Degree Applicable | Glendale Community College
March 2013

COURSE OUTLINE

Geography 107 (C-ID Number: GEOG 130)
Weather, Climate and Climate Change (C-ID Title: Introduction to Weather and Climate)

I. Catalog Statement

Geography 107 is an introduction to the atmosphere with an emphasis on its properties and physical processes. The course focuses on the atmosphere's composition and structure, incoming solar radiation and energy balance, temperature, seasonal changes, atmospheric moisture, clouds and fog, precipitation, air pressure, winds, air masses and fronts, tornadoes, hurricanes, weather forecasting, El Niño, climate and climate change.

Total Lecture Units: 3.0
Total Course Units: 3.0

Total Lecture Hours: 48.0
Total Faculty Contact Hours: 48.0

Recommended Preparation: Eligibility for English 120 or ESL 151.

II. Course Entry Expectations

Skills Level Ranges: Reading 5, Writing 5, Listening/Speaking 5, Math 3.

Prior to enrolling in the course, the student should be able to:
1. understand college-level reading selections;
2. take college-level lecture notes and follow complex oral directions;
3. learn material by participating in class discussions and lectures;
4. solve basic mathematical problems such as the addition, subtraction, multiplication, and division of signed numbers as well as solve simple equations;
5. communicate learning, conceptual understanding and critical analysis skills through writing research papers, essay exams, or other types of writing assignments.

III. Course Exit Standards

At the conclusion of this course, the student should be able to demonstrate critical thinking skills and an understanding of:
1. the energy balance of the Earth-atmosphere system;
2. the forces that cause atmospheric motion and resultant pressure patterns, wind systems and global circulation;
3. atmospheric moisture, clouds and precipitation processes, and their distributions;
4. the nature of weather systems, their distribution and extreme events;

5. the classification and interpretation of atmospheric data through weather maps, radar imagery and satellite data;
6. global climate distributions and the causes and implications of global climate change.

IV. <u>Course Content</u> **Total Faculty Contact Hours = 48 hours**

A. Survey of the Atmosphere 4 hours
1. The thickness of the atmosphere
2. Atmospheric composition
3. The vertical structure of the atmosphere
4. The evolution of the atmosphere

B. Energy and Mass 8 hours
1. Solar radiation and the seasons
2. Energy balance and temperature
3. Atmospheric pressure and wind

C. Water in the Atmosphere 8 hours
1. Atmospheric moisture
2. Cloud types
3. Atmospheric thermodynamics
4. Precipitation processes
5. Precipitation forms

D. Distribution and Movement of Air 6 hours
1. Tropospheric circulation and pressure distribution
2. Air-sea interactions
3. Air mass formation and source regions
4. Types of air masses
5. Fronts: cold, warm, stationary and occluded

E. Atmospheric Disturbances 8 hours
1. Mid-latitude cyclones
2. Lightning, thunder and tornadoes
3. Tropical storms and hurricanes

F. Human Activities and Effects 6 hours
1. Weather forecasting and analysis
2. Data acquisition and dissemination
3. Forecasting methods and types
4. Weather maps and images
5. Numerical models
6. Air pollution and heat islands

G. Current, Past and Future Climates 8 hours
1. Earth's climate zones

2. Climate classification systems
3. Climate change
4. Paleo-climatological methods and techniques
5. Climates of the past
6. Factors involved in climate change
7. Feedback mechanisms
8. General circulation models

V. Methods of Instruction

The following methods of instruction may be used in the course:
1. lecture-discussion;
2. small group sessions;
3. audio-visual presentations;
4. student presentations;
5. local field trips;
6. online presentations.

VI. Out of Class Assignments

The following out of class assignments may be used in the course:
1. creating content in preparation for in-class group presentations;
2. research and writing assignments addressing a topic relative to the course content (e.g., the sequential development of a hurricane);
3. online lessons completed with Moodle or another approved LMS.

VII. Methods of Evaluation

The following methods of evaluation may be used in the course:
1. unit exams;
2. mid-term exams;
3. student presentations (e.g., explaining recent temperature trends in Los Angeles);
4. online exercise (e.g., Moodle-based lesson on the global wind and pressure belts);
5. final examination.

VIII. Textbook(s)

Lutgens, Frederick, Edward Tarbuck, and Dennis Tasa. *The Atmosphere: Introduction to Meteorology 12th Edition.* Upper Saddle River: Prentice Hall, 2012. Print.
13th Grade Textbook Reading Level. ISBN: 0321756312

IX. Student Learning Outcomes

Upon successful completion of the required course work in Weather, Climate and Climate Change, the student will be able to demonstrate critical thinking skills and an understanding of:

1. the key principles and topics in atmospheric science such as earth-sun relationships, seasonality, weather, climate, and climate change;
2. the atmosphere and its constituent processes including energy transfer, air masses and storm formation;
3. modern methods and tools used in atmospheric inquiry and the role of scientific experimentation in the pursuit of atmospheric knowledge;
4. the vertical layers of the atmosphere, the composition of each layer, and the relative importance of the gases within each layer;
5. the forces that cause atmospheric motion and the resultant pressure patterns, wind systems and global circulation;
6. the major steps in the cloud formation process, the principal types of clouds and forms of precipitation;
7. the development and geographic distribution of storm systems and extreme weather events;
8. the changing composition of the atmosphere through time, the root causes, and the impact of these changes on everyday life.

Justification

Geography 107 is an optional course for the Associate in Arts for Transfer degree in Geography. This course is related to the college goal of continuing the development of AA and AS-T degrees. The Geography AA-T degree is accepted by the California State Universities to which our students most frequently transfer.