Master Syllabus Department of Physics and Astronomy



ASTR 120: The Sun and Stars

Course Description

Introduction to the science underlying modern stellar astronomy. Topics include history of astronomy, practical astronomy, naked-eye cosmology, gravity and orbital motion, light and matter and properties of the sun and stars. Observational and experimental data are used to reveal natural physical laws which provide information about remote objects in space. (3 credit hours)

Course Objectives

This course provides insight into the development of physical laws based on, and used in, modern stellar astronomy. Students will be expected to demonstrate their understanding of the science of modern stellar astronomy by using observations and measurements to reveal accurate information about the Sun and stars. They will develop skills in the use of simulations to collect data and discuss patterns of information. Students will integrate information from various sources to explain our current knowledge of the physical properties of stars and enhance communication skills involving written, oral, graphic and symbolic information common in modern physical science.

Rationale

This course for non-science majors provides a contrast between observational and experimental sciences based on common experiences of students. It challenges students to understand the formal data collection process necessary to turn qualitative experiences into quantitative information. This information is the basis for the development of knowledge in the form of physical theories and laws which permit us to construct new information about the physical properties of objects far beyond our sphere of direct influence. This course provides a context for understanding both the processes of science and our place in the universe and advances the cause of science literacy essential in a modern democratic society.

Course content, format, and bibliography

Content

Introduction & The Night Sky

Gravitation & Relativity (Theories and Laws)

Earth Rotation and Revolution (Time and Calendar)

Light & Thermal Radiation (Models of Light)

Celestial Motions/Classification (Observational Science)

Spectroscopy & Matter (Models of Matter)

Lunar Phases, Eclipses and Tides (Visible Cycles)

The Sun (Application of Physical Laws)

Naked-Eye Cosmology (Theory Evaluation)

Properties of Stars (Application of Physical Laws)

Renaissance Astronomy (Advance of Modern Science)

HR Diagram and Mass-Luminosity Relation (Patterns)

Newton's Laws of Motion (Experimental Science)

New Knowledge (Masses and Distances)

Format

This course will use lecture, demonstrations, audio-visual materials, in-class and out-of-class activities, planetarium presentations and homework to achieve course goals.

Bibliography

Typical textbooks include, but are not limited to:

"Stars and Galaxies, Seventh Edition" Michael Seeds and Dana Backman, 2011, Brooks/Cole Publishers.

"In Quest of Stars and Galaxies" Theo Koupelis 2011, Jones and Bartlett Publishers, LLC

"Astronomy Today Volume II: Stars and Galaxies" Eric Chaisson and Steve McMillan, 2008, Pearson Education, Inc Publishers

"Universe: Stars and Galaxies" Roger Freedman and William H. Kauffmann III, 2008, W. H. Freeman Publishers.