

# About METR 3113

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## Who, When, What

The instructor is Prof. Brian Fiedler, ✉ [bfiedler@ou.edu](mailto:bfiedler@ou.edu) Office is at NWC 5636.

METR 3113 *Atmospheric Dynamics I* meets MWF 10am NWC 1350

## Goal Statement

The goal of METR 3113 is to develop the student's abilities in using knowledge of the fundamental forces in the atmosphere: the pressure gradient force, gravity and the Coriolis force. Analysis of atmospheric motion caused by these forces is done without recourse to the analysis of continuous vector fields. This means vector calculus is minimally employed. Aspects of fluid mechanics, for example changes in the pressure field resulting from "colliding parcels", is reserved for later courses.

## Course Content

1. Units, dimensions, dimensional homogeneity and dimensional analysis.
2. Vectors and orientational invariance. Vector products.


3. Elementary functions and elementary differential equations.
4. Review of elementary Newtonian mechanics.
5. The equation of motion in one-dimension as a differential equation, and its solution. Conservation of energy. 1, Pressure. The pressure gradient force. Bernoulli equation. The buoyancy force.
6. The vector equation of motion. Coordinate systems, Cartesian and polar.
7. Centripetal acceleration. Conservation of angular momentum. Cyclostrophic wind balance. Tornadoes.
8. Inertial forces in accelerating reference frames.
9. An equation of motion for meteorology. The Coriolis force.
10. The tidal force.
11. The gradient wind.
12. Angular momentum in the presence of a Coriolis force.
13. An introduction to continuum mechanics with incompressible 2-D flows. Vorticity.
14. The thermal wind.

## Textbook

The textbook will be provided to you in three installments, as a free PDF file, available at TextBook. New versions of the installments, correcting minor errors, will be made available during the semester. Hopefully the errors will be fixable by pencilling in the corrections, and you will not need to print the new versions.

## Grading

The grade for the course is usually determined by a weighted average of JiTT scores, Test scores, Writing Assignments, and Final Exam, The total score for the course is a weighted average of these scores:

- 60%: 3 test scores, with the JiTT score replacing the lowest test score, if it is greater.
- 35%: Final Exam
- 5%: Writing Assignments **OR** Dynamics Carols,  example Carol from 2007

Alternatively, the total score is based 100% on the Final Exam, if that total score is higher than the above method. (Only very rarely is that so).

No calculators are allowed in tests or exams.

The final letter grade is computed from the total score  $t$  with:

- A:  $t \geq 80$ .
- B:  $65 \leq t < 80$ .
- C:  $50 \leq t < 65$ .
- D:  $35 \leq t < 50$ .
- F:  $t < 35$ .

## JiTT

JiTT stands for Just-in-Time Teaching, which you can read about [What is JiTT](#). JiTT always means something simpler --JiTTs are the online questions that must be answered by 8am on the day of a lecture. In general, two new questions are posted by noon after a lecture, which generally gives students 44 hours to read and answer the two new questions.

Students may answer JiTT questions and check their grades at the [secure student record page](#) Students will need both the *class password* to view the page, and their *personal METR 3113 password* to interact with it. (Also, more details about the grading policy can be viewed in the above link). These passwords were distributed on August 12. Your personal METR 3113 password is NOT your OU password.

This will expand at the semester progresses: [2009 Graded Jitt questions](#).

Similar JiTT summaries are available for previous years:

- [2008](#)
- [2007](#)
- [2006](#)
- [2005](#)
- [2004](#)

Those should be helpful to you as you attempt to answer this year's questions.

Students are NOT required to work alone on the JiTT problems. It is not realistic to enforce that; only the honest people would suffer. So share the joy of your scientific and analytic inquiry with your peers!

## Writing Assignment

New for this year is the writing assignment.

## Important Dates for Graded Items

- Monday 9/28: Test #1
- Monday 10/26: Test #2
- Monday 11/23: Test #3
- Monday 12/14: Final Exam, 8am-10am. Confirm with [official schedule](#)
- due dates for the writing assignments will be announced during the semester

## Office Hours

Office hours will be 9:30am to 10:00am MWF in our lecture room NWC 1350. Or you may just drop by my office, NWC 5636. Or you may e-mail me to schedule an appointment. Other office hours are online, the night before class: Sunday, Tuesday and Thursday at 10:00 pm. The subject of the online office hours is usually the JiTT questions, the answers to which are due by 8:00 AM the following morning. The "office hours" are in the chat room available for this course at [learn.ou.edu](#) (use the password given to you by OU).

## Passwords

On August 12, 2009. This password email was sent to all enrolled students.

## Required Disability Statement

What statement is the most common statement on OU syllabi, and that a typical OU student may see 40 times before graduating?

1. "The University of Oklahoma is committed to providing reasonable accommodation for all students with disabilities. Students with disabilities who require accommodations in this course are requested to speak with the professor as early in the semester as possible. Students with disabilities must be registered with the Office of Disability Services prior to receiving accommodations in this course. The Office of Disability Services is located in Goddard Health Center, Suite 166, phone 405/325-3852 or fax only 405/325-4173."
2. "If I have seen further, it is by standing on the shoulders of giants." - Isaac Newton
3. "I have not as yet been able to discover the reason for these properties of gravity from phenomena, and I do not feign hypotheses. For whatever is not deduced from the phenomena must be called a hypothesis; and hypotheses, whether metaphysical or physical, or based on occult qualities, or mechanical, have no place in experimental philosophy. In this philosophy particular propositions are inferred from the phenomena, and afterwards rendered general by induction." - Isaac Newton

Answer: 1.

AboutMETR3113 (last edited 2009-08-16 13:28:15 by BrianFiedler)