DESCRIPTIVE ASTRONOMY I

Lecture: MTWThF 10:00 a.m. to 11:50 a.m., Room 101 Lewis Hall
Instructor: Dr. Ostrovskii, Igor
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Office Hours: MTh 3:00 – 4:00 p.m. (207 Lewis Hall)

by Jay M. Pasachoff and Alex Filipenko, Thomson, Brooks/Cole.

Grading scale and evaluation:
• Grading Scale: A’s --- 90 – 100%; B’s --- 80 – 89%; C’s ---70 – 79%; Etc.
• Grades will be based on homework, tests, and the final examination:
  Quizzes & in-class activities --- 30%
  Two tests ------------------------ 30%
  Final exam ------------------------ 40%

Tests and Final examination schedule:
TEST #1 (class 19), Chapters 1 through 9 ➔ Monday, June 13 (10:00 a.m.)
TEST #2 (class 36), Chapters 10 through 18 ➔ Thursday, June 23 (11:00 a.m.)

FINAL EXAMINATION: ➔ Monday, June 27, 2005, NOON (12:00 a.m.)

Common Courtesy Guidelines:
For the benefit of your fellow students and your instructor, you are expected to practice common courtesy with regard to all course interactions. For example:
• Show up for class on time.
• Do not leave class early, and do not rustle papers in preparation to leave before class is dismissed.
• Be attentive in class; stay awake, don’t read newspapers, etc.
• If you must be late or leave early on any particular day, please inform your instructor in advance.
• After the first day, you will need to sit in the same seat for each class.
• Absence may jeopardize your standing in class because you are responsible for any in-class activities.
• Students who do not practice common courtesy should expect their grade to be reduced because their in-class activity is under the question.

COURSE SYLLABUS

1. A GRAND TOUR OF THE HEAVENS.
   • Observing the Universe, Constellations, Distances in the Universe, Scientific method.
2. LIGHT, MATTER, AND ENERGY: POWERING THE UNIVERSE.
   • Spectrum, Black body radiation, spectral lines of atoms, Doppler effect.
3. LIGHT AND TELESCOPES: EXTENDING OUR SENSES.
   • Telescopes, Hubble space telescope, outside the visible spectrum.
4. OBSERVING THE STARS AND PLANETS: CLOCKWORK OF THE UNIVERSE.
   • Phases of the Moon, Eclipses, Twinkling, Celestial coordinates, Motions of the planets.
   • Time and the International Date Line.
5. GRAVITATION AND MOTION: THE EARLY HISTORY OF ASTRONOMY.
• Ancient Greece Astronomy, Copernicus, Tycho Brahe, Johannes Kepler.
• Galileo Galilei, Isaac Newton, Rotation and revolution of the planets.
6. THE TERRESTRIAL PLANETS: EARTH, MOON, AND THEIR RELATIVES.
• Terrestrial planets, Moon, Earth’s Atmosphere, Mercury, Venus, Mars.
7. THE JOVIAN PLANETS: WINDSWEPT GIANTS.
• Jupiter, Saturn, Uranus, Neptune.
8. PLUTO, COMETS, AND SPACE DEBRIS.
• Pluto, Kuiper-belt, Comets, Meteoroids, Asteroids.
9. OUR SOLAR SYSTEM AND OTHERS.
• Formation, Extra-Solar planets, Planetary systems in formation.

➢ TEST #1 (class 19), Chapters 1 through 9 ➔ Monday, June 13 (10:00a.m.)

10. OUR STA: THE SUN.
• Basic structure, Sunspots and activity, Scientific value of Eclipses, Sun and theory of Relativity.
11. STARS: DISTANT SUNS.
• Colors and Temperatures, Spectral types, Distances, Triangulating, Luminosity, Motions of Stars.
12. HOW THE STARS SHINE: COSMIC FURNACES.
• Stars in formation, Energy sources, Atoms and Nuclei.
• Stellar energy cycles, Brown Dwarfs, Solar Neutrino, Life cycles of Stars.
13. THE DEATH OF STARS: STELLAR RECYCLING.
• The death of Stars, Supernovae, Pulsars.
14. BLACK HOLES: THE END OF SPACE AND TIME.
• Formation, Photon sphere, Event horizon, Time dilation, Detecting a Black Hole.
15. THE MILKY WAY: OUR HOME IN THE UNIVERSE.
• Milky Way, Parts of our Galaxy, Center, Spiral structure, Matter between the stars.
• Radio observations, Mapping, Radio observatory.
16. A UNIVERSE OF GALAXIES.
• Galaxies, Dark side of matter, Birth and life of Galaxies.
17. QUASARS AND ACTIVE GALAXIES.
• Active galactic nuclei, Quasars.
• Expanding Universe, Age, Geometry, Expected deceleration, Future of the Universe.
19. IN THE BEGINNING.
• Cosmic microwave radiation, Deviations from isotropy, Early and Inflationary Universe.

➢ TEST #2 (class 36), Chapters 10 through 18 ➔ Thursday, June 23 (11:00 a.m.)

20. LIFE IN THE UNIVERSE.
• Origin of life, Life in Solar system, Search for Extraterrestrial Intelligence.
21. REVIEW. (Last class # 38)

➢ FINAL EXAMINATION: ➔ Monday, June 27, 2005, NOON (12:00 a.m.)

* - The dates and sections are tentative, and may be changed (but not Final exam!).