ATM 317: Dynamic Meteorology II
Spring Semester 2020 (3 credits), Class Number 1133
Lecture: Tuesday & Thursday 8:45-10:05 in ES B13
http://www.atmos.albany.edu/facstaff/torn/atm317/

Instructor:
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Course Objective:
The goal of this course is to apply the governing equations to describe and understand concepts related to rotation and synoptic to planetary scale phenomena, including vertical motion, jet streaks, and frontal cyclones.

Prerequisites:
ATM 316

Required Text:
Mid-Latitude Atmospheric Dynamics: A First Course, by J. E. Martin (M)

Recommended Text:
An Introduction to Dynamic Meteorology by J. R. Holton and G. J. Hakim, 5th ed. (HH)

Supplementary reading:
Synoptic-Dynamic Meteorology in Midlatitudes, by H. B. Bluestein

Course Requirements:
6 Homework assignments: 25%
In-class quizzes: 10%
2 In-class exams: 17.5% each
Final exam (Tuesday May 12, 10:30 am-12:30 pm): 30%
Grading: A-E
Late Homework and off-time exams are only allowed for University-recognized reasons (http://www.albany.edu/health_center/medicalExcuse.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/medicalexercise.shtml). There are no make-up quizzes.

**Religious Observeance:**
Students must notify the instructor of any lectures and assignment due dates that conflict with recognized religious observances (https://www.albany.edu/registrar/registrar_assets/Religious_Calendar.pdf) well in advance. The instructor will work with the student to provide an alternative arrangement.

**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). Every student has the responsibility to become familiar with the standards of academic integrity at the University. Claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity.

**Course Outline:**

1. Rotation (5 weeks)
   - Review of Kinematic Properties, Thermal Wind (M Chapter 4, HH Chapter 3)
   - Circulation (M 5.1-5.2, HH 4.1)
   - Vorticity (M 5.2-5.3, HH 4.2)
   - Vorticity Equation (M 5.1-5.2, HH 4.3)
   - Potential Vorticity (M 5.2-5.3, HH 4.2-4.4)

2. Atmospheric Waves (2 Weeks)
   - Properties of a wave (HH 5.1)
   - Phase speed, group velocity (HH 5.2)
   - Types of waves in the atmosphere (HH 5.5, 5.7)
3. Quasi-Geostrophic System (7 Weeks)

- Extratropical circulations (M 8.2, HH 6.1)
- QG Assumptions and Equations (M 5.4, 6.2-6.3, HH 6.2-6.3)
- QG Omega Equation (M 6.2-6.3, HH 6.4)
- Trenberth form of Omega equation and Deformation terms (M 6.3, HH 6.5)
- Geostrophic Paradox and Q-vector form of Omega Equation (M 6.4, HH 6.5)