



Syllabus – PHYS 472 Planetary Atmospheres – Fall 2015

Course Information:

PHYS 472: Planetary Atmospheres, 1 credit, Fall 2015
Meeting Times: MWF, 1:00 pm-2:00 pm
Meeting Location: Paul B. Reichardt 207
Prerequisites: Undergraduate E&M, Classical Mechanics, Thermodynamics

Instructor Information:

Instructor: Peter Delamere, Associate Professor of Space Physics
Office: 708E Elvey (Geophysical Institute)
Email: Peter.Delamere@gi.alaska.edu
Phone: (907) 474-6442
Office Hours: by appointment

Scope: Planetary atmospheres play a central role in our exploration of the solar system. Why are atmospheres so interesting? Because we can “see” them. Spectroscopic observations of planetary atmospheres give clues as to the composition of the parent planet, satellite, or even comet. The density, pressure, and composition of planetary atmospheres is extremely varied. Some atmospheres are gravitationally bound, while other atmospheres freely escape (e.g. cometary “atmospheres”). Some atmospheres are tenuous (Mercury), while others harbor dense greenhouse gases (Venus). In this course we will explore the wealth of physics associated with planetary atmospheres, starting at the Sun and ending at Pluto.

Approach: The emphasis will be a very broad overview of planetary atmospheres from the Sun to Pluto. The approach will be comparative with the goal of better understanding the terrestrial atmosphere.

Topics: We will address hydrostatic and thermal equilibrium, spectroscopy, physics of escaping atmospheres, radiative transfer, and compare planetary atmospheres throughout the solar system.

Textbook: No required textbook. Recommended reading will be posted on UAF Blackboard.

Grading:

Homework/Class Participation	50%
Final Exam	50%

Course Policies:

- Attendance and participation in class is expected of all students.
- Assignments are due at the beginning of class on the due date.
- Students are encouraged to work together on homework problems, but the final written solutions must be individual work.
- Students must acknowledge all sources of information – included fellow students – used in homework solutions and final projects. The UAF catalog states: “The university may initiate disciplinary action and impose disciplinary sanctions against any student or student organization found responsible for committing, attempting to commit or intentionally assisting in the commission of . . . cheating, plagiarism, or other forms of academic dishonesty. . . .”

- (e) All UA student academics and regulations are adhered to in this course. You may find these in the UAF catalog (section “Academics and Regulations”).

Students with Disabilities Notice: The University of Alaska Fairbanks is committed to equal opportunity for students with disabilities. Students with disabilities are encouraged to contact the coordinator of Disability Services (Mary Matthews) at the Center for health & Counseling (x7043). See section on Disability Services of the UAF Class Schedule (<http://www.uaf.edu/schedule/>).

Schedule:

Topic	Days/Dates
Introduction to Planetary Atmospheres	Friday, Oct 9
Hydrostatic and Thermal Equilibrium	Monday, Oct 12
Spectroscopy	Wednesday, Oct 14
The Sun	Friday, Oct 16
Stellar Atmosphere	Monday, Oct 19
Exospheres (Moon and Mercury)	Wednesday, Oct 21
Satellite atmospheres (Io, Europa, Enceladus, and Titan)	Friday, Oct 23
Earth, Venus, Mars 1	Monday, Oct 26
Earth, Venus, Mars 2	Wednesday, Oct 28
Giant Planets	Friday, Oct 30
Comets and Pluto	Monday, Nov 2
Radiative Transfer	Wednesday, Nov 4
Atmospheric Evolution	Friday, Nov 6
Wrap up/Final Exam	Monday, Nov 9