

Syllabus
MAE598 Topic: Climate and environmental prediction
Mon/Wed 4:30-5:45 pm, ECG 218

Instructor: Huei-Ping Huang Office: ERC 359 Email: hp.huang@asu.edu
Office hours: Tuesday 10:30-12:00, Wednesday 2:00-3:00, or by appointment

Course website: <http://www.public.asu.edu/~hhuang38/MAE598.html>

Textbook: "Numerical weather and climate prediction", T. T. Warner, Cambridge University Press,
Required

Other recommended books:

"Mesoscale meteorological modeling", 2nd edition, R. A. Pielke, Sr., Academic Press
"An introduction to three-dimensional climate modeling", 2nd edition, W. M. Washington and
C. L. Parkinson, University Science Books

Course outline

- Overview: The objectives of weather and climate prediction
What constitutes a useful prediction?
Deterministic vs. statistical/empirical prediction
- The physical/mathematical basis of weather/climate prediction
Survey of geophysical fluid dynamics
Numerical solutions and related challenges
- Observation and verification
- Predictability: weather vs. climate prediction
- Initialization and data assimilation
- Detailed architecture of a regional or global model; Physical parameterization
- Exercise: Running a regional or global model
- A brief introduction to empirical methods for climate prediction

Due to limited time, we will focus on short-term weather and environmental prediction.

Grade: Nominally 60% homework, 40% term project (final report). No exams.

The discussion in class will only loosely follow the textbook. Supplementary material will be distributed in class. Attendance is strongly encouraged.

Prerequisite and technical preparation:

This is an advanced course on computational+geophysical fluid dynamics. Prior knowledge on fluid mechanics (topics covered by MAE571, MAE578) and computational fluid dynamics (MAE561) is required.