Parameterization Schemes

METR 5353
TR 8:30 - 9:45 pm
5930 NWC

Instructor: Dr. David Stensrud
E-mail: David.Stensrud@noaa.gov
(405) 325-6170, Room 2236 NWC

This course is designed for graduate students interested in numerical weather prediction. The objective of this course is to provide the student with an overview of the assumptions used in the parameterization of sub-grid scale processes and how these assumptions may influence numerical forecasts of the weather. Various well-known parameterization schemes will be reviewed and discussed in class.

Credits: 3 credits

Format: This course is a lecture course and the textbook *Parameterization Schemes: Keys to Understanding Numerical Weather Prediction Models* (Cambridge University Press) is required.

Grading: The grading scheme for this course is:

30% problem sets
20% mid-term exam
20% final exam
20% paper review
10% pop quizzes and class participation

Grading Policy: All assignments are due at the end of the class period on the day assigned. No credit will be given for late assignments. Exceptions may be given for emergency situations after consultation with the instructor.

Problem Sets: There will be a total of 6 to 8 problem sets assigned during the semester. Each problem set has been developed to expand upon topics covered in class and several of them will require the students to write computer programs or run the WRF model and generate plots and analyses. Since the instructor is familiar with the FORTRAN programming language, using this language in your programming assignments is encouraged, but not required. However, assistance in writing code in other programming languages is not available.

Paper Review: Each student will choose a paper related to numerical weather prediction and/or parameterization and write a formal review of the paper. The journal article must be approved by the instructor in advance. The written review should be no more than 2 pages in length. The written reviews are due in class on 10 April.

Mid-term examination: A mid-term examination is tentatively scheduled for 13 March and will cover material presented during the lectures, reading assignments, and homework.

Final examination: A final examination is scheduled during finals week, and will cover all the material presented during the semester, although weighted towards materials covered since the mid-term.

Quizzes: Pop quizzes may be given occasionally during class periods and will primarily cover materials from previous lectures. You will be given 10 minutes to complete each quiz, and they will be handed out when class begins. The days of these quizzes will not be announced and no makeup will be provided.

Class participation: Each student is expected to participate in class by attending lectures on time, asking questions, and answering questions from the instructor. You will be asked to read sections from the book prior to each class and be ready to discuss.

Office Hrs: TR 11:00 am to 12:00 noon in NWC 2236. You can also call me at 325-6170 and make arrangements to visit me during my regular work hours or contact me via email at David.Stensrud@noaa.gov.

Other Considerations: Students with disabilities should contact the instructor within the first two weeks of the course so that accommodations can be made.

Academic misconduct is a serious breach of ethics since it potentially can harm those students who are honestly pursuing their studies. All instances of alleged academic misconduct will be thoroughly investigated and action taken under the official university policies. See www.ou.edu/provost/other/miscode.htm for a complete description of the OU academic misconduct code.

Weekly Topics to be addressed:

13 January – introductions, need for parameterizations, primitive equation model overview

20 January – land surface parameterizations

27 January – land surface and soil-vegetation-atmosphere parameterizations

3 February – no class (AMS annual meeting)

10 February – turbulence closure

17 February – planetary boundary layer parameterization

24 February – convective parameterization

10 March – convective parameterization

13 March –MID-TERM EXAM

17 March – SPRING BREAK

24 March – microphysics parameterization

31 March – microphysics parameterization

7 April – radiation parameterization

14 April – radiation parameterization

21 April – cloud cover and orographic drag parameterization

28 April – ancillary topics

5 May – FINALS WEEK