2008 NCTS& NCTU Joint Course on Mathematics in the Atmospheric and Oceanic Fluids
2008 NCTS & NCTU 秋季跨領域課程 大氣海洋之應用數學

Instructor: Prof. Hung-Chi Kuo 郭鴻基 國家講座教授

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Time: 每週一下午 1:30-4:20, 第一次上課時間 97年9月15日(一)，
交通大學應用數學系數學建模與科學計算研究所開課課號: **5364**，三學分。

Course Outline:

Earth's atmosphere and ocean exhibit complex patterns of fluid motion over a wide range of space and time scales. This is a course on the fluid dynamics of the atmosphere and ocean, with emphasis on the concepts and mathematics. Arthur Eddington, the British astrophysicist once remarked, "Never trust an observation without a supporting theory." The purpose of the course is to provide interpretations (theories) and its supporting mathematics rather than the specific observed phenomena. The course may be useful for people who are interested in understanding the physics, chemistry, and/or biology of Earth's fluid environment.

(1) Conservation laws and basic equations

(2) Circulation, vorticity, and potential vorticity

(3) Normal modes

(4) Quasi-balanced states and quasi-geostrophic analysis

(5) Barotropic equations and geostrophic turbulence

(6) Boundary layer dynamics

(7) Waves and instabilities ---linear perturbation analysis

(8) The vortex dynamics

(9) The general circulation dynamics

(10) Numerical modeling and prediction

Place:

交通大學光復校區科學一館 SA307

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