

Physics 361/UHON399H - Concepts of Modern Physics

Lecture: 8:30 to 9:20 a.m. MWF – Jorgensen Hall 245 Prof. Peter Dowben

This is a course intended for arts, humanities, engineering students or science majors (physics, chemistry, biology). Prerequisites: Phys 211 and Phys 212, OR Physics 141 and 142. The course is intended to cover the concepts and history of basic relativity, gravity, quantum mechanics, and cosmology.

Students with disabilities are encouraged to contact Services for Students with Disabilities (SSD), 132 Canfield Adm. Bldg., for a confidential discussion of their individual needs for academic accommodation. It is the policy of the University of Nebraska-Lincoln to provide flexible and individualized accommodation to students with documented disabilities that may affect their ability to fully participate in course activities or to meet course requirements. To receive accommodation services, students must be registered with the Services for Students with Disabilities (SSD) office <<http://www.unl.edu/ssd/>>, 132 Canfield Administration, 472-3787 voice or TTY.

Instructor:

Prof. Dowben's office is in the Jorgensen Hall, room 310L. His office hours will be every Wednesday, 1-3 p.m. Other meeting times can be arranged by appointment (the phone number is 472-9838; e-mail: PDOWBEN@unl.edu).

Textbooks (read in this order):

- 1) George Gamow, "Thirty Years that Shook the world", AND through chapter 4 of Peter Woit, "Not Even Wrong"
- 2) Nigel Calder, "Einstein's Universe" **or** Stephen William Hawking, "The Universe in a Nutshell"
- 3) Michael Lemonick, "Echo of the Big Bang"
- 4) Lawrence M. Krauss, "A Universe from Nothing: Why There Is Something Rather than Nothing" (I know that another book was listed here, but upon reflection, decided that Krauss was still a better book)
- 5) Lee Smolin, "The Trouble with Physics"
- 6) UHON365H students ONLY should complete Paul Halpern, "Edge of the Universe" (as should anyone interested)

Lectures:

The lecture periods will include discussion of the assigned readings in the text, a variety of demonstrations which illustrate some of the principles you will be learning, and "in class" participation. It is essential that you read the material before coming to class.

Expected Courtesies

No audio or visual recordings (including camera cell phone recordings) may be made in or of the class without permission: the lecture material is the sole property of the University of Nebraska. It is expected that if you come to a class or lecture, you will stay the entire period. Arriving late or leaving early is RUDE. **Cell phones will be turned off** or, better yet, not brought at all to class. Questions should be addressed to the lecturer. There has to be some

understanding that the Professor has obligations to students outside of Physics 361/UHON365H, on the other hand, we do want to help you, so be persistent if you cannot find help immediately.

Questions about the material are very difficult to answer over the phone, so please come to Dowben's office, even if it isn't office hours (see Homework). *Please avoid contacting the instructor prior to 1:30 p.m., Weekdays and Monday afternoons.*

Homework:

To do well in this course you should plan on spending **at least** 8 hours, including class time, per week on this course. This is an average number per week. If you fail to keep on top of the material, you are only creating a burden for yourself. Homework consists of reading and preparing book reports.

Book reports:

There will be a book report due for each book but the last one (5 report altogether from 6 books). It is recommended that a student keep notes of the book as the each book is read. At the end of class discussion of each book but the last one, students are expected to write a 2 page report (single spaced; or preferably up to 4 pages double spaced) of some of the ideas gleaned from the assigned book. The report should be prepared with a typewriter or word processor.

The instructor is looking for evidence of critical thinking about modern physics concepts and how experimental facts and observations support (or not) these key ideas. The instructor will grade the book report on the critical thinking exhibited in the report, scientific content and clarity of expression. While errors of grammar and spelling are unlikely to directly lead to a diminished grade, such inattention to the book report preparation are unlikely to make your report easy to read, and errors of grammar and spelling that are sufficiently numerous in number may lead to irritation of the instructor during the grading process.

Exams:

There will be an in class midterm exam following completion of the first two books. If there is sufficient in-class participation (from the students), then the midterm exam may be waived.

Oral Presentations:

Oral presentations will be assigned at the end of semester from Scientific American or Science Magazine. Each student or group of students will be assigned a topic concerning modern physics in either science or technology. Students will be graded on their presentations based on scientific content as well as on pedagogical effectiveness for the rest of the class. It is likely that scheduled time for the class's final exam will be used for some of the oral presentations. Students are expected to attend each oral presentation.

Make-ups:

There are **no** make-ups for book reports or missed lectures or exams or oral presentations. If you miss two or more assignments with a documented absence conforming to excused absence by the current standards of the College of Arts and Sciences at UNL, you may request an incomplete and will be able to repeat the entire course for a grade. Incompletes must generally be requested well before May 2.

Grading:

Final grades will NOT be posted. You can access your grades through the web, visit Prof. Dowben after May 8, or leave an addressed envelope with Prof. Dowben with your name and identification number (the envelope does NOT have to be stamped, merely addressed clearly). The grade you receive in the course will be based as follows:

Book Reports
40 points: 40%
Midterm exam/In class participation
30 points: 30%
Final Oral Presentation
30 points: 30%

There is no curve for this course.

Grades cannot be given out over the phone under any circumstances. Persistent requests for grade information during grading (at the end of semester, in particular) will only serve to slow the grading process.