

ATMS 411/611 Fall 2015

Introduction to Atmospheric Physics

Taught by: Professor W. Patrick (Pat) Arnott.

Time and Place: Mon/Wed/Fri 11:00am to 12:10pm. Room 4050 in WRB.

Textbook: Atmospheric Science: An Introductory Survey by Wallace and Hobbs.

Office hours: Tuesday and Thursday 1 - 2 pm, RM 213 Leifson Physics, and at other times by appointment. Please feel free to take advantage of them.

Contact: arnottw@unr.edu, 775-784-6834.

Course Administration: webcampus for grades.

<http://www.patarnott.com/atms411/> day to day use, calendar, and homework.

Catalog Description: Atmospheric structure; global radiation balance; radiation scattering by gases and aerosol particles; introduction to radioactive transfer; optical phenomena; atmospheric thermodynamics; cloud physics; aerosol mechanics.

Prerequisite: PHYS 181.

Student Learning Outcomes:

1. Demonstrate ability to work with the thermodynamic structure of the Earth's atmosphere from the surface through the troposphere, stratosphere, mesosphere, thermosphere, and ionosphere: The origin of the atmosphere. Loss of atmospheric gases at the top of the atmosphere and gain of atmospheric constituents from space.
2. Demonstrate ability to use skew-T logP thermodynamic diagrams for the atmosphere, the foundation for each curve on this plot, and uses for understanding weather conditions.
3. Demonstrate ability with aerosol and cloud microphysics, and the connections between them.
4. Demonstrate ability to use atmospheric radiation transfer, including solar radiation, infrared radiation, single and multiple scattering, light scattering by aerosols and cloud hydrometeors, the factors affecting the Earth's radiation balance, the role of radiation in weather and boundary layer dynamics, and the precise meaning of the greenhouse effect. Some questions we will explore are these: why are clouds white, skies blue, what would the sky look like if you could see at infrared wavelengths, and why it matters.

Grading: The class grade is determined as follows:

60% Homework: assigned problems and Quizzes

40% Tests: Midterm, and Final Exam

Students are able to track their grade as the semester progresses using WebCampus. Semester grades will be given using the following percentage guide:

A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
90%- 100%	89%- 89.9%	88%- 88.9%	80%- 87.9%	79%- 79.9%	78%- 78.9%	70%- 77.9%	69%- 69.9%	68%- 68.9%	60%- 67.9%	59%- 59.9%	0- 58.9%

Midterm Exam: A mid-semester, cumulative exam to be administered in class [20% of final grade].

Final Exam: Cumulative exam to be administered in class [20% of final grade].

GUIDE TO DOING WELL IN THIS CLASS:

(My observations of students that get the most out of their course work during this brief time in life when you get to be a student)

1. Attend class, every class. Ask questions in class. I benefit greatly from questions students ask in class as it helps me refine my understanding of the subject matter, and it helps me convey topics more effectively. Other students benefit as well. I am very open to questions in class, and find that when we have a discussion rather than a monologue, we all get a lot more out of our time together, and we can make interesting discoveries as we go along.
2. Do the homework every time, on time.
3. Work with others on the homework so that you learn to work in a group, and you gain the insights of others as they gain from you.
4. Be sure you thoroughly understand the homework and course material.
5. Arrange your daily schedule so that you have time for sleep at night, and can digest the course material daily. Work on each course a little each day.
6. Get started early on everything. It helps cement your knowledge.
7. Eat well, and get some exercise. Some diversions help refresh your enthusiasm and skill.
8. Attend office hours to ask questions and refine your understanding of the subject matter.
9. Seek connections with the subjects of this course and others you are taking or will

take later on.

10. Pay close attention to subjects that are of great interest to you, and you may be able to link your future employment in some way to the concepts of this course.

Final Exam:

Friday December 16th from 8 am to 10 am or Saturday December 12th from 10:15 am to 12:15 pm, depending on events at the end of the semester.

UNR Policies:

Student Absences: NSHE and University policy state that there are no official absences from any university class:

It is the personal responsibility of the student to consult with the instructor regarding absence from class. It is the expectation of the instructor to accommodate absences of students participating in official University functions and to be sensitive to the needs of students who face serious personal issues. In the event that a student misses a class because of a serious personal issue, the Office of the Vice President for Student Services may, at its discretion, send an explanation to affected faculty. The instructor shall make the final determination on whether the missed work can be done at a time other than during the regularly scheduled class period. It is the policy of the NSHE to be sensitive to the religious obligations of its students. Any student missing class, quizzes, examinations or any other class or lab work because of observance of religious holidays shall, whenever possible, be given an opportunity during that semester to make up the missed work. The make-up will apply to the religious holiday absence only. It shall be the responsibility of the student to notify the instructor in advance in writing, according to the policy of the institution offering the class, if the student intends to participate in a religious holiday that does not fall on state holidays or periods of class recess. This policy shall not apply in the event that administering the assignment at an alternate time would impose an undue hardship on the instructor or the institution that could not reasonably have been avoided.

Absence due to university approved extracurricular activity: The University of Nevada, Reno deeply values and supports the participation of undergraduate students in university-approved extracurricular activities. It is the spirit and intent of this policy to offer fair and equitable opportunities to all students, including those who must miss class due to participation in university approved extracurricular activities. University-approved extracurricular activities are defined as those sanctioned by the college dean and/or the provost, and may include, but are not limited to, intercollegiate athletics, band, drama, forensics and recruitment. Students who represent the University at such events shall be provided with alternate, timely accommodations for exams, quizzes, or other course assignments missed as a result of their participation. The alternate accommodations should in no way penalize or disadvantage the student. It is the responsibility of the student to provide written notice to their instructor of their participation in official University activities as soon as the student is aware of the potential need to miss class.

Medical Excuse Policy Effective Fall 2014, the Student Health Center will no longer provide medical excuses for missed classes, exams, or assignments. This policy is based on their limited

resources, which are better dedicated to providing health care; the inability for us to make valid determinations about illnesses or injuries students may have effectively managed through self care; and our commitment to student privacy. Exceptions to this policy may occur if, in the judgment of a health care provider at the Student Health Center, the student will be out of class for an extended period of time due to a serious illness or medical condition. Examples of serious illnesses or medical conditions may include but are not limited to:

- Mononucleosis, which may require bed rest and/or removal from campus
- Hospitalization and/or surgery
- Severe injury or illness requiring prolonged bed rest
- Highly contagious diseases (chicken pox, measles)

This policy is consistent with the recommendations of the American College Health Association and is similar to other colleges and universities. Reference: Policy adapted from Nazareth College and Drexel University

Academic Dishonesty

Cheating, plagiarism or otherwise obtaining grades under false pretenses constitute academic dishonesty according to the code of this university. Academic dishonesty will not be tolerated and penalties can include canceling a student's enrollment without a grade, giving an F for the course or for the assignment. For more details, see the University of Nevada, Reno General Catalog.

Disability Services

Any student with a disability needing academic adjustments or accommodations is requested to speak with me or the Disability Resource Center (Thompson Building, Suite 100) as soon as possible to arrange for appropriate accommodations.

Academic Success Services

Your student fees cover use of:

- Math Center (784-443 or www.unr.edu/mathcenter/)
- Tutoring Center (784-6801 or www.unr.edu/tutoring/)
- University Writing Center (784-6030 or www.unr.edu/writing_center)

These centers support your classroom learning; it is your responsibility to take advantage of their services. Seeking help outside of class helps you develop as a responsible and successful student.

Recording

Surreptitious or covert videotaping of class or unauthorized audio recording of class is prohibited by law and by Board of Regents policy. This class may be videotaped or audio recorded only with the written permission of the instructor. In order to accommodate students with disabilities, some students may have been given permission to record class lectures and discussions. In those cases, students should understand that their comments during class might be recorded.