

Bergen Community College
Division of Mathematics, Science and Technology
Department of Physical Sciences

Master Course Syllabus
PHY 114 - Meteorology

Semester and year:
Course Number:
Meeting Times and Locations:

Instructor:
Office Location:
Phone:
Office Hours:
Email Address:

COURSE TITLE: PHY 114 - METEOROLOGY

COURSE DESCRIPTION:

Meteorology is a study of the Physics of weather. It begins with the present composition of our atmosphere and study of the heat transfer mechanisms that lead to its thermal structure. Included is an analysis of the weather elements – temperature, humidity, clouds, pressure, winds, and precipitation and their physical interactions. The equations of motion are used to illustrate the development and circulation of air masses, fronts, anticyclones, cyclones, hurricanes, and severe storms. Special topics include the Chemistry of air pollution and the Physics of lightning. Labs emphasize sun-weather relationships, weather maps, and forecasting techniques.

3 lecture contact hours, 3 lab contact hours, 4 credits
}General Education Course

TEXTBOOKS: *Weather Studies: Introduction to Atmospheric Science*, E.W. Mills, 6th edition, American Meteorological Society, 2015

Weather Studies eInvestigations Manual: 2018-2019 & Summer 2019, American Meteorological Society Education Program, Meteorological Society, 2018

STUDENT LEARNING OBJECTIVES (OUTCOMES)

The student will be able to:

- A. Describe the methods of investigation used to increase our scientific knowledge.
- B. Present the results of these investigations: the fundamental patterns, processes and concepts active in meteorology.
- C. Develop a vocabulary of meteorological terms.
- D. Understand the vertical thermal structure of our atmosphere
- E. Understand the heat transfer mechanisms in our atmosphere
- F. Understand the controls of temperature
- G. Know how temperature is measured
- H. Know the various humidity variables
- I. Know how humidity is measured

- J. Identify the various fogs
- K. Identify the various cloud types
- L. Understand the importance of instability and stability in the atmosphere
- M. Identify the various forms of precipitation
- N. Know how atmospheric pressure is measured
- O. Know how the various theoretical high and low pressure wind systems from the forces that go into them
- P. Be familiar with various local and seasonal winds
- Q. Understand what goes into the general circulation of the atmosphere
- R. Be familiar with jet streams
- S. Be familiar with air masses, fronts and how they affect the weather.
- T. Develop skills in interpreting these scientific data on weather and be able to discuss and demonstrate simple weather forecasting skills.
- U. Be aware of atmospheric optical phenomena
- V. Know the factors responsible for air pollution
- W. Recognize the ways in which weather affects our daily lives.

ASSESSMENT

For learning objectives A through W, they will be assessed through student performances on examinations and laboratory reports. In addition, for learning objective T, it will be assessed by the student giving an actual verbal weather forecast, including analysis and discussion.

<u>WEEK</u>	<u>TOPIC</u>	<u>READING ASSIGNMENT</u> <u>CHAPTER</u>
1/2	Earth and its atmosphere	1
3/4	Energy and atmospheric structure	2
5/6	Seasonal and daily temperature	3
7	Atmospheric optics	4
		(TEST 1-4)
8	Atmospheric Moisture	5
9	Condensation	6
10	Stability and cloud development	7
11	Precipitation	8
		(TEST 5-8)
12	Wind and pressure	9 & 10
13	Global wind systems/Air Masses	11 & 12
		(TEST 9-12)
14	Fronts, cyclones and weather prediction	13 & 14
15	Thunderstorm/Tornado/Hurricanes	15 & 16
	FINAL EXAMINATION	

GRADING POLICY: Arithmetic average of 3 examinations plus a LAB FOLDER grade and FINAL examination. (Five grades)

From the above average, after two ABSENCES, 3 points will be subtracted for each subsequent absence. After 2 LATENESSES, 1 point will be deducted for each subsequent lateness.