**KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS**

**PHYSICS DEPARTMENT**

**Introduction to Astronomy (Phys 215)**

**Spring (Second Semester) 2021**

**(Term 202)**

**Instructor :** Thamer Al-Aithan

**Office :** Bldg. 6 / 217

**Phone** : X-2861

**E-Mail** : [alaithan@kfupm.edu.sa](mailto:alaithan@kfupm.edu.sa)

**Office Hours** : Times can be checked at my office and/or website. You can see me by

a ppointment, too.

**Course Description**: An Elementary Introduction to Astronomy.

**Topics covered include:**  Celestial mechanics; the solar system; stellar measurement; stellar magnitudes and spectra; galaxies; cosmology, Light and Telescopes, Parallaxes, Early and Modern History of Astronomy including contributions of Arab and Muslim Scientists.

**Course Leaning Outcomes:** -

1. Explain the concept of the celestial sphere and the conventions of angular measurement that enable us to locate objects in the sky
2. understand the scale of items within the Universe
3. understand the Solar System and the relative sizes of the planets
4. Become familiar with the appearance of a range of common astronomical

objects, such as asteroid , comets, satellites, planets, stars, and galaxies.

1. calculate how long it takes for light to reach the Earth from the Sun,

**Prerequisites :** Physics 102

1. **Text :** “The Cosmos: Astronomy in the New Millennium”

4th Ed. By Jay M. Pasachoff & Alex Filippenko, Cambridge

University Press, Thomson-Brooke Cole 2013.

**References :**

1. [Universe (seventh edition)](http://www.whfreeman.com/universe7e/), by Roger A. Freedman & William J. Kaufmann III (W. H. Freeman & Co., New York, 2005 [sic]) ISBN 0-7167-8694-X
2. Foundations of Astronomy 12th Ed, Michael A. Seeds & Dana Backman, Cengage Learning 2012
3. Explorations: An Introduction to Astronomy 7th Ed., Thomas Arny & Stephen Schneider, McGraw-Hill 2013.
4. Astronomy: From The Earth To The Universe, Jay M. Pasachoff, Sixth Edition, and Saunders College Publishing 2002.
5. Frontiers of Astronomy 2nd Ed., David Morrison & Cidney C. Wolff, Saunders College Publishing 1994
6. Discovering the Universe 9th Ed., Neil F. Comins & William J. Kaufmann, W. H. Freeman 2011.
7. Sky and Telescope Magazine (Monthly).
8. Astronomy Magazine (Monthly). h- Elm Al-Falak (Arab and Muslim Contributions to Astronomy), Yahya Shami, Dar Al-Fikr Al-Arabi Pub., Lebanon, 1997. (Arabic)

**Grading Policy :**

Homework+Quizzes 15%

First Major Exam 35%

Final Exam (comperhensive) 50%

**Tentative LEC. SCHEDULE**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Week** | | **Chapter** | **Chapter** |
| Jan. 17th | | 1 | Peering Through the Universe, Finding Constellations in the Sky | 1 |
| Jan. 28th | | 2 | Ancient Astronomy, Geocentric Hypothesis, Muslim Contributions | 1, 5 |
| Feb. 4th | | 3 | Modern Astronomy, Heliocentric Hypothesis, Kepler’s Laws, orbital Speed, Gravitational Force, Galileo, Newton | 5 |
| Feb. 11th | | 4 | Cosmology and the Big Bang Theory (General Review), The Nature of Light and the Spectrum | 18  2 |
| Feb. 18th | | 5 | Black-Body Radiation (Wien’s & Stefan-Boltzmann Laws), Continuum spectrum and Spectral Lines, Doppler Effect and Motion | 2 |
| Feb. 25th | | 6 | How Telescopes Work, Optical, Modern and Wide-field Telescopes, Telescopes and Dishes that See Invisible EM | 3 |
| Mar. 4th | | 7 | Space Telescopes  The Phases of the Moon and the Planets, Solar and Lunar Eclipses | 3  4 |
| Mar. 11th | | 8 | Twinkling, Magnitudes, Rising and setting, Time and Calendars, Solar and Lunar Calendars (Hejriah & Gregprian) | 4 |
| Mar. 18th | | 9 | Terrestrial Planets, The Earth, The Moon | 6 |
| Mar. 25th | | 10 | Jovian Planets | 7 |
| Apr. 1st | | 11 | Asteroids, Dwarf Planets, Comets, Meteoroids, Meteor, Meteorites | 8 |
| Apr. 8th | | 12 | Formation of the Solar System, Extra-Solar Planets (Exoplanets), Brown Dwarfs, General Properties of Solar Planets | 9 |
| Apr. 15th | | 13 | Sun’s photosphere, Chromosphere, Corona, Sun Spots, Solar Wind, Other Solar Activities, Solar Spectra, , Hydrogen, Helium | 10 |
| Apr. 22nd | | 14 | Stellar Color, Temperature, Spectra, Stellar Types The Formation of Stars | 11  12 |
| Apr. 29th | | 15 | The Evolution of Stars  Black Holes  Galaxies | 13  14  16 |
| May 3rd | | 16 | last day of classes |  |
| May 5th – 15th | |  | Final Exams period |  |