ADVANCED SYNOPTIC METEOROLOGY
METR 5413
Spring 2013

Classroom: NWC 5600 Class day and time: Tues. and Thurs., 10 – 11:15 AM
Alternate room: (?) Make-up class day and time: Tues. and Thurs., 9 – 9:55 AM (tentative)

Instructor: Prof. Howie "Cb"Bluestein
Instructor contact information: Office: NWC 5351 (far northwest corner on 5th floor)
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E-mail address: hblue@ou.edu

Office hours: Tues. and Thurs. (2 – 3:30 PM) (tentative)
Office hours may be cancelled if there is a severe-thunderstorm outbreak (or a threat of the aforementioned). Other times by appointment please! If you contact me by e-mail, I will try to contact you within 24 hours.

Texts: *Synoptic-Dynamic Meteorology in Midlatitudes (Vol. I): Principles of Kinematics and Dynamics and (Vol. II): Observations and Theory of Weather Systems*. H. Bluestein, Oxford Univ. Press, 1992 and 1993, respectively. Corrections to the first two printings may be found on the Web at http://weather.ou.edu/~hblue/corrections. Some notes based on recent journal articles will be distributed electronically. These notes may eventually be included in later editions of the text.

Prerequisites: METR 4123 (Dynamic Meteorology II: Synoptic-Scale Systems) and METR 4423 (Synoptic Meteorology Lab), or the equivalent. It is highly recommended that you have already taken METR 5113 (Advanced Atmospheric Dynamics I) and received a grade of B or above. **Please do not enroll in this course if you received a C in METR 5113 or have not taken its equivalent.** It is also recommended that you know how to access, display, and manipulate synoptic-scale rawinsonde and surface data.

Course outline:

I. Geostrophic phenomena
Quasigeostrophic theory revisited: Role of diabatic heating; effective static stability; effects of variations in static stability. Alternative formulations of omega equation and height-tendency equation: Trenberth formulation; Q vectors; quasigeostrophic potential vorticity. Quasi-geostrophic diagnosis. A quasigeostrophic analytic model: Application to baroclinic-instability theory; "bombs" and polar lows. Group velocity and Hovmöller diagrams; blocking.

II. Non-quasigeostrophic phenomena
Observations of surface and middle-upper tropospheric fronts. Kinematics of frontogenesis. Dynamics of frontogenesis: quasigeostrophic frontogenesis; vector form of the frontogenesis function; geostrophic-momentum approximation; Sawyer-Eliassen equation; semigeostrophic equations; semigeostrophic frontogenesis; symmetric instability

III. IPV thinking
Isentropic potential vorticity and the invertibility principle; structure of synoptic-sale systems in terms of IPV; Rossby-wave propagation; barotropic and baroclinic instability.

Grades: 50% in two non-comprehensive exams (tentatively scheduled for 14 March and 2 May); problem sets will be checked off, but not graded and will be considered for borderline grades. Solutions are available online.

Course-related information (e.g., problem sets, solutions, supplementary material) to be disseminated at the class site http://weather.ou.edu/~hblue/metr5413.

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. The Office of Disability Services is located in Goddard Health Center, Suite 166, phone 405/325-3852 or fax only 405/325-4173.

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.