



Astronomy 102

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COURSE TITLE: AST 102, Astronomy II

Prerequisite(s): AST 101 with a minimum grade of "C."

COURSE DESCRIPTION:

This course is a descriptive survey of the universe with emphasis on basic physical concepts and galactic and extragalactic objects. Related topics of current interest are included.

General Education Outcomes

Students who complete the general education core curriculum should be able to demonstrate

1. rationality, logic, and coherence, through critical thinking;
2. their ability to express themselves effectively in written and oral communication;
3. their ability to express themselves effectively in quantitative and qualitative terms;
4. their knowledge of the value and significance of diverse cultures;
5. the scientific method of inquiry;
6. their knowledge of global, political, social, economic, and historical perspectives; and
7. their ability to access, retrieve, synthesize, and evaluate information.

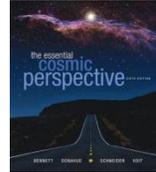
Course Outcomes

After completion of this course, students will

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| <ol style="list-style-type: none"> 1. Complete the course successfully in order to continue on with this sequence and/or transfer to a university and continue on with the study of astronomy or related coursework. 2. Acquire the vocabulary necessary to be able to read and analyze articles in newspapers and magazines relating to astronomy. 3. Discuss the formation of our sun and other stars, their properties, and how we are able to interpret the information | <p style="margin-left: 20px;">we receive from radiation from the stars;</p> <ol style="list-style-type: none"> 4. Compare stellar distances and methods of determination. 5. Outline the process of stellar evolution, including red giants, neutron stars, black holes, white dwarf stars. 6. Contrast and compare our galaxy and other galaxies as to type, contents, age, luminosity, motion, and size. 7. Summarize the size, age, structure and motion of the universe overall, and cosmological models. 8. Describe the "dark matter" issue and possible composition and implications. |
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CREDITS/CONTACT HOURS: 4 credit hour

Textbook: Jeffrey O. Bennett, Megan Donahue, Nicholas Schneider, and Mark Voit, [Essential Cosmic Perspective Media Update](#), 6th edition, [Addison-Wesley](#), 2012



References:

- Jeffrey O. Bennett, Megan Donahue, Nicholas Schneider, and Mark Voit, [Cosmic Perspective](#), 5th edition, [Addison-Wesley](#), 2008
- Eric Chaisson and Steve McMillan, [Astronomy Today](#), 6th edition, [Addison-Wesley](#), 2008
- Roger Freedman and William J. Kaufmann, [Universe](#), 8th edition, [W. H. Freeman](#), 2008
- Eric Chaisson and Steve McMillan, [Astronomy: A Beginner's Guide to the Universe](#), 5th edition, [Addison-Wesley](#), 2008
- John Fix, [Astronomy: Journey to the Cosmic Frontier](#), 5th edition, [McGraw-Hill](#), 2008

Recommended tools: Scientific, graphic calculator (TI series)
Star and Planet finder
Voyager: SkyGazer College Edition v3.7 CD-ROM, 4/E

Method of Instruction: The class will be taught by lecture and class participation in problem sessions and laboratories.

Grading System:

90	-	100	=	A	60	-	69	=	D
80	-	89	=	B	Below	-	60	=	F
70	-	79	=	C					

Methods of Evaluation for Student Performance:

- Weekly problems assigned as homework
- Written quizzes and tests (including a comprehensive final examination)
- In class exercise/practice and/or activities
- Term papers and oral presentation
- Lab reports for each lab

Grade Calculation Method:

There will be midterm and final tests given during the semester. A comprehensive examination will be available. The course grade percentage from midterm tests and final test is weighted by individual instructor.

Attendance Policy:

Students are responsible for punctual and regular attendance in all classes, laboratories, field trips, and other class activities. The college does not grant excused absences; therefore, students are urged to reserve their absences for emergencies. When illness or other emergencies occur, the student is responsible for notifying instructors and completing work missed.

Except in extenuating circumstances with approval by the division dean, instructors withdraw students from class when 80 percent attendance is not maintained. **Some courses have more restrictive**

attendance policies as indicated in course syllabus. If a student exceeds the allowable attendance, the instructor will withdraw the student and award a grade of "W" or "WF" based upon the student's academic standing at the last date of attendance.

Students are tardy if not in class at the time the class is scheduled to begin. Tardy students are admitted to class at the discretion of the instructor. Course syllabi reflect attendance policies related to tardiness.

Withdrawal Policy: During the first 75% of the course, a student may initiate withdrawal and receive a grade of 'W'. A student cannot initiate withdrawal during the last 25% of the course. Extending circumstances require documentation and approval by the appropriate department head and academic dean.

Absences for Religious Holidays: Students who are absent from class in order to observe religious holidays are responsible for the content of any activities missed and for the completion of assignments occurring during the period of absence. Students who anticipate their observance of religious holidays will cause them to be absent from class and do not wish such absences to penalize their status in class should adhere to the following guidelines:

1. Observance of religious holidays resulting in three or fewer consecutive absences: Discuss the situation with the instructor and provide written notice at least one week prior to the absence(s). Develop (in writing) an instructor-approved plan which outlines the make up of activities and assignments.

Observances of religious holidays resulting in four or more consecutive absences: Discuss the situation with the instructor and provide the instructor with written notice within the first 10 days of the academic term. Develop an instructor-approved plan which outlines the make up of activities and assignments.

Classroom Conduct:

ACADEMIC DISHONESTY: Students are expected to uphold the integrity of the College's standard of conduct, specifically in regards to academic honesty. All forms of academic dishonesty including, but not limited to, cheating on assignments/tests, plagiarism, collusion, and falsification of information will call for disciplinary action. Disciplinary action imposed may include one or more of the following: written reprimand, loss of credit for assignment/test, termination from course, and probation, suspension, or expulsion from the College. For further explanation of this and other conduct codes, please refer to the Student Handbook.

CELLULAR PHONES AND PAGERS/BEEPERS: Cellular phones, pagers and beepers are not permitted to be turned on or used within the classroom. Use of these devices during classroom time will be considered a violation of the student code as it relates to "disruptive behavior."

Class/Lab Procedures:

The class is taught primarily by lecture. Questions from students are both expected and encouraged. Student participation is expected in problem sessions and laboratories. Problem sessions and laboratories are generally done in small groups.

Accommodations:

Students who need special accommodations in this class because of a documented disability should notify Student Disability Services by calling (864) 592-4818, toll-free 1-800-922-3679; via email through the SCC web site at www.sccsc.edu/resources/disabilities; or by visiting the office located in the East Building

Room 30-B on the SCC Central campus. Contacting Student Disability Services early in the semester gives the College an opportunity to provide necessary support services and appropriate accommodations.

Course Outcomes & Objectives:

The overall objectives of this course are that the learner will:

- Gain an understanding of the nature of science and astronomy
- Gain an appreciation for the size, scale, and structure of the cosmos
- See that the universe is comprehensible through the scientific principles that can be understood by everyone
- Gain an increased interest in studying current events in astronomy as a life-long learning activity
- Demonstrate a basic familiarity with stellar life cycles, galaxies, and extragalactic objects.

Upon satisfactory completion of this course, the student will be able to:

D. Light and Telescopes

- Identify and describe such characteristics of light such as wavelength, frequency, amplitude, and the speed of light.
- Explain the Doppler effect on light.
- Describe the processes by which an atom absorbs and emits light.
- Indicate when and by whom the telescope was invented.
- Differentiate between the two major types of optical telescopes.
- Identify the focal length, objective, and magnification power of a telescope.
- Explain How CCD Cameras, Adaptive Optics, Space Telescopes, and Radio Astronomy are used to study the Universe today.

E. The Sun and the Stars

- Compare the size and mass of the Sun with the rest of the solar system.
- Identify the different regions in the Sun.
- Explain the sunspot cycle on the surface of the Sun.
- Describe the phenomenon of solar energy production.
- Distinguish the two methods of finding distances to stars.
- Explain the two methods of measuring starlight--absolute magnitude and apparent magnitude.
- List the spectral classes of stars and the dominant color of each class.
- Construct an HR Diagram and describe its use.
- Explain the significance of the mass of a star in determining the star's evolution.
- Explain how binary stars determine the mass of a star.
- Indicate the relation between a star's lifetime and its location on the main sequence.
- Compare open clusters and globular clusters of stars.
- Analyze the role of interstellar material in the formation of stars.
- Describe the pre-main sequence phases of stellar evolution.
- Describe the main sequence phase of stellar evolution.
- Describe the possible phases of stellar evolution after leaving the main sequence.
- Distinguish between evolutionary outcomes of high mass stars and low mass stars.
- Explain the factors determining whether a star will end up as a white dwarf, a neutron star, or a black hole.
- Describe the composition of a white dwarf, a neutron star, and a black hole.
- List the factors that cause nova and supernova explosions.

F. Galaxies and Beyond

- Discuss the process of discovering the size and shape of our galaxy.
- Name the various regions of our galaxy and locate the Sun's position in it.
- Estimate the amount of matter in our galaxy.
- Describe the content and the shape of the four types of galaxies: spirals, barred spirals, ellipticals, and irregulars.

- Explain Hubble's Law in connection with the galaxies in the Universe.
- Discuss dark matter and its role in the Universe.
- Explain what a quasar is.
- List the assumptions contained in the cosmological principle.
- Discuss the factors to be considered in determining the age of the Universe.
- Explain the concepts of bound universe, unbound universe, and marginally bound universe.
- Compare the Big Bang Theory to the Steady State Theory of the origin of the Universe.
- Discuss the possibility of life in our solar system and the possibility of life on planets around other stars.
- Indicate the possibilities of visiting or communicating with another civilization.

Course Content Outline:

The following is an outline of the material covered during the course. The study of nearly every topic involves the critical evaluation of the pertinent theories and concepts as well as the critical evaluation of data in sample problems concerning each of the following topics.

Part 4: Stars

Chapter 10: Our Star

Chapter 11: Surveying the Stars

Chapter 12: Star Stuff

Chapter 13: The Bizarre Stellar Graveyard

Chapter 15: Galaxies and the Foundation of Modern Cosmology

Chapter 16: Dark Matter, Dark Energy, and the Fate of the Universe

Chapter 17: The Beginning of Time

Part 5: Galaxies and Beyond

Chapter 14: Our Galaxy

Part 6: Life on Earth and Beyond

Chapter 18: Life in the Universe