

MET 5590 HURRICANES (97164)
FLORIDA INTERNATIONAL UNIVERSITY
Fall 2009

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Time and location: 10:00-10:50 AM MWF, LC 301

Office Hours: MWF 11:00 AM-12:00 PM & TTH. 1:00-2:00 PM

Prerequisites: None in the formal sense, but the course is open to graduate students in Earth and Environment, other physical sciences, Engineering, or social sciences if they have good quantitative backgrounds.

Texts: K. A. Emanuel, *Divine Wind*, Oxford University Press, 296 pp, 2005, ISBN-13:978-0-19-514941-8.

Williams, Jack, and Bob Sheets: *Hurricane Watch: Forecasting the Deadliest Storms on Earth*, Vintage 1st Edition, 352 pp, 2001 ISBN-0-375-70390-X.

The bookstore should have copies. If not, please let me know. You can reach an on-line version of this syllabus at:

http://www.fiu.edu/~willough/met_4532/0_SyllabusG.pdf

And links to course materials and notes:

http://www.fiu.edu/~willough/met_4532/0_LINKS.htm

Course description: Hurricane history, formation, structure, motion, and impacts for graduate students in engineering, physical sciences or social sciences.

Course Goals and Objectives: This course covers the history and science of hurricanes. As in the undergraduate counterpart, we will follow the texts' focus on hurricane history and meteorology, and I will introduce material on hurricanes as natural disasters, including their human and economic impacts.

Special Requirements for Graduate Credit: In addition to participation in the undergraduate course, graduate students will have a special recitation section (time and place TBA) where we will read and critique selected papers from the scientific literature and work problems that describe hurricane meteorology and effects. Each graduate student will read a popular disaster book from a selected bibliography and present a critical review when we discuss the selected storm in class.

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

The texts are popular accounts of hurricane history and lore. *Emanuel*, though lavishly produced, contains a great deal of cutting-edge science, some excellent art, and much of the significant history. *Sheets and Williams* is more prosaic and more focused on the history, but it also contains a wealth of information. In addition graduate students will become familiar with the scientific and popular literature. I'll add more physical and

social science through the lectures. 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. Consequently, the graduate-level course will emphasize problem solving and MatLab applications. Attending the lectures, doing the reading, participating in discussion, and taking careful notes will be keys to success.

Problems and Graduate recitation	25%
Exam #1	15%
Exam #2	15%
Paper	25%
Final	20%
Total	100%

The undergraduate course focuses primarily on the lecture and concepts; the graduate version is much more quantitative and emphasizes critical analysis.

There will be two exams and a final. Format of the exams will be short answer, short (1-2 paragraph) essay, and draw-and-label a sketch. I am requiring a 2500-word paper in addition to the disaster book report. The topic will be a critical assessment of the

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

current scientific literature based upon the reading that we will do in recitation. Careful solution of the problems, many of which will require MatLab, is crucial to quantitative understanding of hurricanes. Recitation, papers, exams and final will contribute to grades as indicated in the table on the left, and I plan to use a standard 90-80... scale, as shown to the right, for assigning letter grades.

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 5590. I will use Turnitin originality screening software on submitted papers. A paper must pass Turnitin to receive a passing mark. I'll provide the Turnitin URL, course number and password at the time you select topics. That said, everyone is trustworthy unless proven otherwise.

Topics and reading assignments. E is "*Divine Wind*", SW is "*Hurricane Watch*" G denotes special graduate assignments, with **Pn** denoting problem sets. Please complete each assignment before class and come prepared to discuss it.

Class	Mon.	Day	Topic	Assignment
1	AUG	24	Introduction, <i>Kamikaze</i> , <i>Huricán</i>	E: 1-5, 18-22
2		26	Columbus, <i>La Floride</i> & Early history, 1780	E 30-32, 38-39, 63-66, SW: 3-30 G: Disaster reading assignment
3		28	Atmosphere Overview & <i>The Tempest</i>	Notes, E: 49-52
4		31	Hurricane Structure	E: 7-16, G: P1
5	SEP	2	More structure, 19 th Century, Samoa	SW: 31-60, E: 68-71
6		4	Sun and Sea	E: 23-28, G:P 2
		7	Labor Day, NO CLASS	
7		9	Convection	E: 34-36
8		11	Trade Winds	E: 41-47
9		14	Heat Engines	E: 54-61, GP 3
		16	HEW Traveling, NO CLASS	

10		18	Intensity	E: 72-81, G: Literature assign.
11		21	Galveston	E: 83-90 (Paper Topics Due)
12		23	Early 20 th Century	SW 61-95
13		25	Formation	E: 93-101
14		28	Exam Review	Classes 1-13
15		30	Exam #1	
16	OCT	2	Termination	E: 109-115
17		5	Motion	E: 125-134 G: P4
18		7	<i>Hurricane</i> , Hurricanes of 1926 and 1928	E: 103, 104-107, 117-123
19		9	Hurricanes of 1935 and 1938	E: 136-144, 155-163
20		12	Storm Surge	E: 147-152, G: P 5
21		14	Waves	E: 165-171
22		16	1940s, <i>Typhoon</i> & Halsey	172-173, 174-180, 181
23		19	Rain & Hurricane Mitch	E: 182-192, 53, G: P 6
24		21	The 1950s and 1960s	SW: 125-141, 142-156
25		23	Hurricane flying (G: P 7) →	E: 193-202, 213-219, SW: 96-124
26		26	Exam #2 Review	Classes 14-26
27		28	Exam #2	
		30	HEW Traveling NO CLASS	
28	NOV	2	Hurricane remote sensing	Notes
29		4	Project STORMFURY	SW 157-178
30		6	Hurricane Forecasting (G: P 8) →	E: 227-238; SW 203-221
31		9	Camille & Cyclone of 1970	E: 205-211, 221-225
32		13	Tracy & Andrew	E: 244, 240-250; SW: 222-264
		11	Veteran's Day NO CLASS	
33		16	The seasons from Hell 2004-2005	Notes (Papers to Turnitin)
34		18	Hurricanes and climate	E: 252-261; SW: 265-283
35		20	Human impacts	Notes
36		23	Hurricane disasters	Notes (Final Papers Due)
37		25	Wind engineering	Notes (G: P 9)
		26-28	Thanksgiving Break, NO CLASS	
38		30	Windstorm insurance	Notes
39	DEC	2	What does it all mean?	
40		5	Review	Cumulative
	TBA		FINAL EXAM	