Physics 1303.DS2
Fundamentals of Astronomy

Fall 2017

Course Information

Instructor
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Office Hours: MR 1-3 PM, W 1-2 PM, M-F 10am-12pm (if no groups)

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

21st Century Astronomy 5th Edition by Kay, Palen, & Blumenthal
ISBN: 978-0-393-60333-0

The ASU Bookstore has the loose leaf version of the book with Ebook and SmartWork registration. There is also an Ebook only version with SmartWork registration.

We **WILL NOT** use SmartWork for this class.

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

**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.

**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.
Assessing Outcomes & Grade Determination

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

- Chapter Quizzes – 10 questions per chapter will be given as a short quiz. You will have two (2) attempts at the quiz, but questions are randomized so you will likely not get the same questions both times, and your second attempt counts if you take it twice, regardless of the score (higher or lower than the first).
- Four Exploration Activities from the textbook, each worth 20 points and due as listed below.
- Four Unit Tests worth 40 points each and due as listed below.
- A comprehensive Final Exam worth 100 points.

Course Content
This course is divided into four two week units. Each unit will have a test and exploration activity, as well as quizzes for each chapter. Chapter Quizzes will open the first day of the unit and remain open during the full two weeks for that particular unit. Exploration Activities will be available during the first week of the unit only. Unit Tests will become available the second week of the unit and close the last day. Therefore, you will have 12 entire days to complete the Chapter Quizzes and 5 entire days to complete the Conceptual Activities and Unit Tests. **For this reason, I will NOT allow any late work for any reason.**

**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. As stated above, 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 throughout the semester.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
<th>Percentage</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter Quizzes</td>
<td>160</td>
<td>32%</td>
<td>Nov 3, Nov 17, Dec 1 &amp; Dec 15</td>
</tr>
<tr>
<td>Exploration Activities</td>
<td>80</td>
<td>16%</td>
<td>Oct 30, Nov 10, Nov 24 &amp; Dec 8</td>
</tr>
<tr>
<td>Unit Tests</td>
<td>160</td>
<td>32%</td>
<td>Nov 3, Nov 17, Dec 1 &amp; Dec 15</td>
</tr>
<tr>
<td>Final Exam</td>
<td>100</td>
<td>20%</td>
<td>Dec 15</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>500</strong></td>
<td><strong>100%</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
All reading assignments are in the required text – 21st Century Astronomy
NOTE: “end of the day” means 11:59 PM

Unit #1 – Background Science (Oct 23 – Nov 3)
Read Chapter 1, Why Learn Astronomy?
Read Chapter 3, Motion of Astronomical Bodies
Read Chapter 4, Gravity and Orbits
Read Chapter 5, Light
Read Chapter 6, The Tools of the Astronomer

Logical Fallacies (p. 21) test due by end of day Oct 27
Chapter Quizzes due by the end of the day Nov 3
Unit Test #1 due by the end of the day Nov 3
Unit #2 – Stellar Properties and Star Formation (Nov 6 – 17)
Read Chapter 13, Taking the Measure of Stars
Read Chapter 14, Our Star – The Sun
Read Chapter 15, The Interstellar Medium and Star Formation

*H-R Diagram (p. 389) test due by end of day Nov 10*
*Chapter Quizzes due by the end of the day Nov 17*
*Unit Test #2 is due by the end of the day Nov 17*

Unit #3 – Life Cycle of Stars (Nov 20 – Dec 1)
Read Chapter 16, Evolution of Low-Mass Stars
Read Chapter 17, Evolution of High-Mass Stars
Read Chapter 18, Relativity and Black Holes

*Low-Mass Stellar Evolution (p. 477) test due by end of day Nov 24*
*Chapter Quizzes due by the end of the day Dec 1*
*Unit Test #3 is due by the end of the day Dec 1*

Unit #4 – Galaxies and Cosmology (Dec 4 – 15)
Read Chapter 19, Galaxies
Read Chapter 20, The Milky Way – A Normal Spiral Galaxy
Read Chapter 21, The Expanding Universe
Read Chapter 22, Cosmology
Read Chapter 23, Large-Scale Structure in the Universe

*Center of the Milky Way (p. 589) test due by end of day Dec 8*
*Chapter Quizzes due by the end of the day Dec 15*
*Unit Test #4 is due by the end of the day Dec 15*
*FINAL EXAM is due by the end of the day Dec 15*