

MET 4990 SEVERE WEATHER (ID 89438)

FLORIDA INTERNATIONAL UNIVERSITY

Fall 2006

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Time and location: Monday & Wednesday, 9:30-10:45 AM, ECS-136

Office Hours: MW 11:00 AM-12:00 Noon. TU, 9:00-10:00 AM

Prerequisites: MET 3003, General Meteorology.

Text: *Mesoscale Meteorology and Forecasting*, edited by P. S. Ray, 1986, ISBN 0-933876-66-1. The bookstore does not have copies. I have a few copies on hand and will coordinate orders through the American Meteorological Society. It's much cheaper that way because they give a discount and there is no markup.

You can reach an on-line version of this syllabus at:

http://www.fiu.edu/~willough/met_4990/0_Syllabus.htm

And a pdf version at:

http://www.fiu.edu/~willough/met_4990/0_Syllabus.pdf

Course description: This course focuses on local wind systems, thunderstorms, squall lines, mesoscale convection systems, and their interactions with synoptic scale weather. It also introduces methods of observing, analyzing, and predicting convective and mesoscale weather including the interpretation of satellite and radar images.

Course Goals and Objectives: This course is primarily a tour of middle-latitude, mesoscale weather systems. By "mesoscale" we mean storms that are significantly smaller than frontal cyclones (i.e. typical horizontal length < 1000 km) and have typical lifetimes shorter than a day. These systems are dominated by convection. Their winds are not geostrophic. Mesoscale weather is dramatic, spectacular, and sometimes deadly. In the words of the Jimmy Buffet song, "...heaven's ragtime band".

Course organization and philosophy: I hope and expect that you are self-selected for motivation and interest in the atmosphere. This is a demanding course, but the class is small enough for substantial interaction and individual attention. Make a genuine effort, and you should do well.

The book "*Mesoscale Meteorology...*" is twenty years old. It is more advanced in places than the level at which I intend to teach this course, but it contains within it excellent material for motivated undergraduates. By judicious selection of readings and lecture material we can cover the material without straining. I'll provide supplemental notes on the review of stability. Please read the assignments before we cover them in class, and bring the book each time we meet. I welcome thoughtful questions.

I see meteorology as a descriptive natural science that often speaks the language of physics and mathematics. You need some basic mathematical ideas here, but we will be selective and focus on essential concepts. Thus, attending the lectures, doing the reading, participating in discussion, and taking careful notes will be keys to success.

Homework	5%
Midterm	35%
Paper	25%
Final	40%
Total	100%

We will have a couple of homework sets on stability and radar, but for the most part this is a lecture and concepts course. There will be a mid-term and a final. Format of the exams will be short answer, short (1-2 paragraph) essay, draw-and-label a sketch, and one or two problems that you will have seen in the homework. I am requiring a 1000-1500 word

paper. I'll be traveling in late November, and I will give you time to work on the paper then. Homework, paper, midterm and final will contribute to grades as indicated in the table to the left, and I plan to use a standard 90-80... scale, as shown to the right, for assigning letter grades.

Grading Scale	
100-90	A
89-80	B
79-70	C
69-60	D
below 60	F

A word about intellectual dishonesty, which I define as claiming someone else's work or ideas as your own. I won't tolerate it, and it is a certain way to have a bad outcome in MET 4990. Everyone is trustworthy unless proven otherwise.

Daily Weather: We will use the Internet connection in our classroom and local observations to discuss interesting weather during the first few minutes of each class. On your way to class each day, please notice the clouds, temperature, humidity, and wind. Early in the semester, we'll still be in hurricane season, and the South Florida sea breeze should be active. Later on fronts pushing south from the snowy north can be set off some interesting squall lines and convection.

Topics and reading assignments. Page numbers refer to “*Mesoscale Meteorology...*”. The shaded dates are when HEW is traveling. Try to get a good start on your papers before I leave.

	Month	Date	Topic	Reading
1	AUG	28	What is “Mesoscale”?	1-3, 18-34
2		30	Forecast Problems	36-49
	SEP	4	Labor Day	
3		6	Review of stability	Notes (HW1)
4		11	Sounding systems	50-69
5		13	Surface observations	71-84
6		18	Principles of radar	85-94 (HW2)
7		20	Radar observations	94-115
8		25	Satellites	118-136, 145-146
9		27	Fronts	216-234, 248-254
10	OCT	2	Instabilities (<i>Difficult reading!</i>)	259-270
11		4	Gravity waves	272-288
12		9	Review	CUMULATIVE
13		16	Midterm Exam	
14		18	Stationary convection	289-309
15		23	Isolated convection	331-357
16		25	Squall lines	359-387
17		30	MCCs	390-412
18	NOV	1	Tornadoes	414-436
19		6	Mountain waves	472, 481-492
20		8	Sea Breezes	516, 523-542
21		13	Dryline	549-572
22		15	Nowcasting	657-686
23		20	Forecasting	689-718
24		22	Work on paper	
25		27		
26		29	Guest Lecturer, Hurricanes	311-327
27	DEC	4	Predictability	636-643, 653-654
28		6	Review	CUMULATIVE
		TBA	Final Exam	