METR 3123 Atmospheric Dynamics II
Spring 2016

MWF 10:00 am – 10:50 am, National Weather Center 1350
W 4 pm – 5:15 pm, National Weather Center 1350

Instructor:

Prof. Alan Shapiro
National Weather Center, 5423
phone: 325-6097
email: ashapiro@ou.edu (best way to reach me – I read it many times a day)

Instructor's office hours:

MWF 11am – noon
And outside of those hours, if my door is open, feel free to drop in and ask questions.

Teaching Assistant:

Josh Gebauer

Required text:

None

Recommended texts:

Holton, J. R., *An Introduction to Dynamic Meteorology* (3rd or 4th ed is best)
Hay, G. E., 1953: *Vector and Tensor Analysis*. Dover.
Schey, H. M., 1992: *Div, Grad, Curl and All That*, 2nd ed.

Class Notes:

Class notes will be posted on D2L

Prerequisites:

C or better in each of these:
MATH 3413: Physical Math 1
METR 3213: Physical Meteorology 1 -- Thermodynamics
METR 3113: Atmospheric Dynamics I.

Grading:

3 in-class exams (50 %: your two best scores are retained @ 25% each)
Final exam (35 %)
Problem sets (15%)

Information about exams:

- No make-up exams given under any circumstances (but recall that the lowest of the 3 in-class exams gets dropped)

- Exams are closed book. No notes or crib-sheets allowed.

- No calculators allowed.

- Final Exam is comprehensive.

Information about problem sets:

- Feel free to discuss the problem sets in study groups but do not copy each other's work. Your written work must be an original effort if you are to receive credit for the assignment.

- Your problem set solutions should be detailed, explicit and logical. State clearly what equations and assumptions are being used, and describe the nature of each step in a derivation (i.e., use words to supplement your equations). For more information see the handout on "Problem Set Guidelines and Tips".

- Illegible homework gets a grade of 0. The Teaching Assistant decides what's legible.

- Each problem set is due in class on the date specified.

- Late homework is not accepted unless you have an immediate family emergency, documented personal illness (if you lose an arm, I still need to see the note from the doc), religious holiday, or direct participation in a University-sponsored activity.

List of topics (tentative):

Streamlines and trajectories, thermal wind, kinematic and adiabatic methods of calculating vertical motion, pressure tendency equation, kinematics of circulation and vorticity, Bjerknes and Kelvin Circulation theorems, Rossby potential vorticity theorem, vertical vorticity equation, basic wave characteristics, acoustic waves, shallow water waves, internal gravity waves, Rossby waves, structure of the atmospheric boundary layer under stable, neutral and unstable conditions, Reynolds averaging, balance of forces in the well-mixed layer, Ekman boundary layer theory, Ekman pumping and its significance on the synoptic scale.

Class Notes:

I will make heavy use of the whiteboard. Most (95%) of what I do on the board will be available online as pdf files, usually posted before each class. If you find errors, please bring them to my attention!

I may cover a little more material in class than appears in the notes, e.g., if I need to elaborate on someone's question or if I want to amplify on a calculation, or give more examples. The material presented in class takes precedence over the web notes -- so please show up for class!

The figures in my notes will sometimes look pretty raggedy so you may want to redraw some of them (and use colored pens/pencils to help clarify the more complicated bits).

High-tech study aids:

To help draw and label diagrams on the notes and form "connections" between equations, you may want to invest in these latest high-tech drawing aids:

- colored pencils or pens
- a pencil sharpener
- a good rubber eraser (if they exist)
- a ruler

Students with disabilities

The University of Oklahoma is committed to providing reasonable accommodation for all students with disabilities. Students with disabilities who require accommodations in this course should contact me 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.

Academic misconduct

Academic integrity means honesty and responsibility in scholarship. Academic assignments exist to help students learn; grades exist to show how fully this goal is attained. Therefore all work and all grades should result from the student's own understanding and effort. Academic misconduct is any act which improperly affects the evaluation of a student's academic performance or achievement. Misconduct occurs when the student either knows or reasonably should know that the act constitutes misconduct. Examples include (but are not limited to) cheating and unauthorized use of material on exams, improper collaboration, and plagiarism. You are urged to become familiar with the Student's Guide to Academic Integrity available at: http://integrity.ou.edu/students_guide.html