ASTR-110: DESCRIPTIVE ASTRONOMY

Phys/Astro

Course

- ASTR-110: Descriptive Astronomy
- PHYS-110: Descriptive Physics

Effective Term

Fall 2025

SECTION A - Course Data Elements

CB04 Credit Status

Credit - Degree Applicable

Discipline

Minimum Qualifications	And/Or
Physics/Astronomy (Master's Degree)	

Subject Code

ASTR - Astronomy

Course Number

110

Department

Astronomy (ASTR)

Division

Science and Engineering (SE)

Full Course Title

Descriptive Astronomy

Short Title

Descriptive Astronomy

CB03 TOP Code

1911.00 - Astronomy

CB08 Basic Skills Status

NBS - Not Basic Skills

CB09 SAM Code

E - Non-Occupational

Rationale

update textbook

SECTION B - Course Description

Catalog Course Description

An introductory general education course on the formation, properties, evolution, and fates of celestial objects--from galaxies to planets to black holes.

SECTION C - Conditions on Enrollment

Open Entry/Open Exit

No

Repeatability

Not Repeatable

Grading Options
Letter Grade or Pass/No Pass

Allow Audit
Yes

Requisites

SECTION D - Course Standards

Is this course variable unit?
No

Units
3.00

Lecture Hours
54

Outside of Class Hours
108

Total Contact Hours
54

Total Student Hours
162

Distance Education Approval

Is this course offered through Distance Education?
Yes

Online Delivery Methods

DE Modalities	Permanent or Emergency Only?
Entirely Online	Permanent
Hybrid	Permanent
Online with Proctored Exams	Permanent

SECTION E - Course Content

Student Learning Outcomes

	Upon satisfactory completion of the course, students will be able to:
1.	Demonstrate and be able to explain the principles of the study of celestial objects. (How we know what we know.)
2.	Demonstrate knowledge of the characteristics of the different kinds of celestial objects.
3.	Describe conceptual models related to the formation, evolution and fates of galaxies, stars, planets, comets, meteors, and black holes.

Course Objectives

	Upon satisfactory completion of the course, students will be able to:
1.	Describe the principal characteristics of each type of celestial object; asteroids, black holes, comets, galaxies, etc.
2.	Describe the stages of formation, evolution, and death of each type of celestial object, including the stages of stellar death, how stars produce energy, where comets come from and go to, etc.
3.	Demonstrate an improved comprehension of the magnitude of the speed of light and the immensity of interstellar and intergalactic distances; apply this comprehension to questions of future space travel and communication.
4.	Describe the current theories concerning the beginning, history, and possible future of the universe; give key evidence for these theories.
5.	Describe the major methods for determining the distances to stars and galaxies; demonstrate a working knowledge of the H-R diagram and spectroscopic parallax (using intrinsic variables).

6.	Find (especially in a library) good (current, readable, reliable) sources of astronomical information (of the type presented in this class) and be able to read this material with understanding.

Course Content

1. How we know what we know? the nature of light and other electromagnetic waves. Instruments: reflecting, refracting (inc. binoculars), combination telescopes; radio telescopes; high energy (UV, X, Gamma) detectors.
   a. image formation, light-gathering-power, magnification, resolving power, atmospheric distortions and absorptions.
   b. the near future - multimirror telescopes, multiple radio telescopes, space telescopes, as well as southern hemisphere instruments.
   c. spectral analysis; the Doppler Effect.
2. The vastness of space. The speed of light; Einstein and Relativity. Measuring distances using the speed of light. How far to anyplace? The distances to stars, across the galaxy, to distant galaxies, to quasars. The likely future of interstellar travel and communication.
3. The origin/formation, evolution, characteristics, and likely fate of solar system objects - planets (including earth), satellites, asteroids, meteors, comets, and the sun. The requirements for the formation, evolution of life; is there life in space? The sun's visible features - spots, flares, prominences.
4. The origin/formation, evolution, characteristics, and likely fate of stars, small groups (binaries), open and globular clusters, nebulae, and galaxies (incl. quasars). How stars produce energy. The creation of elements. Stellar evolution, including protostars, main sequence, red giants, intrinsic variables, white dwarfs. Star death: supernovae and their remnants, planetary nebulae, neutron stars, pulsars, black dwarfs and black holes.
   a. Determining the distances to stars and galaxies: intrinsic variables, the H-R diagram, spectroscopic and heliocentric parallax, red shift. Star motion.
5. Cosmology. The history and likely future of the universe. The Big Bang, expanding universe, background radiation. Are there other universes?
6. Misc. Sources of current information (well written) about astronomy; magazines and books; use of library.

Methods of Instruction

Methods of Instruction

Types	Examples of learning activities
Lecture	In class lecture
Discussion	Discussion of class topics

Instructor-Initiated Online Contact Types

Announcements/Bulletin Boards
Chat Rooms
Discussion Boards
E-mail Communication
Telephone Conversations
Video or Teleconferencing

Student-Initiated Online Contact Types

Chat Rooms
Discussions
Group Work

Course design is accessible

Yes

Methods of Evaluation

Methods of Evaluation

Types	Examples of classroom assessments
Exams/Tests	Exams on course material may include for example essay, short answer, multiple choice, matching questions.
Quizzes	Quizzes on course material
Projects	Individual or group projects
Homework	Homework problems from book or other questions about the class content

Assignments

Reading Assignments
Reading assignments from the textbook, published articles, library books, or reputable online sources.

Writing Assignments
Examples of writing assignments may include research papers, discussion posts, personal reactions, note taking, and short answer explanations.

SECTION F - Textbooks and Instructional Materials

Material Type
Textbook

Author
Micheal A. Seeds, Dana Backman

Title
Foundations of Astronomy

Edition/Version
14th

Publisher
Cengage

Year
2019

ISBN #
9780357031612

Material Type
Textbook

Author
OpenStax College

Title
Astronomy

Edition/Version
2e

Publisher
OpenStax

Year
2024

ISBN #
ISBN-13: 978-1-951693-50-3

Course Codes (Admin Only)

ASSIST Update
No

CB00 State ID
CCC000234838

CB10 Cooperative Work Experience Status
N - Is Not Part of a Cooperative Work Experience Education Program

CB11 Course Classification Status
Y - Credit Course

CB13 Special Class Status
N - The Course is Not an Approved Special Class

CB23 Funding Agency Category
Y - Not Applicable (Funding Not Used)

CB24 Program Course Status
Program Applicable

Allow Pass/No Pass
Yes

Only Pass/No Pass
No