

Parameterization Schemes

METR 5803
Section 002
TR 1:00 - 2:15 pm
5820 NWC

Instructor: Dr. David Stensrud
E-mail: David.Stensrud@noaa.gov
(405) 325-6170, Room 4368 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 there is no appropriate text yet. However, pdfs of all the course lecture materials on the web (<http://www.nssl.noaa.gov/~stensrud/book>). You are strongly encouraged to download and print these chapters for your use in class. Most of the material covered on examinations, quizzes, and problem sets will be based upon material covered during the lectures, the written chapters, and from the reading assignments.

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 8 to 10 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. 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 from a list of acceptable journals (*Monthly Weather Review*, *Journal of the Atmospheric Sciences*, *Tellus*, *Quarterly Journal of the Royal Meteorological Society*) and both write a formal review of the paper and present an overview of the paper with comments during class. The journal article chosen must be approved by the instructor. The oral summary of this paper will be limited to 15 minutes during an agreed time outside of class (12 minutes for the presentation and 3 for questions from the audience). The grade for this paper review will be based upon the following distribution: 75% on the written paper review, and 25% on the class presentation. The written review should be no more than 3 pages in length. The written reviews are due in class on 5 April, with the oral class presentations occurring one evening during the week of 2 April.

Mid-term examination: A mid-term examination is tentatively scheduled for 15 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.

Quizzes: Pop quizzes will 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, if available, leading or assisting in one or more weather discussion during the semester. The weather discussions will be held weekly, assuming all the technological problems can be overcome.

Office Hrs: TR 2:15 to 3:15 pm in NWC 4368. 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:

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

23 January – land surface parameterizations

30 January – land surface parameterizations

6 February – soil-vegetation-atmosphere parameterizations

13 February – soil-vegetation-atmosphere parameterizations

20 February – turbulence closure

27 February – planetary boundary layer parameterization

6 March – convective parameterization

13 March – convective parameterization, MID-TERM EXAM

20 March – SPRING BREAK

27 March – convective parameterization

3 April – microphysics parameterization, PAPER REVIEWS

10 April – microphysics parameterization

17 April – radiation parameterization

24 April – radiation parameterization

1 May – cloud cover parameterization, orographic drag

8 May – FINALS WEEK