



Syllabus – PHYS 472 Planetary Atmospheres – Fall 2022

Course Information:

PHYS 472: Planetary Atmospheres, 1 credit, Fall 2022
Meeting Times: MWF, 1:00 pm-2:00 pm
Meeting Location: Paul B. Reichardt 165
Prerequisites: Undergraduate E&M, Classical Mechanics, Thermodynamics

Instructor Information:

Instructor: Peter Delamere, Professor of Space Physics
Office: 708E Elvey (Geophysical Institute)
Email: padelamere@alaska.edu
Phone: (907) 474-6442
Office Hours: Tuesday 2:10 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, 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 Google Classroom.

Grading:

Homework/Class Participation	50%
Final Exam	50%

COVID-19 statement: Students should keep up-to-date on the university’s policies, practices, and mandates related to COVID-19 by regularly checking this website: <https://sites.google.com/alaska.edu/coronavirus/uaf?authuser=0> Further, students are expected to adhere to the university’s policies, practices, and mandates and are subject to disciplinary actions if they do not comply.

Student protections statement: UAF embraces and grows a culture of respect, diversity, inclusion, and caring. Students at this university are protected against sexual harassment and discrimination (Title IX). Faculty members are designated as responsible employees which means they are required to report sexual misconduct. Graduate teaching assistants do not share the same reporting obligations. For more information on your rights as a student and the resources available to you to resolve problems, please go to the following site: <https://catalog.uaf.edu/academics-regulations/students-rights-responsibilities/>.

Disability services statement: I will work with the Office of Disability Services to provide reasonable accommodation to students with disabilities.

ASUAF advocacy statement: The Associated Students of the University of Alaska Fairbanks, the student government of UAF, offers advocacy services to students who feel they are facing issues with staff, faculty, and/or other students specifically if these issues are hindering the ability of the student to succeed in their academics or go about their lives at the university. Students who wish to utilize these services can contact the Student Advocacy Director by visiting the ASUAF office or emailing asuaf.office@alaska.edu.

Student Academic Support:

- Speaking Center (907-474-5470, uaf-speakingcenter@alaska.edu, Gruening 507)
- Writing Center (907-474-5314, uaf-writing-center@alaska.edu, Gruening 8th floor)
- UAF Math Services, uaf-traccloud@alaska.edu, Chapman Building (for math fee paying students only)
- Developmental Math Lab, Gruening 406
- The Debbie Moses Learning Center at CTC (907-455-2860, 604 Barnette St, Room 120, <https://www.ctc.uaf.edu/student-services/student-success-center/>)
- For more information and resources, please see the Academic Advising Resource List (https://www.uaf.edu/advising/lr/SKM_364e19011717281.pdf)

Student Resources:

- Disability Services (907-474-5655, uaf-disability-services@alaska.edu, Whitaker 208)
- Student Health & Counseling [6 free counseling sessions] (907-474-7043, <https://www.uaf.edu/chc/appointments.php>, Gruening 215)
- Center for Student Rights and Responsibilities (907-474-7317, uaf-studentrights@alaska.edu, Eielson 110)
- Associated Students of the University of Alaska Fairbanks (ASUAF) or ASUAF Student Government (907-474-7355, asuaf.office@alaska.edu, Wood Center 119)

Nondiscrimination statement: The University of Alaska is an affirmative action/equal opportunity employer and educational institution. The University of Alaska does not discriminate on the basis of race, religion, color, national origin, citizenship, age, sex, physical or mental disability, status as a protected veteran, marital status, changes in marital status, pregnancy, childbirth or related medical conditions, parenthood, sexual orientation, gender identity, political affiliation or belief, genetic information, or other legally protected status. The University's commitment to nondiscrimination, including against sex discrimination, applies to students, employees, and applicants for admission and employment. Contact information, applicable laws, and complaint procedures are included on UA's statement of nondiscrimination available at www.alaska.edu/nondiscrimination. For more information, contact:

UAF Department of Equity and Compliance
 1692 Tok Lane, 3rd floor, Constitution Hall, Fairbanks, AK 99775
 907-474-7300
uaf-deo@alaska.edu

Additional syllabi statement for courses including off-campus programs and research activities:
 University Sponsored Off-Campus Programs and Research Activities
 We want you to know that:

- UA is an AA/EO employer and educational institution and prohibits illegal discrimination against any individual: www.alaska.edu/nondiscrimination.
- Incidents can be reported to your university's Equity and Compliance office (listed below) or online reporting portal. University of Alaska takes immediate, effective, and appropriate action to respond to reported acts of discrimination and harassment.

- There are supportive measures available to individuals that may have experienced discrimination.
- University of Alaska's Board of Regents' Policy & University Regulations (UA BoR P&R) 01.02.020 Nondiscrimination and 01.04 Sex and Gender-Based Discrimination Under Title IX, go to: <http://alaska.edu/bor/policy-regulations/>.
- UA BoR P&R apply at all university owned or operated sites, university sanctioned events, clinical sites and during all academic or research related travel that are university sponsored.

For further information on your rights and resources go to <https://www.alaska.edu/equity/title-ix/student-placement-guidelines/>.

Schedule:

Topic	Days/Dates
Introduction to Planetary Atmospheres	Monday, Oct 31
Hydrostatic and Thermal Equilibrium	Wednesday, Nov 2
Spectroscopy	Friday, Nov 4
The Sun	Monday, Nov 7
Stellar Atmosphere	Wednesday, Nov 9
Exospheres (Moon and Mercury)	Friday, Nov 11
Satellite atmospheres (Io, Europa, Enceladus, and Titan)	Monday, Nov 14
Earth, Venus, Mars 1	Wednesday, Nov 16
Earth, Venus, Mars 2	Friday, Nov 18
Giant Planets	Monday, Nov 21
Comets and Pluto	Monday, Nov 28
Radiative Transfer/Atmospheric Evolution	Wednesday, Nov 30
Final Exam	Friday, Dec 2