

ATM 317: Dynamic Meteorology II Spring Semester 2023 (3 credits), Class Number 1116

Lecture: Tuesday & Thursday 9:00-10:20 in ETEC 480

<http://www.atmos.albany.edu/facstaff/torn/atm317/>

Instructor:

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Office hours: Monday 10:00-11:00, Wednesday 1:00-2:00, and by appointment

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Office hours: Tuesday 1:30-2:30, Wednesday 10:30-11:30 (ETEC Collaboratorium), and by appointment

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:

7 Homework assignments (one of which will be related to Showcase Day): 25%

In-class quizzes: 10%

2 In-class exams: 17.5% each

Final exam (Tuesday May 9, 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/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 https://www.albany.edu/health_center/medicalexexcuse.shtml). There are no make-up quizzes.

Course Format:

Students are expected to attend each lecture. In addition, lectures will be recorded when possible and posted to Blackboard, so students can review lectures afterward. **Watching lectures online is not a substitute for attending lecture.** Absences are unavoidable; therefore, in those situations, students are expected to view the lecture recording (Blackboard keeps track of who views each lecture).

Course Communication:

The primary communication method for the course will be through messages through Blackboard. These messages will be archived on the course page and will automatically send to your UAlbany email address. All lecture materials and assignments will be placed on both the course web page and the course Blackboard page. Students may communicate with each other through the Blackboard message system. I will answer all emails within 24 h of receipt, except on weekends.

Accommodating Disabilities Policy:

Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning and/or psychiatric disabilities. If you believe you have a disability/disabilities requiring accommodation in this class, please notify Disability Access and Inclusion Student Services (CC 130, 442-5501, daiss@albany.edu). Upon verification and after the registration process is complete, the DAISS will provide you with a letter that informs the course instructor that you are a student with a disability registered with the DAISS and list the recommended reasonable accommodations.

Religious Observance:

Students must notify the instructor of any lectures and assignment due dates that conflict with recognized religious observances (<https://www.albany.edu/registrar/academic-calendar/religious-observances>) 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 (https://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)