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, 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 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](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.

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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
- For more information and resources, please see the Academic Advising Resource List ([https://www.uaf.edu/advising/1r/SKM_364e19011717281.pdf](https://www.uaf.edu/advising/1r/SKM_364e19011717281.pdf))

Student Resources:
- Disability Services (907-474-5655, uaf-disability-services@alaska.edu, Whitaker 208)
- 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)

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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
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- 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.

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• 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:

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