



Syllabus – PHYS 472 Planetary Atmospheres – Spring 2019

Course Information:

PHYS 472: Planetary Atmospheres, 1 credit, Spring 2019
Meeting Times: MWF, 1:00 pm-2:00 pm
Meeting Location: Paul B. Reichardt 204
Prerequisites: Undergraduate E&M, Classical Mechanics, Thermodynamics

Instructor Information:

Instructor: Peter Delamere, Associate Professor of Space Physics
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Phone: (907) 474-6442
Office Hours: Tuesday 1:00 to 4:00, or 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, staring 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”).

Student protection and services statement:

Every qualified student is welcome in my classroom. As needed, I am happy to work with you, disability services, veterans’ services, rural student services, etc to find reasonable accommodations. Students at this university are protected against sexual harassment and discrimination (Title IX), and minors have additional protections. As required, if I notice or am informed of certain types of misconduct, then I am required to report it to the appropriate authorities. For more information on your rights as a student and the resources available to you to resolve problems, please go the following site: www.uaf.edu/handbook/

The University of Alaska Fairbanks is an AA/EO employer and educational institution and prohibits illegal discrimination against any individual: <https://alaska.edu/nondiscrimination/>.

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 at the Center for Health & Counseling (x7043).

Your instructor follows the University of Alaska Fairbanks Incomplete Grade Policy: “The letter “I” (Incomplete) is a temporary grade used to indicate that the student has satisfactorily completed (C or better) the majority of work in a course but for personal reasons beyond the student’s control, such as sickness, has not been able to complete the course during the regular semester. Negligence or indifference are not acceptable reasons for an “I” grade.”

Effective communication: Students who have difficulties with oral presentations and/or writing are strongly encouraged to get help from the UAF Department of Communication’s Speaking Center (907-474-5470, speak@uaf.edu) and the UAF English Department’s Writing Center (907-474-5314, Gruening 8th floor), and/or CTC’s Learning Center (604 Barnette Street, 907-455-2860).

Schedule:

Topic	Days/Dates
Introduction to Planetary Atmospheres	Monday, Jan 14
Hydrostatic and Thermal Equilibrium	Wednesday, Jan 16
Spectroscopy	Wednesday, Jan 23
The Sun	Friday, Jan 25
Stellar Atmosphere	Monday, Jan, 28
Exospheres (Moon and Mercury)	Wednesday, Jan 30
Satellite atmospheres (Io, Europa, Enceladus, and Titan)	Friday, Feb 1
Earth, Venus, Mars 1	Monday, Feb 4
Earth, Venus, Mars 2	Wednesday, Feb 6
Giant Planets	Friday, Feb 8
Comets and Pluto	Monday, Feb 11
Radiative Transfer/Atmospheric Evolution	Wednesday, Feb 13
Final Exam	Friday, Feb 15