METEOROLOGICAL STATISTICS
ATMS 405, Fall 2008

Instructor

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Office Hours: Since I do not have an office on campus, office hours will need to be arranged. However, I am very willing to meet with students. Please do not hesitate to contact me if you need help.

Course Prerequisites

ATMS 214 (General Meteorology), MATH 291 (Calculus III)

Required Textbook

Statistical Methods in the Atmospheric Sciences, by Daniel S. Wilks, Second Edition (2005), Elsevier Academic Press.

Course Content

1. Introduction and Background
2. Review of Probability
3. Empirical (Frequency) Distributions and Exploratory Data Analysis
4. Theoretical Probability Distributions
5. Hypothesis Testing
6. Statistical Weather Forecasting
7. Forecast Verification
8. Time Series

Course Objectives and Philosophy

The purpose of this course is to learn how to apply statistical techniques to meteorological problems. In general, there is considerable uncertainty associated with atmospheric data and processes. Statistics provides us methods to "deal" with this uncertainty. Statistics and climatology are important tools in the operational world as well as the research arena. Operational forecasters often overlook the power of statistics. For example, model output statistics (MOS), conditional climatologies, and forecast verification are tools that can help meteorologists evaluate and improve their forecasts.

The course will emphasize the application of statistics to problems in the atmospheric sciences. Although surviving calculus is a prerequisite, this is not a math class and derivations are kept to a minimum. Practicality is emphasized over mathematical elegance. Concepts are presented through applications of the data rather than formal mathematical derivations.

In lieu of a comprehensive final exam, students will work on a semester long project using techniques they learned in class. This project will help integrate material from the book, tie together important concepts, as well as be a significant part of the final grade. In order to facilitate completing assignments and projects, there will be instruction on using MS Excel to perform statistical analysis.

After completing this course, the student should feel comfortable with the idea of statistics, especially in relation to applications in the atmospheric sciences. The course will allow the student to proceed on to more rigorous topics in graduate school or more effectively use standard products produced by the National Weather Service.

Homework Policy
A significant portion of the *learning* in this class will only come about by working through the assigned homework problems and semester long project. Problem sets will be assigned on a regular basis and will be due the next class. Some of the problems will be started in class.

Grading Policy
A 100-90, **B** 89-80, **C** 79-70, **D** 69-60, **F** < 60
The final grade will be based on the following weights;

Tests	40% (4 tests * 10%)
Homework	25%
Project	25%
Class participation	10% (same as a test)

Preliminary **SCHEDULE**	
Introduction and Review of Probability	Aug 20, 25, 27
Empirical Frequency Distributions	Sep 3, 8, 10, 15
Test	Sep 22
Theoretical Probability Distributions	Sep 17, 24, 29, Oct 1
Hypothesis Testing	Oct 6, 8, 15, 20
Test	Oct 27
Statistical Weather Forecasting	Oct 22, 29, Nov 3, 5
Forecast Verification	Nov 10, 12, 17, 19
Test	Dec 1
Time Series	Nov 24, Dec 3, 8
Test	Finals Week