**BARTON COMMUNITY COLLEGE**

**COURSE SYLLABUS**

# **GENERAL COURSE INFORMATION**

Course Number: PHSC 1406

Course Title: Introduction to Meteorology

Credit Hours: 4

Prerequisites: None

Division/Discipline: Academics/Physical Science

Course Description: A study of the principles and lab procedures of weather, including the roles of temperature, moisture, sun-earth interactions, air pressure and winds, general circulation of the atmosphere, air masses, midlatitude cyclones, thunderstorms and tornadoes, hurricanes, weather analysis and forecasting, air pollution, climate change, world climates, atmospheric optical phenomena.

1. **INSTRUCTOR INFORMATION**

# **COLLEGE POLICIES**

Students and faculty of Barton Community College constitute a special community engaged in the process of education. The college assumes that its students and faculty will demonstrate a code of personal honor, which is based upon courtesy, integrity, common sense, and respect for others both within and outside the classroom.

Plagiarism on any academic endeavors at Barton Community College will not be tolerated. The student is responsible for learning the rules of, and avoiding instances of, intentional or unintentional plagiarism. Information about academic integrity is located in the Student Handbook.

The College reserves the right to suspend a student for conduct that is determined to be detrimental to the College educational endeavors as outlined in the College Catalog, Student Handbook, and College Policy & Procedure Manual. [Most up-to-date documents are available on the College webpage.]

Any student seeking an accommodation under the provisions of the Americans with Disability Act (ADA) is to notify Student Support Services via email at [disabilityservices@bartonccc.edu](mailto:disabilityservices@bartonccc.edu).

# **COURSE AS VIEWED IN THE TOTAL CURRICULUM**

Introduction to Meteorology is a general education course at Barton Community College that can be used to fulfill degree requirements as a Natural Science and Mathematics laboratory course.

This course provides a student a basic understanding of the science of meteorology. It focuses on the processes which produce precipitation, a study of the general circulation of the atmosphere, weather fronts and severe weather, etc.

The transferability of all college courses will vary among institutions, and perhaps even among departments, colleges, or programs within an institution. Institutional requirements may also change without prior notification. Students are responsible to obtain relevant information from intended transfer institutions to insure that the courses the student enrolls in are the most appropriate set of courses for the transfer program.

# **ASSESSMENT OF STUDENT LEARNING / COURSE OUTCOMES**

Barton Community College is committed to the assessment of student learning and to quality education. Assessment activities provide a means to develop an understanding of how students learn, what they know, and what they can do with their knowledge. Results from these various activities guide Barton, as a learning college, in finding ways to improve student learning.

Core Outcomes, Competencies and Supplemental Competencies:

Upon successful completion of this course, students will:

1. Explain the vertical structure of the atmosphere.
2. Name the principal gases composing Earth’s atmosphere.
3. Describe Earth’s four major spheres.
4. Diagram the vertical temperature and pressure structure of the atmosphere.
5. Describe solar/Earth interactions.
6. Examine solstices and equinoxes.
7. Identify causes for changes in length of day and sun angle.
8. Diagram earth-sun orientation throughout the year.
9. Measure solar elevation angle.
10. Describe temperature and its impact.
11. Evaluate a map depicting temperature data using isotherms.
12. Describe different temperature scales.
13. Name the principal controls of temperature.
14. Examine basic daily and annual cycles of air temperature.
15. Illustrate how various factors influence temperature at a given latitude.
16. Illustrate how to determine relative humidity and dew point.
17. Illustrate how temperature changes when air is forced to rise.

1. Describe atmospheric processes and cloud types.
2. Describe the movement of water through the hydrologic cycle.
3. Examine basic cloud types.
4. Examine water phase changes.
5. Evaluate atmospheric stability.
6. Explain air pressure, winds, and local/global atmospheric circulation.
7. Examine the Coriolis effect.
8. Explain how atmospheric pressure is displayed on a weather map.
9. Analyze cyclones and anticyclones.
10. Examine global wind patterns.
11. Illustrate the Coriolis effect.
12. Diagram the forces acting to produce wind.
13. Explain air masses & midlatitude weather systems.
14. Analyze air masses and air mass weather.
15. Identify source regions that influence North America.
16. Identify elements of a midlatitude cyclone.
17. Diagram how weather conditions differ at various locations around a midlatitude cyclone.
18. Illustrate the role of upper-air dynamics on a midlatitude cyclone.
19. Describe severe weather phenomena.
20. Explain the elements of thunderstorms and tornado development.
21. Describe the basic structure and characteristics of hurricanes.
22. Illustrate the processes acting during a typical air mass thunderstorm.
23. Outline how certain weather features influence severe thunderstorms.
24. Outline the necessary conditions for hurricane development.
25. Illustrate how pressure and wind patterns influence the hurricane path.
26. Explain weather analysis and forecasting.
27. Describe major steps used to generate a weather forecast.
28. Analyze upper-level flow and its relationship to surface weather.
29. Diagram symbols on a weather map.
30. Diagram isolines, fronts, high and low pressure centers of a surface map.
31. Explain air pollution and its impact.
32. Examine the natural and anthropogenic causes of air pollution.
33. Distinguish between primary and secondary pollutants.
34. Describe the processes which form acid rain.
35. Discuss world climates and climate change.
36. Describe how past climate changes are detected.
37. Describe the natural and man-made causes of climate change.
38. Explain climate classification.
39. Describe positive and negative feedback mechanisms that affect climate.
40. Outline the factors influencing temperature and precipitation patterns.
41. Diagram the temperature and rainfall patterns with Koeppen climate types.
42. Relate a sample climograph to a particular location on earth.
43. Describe how variations in solar output influence Earth’s climate.
44. Explain the optical phenomena of the atmosphere.
45. Explain the difference between reflection and refraction.
46. Examine how a mirage is created.
47. Describe coronas and halos.
48. Analyze how sunlight and raindrops form a rainbow.
49. **INSTRUCTOR EXPECTATIONS OF STUDENTS IN CLASS**

# **TEXTBOOKS AND OTHER REQUIRED MATERIAL**

1. **REFERENCES**
2. **METHODS OF INSTRUCTION AND EVALUATION**

Since laboratory activities are integral to the learning outcomes of this lab science course, students must pass the laboratory portion of the class in order to successfully complete, i.e., pass, the course as defined by departmental or transfer requirements.

1. **ATTENDANCE REQUIREMENTS**
2. **COURSE OUTLINE**