



# BROWARD COMMUNITY COLLEGE COURSE OUTLINE

**LAST REVIEW: 2010-10**

*(i.e. 2003-2004)*

**NEXT REVIEW: 2015-16**

*(i.e. 2008-2009)*

**STATUS: A**

*(A, I, D)*

**COURSE TITLE: Horizons in Astronomy**

**COMMON COURSE NUMBER: AST 1002**

**CREDIT HOURS: 3**

**CONTACT HOUR BREAKDOWN**

*(per 16 week term)*

**CLOCK HOURS:**

*(Voc. Course ONLY)*

Lecture: **48**

Lab:

Clinic:

Other:

**PREREQUISITE(S): MAT 0024**

**COREQUISITE(S): None**

**PRE/COREQUISITE(S):**

**COURSE DESCRIPTION** *(750 characters, maximum):*

AST 1002 is an introductory course that outlines the origin, characteristics, and evolution of the solar system, stars, and galaxies and engages the historical milestones in astronomy from the ancient astronomers to the modern observatories. Students are expected to evaluate current and expected future trends in astronomical research and theories using written compositions and analysis in algebra.

General Education Requirements – Associate of Arts Degree (AA), meets Area(s):

4B

Area

General Education Requirements – Associate in Science Degree (AS), meets Area(s):

4B

Area

General Education Requirements – Associate in Applied Science Degree (AAS), meets Area(s):

Area

**UNIT TITLES**

1. Historical Perspectives
2. Earth-Moon Relationships
3. Characteristics of the Solar System
4. Life Cycle of Stars
5. Galaxies
6. Cosmology



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\*\*\* Complete the following only if course is seeking general education status \*\*\*

## GENERAL EDUCATION Competencies and Skills \*:

In the box to the right of the Competency/Skill, enter all specific **student learning outcome** unit numbers, as indicated in the course outline (i.e. 1.1, 2.7, 4.2, 4.0 and 5.12) that apply.

<b>Course must include <u>all</u> of the following:</b>	
<b>1. Read with critical comprehension**</b>	1.2, 4.1, 4.2, 5.2, 5.3, 6.2
<b>2. Write clearly and coherently**</b>	1.3
<b>3. Demonstrate literacy as appropriate within a given discipline**</b>	F: 1.1, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10, 2.0, 3.0, 4.0, 5.0, 6.0
<b>4. Apply problem solving skills or methods to make informed decisions in a variety of contexts**</b>	1.5, 1.6, 2.1, 2.3, 3.2, 3.4, 3.5, 3.6, 4.3, 5.1, 6.1, 6.2, 6.3
<b>Course must include at least <u>one</u> of the following:</b>	
<b>5. Differentiate between ethical and unethical behavior</b>	1.7, 6.2
<b>6. Demonstrate an understanding of the physical, biological, and social environments and how individual behaviors impact this complex system.</b>	1.1, 1.5, 1.6, 2.1, 2.3, 4.3, 6.2, 6.3
<b>7. Demonstrate an understanding of and appreciation for human diversities and commonalities.</b>	
<b>8. Speak and listen effectively.</b>	

*\*General Education Competencies and Skills endorsed by 2010-2011 General Education Task Force*

### \*\*Required Competencies

#### 1) Read with critical comprehension.

The student will be introduced to the basic texts, concepts, vocabulary, and methods necessary for developing an understanding of the discipline and meeting the required benchmarks as stated in the course outline.

#### 2) Write clearly and coherently.

The student will demonstrate an understanding and mastery of subject matter in a variety of ways, including writing. Writing activities may include both graded and ungraded essays, short answer quizzes, summaries, reactions, journals, and various other reports.

#### 3) Demonstrate and apply literacy across all the disciplines (indicate which ones apply).

- a) **Information literacy** means understanding how to locate needed information, using the appropriate technology for the task, managing and evaluating the extracted information and using it effectively and ethically.
- b) **Technology literacy** is the ability to responsibly and effectively use appropriate technology to access, manage, integrate, or create information, and/or use technology to accomplish a given task.
- c) **Workplace literacy** is having the appropriate knowledge and skills to communicate and work with others effectively and perform job duties, whether it is through the use of computers and/or other technology.
- d) **Cultural literacy** is recognizing, understanding, and appreciating the similarities and differences between one's own culture and the cultures of others through a study of the arts, customs, beliefs, values, and history that define a culture.
- e) **Quantitative literacy** is having the ability to formulate, solve and interpret mathematical/statistical operations and graphical/tabular representations to make informed decisions.
- f) **Scientific literacy** means understanding the methodology and application of the scientific process, the physical and biological worlds, and recognizing that scientific knowledge is continuously updated or revised as new information is discovered.



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**g) Environmental literacy** is creating a context within which environmental issues can be viewed, imparting knowledge to enhance one's ability to analyze the issues, make the connections between humans' decisions and actions and the challenges facing the environment, and instilling the desire to sustain the environment through ethical practices in both one's professional and personal lives.

**4. Apply problem-solving skills or methods to make informed decisions in a variety of contexts.**

The student will use acquired skills or methods to recognize, analyze, adapt, and apply critical thinking to solve problems and make informed decisions.



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## EVALUATION:

In the box to the right of the Methods of Assessment, enter all specific learning outcome numbers (i.e. 1.1, 2.7, 4.0, 4.2 and 5.12) that apply.

1. Portfolio	1.2, 1.3, 2.2, 6.2, 6.3
2. Short essays	
3. Research Papers	1.0, 2.0, 3.0, 4.0, 5.0, 6.0
4. Group projects	1.0, 2.0, 3.0, 4.0, 5.0, 6.0
5. Discussions (In class and online)	1.0, 2.0, 3.0, 4.0, 5.0, 6.0
6. Multiple Choice tests	1.0, 2.0, 3.0, 4.0, 5.0, 6.0
7. Presentations	
8. Service Learning Projects	
9. Quizzes (pop, announced, etc.)	1.0, 2.0, 3.0, 4.0, 5.0, 6.0
10. Take-home tests	
11. Summaries, critiques, and analyses	
12. Reaction papers	
13. Surveys	
14. Performance	
15. Short answer tests	1.2, 1.3, 2.2, 6.2, 6.3
16. Classroom debates and colloquia	
17. Blogs, wikis, web pages	
18. Other (Please explain)	



**Common Course Number:** AST 1002

## **UNITS**

### **Unit 1 Historical Perspectives**

#### **General Outcome:**

- 1.0 The student shall:** be able to analyze the contribution made to astronomy by individuals from the time of Pythagoras to that of Einstein.

#### **Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 1.1** Describe the concept of science and demonstrate the use of scientific method in astronomy.
- 1.2** Demonstrate the ability to critically read and analyze astronomical databases, atlases, and source and course materials.
- 1.3** Demonstrate the ability to present a clearly written composition (discussion post, research paper, PowerPoint presentation, and problem solution) to fulfill course objectives.
- 1.4** Identify astronomical constellations and coordinate systems in order to describe the motions of the stars, Sun, Moon, and planets.
- 1.5** Identify and analyze the various geocentric models of the Universe (Solar System) in terms of the motions of the astronomical bodies using course material.
- 1.6** Identify and analyze the various heliocentric models of the Universe (Solar System) in terms of the motions of the astronomical bodies using course material.
- 1.7** Evaluate ethically the recording and analysis of data using the case study of the geocentric and heliocentric models of the Universe.
- 1.8** Define the wavelengths of the electromagnetic spectrum and demonstrate the ability to use these wavelengths in the analysis of light with spectroscopy.
- 1.9** Identify the principle parts of a telescope in order to compare and contrast a reflecting versus refracting telescope.



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**Unit 2 Earth-Moon Relationships**

**General Outcome:**

- 2.0 The student shall:** be able to compose an interpretation of the cyclic nature of the phases of the Moon, the tidal effect of the Moon on the earth, the causation of lunar and solar eclipses, and the composition of the Earth and Moon.

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 2.1** Identify how the different types of tidal forces created by the Earth, Moon, and Sun alignment affect the ocean tides on earth.
- 2.2** Compare and contrast solar and lunar eclipses, with respect to their causes, frequency, and types.
- 2.3** Compare and contrast the Earth and Moon in terms of their composition.
- 2.4** Evaluate the principal findings of the Apollo missions to the moon.



**Unit 3 Characteristics of the Solar System**

**General Outcome:**

- 3.0 The student shall:** be able to compare and contrast major components of the Solar System.

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 3.1 Distinguish and characterize the Sun and planets.
- 3.2 Construct the Sun in terms of its composition, size and physical parameters
- 3.3 Categorize the major planets into Terrestrial and Jovian categories.
- 3.4 Arrange the Terrestrial planets based on their characteristics and location in the Solar System.
- 3.5 Arrange the Jovian planets based on their characteristics and location in the Solar System.
- 3.6 Assess comets and asteroids in terms of their distinguishing orbital and physical properties.



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**Unit 4 Life Cycle of Stars**

**General Outcome:**

- 4.0 The student shall:** be able to construct the lifecycle of a star's development.

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 4.1** Identify and compare the major spectral types and classes as they would be presented in a Hertzsprung-Russell diagram.
- 4.2** Identify and compare the characteristic differences among proto-stars, main sequence stars, red giants, white dwarfs, and black dwarfs using a Hertzsprung-Russell diagram.
- 4.3** Interpret the function of mass in determining a star's main sequence luminosity and its eventual post-main sequence fate.



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**Unit 5 Galaxies**

**General Outcome:**

- 5.0 The student shall:** be able to compare the methods used to classify galaxies, as well as compare the types of normal and active galaxies.

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 5.1** Construct the Milky Way Galaxy in terms of the physical properties, constituents and stellar populations of the core, nucleus, disk, and halo.
- 5.2** Identify and compare spiral, elliptical, and irregular galaxies using astronomical atlases.
- 5.3** Identify and compare normal and active galaxies using astronomical atlases.
- 5.4** Justify our knowledge of the composition and structure of galaxies.
- 5.5** Compare the different galactic formation theories with respect to the different types of galaxies.



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**Unit 6 Cosmology**

**General Outcome:**

- 6.0 The student shall:** be able to evaluate and compare the present theories explaining the formation of the universe.

**Specific Measurable Learning Outcomes:**

**Upon successful completion of this unit, the student shall be able to:**

- 6.1** Identify and assemble the primary observational evidence that is used to support contemporary cosmologies.
- 6.2** Identify and evaluate the present methods used to determine or estimate the age of the universe in terms of ethical data recording and analysis using relevant articles.
- 6.3** Evaluate the current state of the universe by assessing the large scale distribution of luminous matter, dark matter, and dark energy as indicated by present observational evidence.