

SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

ACADEMIC AFFAIRS

Course Number: Phys-144 Lec. Hrs: 3 Class Credits: 4 Lab hrs: 3 Department: Physics
 Course Title: Survey of Astronomy Semester: Fall Year: 2012

Course Description/Other Information:

This course is a survey of the science of astronomy. The course is designed to satisfy laboratory science transfer credit requirements. Topics covered include how we learn about the universe through an understanding of atomic and subatomic structure, electromagnetic radiation and gravity, and what we currently know of the universe. Covered in depth will be star formation, dynamics and evolution and the structure, dynamics and evolution of galaxies. Cosmological topics such as the Big Bang, dark matter and the accelerating expansion of the universe and the implications on its ultimate fate will be discussed. As time allows additional topics with an emphasis on current developments in astronomy will be presented. Scientific Calculator and WEB access required. Some outdoor observations may be conducted.

Course Objective for PHYS-144 lecture	Competencies for lecture [See Laboratory for Laboratory Competencies]
1. Communication—systematic investigation in writing	1. Reading and writing skills upon entry will enable the student to write short essays on examinations to assess the ability to reason and translate knowledge concepts into his / her own words.

Course Objective for PHYS-144 lecture	Competencies for lecture [See Laboratory for Laboratory Competencies]
<p>2. Computer literacy</p> <p>3. Information literacy</p> <p>4. Quantitative reasoning</p>	<p>2. The final examination of a 15 minute presentation will require the use of PowerPoint or other software tool.</p> <p>Knowledge of proper use of the Web will be reviewed and required.</p> <p>3. Know the age of and the process by which the universe originated, Know the evolution of the universe since its formation, Know the current composition and structure of universe, Be able to describe the most likely fate of the universe, Describe stellar types and their dynamics and composition, Describe the process of star formation with evolution and death, Describe galaxy structure and evolution, Describe solar system formation, evolution, and composition, Describe planetary system formation and composition, Know the structure of the sun, the Earth, and the moon, Know the relationship between wavelength and frequency of electromagnetic radiation [EM], Know the relationship of EM radiation to energy, Know Kepler's Laws of Planetary Motion, Know Newton's Law of Gravity</p> <p>4. The assumption of basic mastery of simple algebra will provide the students with the mathematics skills to employ the following: Evaluation of algebraic equations by replacement of variables with appropriate values, Solution of equations involving a single unknown quantity</p>

Course Objective for PHYS-144 lecture	Competencies for lecture [See Laboratory for Laboratory Competencies]
<p>5. Critical Thinking</p> <p>Other Objectives: see PHYS-144L, the required laboratory component of this course.</p>	<p>Use of the linear equation to plot data on linear and non-linear graph paper, Learn the use of a right-angle and circular or speherical trigonometry to determine the linth of the sides of a right triangle or the circumference of a sphere. Use of a scientific calculator is required.</p> <p>5. At conclusion of course, the student will be able to explain how the spectra of light from celestial bodies can be used to determine the type and composition of stars and galazies.</p> <p>Students will be able to quantify, describe, and predict the orbital motions of stars, planets, moons, comets, and asteroids.</p>

SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

ACADEMIC AFFAIRS

Course Number: Phys-144L Lec. 3 Class Credits: 0 Lab hrs: 3 Department: Physics
 Course Title: Survey of Astronomy Semester: Fall Year: 2012

Laboratory Description:

This description is the laboratory to the course, a survey of the science of astronomy. See course description PHYS-144. The laboratory portion is designed to give students the opportunity to apply the concepts presented and discussed in lecture to actual astronomical data. While measurement and data collection by the students is most desirable for hands-on learning, it is largely impractical. Most astronomical data must be collected at night with telescopes and subject weather conditions. The data used in the laboratory will then be provided with software to the students for their manipulation and calculation in the learning of appropriate concepts.

Course Objectives for PHYS-144L laboratory only	Competencies [See Lecture PHYS-144 for lecture Competencies]
<ol style="list-style-type: none"> 1. Communication—systematic investigation in writing 2. Computer literacy 3. Information literacy 4. Quantitative reasoning 5. Critical Thinking 	<ol style="list-style-type: none"> 1. Work in small teams or groups, Follow detailed and specific procedures for collecting data, Compose a laboratory report. 2. Collect data following a detailed and specific procedure, And then process through appropriate mathematical and astronomical software. 3. Present data in graphs or tables as appropriate. 4. Relate experimental data to mathematical models and physics concepts. 5. Develop appropriate conclusions from analysis of data in a

Course Objectives for PHYS-144L laboratory only	Competencies [See Lecture PHYS-144 for lecture Competencies]
<p>Other Objectives: see PHYS-144, the required course component of this course.</p>	<p>prepared detailed, organized laboratory report. This report must show the purpose, procedure, analysis, conclusions, and uncertainty are clearly presented within the imposed deadline.</p>