

Syllabus

METR 3213: PHYSICAL METEOROLOGY I

MWF, 1100-11:50, NWC 1350
Fall 2007

- Instructor:** Prof. Phillip Chilson (chilson@ou.edu)
Office: NWC 4618, 325-5095, Office Hours: MW 2:00-3:30 PM
Feel free to come outside of office hours if my door is open
- Text:** *Atmospheric Science: An Introductory Survey, 2nd Ed.*,
J. M. Wallace & P. V. Hobbs, Academic Press, 2006
- Pre-requisites:** Grade of C or better in MATH 2443, PHYS 2524, and METR 2023/2021

Course Overview: This course introduces the physical processes associated with atmospheric composition, basic radiation and energy concepts, the equation of state, the zeroth, first, and second law of thermodynamics, the thermodynamics of dry and moist atmospheres, thermodynamic diagrams, statics, and atmospheric stability.

Planned Course Content

- I. Atmospheric Composition** Distribution of atmospheric mass and gaseous constituents. Temperature distribution. Radiative transfer of energy and its role in the thermal regime of the atmosphere.
- II. Basic notions and equations** Gas laws. Virtual temperature. Hydrostatic equation. Geopotential. Hypsometric equation. Isobaric surfaces and pressure reduction methods.
- III. First law of thermodynamics** Principle of conservation of energy. Joules law. Specific heats. Enthalpy. Concept of air parcel. Adiabatic processes. Adiabatic lapse rate. Potential temperature.
- IV. Atmospheric moisture** Water vapor in the air. Moisture parameters. Evaporation and condensation. Saturated-adiabatic processes and lapse rate. Equivalent potential temperature.
- V. Static stability** Stability of unsaturated and saturated air. Conditional and convective instability. Buoyancy.
- VI. Second law of thermodynamics** Carnot cycle. Reversible and irreversible processes. Statements of the Second Law. Entropy. Clausius-Clapeyron equation.
- VII. Thermodynamic diagrams** Pseudoadiabatic charts. Temperature entropy, skew T ln p diagrams and their applications.

NOTE: Supplemental reading and study material for this course will be provided through the class home page (<https://learn.ou.edu/>). These materials are considered part of the required reading. It is the responsibility of the student to regularly access the class home page and check for the availability of new material.

Grading

Quizzes	25%
Examinations (3)	50%
Comprehensive Final Examination	25%

$$\text{Final Grade} = 0.25 \cdot \text{Quiz Average} + 0.50 \cdot \text{Exam Average} + 0.25 \cdot \text{Final Exam Grade}$$

$$\text{Quiz Average} = \frac{1}{8} \sum 8 \text{ Highest Quiz Grades}$$

$$\text{Exam Average} = \frac{2}{5} \cdot \sum 2 \text{ Highest Exam Grades} + \frac{1}{5} \cdot \text{Lowest Exam Grade}$$

Examinations and Quizzes: No unexcused make-ups for the quizzes or exams will be given. If you cannot be present for an examination, it is YOUR responsibility to make other arrangements before the examination. Otherwise, the missed test cannot be retaken.

Additional information regarding class policies can be found on the class home page.

Class Homepage

The class home page will be available through Desire2Learn (<https://learn.ou.edu/>)

Tentative Schedule of Exams, Quizzes, and Breaks

August	31	(Friday)	Quiz 1
September	03	(Monday)	Labor Day
	07	(Friday)	Quiz 2
	14	(Friday)	Quiz 3
	21	(Friday)	Exam 1
	28	(Friday)	Quiz 4
October	03	(Wednesday)	Quiz 5
	05	(Friday)	"Fall Holiday"
	12	(Friday)	Quiz 6
	19	(Friday)	Exam 2
	26	(Friday)	Quiz 7
November	02	(Friday)	Quiz 8
	09	(Friday)	Quiz 9
	14	(Wednesday)	Exam 3
	16	(Friday)	Statehood Day
	21	(Wednesday)	Thanksgiving Break
	23	(Friday)	Thanksgiving Break
	30	(Friday)	Quiz 10
December	14	(Friday)	Final Exam, 1:30 - 3:30 PM

Academic Honesty: Homework assignments are important for your understanding of the material. Occasional help from a classmate is fine but be sure that you actually understand the material. It will help tremendously for you to come visit me in my office hours. Realize that simply copying a homework assignment from any source is considered cheating and will definitely not help your understanding. If caught, such activity could result in a failing grade in the course and possible disciplinary action. You are responsible for knowing the University of Oklahoma Student Code which can be obtained at <http://www.ou.edu/studentcode/>. Each assignment for this class must be accompanied by the following signed statement:

STATEMENT OF ACADEMIC INTEGRITY

On my honor I affirm that I have neither given nor received inappropriate aid in the completion of this exercise (homework, quiz, examination, laboratory report, etc.).

Signature: _____ Date: _____

Religious Holidays: It is the policy of the University to excuse absences of students that result from religious observances and to provide without penalty for the rescheduling of examinations and additional required class work that may fall on religious holidays.

Reasonable Accommodation Policy: The University of Oklahoma is committed to providing reasonable accommodation for all students with disabilities. Those having such a need are requested to speak with Prof. Chilson as early in the semester as possible. Students with disabilities also must be registered with the Office of Disability Services (ODS) prior to receiving accommodations in this course. You may contact the ODS at Goddard Health Center, Suite 166, phone 405-325-3852 or TTD only at 405-325-4173.