

METR 5123 ADVANCED ATMOSPHERIC DYNAMICS II
Spring 2012
TR 1:00 - 2:15
National Weather Center, room 5930

Instructor:

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Office hours:

Soon to be announced. Extra hours will also be available upon request -- or just drop by and see if I'm free. I'm usually not here much in the mourning, er morning.

Required texts: None. But course notes will be given out at the beginning of each class.

Recommended texts:

Chandrasekhar, S. 1962: *Hydrodynamic and Hydromagnetic Stability*. Dover.
Gill, A. E., 1982: *Atmosphere-Ocean Dynamics*. Academic Press.
Kundu, and Cohen, 2008: *Fluid Mechanics*. Academic Press.
A more extensive list of suggested reading/references will be distributed in class.

Prerequisites:

- METR 5113 (Advanced Atmospheric Dynamics I) or equivalent.
- Working knowledge of advanced calculus, differential equations (odes and pdes)

Grading:

- Mid-term exam @ 30 %
- Final exam (not comprehensive) @ 35 %
- Class presentation/lecture on baroclinic instability @ 35 % (need a team of at least 3 for this)
OR
Critical literature review on a topic in dynamics @ 35 %

Topics (tentative):

Shallow water theory, Poincare and Kelvin waves, nonlinear steepening, Stokes drift, linear and nonlinear lee waves, internal wave reflections from mountains, WKB approximation, method of stationary phase, solitons, hydraulic jumps and bores, katabatic flows, nocturnal low-level jets, thermal instability, centrifugal instability, Kelvin-Helmholtz instability, Orr-Sommerfeld equation, Theorems of Squire, Rayleigh and Fjortoft, baroclinic instability.

Note: Any student who has a disability that may prevent him or her from fully demonstrating his or her abilities should contact me as soon as possible so that accommodations necessary to ensure full participation and educational opportunity can be made.