Physics 1303.D10
Fundamentals of Astronomy

Summer I 2019

Course Information

Instructor
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Office Hours: By appointment

Course Description

Physics 1303, Fundamentals of Astronomy, is a three credit hour introductory study of the current knowledge and techniques of astronomy and astrophysics. Broad topics in the field will be covered, but the emphasis will be on stellar astronomy and cosmology.
Required Materials

Astronomy by Fraknoi, Morrison, & Wolff

Print:

Digital:

iBooks:
ISBN-10: 0-9986257-3-6

This book is available freely from OpenStax by going to this webpage:
https://openstax.org/details/books/astronomy
You may purchase a hard copy, but you do not have to, you can download the entire book for free from the above webpage.

Optional Software

Starry Night College planetarium software is suggested for your personal use only. There will be no required assignments using this software for this class. However, purchasing this software is a requirement if you are taking the laboratory that goes along with this course (PHYS 1103).

When ordering your student version of Starry Night College, use the referral code: omeh7t
Goals, Objectives, and Outcomes

General Course Goals

There are two general goals for Physics 1303.

1. After completing the Fundamentals of Astronomy course, you should be able to comprehend, apply, and analyze the most important scientific models governing modern astrophysics and be familiar with the astronomical objects studied by astronomers.

2. After completing the Fundamentals of Astronomy course, you should be able to comprehend, apply, and analyze the practices and methodologies used by modern astronomers in constructing astrophysical models.

Course Objectives

Upon completion of the Fundamentals of Astronomy course, you should be able to:

1. Recognize scientific and quantitative methods and the differences between these approaches and other methods of inquiry used in modern astrophysics and to communicate the findings, analyses, and interpretations in writing.

2. Identify and recognize the differences among competing modern astrophysical scientific theories.

3. Demonstrate the ability to translate, interpret, and extrapolate the most important scientific models governing modern astrophysics, the practices and methodologies used by modern astronomers in constructing astrophysical models, and to be familiar with the astronomical objects studied by astronomers.

4. Further develop critical/logical thinking, scientific reasoning, and problem solving skills in the area of astrophysics.

Learning Outcomes

When you complete this course, you should be able to apply the following intellectual skills to astrophysical concepts:

- **Knowledge**: define, recite, describe, label, list
- **Comprehension**: explain, predict, summarize, translate
- **Application**: change, compute, construct, predict
- **Analysis**: compare, contrast, diagram, infer
- **Synthesis**: combine, compose, create, revise, summarize
- **Evaluation**: appraise, compare, critique, contrast

**Academic Integrity**
Angelo State University expects its students to maintain complete honesty and integrity in their academic pursuits. Students are responsible for understanding and complying with the university **Academic Honor Code** and the ASU Student Handbook.

**Accommodations for Disabilities**
The Student Life Office is the designated campus department charged with the responsibility of reviewing and authorizing requests for reasonable accommodations based on a disability, and it is the student’s responsibility to initiate such a request by contacting the Student Life Office. The Student Life Office will establish the particular documentation requirements necessary for the various types of disabilities.

**Religious Holidays**
A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. A student who fails to do class work for the observance of a religious holy day shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence.

**Late Work**
- Unexcused late work or missed tests will not be accepted.
- If your assignments are not submitted by the posted deadline you will receive a zero for that assignment.
- You must contact your professor **before** the assignment is due if you believe it will be late or as soon as possible after the due date in the case of an unexpected emergency.
Assessing Outcomes & Grade Determination

Method of Assessing Outcomes
Student learning outcomes will be assessed with:

- Quizzes/Worksheets (35%) for chapters assigned each week are all due on Friday (except for the last week, which is due Wednesday). Both quizzes and worksheets will be completed through the Blackboard website.
- Conceptual Activities (15%) will be given with due dates on Saturdays.
- Four midterm exams (30%) completed on Blackboard due on Sundays.
- A comprehensive Final Exam (20%) on July 3.

**NOTE:** Blackboard issues will arise, if you wait until the last minute to complete assignments you run the risk of missing them. I can fix problems such as browser crashes and internet outages, but **NOT** the hour before it is due. You have multiple days to complete work, so **due dates are firm.**

Grade Determination
Your final grade will be determined by your scores on all tests and exams.

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<thead>
<tr>
<th>Assignment</th>
<th>Location</th>
<th>Percentage</th>
<th>Due Date</th>
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<tbody>
<tr>
<td>Quizzes/Worksheets</td>
<td>Blackboard</td>
<td>35%</td>
<td>Fridays</td>
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<tr>
<td>Conceptual Activities</td>
<td>Blackboard</td>
<td>15%</td>
<td>Saturdays</td>
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<tr>
<td>Midterm Exams</td>
<td>Blackboard</td>
<td>30%</td>
<td>Sundays</td>
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<tr>
<td>Final Exam</td>
<td>Blackboard</td>
<td>20%</td>
<td>July 3</td>
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<td><strong>TOTAL</strong></td>
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Angelo State University employs a letter grade system. Grades in this course are determined on a percentage scale:

- A = 90-100%
- B = 80-89%
- C = 70-79%
- D = 60-69%
- F = 59% and below
Course Outline
Reading Assignments and Other Important Class Assignments

NOTE: “end of the day” means 11:59 PM but assignments are timed and will not be available to start all the way until that time

WEEK 1 (June 3 – 7): Background Science
Read Chapter 1, Science and the Universe: A Brief Tour
Read Chapter 2, Observing the Sky: The Birth of Astronomy
Read Chapter 3, Orbits and Gravity
Read Chapter 5, Radiation and Spectra
Read Chapter 6, Astronomical Instruments
Quizzes & Worksheets due by the end of the day June 7
Astronomy vs Astrology test due by the end of the day June 8
Midterm Exam #1 is due by the end of the day June 9

WEEK 2 (June 10 – 14): Stellar Properties
Read Chapter 17, Analyzing Starlight
Read Chapter 18, The Stars: A Celestial Census
Read Chapter 19, Celestial Distances
Read Chapter 15, The Sun: A Garden Variety Star
Read Chapter 16, The Sun: A Nuclear Powerhouse
Quizzes & Worksheets due by the end of the day June 14
H-R Diagram test is due by the end of the day June 15
Midterm Exam #2 is due by the end of the day June 16

WEEK 3 (June 17 – 21): Life Cycle of Stars
Read Chapter 20, Between the Stars: Gas and Dust in Space
Read Chapter 21, The Birth of Stars
Read Chapter 22, Stars from Adolescence to Old Age
Read Chapter 23, The Death of Stars
Read Chapter 24, Black Holes and Curved Spacetime
Quizzes & Worksheets due by the end of the day June 21
Low-Mass Stellar Evolution test due by the end of the day June 22
Midterm Exam #3 is due by the end of the day June 23
WEEK 4 (June 24 – 28): Galaxies
Read Chapter 25, The Milky Way Galaxy
Read Chapter 26, Galaxies
Read Chapter 27, Active Galaxies, Quasars, and Supermassive Black Holes
Read Chapter 28, The Evolution and Distribution of Galaxies
Quizzes & Worksheets due by the end of the day June 28
Galaxy Classification test due by the end of the day June 29
Midterm Exam #4 is due by the end of the day June 30

WEEK 5 (July 1 – 3): Cosmology and the Universe
Read Chapter 29, The Big Bang
Read Chapter 30, Life in the Universe
Quizzes & Worksheets due by the end of the day July 3
FINAL EXAM is due by the end of the day July 3