

# **SCI 222 Meteorology**

## **Project III**

### **Purpose**

Demonstrate your understanding of the physics of weather processes.

### **What it is**

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

### **Unit III objectives**

1. Describe the process of nucleation of cloud droplets.
2. Describe dry and saturated adiabatic lapse rates.
3. Identify and describe different mechanisms that change the altitude of air masses.
4. Describe what makes an air mass “stable” or “unstable.”
5. Identify and distinguish warm clouds and cold clouds.
6. Identify the different types of precipitation and explain the mechanisms by which they form.
7. Identify the forces that accelerate air vertically and horizontally.
8. Identify and explain conditions of mechanical equilibrium for winds, including geostrophic balance and conditions of sub-and super-geostrophy, and the effects of surface friction.
9. Describe, classify, and explain named local winds.
10. Describe average global annual patterns of atmospheric surface and upper-level pressure, temperature, precipitation, and wind.
11. Identify and explain the energy imbalance driving global circulation.
12. Describe and explain the three-cell model of global circulation, including the jet streams.
13. Describe and explain the different climates identified in the Köppen classification.
14. Describe large-scale patterns and cycles, including the ENSO, the Madden-Julien oscillation, and persistent high-and low-pressure centers.

### **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.

- Report on the climate of some geographic location, explaining its features, the geographic and atmospheric processes responsible for its characteristics, its Köppen classification, and specific local wind patterns.
- Report on a named local wind, explaining its origin and human impacts.
- A poster explaining clouds and rain.
- A poster explaining the jet stream.
- A pamphlet explaining different types of precipitation.
- A program or spreadsheet that lifts a surface parcel to the tropopause.
- A video explaining what makes the wind blow.

## 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

Mar 28	Project assigned
Apr 6	Sign-ups
Apr 11	Work day
Apr 13	Check-ins due
Apr 27	Project due

## Scoring

### Sign-up (7 points)

Tell me what you have in mind.

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.

### Final Project (100 points)

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

+15	Neat, creative, and visually appealing.
+50	Objectives are covered completely and correctly.
+15	Annotated bibliography properly cites, evaluates, and acknowledges sources.
+20	Organized and easily understandable.