

# SCI 222 Meteorology

## Project II

### Purpose

Demonstrate your understanding of the physics of atmospheric phenomena.

### What it is

Your project is a formal way to demonstrate that you understand the content covered in Unit II of the course. It should thoroughly fulfill at least *two* of the unit objectives (one for a demonstration, four for a quiz).

### Unit II objectives

1. State the identity and proportion of significant permanent and variable gases in the atmosphere.
2. Recount and explain the history of atmospheric composition over the lifetime of the Earth.
3. Describe and explain the vertical structure of the atmosphere.
4. Describe the heat transfer mechanisms of conduction, convection, and radiation. Explain their significance to the atmospheric energy budget.
5. Identify the relationships between the temperature of a black body emitter to its power emitted and to its wavelength of maximum emission.
6. Explain the energy budget of the Earth's surface, including atmospheric contributions.
7. Identify diurnal, annual, and geographic variations in insolation, and their significance to weather and climate.
8. Describe and explain changes in volume, enthalpy, and entropy associated with phase changes.
9. Explain the concept of saturation.
10. Define and evaluate different ways to convey humidity: dew point, partial pressure, absolute humidity, mixing ratio, and relative humidity.
11. Describe methods to measure humidity.
12. Identify and explain insights that can be drawn from the humidity of an air mass.

### Possible projects

These are some ideas for a project. You are free to suggest others. I will approve of projects that demonstrate your mastery of the required unit objectives.

- A quiz covering at least four of the unit objectives.
- A poster explaining humidity and saturation.
- A poster explaining the layers of the atmosphere. (This would need to include information covering another objective besides number 3.)
- A short story set in a time when the Earth's atmospheric composition was different than it is now.
- A physical demonstration of the principles of one of the objectives, such as the Planck radiation formula; volume, enthalpy, and entropy of phases changes; heat transfer

## PROJECT 2 DESCRIPTION

mechanisms; insulation; or humidity and saturation. A demonstration must be different from demonstrations or lab activities presented in class.

- A report on methods to measure humidity, including explanation of the science of how the sensors work.

### Graded Components

**Sign up:** Select a project. Describe succinctly what form your project will take, and which unit objective(s) it will cover.

**Check-in:** Give an overview of your project in more detail than your sign-up. Depending on the nature of your project, this may be a rough draft, or a conference with the instructor. You will be notified after your sign-up.

**Final Draft:** The completed project.

### Dates and Deadlines

Feb 27	Project assigned
Mar 6	Sign-ups
Mar 13	Work day
Mar 16	Check-ins due
Mar 24	Project due

### Scoring

#### Sign-up (7 points)

Tell me what you have in mind. In your sign-up, explain how the project will demonstrate your mastery of the chosen unit objectives.

Feedback on the sign-up will include specifying the nature of the required check-in and a rubric for the specific project.

+3	Identifies the form of the project.
+2	Identifies the unit objective(s) addressed.
+2	Describes how the project will demonstrate mastery of the objective(s).

#### Check-in (18 points)

Show the progress made toward the project and clarify expectations.

+6	Provides evidence that the project will satisfy the objective(s).
+12	Demonstrate that the project is fully planned.

PROJECT 2 DESCRIPTION

**Final Project (100 points)**

A more detailed rubric specific to your project will be provided to you after sign-up.

+15	Neat, creative, and visually appealing.
+50	Objectives are covered completely and correctly.
+15	Sources are properly cited, evaluated, and acknowledged.
+20	Organized and easily understandable.