

## **Introduction to Astronomy Syllabus**

**AST1002, Summer 2019, June 24 - July 26**

### **Course & Faculty Information**

**Lecturer:** TBA

**E-mail:** TBA

**Time:** Monday through Friday (1.8 contact hours each day)

**Contact hour:** 45 hours

**Credit:** 3

**Office hours:** By Appointment

### **Course Description**

This course is a survey of the elementary aspects of the astronomical universe. Topics include the history and growth of astronomy, instrumentation, solar system, stars, galaxies and cosmology. Star-gazing sessions and planetarium trips are included to identify the prominent constellations and stars.

### **Textbook Information**

*No Textbook is required. All information will be provided by the instructor*

### **Collegewide Student Learning Outcomes**

The Collegewide Student Learning Outcomes assessed and reinforced in this course include the following:

- Critical Thinking
- Scientific and Quantitative Reasoning

## Measurable Course Objectives

Measurable Course Objectives are outcomes students are expected to achieve by the end of the course.

- Define terms used to describe and measure the visible universe.
- Explain phenomena observed in the sky such as eclipses, the motions of stars, the appearance of the night sky, the cause of the seasons.
- Explain the development of the heliocentric model and the demise of the geocentric model.
- Explain the cause of tides.
- Describe light and matter interactions, spectra and the basic types of telescopes.
- Compare and contrast Terrestrial and Jovian planets.
- Describe the basic properties of the sun, its energy generation, sunspots and ways the sun affects Earth.
- Describe the major types of stars in terms of their temperature, luminosity and size.
- Describe the life cycle of a star.
- Describe the overall appearance of the Milky Way Galaxy.
- Describe the large-scale structure of the visible universe, its expansion, the Big Bang Model and use concepts such as look-back time and light travel-time.

## Grade Scale and Evaluation Methods

There will be a total of 500 points available during this semester. The breakdown of these points, as well as the grading scale, is shown below.

**Tests - 400 points.** There will be four tests, each worth 100 points

**Final Exam – 100 points.** The final exam is cumulative and required. If your score on the final is higher than a your lowest test grade, It can replace your lowest test grade. If your score on the final is not higher than any of your previous tests, it will be added towards your point total.

### Grading Scale:

A = 90-100%

B = 80-89%

C = 70-79%

D = 60-69%

F = Below 60%

## **Late Assignments and Make-up Exams**

Tests cannot be made up under any circumstances. If you miss a test, you will receive a zero. For missed exams, your final exam score will replace the zero.

## **Attendance Policy**

The College recognizes the correlation between attendance and both student retention and achievement. Per [College Policy 3.060](#) **Students are expected to attend all classes, actively participate and complete all assigned course work for all courses for which they are registered.**

## **The Following was copied from the College's policies and procedures:**

"Faculty may, prior to the last published date to withdraw from a course, withdraw students without warning who have been absent more than ten percent (10%) of the scheduled class or activity time or who are not interactive or responsive in a timely manner in distance learning courses, as determined by the instructor. Faculty may issue a grade of "F" to students who miss more than ten percent (10%) of the scheduled class or activity time after the last published date to withdraw from a course."

## **My cheating policy**

Cheating of any kind, including plagiarism, will result in an "F" for the course, as well as the involvement of student affairs. If you have any doubts about what constitutes cheating, come ask me before you engage in that activity. I will not accept that you did not understand that what you were doing constituted cheating. Any student who shares his or her work for the purposes of cheating on assignments or tests is subject to the same penalties as the student who commits the act and will receive an "F" for the course.

## **Classroom Guidelines**

- Talking is a distraction for both me and other students around you. If you have any questions, please ask me.
- It is your responsibility to be here on time. You will not get extra time if you come late to a test.
- It is your responsibility to come to class prepared. I will not provide you with a calculator in the event you forget one.
- Food is not permitted in the classroom. Drinks with a screwable cap are permitted. Any

other drink must be left outside the classroom.

- Students are not to be on the computers unless we are doing a lab, or you have permission directly from me. Any other circumstances are prohibited.
- Respect your classmates! Speak kindly and act in a courteous manner. Help keep the classroom environment positive.

### **Laptop/Netbook/Tablet Policy**

Laptops and tablets are allowed in this classroom. However, you must use these devices to take notes, or follow along with the PowerPoint notes during class.

Any other use is prohibited. If you would like to use a laptop to follow along with the notes, please come see me after class.

### **Cell Phones**

Keep your phone on silent and in your bag. If you are using it in class, you will be asked to leave.

### **Course Schedule:**

#### **WEEK 1**

##### **I) The Cosmic Landscape**

- a. Astronomical numbers
  - i. scientific notation
  - ii. units
- b. The night sky
  - i. Constellations and asterisms
    - i i. Daily motion
- c. The celestial sphere
  - i. Latitude and longitude
  - ii. Celestial coordinates
- d. The year
  - i. The ecliptic and the zodiac
  - ii. The seasons
  - iii. Solstices and equinoxes

- iv. Precession
- v. Solar analemma
- e. The day
  - i. Time zones
- f. Phases of the moon
  - i. Synchronous rotation
- g. Eclipses
  - i. Lunar
  - ii. Solar

## II) Origins of Astronomy

- a. Heliocentric vs Geocentric models
- b. Retrograde motion
  - i. Copernicus vs Ptolemy
- c. Tycho Brahe
- d. Galileo
  - i. Phases of Venus
  - ii. Moons of Jupiter
- e. Kepler
  - i. Kepler's 3 laws
- f. Newton
  - i. Newton's Laws and Law of gravitation
- g. Tides
  - i. Neap and spring tides
  - ii. Tidal braking
- h. Stellar parallax

## **WEEK 2**

### I) Einstein's theory of Gravity

- a. Black holes

- b. Gravitational waves
- c. Principle of equivalence

## II) The nature of Light

- a. EM waves
- b. Wave particle duality

## III) The EM spectrum

- a. dispersion

## IV) Thermal radiation

- a. Blackbody Curves
- b. Wein's Law
- c. Stefan-Boltzmann Law

## V) Kirchhoff's Laws

- a. Emission, absorption, and continuous spectra

## VI) Photon-electron interactions

## VII) Doppler shifts

# **WEEK 3**

## I) The sun

- a. Solar atmosphere
  - i. Photosphere
  - ii. Chromosphere
  - iii. Corona
- b. Sunspots
  - i. The sunspot cycle
  - ii. Prominences
  - iii. Solar Flares and CME's
- c. The proton-proton chain
- d. Solar interior

- i. Core
- ii. Radiative zone
- iii. Convective zone

## II) Star birth

- a. Nebulae
  - i. Reflection
  - ii. Emission
  - iii. Dark

## III) Types of stars and Stellar evolution

- a. HR diagrams
- b. Brown dwarfs
- c. Red Dwarfs
- d. Main sequence stars
- e. Evolution into Giants and supergiants
- f. Planetary Nebulae
- g. Nova and Supernova explosions

## **WEEK 4**

### I) The inner solar system

- a. Comparative analysis of the terrestrial planets

### II) The outer solar system

- a. The gas giants and moons of interest

### III) Asteroids, comets, and dwarf planets

- a. Asteroid belt
- b. Trojan asteroids
- c. The Kuiper belt
- d. The Oort cloud

### IV) Detecting Extrasolar Planets

- a. Transit method

- i. Kepler mission
- b. Radial Velocity Method

## **WEEK 5**

### V) Classifying Galaxies

- a. Hubble diagram

### VI) Rotation curves of spiral galaxies

- a. Dark matter

### VII) Galaxy clusters

### VIII) Cosmology

- a. The big bang
- b. Inflation
- c. Cosmic microwave background
- d. The Hubble constant

### IX) Dark Energy and the fate of the universe

## **Academic Integrity**

As members of the Seminole State College of Florida community, students are expected to be honest in all of their academic coursework and activities.

Academic dishonesty, such as cheating of any kind on examinations, course assignments or projects, plagiarism, misrepresentation and the unauthorized possession of examinations or other course-related materials, is prohibited.

Plagiarism is unacceptable to the college community. Academic work that is submitted by students is assumed to be the result of their own thought, research or self-expression. When students borrow ideas, wording or organization from another source, they are expected to acknowledge that fact in an appropriate manner. Plagiarism is the deliberate use and appropriation of another's work without identifying the source and trying to pass-off such work as the student's own. Any student who fails to give full credit for ideas or materials taken from another has plagiarized.

Students who share their work for the purpose of cheating on class assignments or tests are subject

to the same penalties as the student who commits the act of cheating.

When cheating or plagiarism has occurred, instructors may take academic action that ranges from denial of credit for the assignment or a grade of "F" on a specific assignment, examination or project, to the assignment of a grade of "F" for the course. Students may also be subject to further sanctions imposed by the judicial officer, such as disciplinary probation, suspension or dismissal from the College.