SPST655

Course Summary

Course : SPST655 **Title:** Planetary Atmospheres
Length of Course: 8 **Faculty:**
Prerequisites : N/A **Credit Hours:** 3

Description

Course Description:

Planetary atmospheres play a significant role in the understanding and exploration of our solar system. Fundamental to life is a planet's atmosphere and climate, and planetary meteorologists derive their understanding of atmospheres from remote sensing satellites and in-situ measurements from probes. The study of planetary atmospheres is commonly separated into two categories, the terrestrial planets (Mercury, Venus, Earth, and Mars) and the giant gas planets (Jupiter, Saturn, Uranus, and Neptune). This course introduces current understandings of atmospheres' origins and evolutions of both the terrestrial and gas planets, as well as Saturn's moon, Titan. Density, pressure, and composition of planetary atmospheres can vary significantly, with some atmospheres being gravitationally bound, while others freely escape. Additionally, some atmospheres are extremely thin, while others are incredibly dense. It is this comparative planetology that further advances our understanding of the earth and our entire solar system, and is critically important as we look to inhabit other worlds!

Course Scope:

There are no formal prerequisite requirements for this course. The course is divided into 8 weeks

with topics addressing terrestrial planets, gas planets, and satellites. Topics range from atmospheric evolution, structure, and composition of planetary atmospheres to basic thermodynamics, chemistry, radiative transfer, greenhouse effects and climate.

Objectives

The successful student will fulfill the following learning objectives:

CO-1 Describe current understanding of the origin and evolution of planetary and satellite atmospheres.
CO-2 Compare the structure and vertical profiles of planetary and satellite atmospheres.
CO-3 Explain factors that contribute to the various planetary climates.
CO-4 Demonstrate ability to communicate scientific data and concepts through written, oral, and visual presentations.

Outline

Week 1: Earth – Our Home Planet Part I

Course Objectives

- CO-1

Textbook Readings

- **(Required)** Comparative Climatology of Terrestrial Planets: Physical Processes Controlling Earth's Climate – A.D. Del Genio
- **(Optional)** Alien Skies: Chapter 1 – The Home Planet

Required Tasks

- Week 1 Lesson
- Week 1 Discussion
- Review Unit 1 Assignment
- Review Course Project

Week 2: Earth – Our Home Planet Part II

Course Objectives

- CO-2, CO-4

Textbook Readings

- **(Required)** Encyclopedia of the Solar System – Chapter 20: Earth as a Planet: Atmosphere and Ocean – A. P. Showman and T. E. Dowling

Required Tasks

- Week 2 Lesson
- Week 2 Discussion
- Unit 1 Assignment

Week 3: Venus – Earth's Twin Sister Part I

Course Objectives

- CO-2, CO-3

Textbook Readings

- **(Required)** Comparative Climatology of Terrestrial Planets: The Atmosphere and Climate of Venus – M. A. Bullock and D. H. Grinspoon
- **(Optional)** Alien Skies: Chapter 2 – Venus

Required Tasks

- Week 3 Lesson
- Week 3 Discussion
- Review Unit 2 Assignment

Week 4 : Venus – Earth's Twin Sister Part II

Course Objectives

- CO-3, CO-4

Textbook Readings

- **(Required)** Encyclopedia of the Solar System – Chapter 14: Venus: Atmosphere – F. W. Taylor, D. M. Hunten

Required Tasks

- Week 4 Lesson
- Week 4 Discussion
- Unit 2 Assignment

Week 5: Mars – Earth's Little Brother Part I

Course Objectives

- CO-1

Textbook Readings

- **(Required)** Comparative Climatology of Terrestrial Planets – Mars: Atmosphere and Climate Overview – S. C. R. Rafkin, J. L. Hollingsworth, M. A. Mischna, C. E. Newman, and M. I. Richardson
- **(Optional)** Alien Skies: Chapter 3 – Mars

Required Tasks

- Week 5 Lesson
- Week 5 Discussion
- Review Unit 3 Assignment

Week 6: Mars – Earth's Little Brother Part II

Course Objectives

- CO-1, CO-4

Textbook Readings

- **(Required)** Encyclopedia of the Solar System – Chapter 16: Mars Atmosphere: History and Surface Interactions – D. C. Catling

Required Tasks

- Week 6 Lesson
- Week 6 Discussion
- Unit 3 Assignment

Week 7: Titan – Saturn's Largest Moon

Course Objectives

- CO-2, CO-3, CO-4

Textbook Readings

- **(Required)** Encyclopedia of the Solar System – Chapter 38: Titan – A. Coustenis
- **(Optional)** Alien Skies: Chapter 4 – Titan

Required Tasks

- Week 7 Lesson
- Week 7 Discussion

- Course Project

Week 8: The Gas Giants

Course Objectives

• CO-2, CO-4

Textbook Readings

- **(Required)** Encyclopedia of the Solar System – Chapter 32: Atmospheres of the Giant Planets – R. A. West

Required Tasks

- Week 8 Lesson
- Week 8 Discussion
- Final Exam

Evaluation

Grades for this course will be based upon graded discussion assignments and discussions.

Discussions

Weekly discussion questions are provided in the Discussion section of the E-classroom. Participation is mandatory and will count towards the course grade. All discussion original comments are due at 11:59 pm, ET on the Wednesday of the assignment week. You are expected to provide an original, substantial comment of several well-written paragraphs in each session and participate in the ensuing discussion about your post. This is your discussion. You must also post a similar comment or reflection in reply to at least two other students' contribution. Statements such as "I agree" or "good post" will not count as a reply. Discussions will require research and proper citation of sources.

Assignments

There are 5 graded assignments for this course. This includes 1) three question-based assignments that require open-ended responses and/or calculations, 2) a poster presentation accompanied with an audio recording for the course project, and 3) a final exam. More information for the assignments can be found under the "Assignments" tab.

Please see the Student Handbook to reference the University's grading scale.

Grading:

Name	Grade %
Discussions	24.00 %
Week 1 Discussion	3.00 %
Week 2 Discussion	3.00 %
Week 3 Discussion	3.00 %
Week 4 Discussion	3.00 %
Week 5 Discussion	3.00 %
Week 6 Discussion	3.00 %
Week 7 Discussion	3.00 %
Week 8 Discussion	3.00 %
Assignments	56.00 %
Unit 1 Assignment	12.00 %
Unit 2 Assignment	12.00 %
Unit 3 Assignment	12.00 %
Final Exam	20.00 %
Course Project	20.00 %
Poster Presentation	20.00 %

Materials

Book Title: Comparative Climatology of Terrestrial Planets
Autor: Mackwell, Stephen J; Simon-Miller, Amy A; Harder, Jerald W; Bullock, Mark A
Publication Info: University of Arizona Press

Book Title: Encyclopedia of the Solar System
Author: Spohn, Tilman; Breuer, Doris; John, Torrence V
Publication Info: Elsevier Inc
ISBN: 978-0-1241-5845-0

Book Title: Alien Skies
Author: Frederic J. Pont
Publication Info: Springer New York
ISBN: 978-1-4614-8554-4

Required Technology

- See the Technology Requirements section of the undergraduate catalog for the minimum • hardware and software requirements. Microsoft Office 365 is available to APUS students for free. To sign up, visit. If you have questions about accessing the software, please contact Classroom support at classroomsupport@apus.edu.

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Course Guidelines

Citation and Reference Style

- Attention Please: Students will follow the APA Format as the sole citation and reference style used in written work submitted as part of coursework to the University. Assignments completed in a narrative essay or composition format must follow the citation style cited in the APA Format.

Tutoring

- Tutor.com offers online homework help and learning resources by connecting students to certified tutors for one-on-one help. AMU and APU students are eligible for 10 free hours* of tutoring provided by APUS. Tutors are available 24/7 unless otherwise noted. Tutor.com also has a SkillCenter Resource Library offering educational resources, worksheets, videos, websites, and career help. Accessing these resources does not count against tutoring hours and is also available 24/7. Please visit the APUS Library and search for 'Tutor' to create an account.

Late Work

The University encourages all work to be completed according to the course schedule. The University Late Work Policy can be found in the Student Handbook here.

Turnitin

- Faculty may require assignments be submitted to Turnitin.com. Turnitin.com will analyze a paper and report instances of potential plagiarism for the student to edit before submitting it for a grade. In some cases, professors may require students to use Turnitin.com. This is automatically processed through the Assignments area of the course.

Academic Dishonesty

- Academic Dishonesty incorporates more than plagiarism, which is using the work of others without citation. Academic dishonesty includes any use of content purchased or retrieved from web services such as CourseHero.com. Additionally, allowing your work to be placed on

such web services is academic dishonesty, as it is enabling the dishonesty of others. The copy and pasting of content from any web page, without citation as a direct quote, is academic dishonesty. When in doubt, do not copy/paste, and always cite.

Submission Guidelines

- Some assignments may have very specific requirements for formatting (such as font, margins, etc.) and submission file type (such as .docx, .pdf, etc.) See the assignment instructions for details. In general, standard file types such as those associated with Microsoft Office are preferred, unless otherwise specified.

Disclaimer Statement

- Course content may vary from the outline to meet the needs of this particular group.

Communicating on the Discussion

- Discussions are the heart of the interaction in this course. The more engaged and lively the exchanges, the more interesting and fun the course will be. Only substantive comments will receive credit. Although there is a final posting time after which the instructor will grade comments, it is not sufficient to wait until the last day to contribute your comments/questions on the discussion. The purpose of the discussions is to actively participate in an on-going discussion about the assigned content.
- "Substantive" means comments that contribute something new and hopefully important to the discussion. Thus, a message that simply says "I agree" is not substantive. A substantive comment contributes a new idea or perspective, a good follow-up question to a point made, offers a response to a question, provides an example or illustration of a key point, points out an inconsistency in an argument, etc.
- As a class, if we run into conflicting viewpoints, we must respect everyone's own opinion. Hateful and hurtful comments towards other individuals, students, groups, peoples, and/or societies will not be tolerated.

Identity Verification & Live Proctoring

- Faculty may require students to provide proof of identity when submitting assignments or completing assessments in this course. Verification may be in the form of a photograph and/or video of the student's face together with a valid photo ID, depending on the assignment format.
- Faculty may require live proctoring when completing assessments in this course. Proctoring may include identity verification and continuous monitoring of the student by webcam and microphone during testing.

University Policies

- Student Handbook
- Drop/Withdrawal policy
- Extension Requests
- Academic Probation
- Appeals
- Disability Accommodations

The mission of American Public University System is to provide high quality higher education with emphasis on educating the nation's military and public service communities by offering respected, relevant, accessible, affordable, and student-focused online programs that prepare students for service and leadership in a diverse, global society.