

# **ATM 418: Dynamic Meteorology III**

## **Fall Semester 2017 (3 credits), Class Number 7115**

Lecture: Tuesday & Thursday 8:45-10:05 in ES B13

<http://www.atmos.albany.edu/daes/atmclasses/atm418>

### **Instructor:**

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Office hours: Monday and Wednesday 1:00-2:00, and by appointment

### **Course Objective:**

This course uses the governing equations of the atmosphere to understand mesoscale phenomena, including fronts, flow over topography, convection, and the boundary layer.

### **Prerequisites:**

ATM 317, 320

### **Text:**

*Mesoscale Meteorology in Midlatitudes* by P. Markowski and Y. Richardson (M&R)

### **Supplementary reading:**

*An Introduction to Dynamic Meteorology* by J. R. Holton and G. J. Hakim (H&H)

*Mid-Latitude Atmospheric Dynamics: A First Course*, by J. E. Martin

*Cloud Dynamics*, by R. A. Houze

### **Course Requirements:**

6 Homework assignments: 25%

In-class quizzes: 10%

2 In-class exams: 17.5% each

Final exam (Friday December 15, 3:30-5:30 pm): 30%

Grading: A-E

Late Homework and off-time exams are only allowed for University-recognized reasons ([http://www.albany.edu/health\\_center/medicaexcuse.shtml](http://www.albany.edu/health_center/medicaexcuse.shtml)). Homework assignments lose 25% of their value per day it is late (i.e., an assignment turned in two days late cannot get better than a 50%).

## Quiz Policy:

Most lectures will begin with a 2 question quiz that covers information from the previous lecture. At the end of the semester, the quiz average will be computed, excluding the lowest three scores. Missed quizzes will count as a zero; however, missing quiz scores can be included in the three dropped quizzes at the end of the semester. More than three missing quizzes will count against the student's final quiz score, unless the student has a university-recognized reason for missing classes on specific dates (see [http://www.albany.edu/health\\_center/medicaexcuse.shtml](http://www.albany.edu/health_center/medicaexcuse.shtml)). There are no make-up quizzes.

## Academic Integrity:

Although students can work together, all homework assignments must be completed independently. Homework assignments that are substantially similar to other students will be given a zero for that assignment. Copying from other students on quizzes and exams may result in a zero for that work and referral for disciplinary action under the University's policy on academic integrity ([http://www.albany.edu/undergraduate\\_bulletin/regulations.html](http://www.albany.edu/undergraduate_bulletin/regulations.html)).

## Course Outline:

### 1. Fronts (2 weeks)

- Important Aspects of fronts (Martin 7.1)
- Frontogenesis (Martin 7.2)
- Vertical Circulation (Class Notes)

### 2. Topographic flow (3 weeks)

- Mountain Waves (M&R 12.1, 12.2)
- downslope winds (M&R 12.3)
- flow around topography (M&R 13.1-13.2)

### 3. Dynamics of Convection (7 Weeks)

- convective initiation, buoyancy and entrainment (M&R Chapter 7.2-7.4 and class notes)
- squall lines and RKW theory (M&R 9.1-9.4)
- supercell dynamics (M&R 8.4)
- sea breezes and dry lines (M&R 5.2, 5.4, 4.7)

### 4. Boundary Layer (3 Weeks)

- mean and perturbation form of equations (H&H 8.1)
- turbulent kinetic energy (H&H 8.2)
- introduction to K methods (H&H 8.3)
- Ekman solution and spin-down (H&H 8.3)