Physics 175

Introduction to Astronomy
4 Credits

Instructor – Dr. Mark Conde
Overview

Description

This will be a standard 100-level undergraduate introduction to astronomy for non-science majors. It covers the science of astronomy and its social consequences, with an emphasis on the interrelationships between astronomy and other sciences. As listed in the UAF Catalog, the topics to be covered are:

- Astronomical concepts and tools
- The solar system
- Stellar astronomy
- Cosmology.

There is an associated lab component, in which we will undertake some practical hands on investigation of the tools and techniques used by astronomers to observe and understand the universe around us. When the weather permits, we will devote a portion of our lab sessions to using telescopes on the roof of the Reichardt building to observe some interesting sky objects. This part of the course is included for your interest and enjoyment, so participation in the sky observing sessions is voluntary.

The course is included in the UAF Core Curriculum, whose Natural Sciences component aims to “prepare students for lifelong learning in the natural sciences.” This means that our discussion of the topics above must include consideration of:

- The scientific method, as it applies to astronomy
- The societal relevance of astronomy, and how it interacts with public policy

These are the two Core expectations identified for the Core Natural Science courses. The scientific method will be discussed in lectures, and you will apply it practice during the labs. The societal importance of astronomy will also be discussed in lectures, and a number of homework questions ask you to discuss issues of societal relevance.

Core Natural Science courses are required to undergo Student Learning Outcomes Assessment once every five years. One of the consequences of this is that the University may request additional feedback from you regarding your assessment of the conduct and value of this course.

The course will be closely linked to the assigned textbook (*Universe*, 9th Edition) although at times we may cover the topics in a slightly different order.

Course goals

Upon completion of this course students will:

- Understand the tools and techniques of scientific study, and how these have been used to establish our current knowledge of the universe.
- Be familiar with the hierarchy of objects that make up the universe, how they are distributed through space, and how Earth is placed in this universe.
- Understand the basic nature of these objects – how they formed, how they behave, and what their ultimate fates are likely to be.
- Appreciate the societal relevance of astronomy and its connection to other fields of science.
My goal as an instructor is to provide every student with maximum possible opportunity for success. This means that I try to be as flexible as possible with the course requirements, to avoid creating needless hurdles. Nevertheless, some penalties for missed or late work are necessary; my policies in this regard are outlined below.

Instructor information

Instructor: Dr. Mark Conde  
Office locations: Reichardt room 113 and Elvey room 706F.  
Office Phone: 474-7741  
Email: mark.conde@gi.alaska.edu  
Office hours: 9:00 AM – 11:15 AM Tuesday and Thursday, or immediately after class on these days. I will be in Room 113 of the Reichardt building at these times.

Teaching Assistant: Blake Stauffer (email: bhstauffer@alaska.edu, office: Reichardt 128)  
Lab Manager: Agatha Light (email: aslight@alaska.edu, phone: 474-7857, office: Reichardt room 114.)  
Office Manager: Saundra Jefko (email: physics@uaf.edu, phone: 474-7339, office: Reichardt room 102.)

Target schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Topics (from the textbook Universe)</th>
<th>Labs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aug 27 – Aug 31</td>
<td>Class introduction, Chapter 1</td>
<td></td>
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<tr>
<td>2</td>
<td>Sep 03 – Sep 07</td>
<td>Chapters 2-3</td>
<td></td>
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<tr>
<td>3</td>
<td>Sep 10 – Sep 14</td>
<td>Chapters 4-5, Quiz 1</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Sep 17 – Sep 21</td>
<td>Chapters 6-7</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Sep 24 – Sep 28</td>
<td>Chapters 8-9, Quiz 2</td>
<td>3</td>
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<tr>
<td>6</td>
<td>Oct 01 – Oct 05</td>
<td>Chapters 10-11</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Oct 08 – Oct 12</td>
<td>Chapters 12-13, Quiz 3</td>
<td>5</td>
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<tr>
<td>8</td>
<td>Oct 15 – Oct 19</td>
<td>Chapters 14-15</td>
<td>6</td>
</tr>
<tr>
<td>9</td>
<td>Oct 22 – Oct 26</td>
<td>Chapters 16-17, Quiz 4</td>
<td>7</td>
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<tr>
<td>10</td>
<td>Oct 29 – Nov 02</td>
<td>Chapters 18-19</td>
<td>8</td>
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<tr>
<td>11</td>
<td>Nov 05 – Nov 09</td>
<td>Chapters 20-21, Quiz 5</td>
<td>9</td>
</tr>
<tr>
<td>12</td>
<td>Nov 12 – Nov 16</td>
<td>Chapters 22-23</td>
<td>10</td>
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<tr>
<td>13</td>
<td>Nov 19 – Nov 23</td>
<td>Thanksgiving week, Chapter 24</td>
<td>Make up</td>
</tr>
<tr>
<td>14</td>
<td>Nov 26 – Nov 30</td>
<td>Chapters 25-26, Quiz 6</td>
<td>11</td>
</tr>
<tr>
<td>15</td>
<td>Dec 03 – Dec 07</td>
<td>Chapters 27-28</td>
<td>Review</td>
</tr>
<tr>
<td>16</td>
<td>Dec 10 – Dec 14</td>
<td>Finals week</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Dec 17 – Dec 21</td>
<td>Grades posted by Dec 19</td>
<td></td>
</tr>
</tbody>
</table>

Note that this is a rather ambitious schedule, requiring us to cover roughly one chapter from Universe per lecture. It is unlikely that we will make it all the way to the end of the book as shown here, but I at least want to complete up to Chapter 24.
Course components and instructional methods

Instructional materials

Material for this course will be prepared electronically and will be available over the web via the “Blackboard” system at http://classes.uaf.edu. Material to be posted this way includes:

- Course syllabus (this document)
- Lecture notes (see comments below)
- Homework problem sets
- Lab notes
- Supplementary handouts
- Online student grades

Note that I will not be distributing homework or exam solutions to the web. These will instead be posted in the glass cabinets in the physics departmental area of the Reichardt building.

Lectures

I will be presenting lectures mostly using a computer, although I will supplement this with additional informal diagrams etc drawn on the blackboard. I intend to post printable versions of the electronic lecture notes online ahead of time, provided this does not appear to be adversely affecting lecture attendance.

Lectures will be held on Tuesdays and Thursdays from 11:30 am – 1:00 pm in room 202 of the Reichardt building. You should read the lecture notes and the relevant chapter from Universe beforehand. I strongly recommend bringing printed versions of the notes to class, and annotating them with your own supplemental notes during the lecture.

Labs

Generally, each student will be expected to complete one lab session per week. There are currently two sections allocated for this class, corresponding to labs on Tuesday and Wednesday evenings. The labs meet in room 252 of the Reichardt building, and run from 7:00 until 10:00 pm on their respective days.

There are no labs scheduled for thanksgiving week. We will instead use this week as a chance to do makeup labs. Lab sessions in the final week of semester will be used as recitations in preparation for the final exam.

Depending on how we go, there will be either 11 or 12 labs. Lab write ups should be completed during the lab, and turned in to the TA at the end of the session. Your worst lab score will be discarded; the remaining 10 or 11 scores for your lab write ups will contribute to your final grade.

Laboratory sessions are a vital part of this course, and should not be missed. To pass this course, there is an absolute requirement that you must attend and write up at least 7 of the labs. Any student failing to reach this number will automatically fail.

1 All students should have access to Blackboard. Please let me know if you have difficulties with this.
**Homework**

Homework will be assigned each week during the Tuesday lecture, and will be due by 5:00 pm on the following Tuesday. **All homework must be submitted via the box for this class that is located in the physics departmental office. Please do not put homework in my departmental mailbox, as this will delay getting it to the TA for grading.** You may work with others, but you are prohibited from simply copying other’s work. Homework will count significantly toward your final grade, as well as provide me with feedback regarding your understanding of the material.

Please realize that even if you submit a correct solution to a problem, your grader may not recognize it as correct if it’s poorly presented. To maximize your chance of scoring well, your homework must be

- neatly laid out
- largely free from crossing out and over-writing
- use grammatically correct English and be well enough written that the grader can understand what you’re trying to say

Solution sets will be posted in the glass cabinet in the Physics Dept. hall. You are strongly encouraged make copies to help you understand how to approach these problems; it will likely help on tests.

**Exams and Quizzes**

There will be six 20-minute quizzes during the semester and one two-hour final exam. The preliminary dates for these are

- Quizzes: Sep 13, Sep 27, Oct 11, Oct 25, Nov 08, and Nov 29
- Final: 10:15 a.m. - 12:15 p.m., Thursday, Dec. 13.

No textbooks or printed material will be allowed in the final exam, but you may bring in any amount of your own original (not photocopied) handwritten notes. No notes of any sort may be used during the quizzes. Only your best 5 quiz scores will contribute to your final grade. Your lowest quiz score will be discarded and will make no contribution.

**Course policies**

**Grading**

The course grade will consist of the following components

- Best 5 (out of 6) quizzes: 25% (each quiz is worth 5%)
- One two-hour final exam: 20%
- Homework: 25%
- Best 10 or 11 (out of 11 or 12) labs: 30%

I will post all grades online, using the UAF’s “Blackboard” system (http://classes.uaf.edu). All registered students have access to this system for checking their grades. Please do check that we have posted all your grades correctly, and let me know if you think there is
an error. Also, please retain all work that we return after grading, in case an error does appear. Returned graded work is proof of your scores.

Final grades will be returned as letter grades with plus/minus modifiers. These will be derived from your overall percentage grade. The approximate conversions for each letter grade will be as follows: A: ≥90%; B: 75% to 90%; C: 60% to 75%; D: 50% to 60%; F: <50%. Plus/minus modifiers will subdivide each main grade into three equally spaced sub-levels.

**Attendance**

UAF policy\(^2\) states that regular class attendance is required. If attendance becomes a concern, I may need to respond by introducing unannounced “pop quizzes” to allow me to reward those who do attend regularly. Extra credit will be given for points scored on any such quizzes.

**Class participation**

There is no requirement for you to participate actively in class by asking questions or joining discussions, and there is no grade component based on this. Nevertheless, you are of course free to ask questions at any time during the lectures. Because we have a large amount of material to cover, I may defer answering lengthy or numerous questions until after class.

**Consequences of Low Grades**

It is important to understand the implications of receiving a letter grade of “C” or below for this course. The following table\(^3\) describes UAF regulations with regard to grades of ‘C’ and below:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Definition and academic implications</th>
<th>Grade Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>C+</td>
<td>Satisfactory to Fair: satisfactory level of performance, with some mastery of material</td>
<td>2.3</td>
</tr>
<tr>
<td>C</td>
<td>Average: satisfactory level of performance and level of competency in the subject. A minimum grade of C (2.0) is required for all prerequisite and major courses.</td>
<td>2.0</td>
</tr>
<tr>
<td>C-</td>
<td>Barely satisfactory: Minimum grade required for all Core (X) Courses. A grade of C- (1.7) in a class which is a prerequisite for another class or in a class required for a student’s major will result in the student being required to re-take the class.</td>
<td>1.7</td>
</tr>
<tr>
<td>D+, D, D-</td>
<td>Below Average: Fair to poor level of competency in the subject matter. A grade of D+, D or D- in a Core (X) class will automatically require the student to re-take the class to receive core credit, starting Fall 2011.</td>
<td>1.3, 1.0, 0.7</td>
</tr>
</tbody>
</table>

Needless to say, a grade of “F” represents a failure. Zero grade points will be awarded, and the course must be re-taken to receive credit.

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\(^2\)See [http://www.uaf.edu/catalog/current/academics/regs2.html#Attendance](http://www.uaf.edu/catalog/current/academics/regs2.html#Attendance), which states that: “You are expected to regularly attend classes; unexcused absences may result in a failing grade. You are responsible for conferring with your instructor concerning absences and the possibility of arranging to make up missed work.”

\(^3\) Taken from [http://www.uaf.edu/files/uafgov/Table-C-grades-policy.doc](http://www.uaf.edu/files/uafgov/Table-C-grades-policy.doc)
**Missed or late work**

A make-up quiz will be offered if a student misses a quiz due to illness, clash with another UAF commitment, or a genuine emergency. Determination of whether circumstances justify this make-up will be at the discretion of the instructor. An unexcused absence will lead to 0 points earned on that quiz.

The department runs make-up labs during thanksgiving week. Students will be allowed to make up at least one missed lab this way. Making up more than one missed lab will be at the discretion of the lab teaching assistant – whether this is possible will depend on availability of equipment and TA time, both of which are in turn dependent on the level of demand for make-ups.

Problem sets will generally not be accepted after the due date, without evidence of illness or genuine emergency. Students having documented clashes with other UAF commitments may pre-arrange alternate homework submission deadlines with me. All decisions regarding late homework or alternate deadlines will be at the discretion of the instructor.

**Student conduct and academic honesty**

It is the responsibility for each student to be informed about the policies for student conduct and safety at the University of Alaska. You are encouraged to read these policies at [http://www.uaf.edu/schedule/conduct/](http://www.uaf.edu/schedule/conduct/). It should go without saying that students are expected to do their own original work for all assignments. Any deviation from this may be considered academic misconduct and may result in a failing grade and referral to university authorities for possible disciplinary action.

**Course requirements and materials**

**Prerequisites**

Placement in ENGL F111X or higher; placement DEVM F105 or higher, or permission of instructor.

**Textbooks**

Required:

- *Universe*, Ninth Edition by Freedman, Geller, & Kaufmann (W.H. Freeman & Co.)

Recommended additional reading: There are numerous excellent 100-level astronomy books available now. Any of the recent ones would likely be helpful for this course.

**Calculators**

You will need access to a calculator to complete some of the homework problems. Calculators will also be permitted during quizzes and the final exam, although I rarely pose
problems on these tests that require one. You will not need anything elaborate; an easy-to-use scientific calculator is all that you will need. Remember that it is much more important to present the correct reasoning for solving a problem than it is to arrive at the correct numerical value. Please, explain your reasoning when presenting solutions to homework and exam problems. I will award partial points for correct reasoning, if presented, even if the final answer is incorrect or incomplete.

Support Services

Complaints and concerns

You are always welcome to discuss your concerns with me. However, if you have a concern that you feel cannot be resolved by discussion with me, you may wish to contact the Physics Department chair, Dr. Szuberla. The University also has an Academic Advising Center on the 5th floor of the Gruening building, open Monday to Friday, 8 am to 5 pm and contactable via phone at 907-474-6396. The advising center can help with all student matters, from study tips to help with understanding the University's formal mechanisms for academic appeals. (See also http://www.uaf.edu/advising/)

Student Health and Counseling Center

The University provides health and counseling services through its Student Health and Counseling Center, which is located on the 2nd floor of the Whitaker Building (the same building as Fire and Police, across from the bus turn around.) The center will see students on an appointment basis. The number to call for an appointment is 474-7043. It is best to do so at 8:00 AM in the morning, because they are scheduled daily on a first come first serve basis.

Disabled students

Disability services are provided free of charge, and are available to any student who qualifies as a person with a disability. Student seeking special accommodations for a disability must first discuss their needs with Disability Services. Call 474-5655 to schedule an appointment.

UAF Disability Services is located in the Whitaker Building, room 208. Extensive support is available, as described at http://www.uaf.edu/disability/