

COURSE OUTLINE

METO-111

Meteorology

3 Credits

Science Core Course

HOWARD COMMUNITY COLLEGE

Description

This course is designed as an introduction to the study of weather, climate and the atmosphere. Topics will include solar and terrestrial radiation, temperature and humidity, cloud formation, air pressure and winds, circulation and weather patterns, tornadoes, hurricanes, air pollution, and climatic change. (3 hours weekly)

Statement on General Education and Liberal Learning

A liberal education prepares students to lead ethical, productive, and creative lives and to understand how the pursuit of lifelong learning and critical thinking fosters good citizenship. General education courses form the core of a liberal education within the higher education curriculum and provide a coherent intellectual experience for all students by introducing the fundamental concepts and methods of inquiry in the areas of mathematics, the physical and natural sciences, the social sciences, the arts and the humanities, and composition. This course is part of the general education core experience at Howard Community College.

Overall Course Objectives

Upon completion of this course, the student will be able to:

1. Describe the composition of the atmosphere, and how this composition has evolved over time.
2. Discuss the primary ways in which clouds form.
3. Identify different cloud types and explain their occurrence.
4. Discuss the vertical divisions of the atmosphere.
5. Exhibit an understanding of the physical concepts of density and buoyancy, and how these concepts relate to weather.
6. Explain the Coriolis Effect, and its implications for weather.
7. Explain the greenhouse effect, ozone depletion, and various types of air pollution.
8. Recognize global weather patterns, and climatic zones and explain their distribution.
9. Demonstrate an understanding of the relationships between the sun and earth which cause the seasons, solstices and equinoxes.
10. Discuss the difference between conduction, convection, and radiation transport of heat.
11. Discuss the concept of specific heat.
12. Explain the role of water as a heat reservoir and temperature modifier.
13. Discuss the windchill index.
14. Compare sensible heating and latent heating of the atmosphere.
15. Distinguish between heat and temperature.
16. Discuss how and why air pressure changes at the earth's surface.
17. Explain the formation of the strong air masses that affect U.S. weather.

18. Discuss the causes and effects of horizontal and vertical winds.
19. Relate adiabatic processes to relative humidity changes.
20. Discuss global wind patterns and important local winds.
21. Describe the different types of fog and precipitation, and explain why each occurs.
22. Recognize and explain optical phenomena in the atmosphere.
23. Discuss extratropical cyclones and anticyclones and their effect on U.S. weather.
24. Recognize the different types of frontal systems.
25. Discuss the life cycle of a thunderstorm.
26. Explain why lightning occurs.
27. Discuss the atmospheric and terrain conditions that spawn tornadoes.
28. Discuss the characteristics and distribution of hurricanes.
29. Interpret surface weather maps and upper air charts.
30. Forecast the weather for several east coast U.S. cities.

Major Topics

- I. Introduction to the Atmosphere
- II. Solar and Terrestrial Radiation
- III. Temperature
- IV. Moisture and Atmospheric Stability
- V. Condensation and Precipitation
cloud classification and varieties
- VI. Air Pressure and Winds
- VII. Circulation of the Atmosphere
westerlies, jet streams, ocean currents, global weather
- VIII. Air Masses
- IX. Weather Patterns
fronts, cyclones
- X. Thunderstorms and Tornadoes
- XI. Hurricanes
- XII. Weather Analysis and Forecasting
weather charts, satellites
- XIII. Air Pollution
- XIV. Earth's Changing Climate
volcanic activity, greenhouse warming
- XV. World Climates
geography and climatic zones

Course Requirements

Grading/exams: Grading procedures will be determined by the individual faculty member but will be calculated on the basis of quizzes, exams, projects, and a final exam.

Writing: Specific writing assignments will be determined by the individual faculty member.

Other Course Information

This course is a Science core course, Science elective, and an Arts and Science elective.