SYLLABUS

METR 3123   **SPRING 2012**

<u>Atmospheric Dynamics II</u>

Time and Place: TR 1:00-2:15 pm, Room 5600 National Weather Center
                                    W   1:00–2:15 pm, Room 1350 National Weather Center

Instructor: Dr. Fred Carr
                                    Room 5220 NWC   Phone: 325-2990
                                    E-mail: fcarr@ou.edu

Office hours: TWR 2:30-3:30 pm or by appointment.

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

Teaching Assistant: Michael Buban, Rm 4380 NWC   E-mail: michael.buban@noaa.gov

                                    Office hours: MTW 11:00 am -12:00 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**

                                    Lackmann, Gary, 2011: *Midlatitude Synoptic Meteorology: Dynamics, Analysis & Forecasting*, **Amer. Meteorological Soc.**

Exams and Grades:

        The grading policy will be as follows:

        3 in-class exams - 20% each – lowest score will be dropped: 40%
        Homework (problem sets): 20%
        Daily quizzes: 15%
        Final Exam (25%)   Friday, May 11, 1:30-3:30 pm (guaranteed severe wx day!)

Exam Policies:

1. Exams will be given during the Wed. pm time period .
2. No make-up exams will be given. (A missed exam will count as the dropped exam.)   Please contact instructor in case of a family or medical emergency.
3. Exams are closed book
4. No calculators or any electronic device may be used 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. More guidance will be provided later.

3. Occasionally, the homework will involve completion of some of the Matlab-based demonstrations contained on the CD provided with the text, guided by the instructions/questions in Holton's Problems section. More information on this will be provided later.

4. Discussion of homework problems with your classmates is acceptable, but copying is not. Please turn in your own work. Information on what constitutes proper and improper collaboration is provided at http://integrity.ou.edu/students_guide.html   Please read this.

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://som.ou.edu/academics.php?type=current&prog=undergraduate However, these will be slightly modified owing to what was taught in METR 3113 in Fall 2011, 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 one or more equations or concepts 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) Make-up lectures; (2) Exams; (3) Discussion of the homework problems; (4) Possible "lab exercises" to illustrate course material; (5) Exam review sessions

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.

Other policies:

No phones, laptops or other electronic devices may be used during class or exams.

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 Disability Resource Center prior to receiving accommodations in this course. The Disability Resource Center is located in Goddard Health Center, Suite 166, phone 405/325-3852 or fax only 405/325-4491. Other information may be found at *http://www.ou.edu/drc/home.html*

All students are expected to be familiar with and abide by the OU Academic Misconduct Code. Information on this code is also located at http://integrity.ou.edu/students_guide.html