

# Metr 4303-001

## Statistical Meteorology

**Class meets:** MWF 11 – 11:50 PM NWC 5720

**Professor:** Dr. Michael Richman

**Office:** 5646; **Office hours:** MW 10 - 11 or by scheduled appointment

**Contact points:** Can be reached by phone: 5-1853 or by email: [mrichman@ou.edu](mailto:mrichman@ou.edu)

### *Philosophy behind the course:*

This course is designed to illustrate the interplay between statistics and meteorology. In order to understand how experiments are designed and analyzed, the course will cover theory of descriptive statistics, a brief overview of probability and probability distributions, inferential statistics, and regression. The relevance to the atmosphere will be examined through use of meteorological data sets.

### *Course work & Grading Policies*

#### **Books and Clicker:**

*Required:* (1) Wilks, Daniel, 2005: Statistical Methods in the Atmospheric Sciences. Second Edition. ISBN: 0127519661

(2) Clicker (ten answer HITT variety) available at the OU bookstore.

*Optional:* Spector, Phil: 1994: An Introduction to S and Splus. ISBN: 0-534-19866-X [also 1 copy available in Bizzell Library]

Free Splus primer: [Spoetry](#) is on D2L under the Metr 4303 “content” tab [*Do NOT print on any SOM printer as it is >400 pp*]

**Homework:** Assigned at least a week prior to due date. Late assignments penalty: 33% (< 7 days) or 66% (7 to 14 days).

**Tests:** There are two semester tests and a final (Dec. 16 at 1:30 – 3:30 PM). The lowest semester test grade is dropped.

**Handouts:** Lecture notes covering the presentations will be distributed.

**Computing:** All students who do not have a School of Meteorology (SoM) account should obtain one from Mark Laufersweiler. Course work will be reinforced by application of real meteorological data sets using the Splus statistical/mathematical package. This is available on any of the Metlab Workstations. A free version is available for Windoze machines. The optional text by Spector and the free web link primer have good introductory material on the use of the package. Data sets will be available online for testing statistical methods and for homework. I will make myself available for help with Splus.

**Student feedback and participation:** Students are expected to participate actively in a professional manner. Using the clickers will facilitate tracking your attendance and participation. In class, following the clicker questions, students are encouraged to ask questions as well as questions of the professor. *Students are expected to click on at least 90% of the questions after week 1 of class to receive full participation credit. Credit will be pro-rated on percentages less than 90%.*

**Graduate students:** A final course project will be required in addition to the regular class work and homework. Please see instructor *within the first 30 days* to get advice on an appropriate topic. Work related to your thesis is encouraged.

**Grades:** Undergraduates and graduates will be graded separately to give undergrads the same chance of a high grade as the graduate students. Grade percentages will be constructed as shown below.

<u>Undergraduates</u>		<u>Graduates</u>	
Homework:	30%	Homework:	20%
Test 1 or 2:	30%	Test 1 or 2:	25%
Final:	30%	Final:	25%
Participation:	10%	Participation:	10%
		Project	20%

<u>Date</u>	<u>Topic</u>	<u>Book Chapter in Wilks</u>
8/25	Introduction	1
8/27	Organization of data, Location	3
8/29	SCI and ATS pre-tests	
9/01	No class – Labor Day	
9/03	Variability	
9/05	The Variability, higher order moments – graphical devices	
9/08	Higher order moments	
9/10	Graphical devices and reexpression	
9/12	Association between two variables	
9/15	Multivariate association	
9/17	Frequency tables	
9/19	Forecast verification issues	7.1, 7.2
9/22	<b>Test 1</b>	
9/24	Probability	2
9/26	Probability	
9/29	Conditional Probability	
10/01	Independence and Randomness	
10/03	Bayes' Theorem	
10/06	Probability Distributions	4
10/08	Probability Distributions	
10/10	<b>No Class</b> - OU/TX travel day	
10/13	Uniform distributions	
10/15	Normal distributions	
10/17	Sampling from a population	
10/20	Discrete distributions	
10/22	Continuous distributions	
10/24	Continuous distributions	
10/27	Normal Distribution of sample means	
10/29	Normal distribution of sample means	
10/31	<b>Test 2 [BOO!]</b>	
11/03	Sample estimation	5
11/05	Sample estimation	
11/07	Paired measurements & matched samples	
11/10	Paired measurements & matched samples	
11/12	Hypothesis testing about a mean	
11/14	Errors & power	
11/17	Hypothesis testing with unknown standard deviation	
11/19	P-values	
11/21	P-values	
11/24	Paired measurements	
11/26	<b>No class</b> – Thanksgiving	
11/28	<b>No class</b> – Thanksgiving	
12/01	Differences between populations	
12/03	T-tests	
12/05	Regression	6
12/08	Regression	
12/10	Regression	
12/12	Regression	
12/16	<b>Scheduled final exam – 1:30 am – 3:30 PM</b>	

**Reasonable Accommodation Policy:** “Any student in this course who has a disability that may prevent him or her from fully demonstrating his or her abilities should contact me personally as soon as possible so we can discuss accommodations necessary to ensure full participation and facilitate your educational opportunities.” See <http://drc.ou.edu/content/view/16/> for more details.

**Academic Misconduct Policy:** “Each student should acquaint him or her self with the University’s codes, policies, and procedures involving academic misconduct, grievances, sexual and ethnic harassment, and discrimination based on physical handicap.” See <http://www.ou.edu/provost/pronew/content/integritymenu.html> for more details and the entire OU Academic Code can be found at <http://www.ou.edu/studentcode/OUStudentCode.pdf>