

METR 5123 ADVANCED ATMOSPHERIC DYNAMICS II

Spring 2014

TR 1:00 - 2:15 pm

National Weather Center, room 5930

Instructor:

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Office hours:

TR, 2:30-3:30 p.m. Extra hours available upon request -- or just drop by and see if I'm free. I'm usually not here much in the morning, er morning.

Required texts: None. But my notes will be made available prior to 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 % (tag-team presentation)

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.

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 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.