**Introduction to Meteorology (ATM-145-01)**

**Fall 2014**

**Lecture: M, W, F 10:00 – 10:50 (Room: H-112)**

**Laboratory: M 12:00 – 1:50 (Room: R-103)**

**Instructor:** Dr. Joseph Kravitz

**Office Hours:** W and F 12 – 1 in H-227 or by appointment

***The best way to reach me is by e-mail:*** jkravitz@berkshirecc.edu but I also can be reached by phone at 499 – 4660, ext. 4528

**Course Website:** <http://blogs.berkshirecc.edu/meteorology/>

**Course Description:**

An introduction to the science of the atmosphere. This course will present an introduction to the physical processes governing the weather that we observe every day and the weather and climate issues that are so important to the human condition. This course is intended as both:1) a general information course for both science and non-science oriented students; and 2) an introduction to meteorology for those students who may be considering a career in the atmospheric sciences.

**Course Objectives:**

1. Know the composition and fundamental structure of the atmosphere and understand why

 all weather is limited to the lowest layer (troposphere).

2. Understand how earth’s atmosphere and surface is heated, including how the “greenhouse

 effect” works.

3. Understand the fundamental atmospheric properties of temperature and moisture and be

 able to apply this knowledge to explain the formation of fog, clouds and precipitation.

4. Identify the different types of precipitation (e.g. rain, snow, sleet, freezing rain, hail) and

 be able to explain how and in which types of atmospheric scenarios each forms.

5. Understand atmospheric pressure and the physical forces governing the atmosphere.

6. Apply knowledge of atmospheric pressure and forces to understand the formation and

 motion of weather systems.

7. Know the fundamental circulations of the oceans and atmosphere, how they are generated,

 and how they interact.

8. Apply learned physical principles of the atmosphere to understand the formation and

 behavior of specific weather phenomena (e.g. cyclones, fronts, thunderstorms, hurricanes).

9. Understand the methods utilized in modern weather forecasting.

10. Employ weather data and maps obtained from instruments and online sources to

 understand real-time and forecast weather scenarios.

11. Know the difference between weather and climate and identify the regional and local

 features governing the climate of any particular area.

12. Understand the science behind climate change and global warming.

**Prerequisites:**

Skills prerequisite: ENG 020 and ENG 060

**Core Competencies:**

***Scientific Knowledge and Reasoning (CC-SK):*** This core competency is

“embedded” in the course and will be given, automatically, upon successful completion of the course with a grade of C or better.

**Course Structure and Teaching Methods:**

This course contains both lecture and laboratory components. Lectures will be primarily powerpoint based, following the outline of textbook reading assignments. However, class discussion will be encouraged. Students will receive lecture note and review packets as study aids. Sets of homework questions will also be utilized to help focus the student’s attention on the reading and lecture material and assess whether the class has a good understanding of the concepts.

Laboratory activities will include: 1) direct visualization and discussion of real-time atmospheric processes (field work); 2) examination of the instrumentation utilized to record atmospheric properties and weather data (e.g. thermometer, barometer); 3) application of instrument data to understand weather patterns and forecasting; 4) utilization of internet based weather data, maps and forecast models to understand ongoing real-time weather processes and phenomena; 5) simple laboratory experiments to demonstrate basic atmospheric physical principles; and 6) basic weather map evaluation exercises.

**Textbook:**

***Essentials of Meteorology: An Invitation to the Atmosphere***, 7th ed., C. Donald Ahrens: Brooks/Cole, Cengage Learning 2015 (ISBN-13: 978-1-285-46236-3)

**Other Resources:**

***BCC Weather Station:*** We will be utilizing real-time data from the weather instruments installed on the main campus, mainly during laboratory sessions. This information can be accessed using any computer from the BCC website.

 ***Weblinks –*** There are numerous weather and climate links which we will be using primarily during labs. These links can be found at the class website: <http://blogs.berkshirecc.edu/meteorology/>

**Assessment:**

 ***Exams :*** Three **non-cumulative** exams ––––––– **60%**

***Homework:* Six** **sets** of homework questions –––––– **20%**

***Laboratory:***  Primarily attendance and participation – **20%**

 **100%**

**Attendance Policy:**

***Lecture attendance is critical to ensure success and is, therefore, mandatory.*** With a legitimate excuse a student may collect three excused absences. With additional excused absences, or if absences are not excused, ***the student may be subject to withdrawal from the course.*** All anticipated attendance problems should be discussed with the instructor. It is the student’s responsibility to obtain missed materials or assignments from fellow students or the instructor.

***Lab attendance:*** The laboratory sessions are a critical component of the course. **Please note that lab attendance and participation counts for 20% of your grade for this class.** With more than 2 absences, ***the student may be subject to withdrawal from the course.***

***Attendance at exams is mandatory.*** Failure to attend an exam will result in an automatic zero for that exam. To avoid this, it will be necessary to leave a phone or email message with your instructor as soon as you know that you are unable to attend the exam. You may be asked to provide documentation to justify your absence. Make up exams may be available, at the discretion of the instructor.

***Homework must be handed in by the end of class on the due date.*** Failure to hand in homework will result in a grade of 50% for that homework.

***Tentative* Lecture and Exam Schedule**

 **Lecture Reading in Text**

**Sept** 3 Intro/Atmospheric Composition and Structure Chapter 1

 5 Atmospheric Composition and Structure 1

 8 Atmospheric Composition and Structure 1

10 Energy and Radiation: Heating the Earth 2

 12 Energy and Radiation: Heating the Earth 2

 15 Energy and Radiation: Heating the Earth 2

17 Energy and Radiation: Heating the Earth 2

19 Air Temperature 3

22 Air Temperature 3

24 Air Temperature 3

 ***Homework #1 Due***

26 Moisture, Condensation and Clouds 4

29 Moisture, Condensation and Clouds 4

**Oct** 1 Moisture, Condensation and Clouds 4

 3Moisture, Condensation and Clouds 4

 6Visual Phenomena 15

 8 Visual Phenomena 15

***Homework #2 Due***

**10** **No Class**

**Oct 13** **No Class – Columbus Day**

**15** **EXAM Chapters 1 – 4, 15**

17 Cloud Development and Precipitation 5

20 Cloud Development and Precipitation 5

22 Cloud Development and Precipitation 5

24Cloud Development and Precipitation 5

27Air Pressure and Winds 6

29Air Pressure and Winds 6

 31 Air Pressure and Winds 6

 ***Homework #3 Due***

**Nov**  3 Atmospheric Circulations 7

 5 Atmospheric Circulations 7

 7 Atmospheric Circulations 7

10 Middle Latitude Cyclones and Fronts 8

12 Middle Latitude Cyclones and Fronts 8

14 Middle Latitude Cyclones and Fronts 8

 ***Homework #4 Due***

**17** **EXAM Chapters 5 – 8**

**19 No Class – Pre-registration Advising**

 21 Weather Forecasting 9

24Weather Forecasting 9

26Thunderstorms and Tornadoes 10

 **28 No Class – Thanksgiving**

**Dec** 1 Thunderstorms and Tornadoes 10

3 Thunderstorms and Tornadoes 10

 ***Homework #5 Due***

 5 Tropical Cyclones (Hurricanes) 11

 8 Tropical Cyclones (Hurricanes) 11

 10 Climate and Climate Change 13

12 Climate and Climate Change 13

 ***Homework #6 Due***

**(TBA) 15 – 18 EXAM Chapters 9 – 11, 13, 15**

**Laboratory Sessions:**

There will be handouts for many of the lab sessions. These will be distributed in class on the Wednesday prior to the lab. It is the responsibility of the student to review this handout beforehand in order to be prepared to execute the lab.

In place of two labs during the regularly scheduled time, each student will have two sessions with the instructor (Room H-227) helping to put together a weather forecast that will be placed on the BCC website. In this way, the student will be involved in seeing how a public forecast is made. Scheduling for these sessions will be discussed in class and based upon student availability. You will receive a handout with the scheduled times.

 In place of one lab session there will be a field trip to the National Weather Service office in Albany, NY on the afternoon of Monday, November 26.

***Tentative* Lab Schedule**

**Sept** 8 Geography and Time Standardization

15 Atmospheric Structure and Instrumentation

22 Temperature and Seasons

 29 Moisture and Condensation

**Oct** 6 Clouds

**13**  **No Lab – Columbus Day**

20 **No Lab (Weather Forecasting)**

27 Satellite and Radar

**Nov**  3 **No Lab (Weather Forecasting)**

 10 Weather Map Analysis I

17 Weather Map Analysis II

 **24 Field Trip: NWS Office – Albany, NY**

**Dec**  1 Thunderstorms and Tornadoes

 8 Hurricanes