapers, journals, and Internet sources related to the basics of weather forecasting.
- Observations of local weather using Moorpark Weather Station World-Wide-Web link and other resources.

## Articulation

### C-ID Descriptor Number

GEOG 130

### Status

Approved

### Equivalent Courses at 4 year institutions

University	Course ID	Course Title	Units
CSU Northridge	GEOG 103	Weather	3
UC Santa Barbara	GEOG 3A	Oceans and Atmosphere	4
Cal Poly San Luis Obispo	PHYS 107	Introduction to Meteorology	3
CSU Fresno	GEOG 5	Physical Geography: global Concepts, Weather and Climate	3

### Comparable Courses within the VCCCD

GEOG R103 - Introduction to Weather and Climate

GEOG V05 - Introduction to Weather and Climate

## District General Education

### A. Natural Sciences

#### A2. Physical Science

Approved

### B. Social and Behavioral Sciences

### C. Humanities

### D. Language and Rationality

### E. Health and Physical Education/Kinesiology

### F. Ethnic Studies/Gender Studies

### Course is CSU transferable

Yes

### CSU Baccalaureate List effective term:

Fall 1995

## CSU GE-Breadth

### Area A: English Language Communication and Critical Thinking

### Area B: Scientific Inquiry and Quantitative Reasoning

#### B1 Physical Science

Approved

**Area C: Arts and Humanities****Area D: Social Sciences****Area E: Lifelong Learning and Self-Development****Area F: Ethnic Studies****CSU Graduation Requirement in U.S. History, Constitution and American Ideals:****UC TCA**

UC TCA  
Approved

**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 5A: Physical Science  
Approved

**Area 6: Languages Other than English (LOTE)****Textbooks and Lab Manuals****Resource Type**

Textbook

**Description**

Aguado Edward, and James Burt. *Understanding Weather and Climate*. 7th ed., Pearson, 2015.

**Resource Type**

Textbook

**Description**

Lutgens, Frederick, et al. *The Atmosphere: An Introduction to Meteorology*. 14th ed., Pearson. 2018.

**Library Resources****Assignments requiring library resources**

Research and analysis of topics appropriate to the course using the Library's print and online resources; access to current newspapers and other periodicals for current information on meteorology. Access to Google Earth.

**Sufficient Library Resources exist**

Yes

**Example of Assignments Requiring Library Resources**

Research papers on what the historic climate conditions of Ventura County and the state of California were and how they are changing given changes in global climate.

## Distance Education Addendum

### Definitions

#### Distance Education Modalities

Hybrid (1%–50% online)

Hybrid (51%–99% online)

100% online is a temporary emergency approval ONLY

### 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)	Regular Asynchronous discussion boards will be used to encourage discussion among students where they can compare and contrast/ discuss /identify and analyze elements of course outcomes. Other Discussion boards will also be used for Q&A and general class discussion by students and instructor to facilitate student learning outcomes. E.g. - Students will use the discussion board in Canvas to discuss how the geosphere and hydrosphere influence each other.
E-mail	Email, class announcements and tools such as “Message Students Who” and “Assignment Comments” in Canvas will be used to regularly communicate with all students to clarify class content, remind of upcoming assignments, and provide immediate feedback to students on coursework to facilitate student learning outcomes. Students will be given multiple ways to email instructor through Canvas inbox and faculty provided email account through their own canvas email and school email.
Other DE (e.g., recorded lectures)	Faculty will use a variety of tools and media integrated within the LMS to help students reach SLO such as: o Recorded Lectures, Narrated Slides, Screencasts o Instructor created content o MC Online Library Resources o Canvas Peer Review Tool o Canvas Student Groups (Assignments, Discussions) o 3rd Party (Publisher) Tools (Mastering Geography) o Websites and Blogs o Multimedia (YouTube, Films on Demand, 3CMedia, Google Earth, Earth.nullschool, etc.)
Synchronous Dialog (e.g., online chat)	Scheduled synchronous sessions may be organized at the instructor’s discretion to demonstrate skills, address problems, and review asynchronous lectures. Synchronous sessions may also be used for tudents to work on problem sets together. The platform for such sessions may include ConferZoom or any other approved medium for synchronous dialog.



**Hybrid (51%–99% online) Modality:**

<b>Method of Instruction</b>	<b>Document typical activities or assignments for each method of instruction</b>
Asynchronous Dialog (e.g., discussion board)	Regular Asynchronous discussion boards will be used to encourage discussion among students where they can compare and contrast/ discuss /identify and analyze elements of course outcomes. Other Discussion boards will also be used for Q&A and general class discussion by students and instructor to facilitate student learning outcomes. E.g. - Students will use the discussion board in Canvas to discuss how the geosphere and hydrosphere influence each other.
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Synchronous Dialog (e.g., online chat)	Scheduled synchronous sessions may be organized at the instructor’s discretion to demonstrate skills, address problems, and review asynchronous lectures. Synchronous sessions may also be used for students to work on problem sets together. The platform for such sessions may include ConferZoom or any other approved medium for synchronous dialog.

**100% online Modality:**

<b>Method of Instruction</b>	<b>Document typical activities or assignments for each method of instruction</b>
Asynchronous Dialog (e.g., discussion board)	Regular Asynchronous discussion boards will be used to encourage discussion among students where they can compare and contrast/ discuss /identify and analyze elements of course outcomes. Other Discussion boards will also be used for Q&A and general class discussion by students and instructor to facilitate student learning outcomes. E.g. - Students will use the discussion board in Canvas to discuss how the geosphere and hydrosphere influence each other.
E-mail	Email, class announcements and tools such as “Message Students Who” and “Assignment Comments” in Canvas will be used to regularly communicate with all students to clarify class content, remind of upcoming assignments, and provide immediate feedback to students on coursework to facilitate student learning outcomes. Students will be given multiple ways to email instructor through Canvas inbox and faculty provided email account through their own canvas email and school email.

Other DE (e.g., recorded lectures)	Faculty will use a variety of tools and media integrated within the LMS to help students reach SLO such as: <ul style="list-style-type: none"> <li>o Recorded Lectures, Narrated Slides, Screencasts</li> <li>o Instructor created content</li> <li>o MC Online Library Resources</li> <li>o Canvas Peer Review Tool</li> <li>o Canvas Student Groups (Assignments, Discussions)</li> <li>o 3rd Party (Publisher) Tools (Mastering Geography)</li> <li>o Websites and Blogs</li> <li>o Multimedia (YouTube, Films on Demand, 3CMedia, Google Earth, Earth.nullschool, etc.)</li> </ul>
Synchronous Dialog (e.g., online chat)	Scheduled synchronous sessions may be organized at the instructor's discretion to demonstrate skills, address problems, and review asynchronous lectures. Synchronous sessions may also be used for students to work on problem sets together. The platform for such sessions may include ConferZoom or any other approved medium for synchronous dialog.

## Examinations

### Hybrid (1%–50% online) Modality

On campus  
Online

### Hybrid (51%–99% online) Modality

On campus  
Online

## Primary Minimum Qualification

GEOGRAPHY

## Review and Approval Dates

### Department Chair

11/11/2021

### Dean

11/12/2021

### Technical Review

11/18/2021

### Curriculum Committee

12/07/2021

### DTRW-I

MM/DD/YYYY

### Curriculum Committee

MM/DD/YYYY

### Board

MM/DD/YYYY

### CCCCO

MM/DD/YYYY

### Control Number

CCC000428295

### DOE/accreditation approval date

MM/DD/YYYY

