

Department of Atmospheric Sciences

COURSE ANNOUNCEMENT – SEMESTER II – 2006–2007

ATMS 520: General Circulation

Call number: 30899

Instructor: Prof. Mankin Mak, 205 Atmos. Sci. Bldg., 333-8071

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Room and Time: 9:00 – 9:50 a.m. M W F, 109 Atmospheric Sciences Bldg.

Credit: 4 hours

Prerequisites: ATMS 401 or consent of instructor and ATMS 402

This course is designed to give the student an overall view of the observed general circulation of the earth's atmosphere and the current theoretical understanding of it. The balance requirements of moisture, angular momentum and energy conservation will first be discussed. The important processes and types of motions that give rise to such transfers will then be examined by means of different mathematical and numerical modelings. The nature and theory of the longitudinal and temporal variability of the atmospheric structure will be discussed.

Course Content:

- Week 1: Basic general considerations
Radiative-forcing, -eqm, -convective-eqm & temperature
- Week 2: Zonal mean & variability of circulation
- Week 3: Tropopause
- Week 4: Hadley circulation
- Week 5: Angular momentum budget
- Week 6: Heat and kinetic energy budget
- Week 7: Wave-mean flow interaction
- Week 8: Ferrel cell & residual circulation
- Week 9: Stationary planetary waves
- Week 10: Local statistics
- Week 11: Transient eddies (Theory)
- Week 12: Instability of zonally varying flow
- Week 13: Geostrophic turbulence
- Week 14: General circulation modeling

Text: *Physics of Climate*, by Peixoto and Oort, American Institute of Physics, 1992.
(Recommended)

Introduction to Circulating Atmospheres, by I. N. James, Cambridge Univ. Press, 1995. (Recommended)

Journal articles