Instructor: Dr. Haiyan Jiang; Office: AHC5 371; Phone: 305-348-2984; Email: haiyan.jiang@fiu.edu.
Time: Tu/Th, 11:00 AM-12:15 PM
Location: AHC5 357
Office hours: Tu, 12:15 PM-1:15 PM or by appointment
Course Web Site: http://faculty.fiu.edu/~hajian/MET4300/MET4300.html

Course overview:

This course focuses on introducing thunderstorms, tornadoes, squall lines, mesoscale convection systems, and their interactions with synoptic scale weather. We will also discuss impact synoptic scale weather, such as frontal cyclones, blizzards, and cold waves. We will also look at methods of observing, analyzing, and predicting convective and mesoscale weather including the interpretation of satellite and radar images. A key reason for this course is to understand 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. Graduate students will have the opportunity to work on a research-related literature review and term paper reports to increase their ability to utilize knowledge learned in their research/thesis work.

Prerequisite: General Meteorology (or instructor’s permission).

Textbook:


Grading:

The final numeric grades will be determined according to the following table:

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<tr>
<th>Undergraduate Students:</th>
<th>Graduate Students:</th>
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<tr>
<td>Class participation</td>
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<tr>
<td>Exam #1 20%</td>
<td>Exam #1 20%</td>
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<td>Exam #2 20%</td>
<td>Exam #2 20%</td>
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<tr>
<td>Final exam 50%</td>
<td>Final exam 40%</td>
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<tr>
<td>Total 100%</td>
<td>Final term paper 10%</td>
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<td>Total 100%</td>
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Course lectures:

Electronic portions (pdf files) of course lectures will be provided on the class website for download after the lecture is given so that you can review. Notes on the board may or may not be posted, so if you miss class, please see a fellow student. Exercises will be given in class after each chapter and will be posted online as well.
Tentative course schedule:

January
Week 1: Jan. 8 (Tu) & Jan. 10 (Th)
  Lecture 1  Course introduction
  Lecture 2  Properties of the atmosphere (CH1)
  Lecture 3  Meteorological measurements (CH2)
Week 2: Jan. 15 (Tu) & Jan. 17 (Th)
  Lecture 4  Radar and satellite (CH2)
  Lecture 5  Weather maps (CH3)
  Lecture 6  Numerical models (CH4)
Week 3: Jan. 22 (Tu) & Jan. 24 (Th)
  Lecture 7  Climate and climate change (CH5)
  Lecture 8  Atmospheric stability and stability indices (CH6)
  Lecture 9  Forces and balanced motions (CH7)
Week 4: Jan. 29 (Tu) & Jan. 31 (Th)
  Lecture 10  Pressure systems (CH8)
  Lecture 11  Airmasses and fronts (CH9)
  Lecture 12  Frontal cyclones in the lee of the Rockies (Lee cyclones, CH10)

February
Week 5: Feb. 5 (Tu) & Feb. 7 (Th)
  Lecture 13  Frontal cyclones on the east and Gulf coasts (Nor’easters, CH11)
  Lecture 14  Exam #1 Review (Feb. 5, Tu)
  Lecture 15  Exam #1 (Feb. 7, Th)
Week 6: Feb. 12 (Tu) & Feb. 14 (Th)
  Exam#1 answers and explanations
  Lecture 16  Freezing precipitation and ice storms (Ch 12)
  Lecture 17  Lake-effect snowstorms (CH13)
Week 7: Feb. 19 (Tu) & Feb. 21 (Th)
  Lecture 18  Cold waves (CH14)
  Lecture 19  Blizzards (CH15)
  Lecture 20  Mountain snowstorms (CH16)
Week 8: Feb. 26. (Tu) & Feb. 28 (Th)
  Lecture 21  Mountain windstorms (CH17)
  Lecture 22  Air mass & multicell thunderstorms (CH18)
  Lecture 23  Mesoscale convective complexes (CH18)

March
Week 9: Mar. 5 (Tu) & Mar. 7 (Th)
  Lecture 24  Squall lines (CH18)
  Lecture 25  Supercell thunderstorms (CH18)
  Lecture 26  Tornadoes I (CH19)
Week 10: Mar. 12 (Tu) & Mar. 14 (Th)
  Spring Break, NO CLASS
Week 11: Mar. 19 (Tu) & Mar. 21 (Th)
  Lecture 27  Tornadoes II (CH19)
  Lecture 28  Tornadoes III (CH19)
  Lecture 29  Tornadoes IV (CH19)
Week 12: Mar. 26 (Tu) & Mar. 28 (Th)
Lecture 30  Exam #2 review (Mar. 26, Tu)
Lecture 31  Exam # 2 (Mar. 28, Th)

April
Week 13: Apr. 2 (Tu) & Apr. 4 (Th)
Exam#2 answers and explanations
Lecture 32  Hailstorms (CH20)
Lecture 33  Lightning (CH21)
Week 14: Apr. 9 (Tu) & Apr. 11 (Th)
Lecture 34  Downbursts (CH22)
Lecture 35  Final review (Apr. 11, Th)
Term-Paper Presentations for Graduate Students on Apr. 11 (Th)
Week 15: Apr. 16 (Tu) & Apr. 18 (Th)
Reading week, No class

Final exam: Thursday, April 25, 9:45 am-11:45 am