

**METR 5113 ADVANCED ATMOSPHERIC DYNAMICS I**  
**FALL 2006**  
**MWF 11:00 - 11:50AM**  
**National Weather Center (NWC), Room 5600**

Instructor:

Alan Shapiro  
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ashapiro@ou.edu (email is a good way to reach me -- I read it many times a day)

Office hours:

MWF noon - 1:00 p.m.  
Additional office hours upon request -- just ask! You can also drop by my office anytime and see if I'm free. I'm usually not here early in the morning (er, morning).

Required text:

Kundu, P. K. and Cohen, I. M., 2003: *Fluid Mechanics*. Academic Press.

Recommended text:

Hay, G. E., 1979: *Vector and Tensor Analysis*. Dover Publications.  
A list of references and suggested readings will also be distributed on the first day of class.

Class notes:

pdf files of class notes will be on the web at: <http://weather.ou.edu/~ashapiro/METR5113>

Prerequisites:

MATH 4163 (Partial Differential Equations) or equivalent coursework.

Grading:

2 in-class exams (30 % each)  
Final exam (40 %)

List of topics (tentative):

Vector and Cartesian tensor analysis. Lagrangian versus Eulerian viewpoints. Streamlines and trajectories. Forces. Mass conservation. Useful flow decompositions. Potential theory and applications. Bernoulli's equations and applications. Navier-Stokes equations and some simple exact solutions. Kinematics of vorticity and circulation. Vorticity dynamics. Ekman layer. Rossby waves. Linear gravity wave analysis. Shallow water and deep water limits. Dispersion. Group velocity. Internal gravity waves.

*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.*