Physics 1303.010
Fundamentals of Astronomy

Spring 2018

Course Information

Meeting Place & Time
ASU Planetarium (VIN P-02)
TR 09:30-10:45 AM

Instructor
Dr. Kenneth Carrell
Office: VIN 119
Phone: (325) 942-2136
Email: kenneth.carrell@angelo.edu
Office Hours: MTR 1:30-3:00 PM, M-F 11am-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. SmartWork is NOT required for this class, there will be NO assignments from SmartWork.

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
Planetarium Class Etiquette

- No food, drinks, or tobacco products are allowed in the planetarium or the outer lobby area.
- Please do not leave trash in the planetarium or lobby.
- Please do not disturb fellow students during class time.
- Please do not put your feet up on the chair in front of you.
- Silence cell phones and other electronic devices.
- No texting/messaging during class.
- Please let me know if you will be using any electronic device during class.

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

Course Administration

Class Attendance

- **THERE IS NO DIFFERENCE BETWEEN ‘EXCUSED’ AND ‘UNEXCUSED’ ABSENCES** – you can miss 2 (two) full weeks of class for ‘free’.
- Class attendance is both an ASU and course requirement.
- You are expected to attend all scheduled class meetings.
- You are responsible for all course material and information that is presented in class.
- Attendance will be taken for each class meeting.
- Students will complete and return in-class quizzes and/or initial the sign-in sheet for each class attended.
- If you miss class, get the class notes and information from a fellow student.
- Attendance (or lack thereof) often makes a difference in your success in this class.
- **ANY STUDENT CAUGHT SIGNING IN FOR ANOTHER STUDENT WILL RESULT IN ALL PARTIES BEING DROPPED 1 (ONE) LETTER GRADE.**
Late Work

- **Unexcused late work or missed tests will not be accepted.**
- If your assignments are not submitted by the posted deadline or if you miss an in-class test, 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). Quizzes will be due on the Monday after we finish the chapter in class. There are 16 chapters, so there are 10 ‘bonus’ points in the quizzes.
- Four Conceptual Activities from the textbook, each worth 20 points and due as listed below.
- Three *Blackboard* Unit tests worth 40 points each and due as listed below.
- An in-class (planetarium) midterm exam worth 50 points on October 23.
- An in-class (planetarium) final exam worth 100 points on December 13 starting at 8 AM.
- Extra credit will be given for attending public planetarium shows. You can get 5 points for attending each of the four different shows this semester once. This is a possible total of 20 extra credit points and will only add to your grade (it can never lower it). Public shows are Thursday nights at 7 & 8 PM. If you come to all 4 shows I will give 5 bonus points making it possible to earn 25 total bonus points.

**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. Emailing me asking to reset a test after ~5PM on a due date will likely not receive a response. **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 plus any extra credit points earned throughout the semester.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Location</th>
<th>Points</th>
<th>Percentage</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter Quizzes</td>
<td>Blackboard</td>
<td>150</td>
<td>30%</td>
<td>Tuesdays</td>
</tr>
<tr>
<td>Conceptual Activities</td>
<td>Blackboard</td>
<td>80</td>
<td>16%</td>
<td>Jan 26, Mar 2, Mar 30 &amp; Apr 27</td>
</tr>
<tr>
<td>Unit Tests</td>
<td>Blackboard</td>
<td>120</td>
<td>24%</td>
<td>Feb 16, Apr 9 &amp; Apr 30</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>Planetarium</td>
<td>50</td>
<td>10%</td>
<td>Mar 8</td>
</tr>
<tr>
<td>Final Exam</td>
<td>Planetarium</td>
<td>100</td>
<td>20%</td>
<td>May 10</td>
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<tr>
<td>Extra Credit</td>
<td>Planetarium</td>
<td>up to 35</td>
<td></td>
<td></td>
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<tr>
<td><strong>TOTAL</strong></td>
<td></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

Final course grades will also be determined in part based on attendance as follows:

<table>
<thead>
<tr>
<th>Number of Absences</th>
<th>Highest Grade Possible</th>
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<tbody>
<tr>
<td>0-4 (&gt;85% attendance)</td>
<td>A</td>
</tr>
<tr>
<td>5-7 (75-85% attendance)</td>
<td>B</td>
</tr>
<tr>
<td>8-10 (65-75% attendance)</td>
<td>C</td>
</tr>
<tr>
<td>11-13 (55-65% attendance)</td>
<td>D</td>
</tr>
<tr>
<td>14+ (&lt;55% attendance)</td>
<td>F</td>
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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

WEEK 1 (Jan 16 – 19)
Introduction to the course and planetarium
Read Chapter 1, Why Learn Astronomy?

WEEK 2 (Jan 22 – 26)
Read Chapter 3, Motion of Astronomical Bodies
Logical Fallacies Blackboard test due by the end of the day Jan 26

WEEK 3 (Jan 29 – Feb 2)
Read Chapter 4, Gravity and Orbits

WEEK 4 (Feb 5 – 9)
Read Chapter 5, Light

WEEK 5 (Feb 12 – 16)
Read Chapter 6, The Tools of the Astronomer
Unit Test #1 due by the end of the day Feb 16

WEEK 6 (Feb 19 – 23)
Read Chapter 13, Taking the Measure of Stars

WEEK 7 (Feb 26 – Mar 2)
Read Chapter 14, Our Star – The Sun
H-R Diagram Blackboard test is due by the end of the day Mar 2

WEEK 8 (Mar 5 – 9)
Read Chapter 15, The Interstellar Medium and Star Formation
Mar 8 – MIDTERM EXAM (Unit Test #2) in the Planetarium

SPRING BREAK – MARCH 12 – 16

WEEK 9 (Mar 19 – 23)
Read Chapter 16, Evolution of Low-Mass Stars
WEEK 10 (Mar 26 – 30)
Read Chapter 17, Evolution of High-Mass Stars
Low-Mass Stellar Evolution test due by the end of the day Mar 30

WEEK 11 (Apr 2 – 6)
Read Chapter 18, Relativity and Black Holes

WEEK 12 (Apr 9 – 13)
Read Chapter 19, Galaxies
Unit Test #3 is due by the end of the day Apr 9

WEEK 13 (Apr 16 – 20)
Read Chapter 20, The Milky Way – A Normal Spiral Galaxy

WEEK 14 (Apr 23 – 27)
Read Chapter 21, The Expanding Universe
Center of the Milky Way Blackboard test due by end of day Apr 27

WEEK 15 (Apr 30 – May 4)
Read Chapter 22, Cosmology
Read Chapter 23, Large-Scale Structure in the Universe
Unit Test #4 is due by the end of the day Apr 30

WEEK 16
May 10 - FINAL EXAM 8-10 AM in Planetarium