

SYLLABUS

METR 3123

SPRING 2009

Atmospheric Dynamics II

Time and Place: MWF 10:00-10:50 am, Room 1350 National Weather Center
W 4:00 – 5:15 pm, Room 1350 National Weather Center

Instructor: Dr. Fred Carr
Room 5919 NWC Phone: 325-2990
E-mail: fcarr@ou.edu

Office hours: MWF 1:30-3:30 pm; TR 9:00-11:00 am . (Please e-mail me or call Marcia in my office at 325-6561 to confirm appointment.)

Prerequisites: C or better in MATH 3413, METR 3113, METR 3213

Grader: Nathan Dahl, 5115 NWC (or in Mac Lab)
E-mail: droughtman@ou.edu
Office hours: TR 1:30-2:30 pm; or by appointment.

Required Text: **Holton, James R., 2004: *An Introduction to Dynamic Meteorology*, 4th Edition, Academic Press**

Selected Reading: **Martin, Jonathan E., 2006: *Mid-Latitude Atmospheric Dynamics – A First Course*, Wiley**

Bluestein, Howard B., 1992: *Synoptic-Dynamic Meteorology in Midlatitudes, Vol. I: Principles of Kinematics and Dynamics*, Oxford

Additional handouts and reading assignments as required.

Exams and Grades:

The grading policy will be as follows:

3 in-class exams - 25% each – lowest score will be dropped: 50%

Homework (problem sets): 20%

Final Exam (30%) Friday, May 15 8:00-10:00 am (sorry!)

Exam Policies:

1. Exams will be given during the Wed. pm time period to allow more time for completion.
2. No make-up exams will be given. (A missed exam will count as the dropped exam.) Please see instructor in case of a family or medical emergency.
3. Exams are closed book
4. No calculators are allowed during exams
5. Final Exam is comprehensive

Homework Policies:

1. Problem sets are collected at the start of class on the day they are due. Late homework is not accepted except in cases of family or medical emergency.
2. Homework should be done neatly, with clear explanations of your logic. That is, please explain your reasoning, state the assumptions, and proceed in a logical order.
3. There will be a writing component in this class. One problem in each homework set will be selected for evaluation. More on this later.
4. Discussion of homework problems with your classmates is acceptable, but copying is not. Please turn in our own work. Information on what constitutes proper and improper collaboration is provided at <http://www.ou.edu/provost/integrity/>

Course Objectives:

This is the second course in the School of Meteorology's dynamic meteorology sequence. General guidelines for the content of the course are provided in the "Knowledge Expectations" found at <http://weather.ou.edu/knowledge.php> However, these will be slightly modified owing to what was taught in METR 3113 in Fall 2008, the material in the text, and the instructor's prerogative on what to emphasize. I believe very strongly in the connection between dynamics and observations, so I will attempt to show a weather chart of some kind every lecture that illustrates some concept in that day's lecture. We will also put a lot of emphasis on the physical interpretation of the equations, so that you will see that they are "talking to you" about the relevant physics.

The Wednesday afternoon sessions will be used for (1) Exams; (2) Discussion of the homework problems; (3) Make-up lectures; (4) Possible "lab exercises" to illustrate course material; (5) Good writing guidelines.

Course Topics:

1. Review of previous material
 - a. Equations of motion and wind-pressure relationships
 - b. Natural coordinates; trajectories; streamlines
 - c. Thermal wind
 - d. First Law of Thermodynamics
2. Kinematics
 - a. Wind field in Cartesian and natural coordinates
 - b. Divergence, vorticity and deformation
3. Circulation and Vorticity
 - a. Circulation theorem
 - b. Vorticity and the vorticity equation
 - c. Potential vorticity and the potential vorticity equation
4. Turbulence and the planetary boundary layer
 - a. Viscosity, stress and turbulence in the atmosphere
 - b. Reynolds averaging
 - c. PBL: well-mixed; momentum, temp., and moisture fluxes
 - d. Ekman layer dynamics

Web site:

This class will be using the Desire2Learn course management software, located at <http://learn.ou.edu>. Announcements, lectures and other related information will be posted here. I may also send e-mails outside of D2L.

The University of Oklahoma is committed to providing reasonable accommodation for all students with disabilities. Students with disabilities who require accommodations in this course are requested to speak with the professor as early in the semester as possible. Students with disabilities must be registered with the Office of Disability Services prior to receiving accommodations in this course. The Office of Disability Services is located in Goddard Health Center, Suite 166, phone 405/325-3852 or fax only 405/325-4173.

All students are expected to be familiar with and abide by the OU Academic Misconduct Code. Information on this code is at <http://www.ou.edu/provost/pronew/content/integritymenu.html>