

Physics II Content Outline

- I. Ancient History
 - A. Pre-Hellenistic
 - B. The 5 (7?) Planets
 - C. Ionians/Greeks
 - D. The Dark Ages
- II. Modern History
 - A. Renaissance – Earth is now a planet
 - B. Modern Discoveries/Theories – Life on mars, New Planets, Photography...
 - C. Technology takes over
- III. Optics
 - A. Types of lenses
 - B. Measurement/calculation of Focal Length
 - C. Magnification
 - D. F-number
- IV. Telescope Construction
 - A. History and Optical Schemes
 - B. Mounting schemes
 - Ball & socket, Alt-azimuth, Equatorial
- V. Observation techniques
 - A. Position, assemble, and adjust telescopes
 - B. Find and track the Moon, planets, stars, Sun, and other sky features
 - C. Declination & Right Ascension
 - D. Celestial Sphere: define zenith, nadir, meridian, latitude, equator
 - E. The problem of Longitude
- VI. Origin, Structure, and Motion of the Earth-Moon System
 - A. Facts
 - B. Gravity (... Newton ... Einstein)
 - C. Phases
 - D. Tides
 - E. Eclipses
 - F. Origin Theories
- VII. Origin, Structure, and Motion of the Earth-Sun System
 - A. Sun Facts B. Kepler & ellipses C. Day/year terminology D. Seasons
- VIII. Big stuff in the Solar System – Comets, Asteroids, Meteors, Oort Cloud...
including History of discovery
- IX. Planets
- X. Stuff that's bigger than the Solar System
 - A. Galaxies
 - 1. Definition and Discovery (Galileo)
 - 2. Formation theories
 - 3. Shapes of galaxies
 - 4. Galaxies collide and merge
 - 5. Structure of Milky Way
 - 6. The search for Dark matter and other mysterious stuff
 - B. Galaxy Clusters and bigger stuff
 - 1. Local Group
 - 2. Virgo Group
 - 3. Superclusters
 - C. Universe
 - 1. Big bang theory
 - 2. Doppler Effect
 - 3. Open-Closed Universe debate
- XI. The Physics of Light and Sound
 - A. Key Terms
 - B. Electromagnetic Spectrum
 - C. Frequency and Period Calculations
 - D. v & c
 - E. Wavelength and Frequency Calculations
 - F. Reflection and simple Ray Diagrams
 - G. Diffraction, Interference, Spectra, Polarization, Inverse-square law
 - H. Refraction & Ray tracing
 - I. Measuring distance in space
- XII. Stellar Evolution
 - A. Nuclear reactions B. Luminosity C. Spectral Class D. H-R Diagram
 - E. Change Taking Places
 - 1. Ignition 2. Main sequence 3. End game
- XIII. Space Exploration
 - A. Modern Discoveries
 - 1. Uranus & Neptune
 - 2. Pluto
 - 3. Quasars and other cool stuff
 - 4. Planets around other stars
 - 5. Other planets around the Sun
 - B. Unmanned achievements
 - C. Manned achievements
 - D. Future Goals
- XIV. Modern Topics – Quantum, Relativity (time dilation), Strings
- XV. Astro-Photography

- A. Astro-photography with a SLR Camera
- B. CCD digital photography

XVI. Hands-On Universe