Course Description:

ATM 460/560 ATMOSPHERIC DYNAMICS (3-0) 3 credits. Prerequisites: MATH 321 and PHYS 211. Equations of motion, kinematics of fluid flow, continuity equation, vertical motion, theorems of circulation and vorticity, quasi-geostrophic systems, and wave motions in the atmosphere.

Satisfies the meteorology distribution requirement for the ATM M.S. program.

Students enrolled in ATM 560 will be held to a higher standard than those enrolled in ATM 460.

Instructor:

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Logistics:

For the Fall, 2010, semester, we will meet on Mondays, Wednesdays, and Fridays, at 9 AM MT in Electrical Engineering/Physics Bldg. Room 255, on the SDSMT campus. Classes will follow a lecture/discussion format, with instructor and students contributing to the learning process. There occasionally will be

During most weeks there will be homework assignments so we can solidify our progress as we cover the topics we have in our syllabus this spring. These assignments will involve solving problems involving thought and calculation. Work will be collected, reviewed, and returned to students with comments. Use of computational tools, including calculators and computer software packages such as Excel, MathCad, MatLab, IDL, Mathematica, etc., is encouraged in preparation of problem assignments.

There will be 2 hourly exams during the semester and a comprehensive final exam during finals week. The hourly exams will be conducted during regular class hours on Wednesday, October 13, and Monday, November 22. The final will be on the last day of finals week, Friday, December 17, starting at 5 PM.

Objectives:
This class is intended to introduce students to the fundamental concepts of fluid dynamics necessary for understanding large-scale motions in the earth’s atmosphere.

Outcomes:
Students will be able to understand and manipulate the full equations of motion of a layer of fluid on a rotating sphere to produce simplified relationships relevant to understanding large-scale motions. They will understand various important conservation laws that constrain these motions, and will become familiar with various quantities used in describing such fluid flows including circulation, vorticity, potential vorticity, etc. Students will be able to use quasi-geostrophic theory to understand the development and propagation of typical mid-latitude baroclinic waves.

Grading:
The final grade will be computed based on examination scores, and completion of homework assignments.

Homework – 20%
Hourly exams – 20% each
Final exam – 40%

Adjustments of grades on the borderline between one letter grade and the next will be based on class participation.

Other Academic Policies
Academic policies governing this class are presented in the 2010-2011 SDSMT catalog.

Text


Other Administrative Minutiae
Office Hours will be Tuesday and Thursday mornings, from 9 to 11 AM, or by appointment.

Successful completion of this course will require approximately 135 hours of student effort during the semester, including time spent in class.