PHY 106 – Astronomy

Fall 2016

Course: Lecture: MWF 1:30 – 2:20 pm in Dana 146
Lab: M 2:30 – 5:20 pm in Dana 126 (Sections A and B)
T 1:40 – 4:20 pm in Dana 126 (Sections C and D)

Instructor: Dr. Thompson Email: krthompson@davidson.edu
Office: Dana 163 Phone: 704-894-3131
Office Hours: M, W, F 10:30 – 11:30 am, T 8:30 – 9:30 am, and R 1:30 – 3:00 pm.

Text: Astronomy: An Interactive Introduction, Belloni and Thompson

Course Overview: This class is a survey of astronomy that emphasizes the nature of objects in the Universe as well as the physical and mathematical principles necessary to understand how astronomers observe and interpret phenomena. Topics include naked eye astronomy, planetary motions, understanding light, the life cycles of stars, the structure of galaxies, and the evolution of the Universe. To fully understand the course material, it is essential that students attend class regularly, complete all assignments on time, and participate in all class discussions.

Learning Objectives: By the end of this course, students will:

1. obtain a basic understanding of the fundamentals of astronomy and our place in the Universe;
2. gain an understanding of the physical laws of nature and their connection to the field of astronomy;
3. apply the scientific method to investigate physical phenomena;
4. work efficiently in collaborative groups in a laboratory setting;
5. develop laboratory and problem solving skills necessary to conduct a scientific experiment;
6. accurately and effectively communicate scientific principles both orally and in writing.

Learning Outcomes: By the end of this course, students will be able to:

1. demonstrate a broad base of knowledge about astronomy (e.g., the constellations, motion of the stars, planets, galaxies, etc.);
2. explain observed astronomical phenomena (e.g., how light can be used to determine properties of stars) using fundamental physical principles (e.g., properties of light, spectroscopy, blackbody radiation, etc.);
3. demonstrate the ability to think critically and solve problems in the framework of the scientific method;
4. exhibit laboratory skills through the collection, analysis, and communication of scientific data;
5. solve problems collaboratively in both the classroom and laboratory settings.
Evaluation: Criteria for determining the student grade is as follows:

- Concept Checks and Exercises: 15%
- Laboratory (including pre- and post-labs): 15%
- 3 Reviews: 15% each
- Final Exam: 20%
- Final Project: 5%

Course Requirements:

Attendance/Participation: Class attendance and participation are essential for success in this course. All students are expected to fully participate in all class discussions and exercises. The College’s 25% rule on attendance will be in effect: missing 25% of the classes (11 this semester) will result in an F in the course. You are responsible for the material presented in class each day, for any announcements that are made, and for any assignments that are due. Please initial the role posted in the classroom upon arrival to each class meeting to indicate your presence. If you must miss class due to illness or an emergency, please email me before class if possible.

Honor Code: You each have agreed to adhere to the Honor Code in everything you do. If there are any questions about how the Honor Code applies to a given assignment, please ask. Rather than writing the full pledge (On my honor I have neither given nor received unauthorized information regarding this work, I have followed and will continue to observe all regulations regarding it, and I am unaware of any violation of the Honor Code by others) for each assignment, the the word PLEDGED followed by the date and your signature on the top of each assignment will signify your compliance with the Code.

Concept Checks and Exercises: Concept checks will be assigned on a regular basis and will generally be due every class meeting. Exercises will be assigned occasionally throughout the semester. They are to be completed in-class and submitted before leaving. Concept check questions will be posted on Moodle and are to be submitted at the beginning of class on the designated due date. All work is expected to be completed and submitted on time. If you miss class you are still responsible for submitting your work on time – either by submitting it early or by placing it in a drop folder on Moodle that is designated for this purpose. Late assignments will be penalized 20% per day late. For example, an assignment received up to 24 hours late will receive a max of 80% of the points possible. Those received between 24 – 48 hours late will only receive up to 60% credit. The lowest 3 homework grades will be dropped at the end of the semester. To receive full credit, all submitted homework is expected to adhere to the following guidelines:

- Homework must be clear, legible, and neatly arranged (not crammed onto the page, questions must be in numerical order, etc.).
- For math problems, student must show all work and use units. Numerical answers must be clearly delineated by being enclosed by a box. For conceptual questions, acceptable explanations must accompany a simple ‘yes’ or ‘no’.
- For long answer questions, answers must be provided in complete sentences.
c. Multiple pages must be **stapled**.
d. No “fringes” on submitted homework.

*Students must complete all assignments on their own* but are encouraged to attend office hours to discuss problems with the instructor/other students. You may not consult another student or the internet unless specifically specified in the homework problem. Do not consult solution manuals, solution sets, or another student’s work from any previous class. Copying the work of a tutor or another student is an **Honor Code violation**. The word *Pledged* along with your name, date, and signature at the top of each assignment will signify your compliance with the Honor Code.

**Activities:** Throughout the semester, a number of small activities may be assigned as part of your homework. These activities will be done outside of class and will usually include multiple nights of astronomical observations. It is essential that you take advantage of clear nights and do not procrastinate to complete the activities. Per the Honor Code, it is expected that you complete all observations at the necessary times and be honest about any missed observations. You may not find missed information online, in an almanac, or from any source other than those permitted by the individual assignment. Some activities will be completed in groups, while other will require you to work alone.

**Laboratory:** Attendance at the scheduled weekly laboratory session is required. If you need to miss lab for an approved scheduled event, you must notify me via email **one week** prior to the missed lab. If you need to miss lab due to an unexpected illness or family emergency, you must notify me prior to the start of the scheduled lab. Pre- and post-lab exercises may be assigned. These can be found on the Moodle lab page and will be due either 1 hour before or 24 hours after your lab session has begun/ended, respectively. Students are required to purchase a dedicated laboratory notebook before the first lab meeting. This notebook should be a **standard sized spiral bound notebook with inside folders or a pocket folder with inside brads**. You will record your laboratory experiments in this notebook, which will be collected and graded at the end of each laboratory session. Further details regarding laboratory reports, procedures, and expectations will be given in class and at the first scheduled laboratory session. Due to the nature of astronomy, some laboratory exercises will be held outside of class during evening hours. These will be weather dependent and you be told in advance when these will occur.

**Reviews/Final Exam:** There will be three one hour closed-book in-class reviews and a self-scheduled comprehensive final exam. Consulting reviews from any other offering of PHY 106 is an **Honor Code violation**. The date of each review is shown on the class schedule (on Moodle).

**Final Project:** All students will be required to complete a final project by the end of the semester. Project topics will be chosen near the middle of the semester. You will be expected to check in with the instructor regarding the status of your project a few weeks after your topic is chosen to ensure your plan satisfies all of the project requirements. Evaluation of the final project will consist of a project submission to the instructor as well as a class presentation during lab. This project will comprise **5%** of your final course grade. However, failure to complete the project will result in the drop of a full
letter grade (10%) in the course. The assignment due date will be strict. More details will be discussed once the projects are assigned.

**Calculators:** You will need an electronic calculator capable of performing trigonometric functions and scientific notation. These are available for about $10. If you need help selecting one, please ask. **You are expected to bring your calculator to every class and lab.** You will not be permitted to use phones, tablets, or similar devices as calculators during exams.

**ADA:** If you have a diagnosed learning or other disability such that you are allowed accommodations for reviews, assignments, laboratories, or the final exam, please make sure that you contact the Dean of Students office immediately. I must receive notification from the Dean of Students office regarding your accommodation for this course before assignments are due or reviews are taken.

**Electronic Devices:** Electronic devices such as phones, ipods, and laptop computers can be very distracting to you and others around you. For this reason, all phones, ipods, and laptop computers must be turned off and put away before the start of each lecture and laboratory session. *I do not allow laptop computers or electronic video or voice recording devices unless they have been approved by me prior to use.* See the ‘iPads’ section below for guidelines regarding the use of iPads in this course.

**iPads in PHY 106:** All students enrolled in PHY 106 in the Fall Semester of 2016 will receive an iPad to use for the duration of the course, provided that one is not already owned. Please see the guidelines below for how you may and may not use your iPad while in class. If you believe using your iPad in any other capacity other than those listed below would be beneficial, please consult the instructor.

You may:

- View the course textbook when needed
- Take class notes using Penultimate or similar app
- View course material as a PDF or on Moodle
- Take photos of in-class demonstrations (not class notes)
- Use in the laboratory as described in individual lab procedures
- Use apps as instructed to complete in-class tasks and projects

You may not:

- Video or voice record class lectures (unless you have prior approval)
- Take photographs of lecture notes (on the board or on PPT)
- Surf the internet (unless specifically told to do so)
- Message friends or family
- Listen to music
- Take part in any other non-academic activity

**Tentative Schedules:** Tentative class and lab schedules can be found on the Moodle page. Also, remember that outdoor observing activities will occur outside of normal lab times.