SPST180

Course Summary

Course : SPST180 **Title :** Introduction to Astronomy
Length of Course : 8
Prerequisites : N/A **Credit Hours :** 3

Description

Course Description: This course will introduce students to the wonders of the universe. Topics will include deciphering the motions of objects in the sky, learning how astronomers decode the light coming to us from distant objects, exploring the Earth and other bodies in our solar system, and investigating the properties and structure of stars, galaxies, and the universe itself. Students will be encouraged to develop a conceptual understanding of these topics beyond memorization of facts. While the course is conceptual in nature, students should expect to use some mathematics. Completion of at least college algebra prior to taking this course is highly recommended.

Course Scope:

This is a survey course of astronomy that covers a wide range of material, from the patterns of motion we see in the sky from Earth to the current ideas about the evolution and large-scale structure of the entire universe. Along the way, we will acknowledge the contributions of some historical scientists, look at the tools and techniques modern astronomers use to probe the universe, examine the formation and nature of our Solar System (including the star at its center, the Sun), the properties of other stars, and the structure of our Milky Way Galaxy and the other galaxies beyond. Clearly, as an introductory survey course, the objectives of this class are geared towards gaining a conceptual understanding of these topics and how astronomy is done, rather than memorizing a lot of facts. We will be using some mathematics, though almost all math in the class will be at the level of college algebra or below (a couple exceptions to this will be addressed in the course material). The math concepts used in this class will be mainly evaluating algebraic expressions (solving for a variable), using scientific notation and reading graphs. The overall goal of the course is to give students a framework within which to understand astronomy topics in the news, to hopefully excite a lifelong interest in enjoying looking at the sky (knowing more about what is up there), and to provide a strong foundation upon which to build, if the student should decide to take more in-depth astronomy courses in the future.

Important Note: This is a very intense course, and it will be critical for you not to fall behind.

Objectives

After successfully completing this course, you will be able to

- Recall major advances in astronomical knowledge contributed by such scientists as Copernicus, Galileo, Kepler, and Newton. (CO-1)
- Relate how astronomers use telescopes and electronics to analyze the electromagnetic spectrum to identify properties of celestial objects. (CO-2)
- Interpret the motions of the stars, Sun, and Moon in the sky and how those motions combine to create seasons, lunar phases, and eclipses. (CO-3)
- Describe the structure of Earth's interior, surface, atmosphere, and magnetic field. (CO-4)
- Compare and contrast the surface processes and/or atmospheres of both the terrestrial and gas giant planets of our solar system. (CO-5, CO-6)
- Describe the layers of the Sun and the role of magnetic fields in shaping solar atmospheric phenomena. (CO-7)
- Explain the process by which the Sun and other stars make energy and transport it from their cores outward into the system surrounding them. (CO-8)
- Make use of the Hertzsprung-Russell diagram and other methods to classify stars based on their observed properties, and determine stellar ages through the comparison of cluster diagrams. (CO-9,10)
- Describe the lifecycles of both low mass and high mass stars, understand how their properties change during each evolutionary stage and how their evolution can be represented on a Hertzsprung-Russell diagram. (CO-11)
- Relate how astronomers have deduced the shape and structure of the Milky Way Galaxy. (CO-12)
- Distinguish between different types of galaxies, and identify how observations of distant galaxies have been used to probe the large-scale structure of the universe. (CO-13)
- Describe the evidence we have for the existence of supermassive black holes and their role in the evolution and activity of galaxies. (CO-14)
- Outline the evidence for the evolution of the universe. (CO-15)

Outline

Week 1: Orbits and Gravity/Astronomical Instruments

Learning Outcomes

CO-1: Understand the lows of motion which govern the orbits of the planets and the workings of the universe.

CO-2: Relate how astronomers use telescopes and electronics to analyze the electromagnetic spectrum to identify properties of celestial objects.

Required Readings

Text Reading:

Fraknoi, Morrison, and Wolff, Chapters 3 & 6

Assignments

Introduction Forum Post

Week 1 Quiz

Week 1 Pre-Test

Recommended Optional Reading
Recommended Media

Week 2: Earth, Moon, and Sky/Earth as a Planet

Learning Outcomes

CO-3: Describe the causes of the phases of the Moon, the tides, and the motions of the stars and other objects in the sky.

CO-4: Describe the structure of Earth's interior, surface, atmosphere, and magnetic field.

Required Readings

Text Reading:

Fraknoi, Morrison, and Wolff, Chapters 4 & 8

Assignments

Forum Post #2

Week 2 Quiz

Recommended Optional Reading
Recommended Media

Week 3: Earth-Like Planets: Venus and Mars/The Giant Planets

Learning Outcomes

CO-5: Compare and contrast the surface processes and/or atmospheres of the terrestrial planets of our solar system.

CO - 6: Compare and contrast the atmospheres, sizes, and densities of the gas giant planets of our solar system.

Required Readings

Text Reading:

Fraknoi, Morrison, and Wolff, Chapters 10 & 11

Assignments

Forum Post #3

Week 3 Quiz

Recommended Optional Reading
Recommended Media

Week 4: The Sun: a Garden Variety Star/ A Nuclear Powerhouse

Learning Outcomes

CO-7: Describe the layers of the Sun and the role of magnetic fields in shaping solar atmospheric phenomena.

CO-8: Explain the process by which the Sun and other stars make energy and transport it from their cores outward into the system surrounding them.

Required Readings

Text Reading:

Fraknoi, Morrison, and Wolff, Chapters 15 & 16

Assignments

Forum Post #4

Week 4 Quiz

Recommended Optional Reading
Recommended Media

Week 5: Analyzing Starlight/ The Star: A Celestial Census

Learning Outcomes

CO-9: Describe the properties of stars and how astronomers extract information from starlight in order to determine these properties.

CO-10: Make use of the Hertzsprung-Russell diagram and other methods to classify stars based on their observed properties.

Required Readings

Text Reading:

Fraknoi, Morrison, and Wolff, Chapters 17 & 18

Assignments

Midterm

(Weeks 1-4)

Forum Post #5

Week 5 Quiz

Recommended Optional Reading
Recommended Media

Week 6: Midterm (Weeks 1-4) Forum Post #5 Week 5 Quiz

Learning Outcomes

CO-11: Make use of the Hertzsprung-Russell diagram and other methods to distinguish the corresponding patterns in stellar life cycles.

Required Readings

Text Reading:

Fraknoi, Morrison, and Wolff, Chapters 22 & 23

Assignments

Forum Post #6

Week 6 Quiz

Recommended Optional Reading
Recommended Media

Week 7: The Milky Way Galaxy/Galaxies

Learning Outcomes

CO-12: Relate how astronomers have deduced the shape and structure of the Milky Way Galaxy.

CO-13: Distinguish between different types of galaxies, and identify how observations of distant galaxies have been used to probe the large-scale structure of the universe.

Required Readings

Text Reading:

Fraknoi, Morrison, and Wolff, Chapters 25 & 26

Assignments

Forum Post #7

Week 7 Quiz

Week 7 Post-Test

Recommended Optional Reading
Recommended Media

Week 8: Active Galaxies, Quasars, and Supermassive Black Holes/The Big Bang/ Review and Final Exam

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Learning Outcomes

CO - 14: the evidence we have for the existence of supermassive black holes and their role in galaxy evolution and activity.

CO-15: Outline the evidence for the evolution of the universe.

Required Readings

Text Reading:

Fraknoi, Morrison, and Wolff, Chapters 27 & 29

Assignments

Forum Post #8

Week 8 Quiz

Recommended Optional Reading
Recommended Media

Evaluation

Grading:

Name	Grade %
Introductions Forum	1.00 %
Introductions Forum	1.00 %
Forum Assignments	14.00 %
Week 2 Forum	2.00 %
Week 3 Forum	2.00 %
Week 4 Forum	2.00 %
Week 5 Forum	2.00 %
Week 6 Forum	2.00 %
Week 7 Forum	2.00 %
Week 8 Forum	2.00 %
Chapter Quizzes	25.00 %
Week 8 Quiz	3.13 %
Week 7 Quiz	3.13 %
Week 6 Quiz	3.13 %
Week 5 Quiz	3.13 %
Week 4 Quiz	3.13 %
Week 3 Quiz	3.13 %
Week 1 Quiz	3.13 %
Midterm Exam	30.00 %
Midterm Exam - Week 5 - 2	30.00 %
Final Exam	30.00 %
Final Exam - Week 8	30.00 %
Unassigned	0.00 %
Week 2 Quiz	0.00 %

Materials

Book Title: Astronomy - e-book available online; link provided inside the classroom

Author: OpenStax

Publication Info: OpenStax

ISBN: SPST180-N/A

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 Assignments

- Students are expected to submit classroom assignments by the posted due date and to complete the course according to the published class schedule. The due date for each assignment is listed under each Assignment.
- Generally speaking, late work may result in a deduction up to 15% of the grade for each day late, not to exceed 5 days.
- As a working adult I know your time is limited and often out of your control. Faculty may be more flexible if they know ahead of time of any potential late assignments.

Turn It In

- 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 Forum

- Forums 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 forum. The purpose of the forums 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 view points, we must respect each individual's own opinion. Hateful and hurtful comments towards other individuals, students, groups, peoples, and/or societies will not be tolerated.

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.