

GEO 347G/387G Climate System Modeling
3 Credits: MWF 10 – 11 am
Room: JGB 3.216B

Instructor: Dr. Ned Vizu
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Office Hours: by appointment

Prerequisites:

Upper-division standing/graduate student
Basic knowledge of UNIX and programming experience in Fortran

Textbook/Materials:

“An Introduction to Three-Dimensional Climate Modeling” by Warren M. Washington and Claire L. Parkinson. University Science Books

Description:

In this course you will study the basic theory of climate system modeling using state-of-the-art WRF regional climate model in a variety of applications. This includes learning how to set-up, run on high-performance computing platforms, and analyze output from the regional climate model to address relevant scientific questions.

Syllabus:

I. Introduction

II. Physical Description of the climate system

- a. atmosphere
- b. oceans
- c. land surface
- d. cryosphere/ice

III. Modeling the climate system

- a. Fundamental equations
- b. vertical coordinate systems
- c. radiation and cloud processes
- d. surface processes

IV. Basic Methods for solving model equations

- a. Finite differencing
- b. spectral method

V. Weather Research and Forecasting Model (WRF)

- a. Introduction
- b. ARW Solver
- c. WRF Model Physics
- d. WRF Software
- e. Getting started with the TACC Ranger
 - unix/linux commands
 - vi editor
- f. WRF Preprocessing System (WPS)
- g. WRF ARW Initialization
 - Basics
 - How to set up and run
- h. ARW namelist.input

i. Post-processing and graphical tools (GrADS)

VI. Research Project

Grading: Your final grade for the course will be based on the following components

- Oral presentation of project ~ **50%**
- Written research project ~ **50%**

UT Honor Code:

The core values of the University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the University is expected to uphold these values through integrity, honesty, trust, fairness, and respect towards peers and community. For more detailed information regarding the UT Honor Code please see: <http://registrar.utexas.edu/catalogs/gi09-10/ch01/index.html>

Policy Regarding Religious Holidays:

By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.