PHY 335 - Modern Physics

Syllabus **Dr. R.L. Herman** **Fall 2010**

Instructor: Dr. R. Herman
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The twentieth century started off with a bang ...at least in physics. It was only in 1900 when Lord Kelvin said, "There is nothing new to be discovered in physics now, All that remains is more and more precise measurement." But physics was about to change, spurred on by the work of Albert Einstein, TIME Magazine's Person of the Century Newtonian, or classical physics, would be overthrown, being replaced by what we now refer to as Modern Physics.

Course Content:

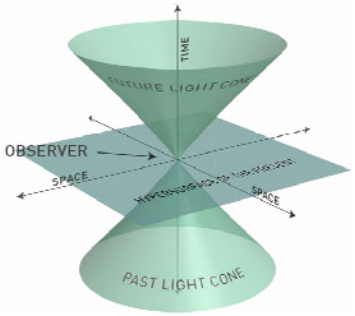
Required Texts: *Introduction to Modern Physics*. John Dirk Walecka, World Scientific, 2008.

Course Description:

This course is an introduction to modern physics. Modern physics can be considered any branch of physics developed in the 20th century that has been greatly influenced by early 20th century physics. Your exposure to physics has mainly been confined to classical, or Newtonian, physics and dated before the 1900s. In early 1900 the revolutions of quantum theory and relativity have lead to a rethinking of our concept of space, time, and the universe on large and small scales. In this course we will explore some of these ideas providing you with some literacy in modern physics, while leaving some of the nuts and bolts for later courses.

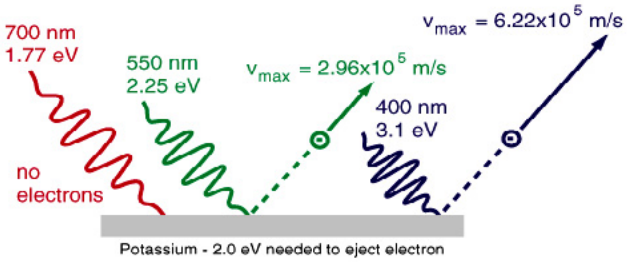
We will cover Chapters 2-8 plus some additional topics if there is time, including material in the appendices. This will cover topics in special relativity, early quantum theory, quantum mechanics in one dimension, the hydrogen atom, and introductions to atomic, nuclear and elementary particle physics.

Additional resources will be posted or linked to the course web site: **people.uncw.edu/hermanr/phy335**.



As you progress from introductory physics to intermediate physics, you will see a big change in how your courses appear. The textbooks will no long have lots of worked out problems and colorful diagrams. There are far fewer problem sets and the amount of time needed to work on problems can take considerably longer. You will find a greater need to visit your instructors to see if you are on the right track. Also, the level of use of calculus and differential equations will increase as you learn about the elegant models that are used to understand the world around us. It will take time and effort to delve into this wonderful world. The amount of time and energy that you put into your reading, working on problems, and discussing physics will pay off in the long term. Your instructors are here to help guide you as you uncover the mysteries and solve the puzzles of the real world.

In this course we you will get an overview of a variety of topics in modern physics. More in depth study of individual topics can be taken up later in upper level courses. In particular, the topics covered will include the failure of classical physic to explain phenomena such as blackbody radiation,specific heat of solids, spectral lines; the emergence of the quantum concept and photons; matter waves, the Schrodinger equation; wave-particle duality; angular momentum and spin; atomic physics, nuclear physics, and particle physics; and, special and general relativity.



Course Requirements:

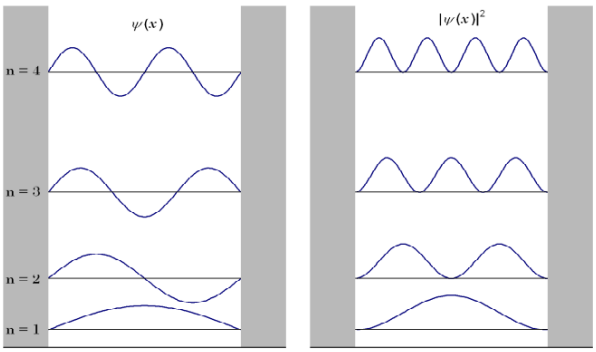
Participation/Attendence: You are expected to attend every class and to contribute to the class based upon your reading. After three excused absences, there will be a penalty of 2% for each absence from your total grade.

Homework: Homework assignments will be collected on a regular basis and you will be told when the work is due. As doing homework is very important for learning the material in this course, it will count as 30% of your grade.

Papers: You will exploretopics not covered in class. This will result in writtten papers. These will count 10% of your grade.

Exams and Grades: There will be four exams and a final for this course. The exams will cover the basic material up to the date of the exam. The tentative dates for the exams are below.

Exams	Chapters	Date
Exam I	2-3	Sep 9
Exam II	4	Sep 30
Exam III	5-6	Oct 26
Exam IV	7-8	Nov 18
Final	Cumulative	Dec 7, 11:30 AM



Your final grade will be based on the following:

Homework	30%
Papers	10%
Exams	40%
Final	20%

90-100	A
80-89.5	B
70-79.5	C
60-69.5	D

Plus-minus grading may be used in special cases.

This syllabus is subject to change!

Academic Honor Code: All members of UNCW's community are expected to follow the academic Honor Code. Please read the UNCW Honor Code carefully (as covered in the UNCW Student Handbook). Academic dishonesty in any form will not be tolerated in this class. Please be especially familiar with UNC-W's position on plagiarism as outlined in the UNCW Student Handbook. Plagiarism is a form of academic dishonesty in which you take someone else's ideas and represent them as your own.

Student Disabilities: UNCW Disability Services supplies information about disability law, documentation procedures and accommodations that can be found at http://www.uncw.edu/stuaff/disability/.To obtain accommodations the student should first contact Disability Services and present their documentation to the coordinator for review and verification.

Campus Respect Compact. UNCW has recently instituted a Respect Compact to affirm our commitment to a civil community, characterized by mutual respect. That Compact will soon be affixed to the wall of each classroom and can be accessed at:

http://www.uncw.edu/stuaff/pdc/documents/SeahawkRespectCompact.pdf

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Other Books

There are many other books on modern physics and the history of quantum theory and relativity. You are encouraged to go to the library and seek out more resources. Also, links will be provided to additional readings at the course web site.