

METR 3123, ATMOSPHERIC DYNAMICS II SPRING 2010

TR 1:00 - 2:15 p.m., National Weather Center 5900
W 4:00 - 5:15 p.m., National Weather Center 5900

Instructor:

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

Office Hours:

MWF 1:00 p.m. - 2:00 p.m.
And if my door is open, feel free to drop in and ask questions.

Grader:

Kevin Haghi

Required Text:

Holton, J. R., 2004: *An Introduction to Dynamic Meteorology*, 4th ed.

Recommended Texts:

Hay, G. E., 1953: *Vector and Tensor Analysis*, Dover.
Schey, H. M., 1992: *Div, Grad, Curl and All That*, 2nd ed.

Prerequisites:

C or better in each of these courses:

MATH 3413: Physical Math 1
METR 3213: Physical Meteorology I -- Thermodynamics
METR 3113: 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 permitted.
- No calculators allowed on exams.
- 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 any credit for the assignment.
- Problem set solutions should be detailed, explicit, and logical. State clearly what equations/assumptions are being used, and describe the nature of each step in a derivation (i.e., use words to supplement your equations).
- Illegible homework gets a grade of 0. The grader decides what's illegible.
- Problem sets are due in class on the day they're due.
- Late homework not accepted unless you have a documented medical emergency (if you lose an arm I still need to see the note from the doc).

List of Topics:

Order of magnitude reasoning. Eulerian and Lagrangian viewpoints. Trajectories and streamlines. Forces. Statics. Equations of motion in inertial and rotating reference frames. Scale analysis of equations of motion. Mass conservation. Isobaric coordinates. Natural coordinates. Inertial flow. Geostrophic, cyclostrophic, and gradient balances. Thermal wind. Kinematics of circulation and vorticity. Vorticity dynamics.

OU is committed to providing reasonable accommodation for all students with disabilities. Students with disabilities who require accommodations in this course are urged to speak with me 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 in Goddard Health Center, Suite 166, phone 405/325-3852.

All students are expected to be familiar with and abide by the OU Academic Misconduct Code. Information on this code and other student policies is located at <http://studentconduct.ou.edu>

Class Notes

I will make heavy use of the blackboard. To help you draw and label diagrams in your notes you may want to invest in the latest high-tech drawing aids:

- colored pencils or pens
- a pencil sharpener
- a rubber eraser
- a ruler

It's a good idea to take good, complete notes in class. However, as a supplement, my class notes will be available on the web as pdf files, usually before each class. You can download them from here:

<http://weather.ou.edu/~ashapiro/METR3123>

Some words of caution about the notes:

- The notes may contain typographical errors. If something doesn't look right, chances are it's wrong. I'd be grateful if you'd bring typos to my attention.
- I may cover 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 -- another reason to show up for class and take good notes!
- The figures in the notes will sometimes look pretty raggedy -- worse than my crappy drawings on the blackboard. So you may want to redraw some of those figures (and use colored pens/pencils to help clarify the more complicated diagrams).