PHY355 Modern Physics for Engineers, Spring 2000

Unique Number: 55200

Class - Meets TTh 3:30-5 in RLM 4.102

Instructor - Professor Greg O. Sitz

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office hours: Wednesday 10:30-11:30, Tuesday 5-6, or by appointment.

Text - *Modern Physics for Scientists and Engineers*, by *Thorton and Rex*. We will cover chapters 1-7 and selected topics from other chapters (9, 15 and 16).

Grading - The breakdown is: Homework 30% (assigned approximately weekly), In-class exams (2): 40%, Final Exam 30%.

Homework - You are encouraged to discuss homework with anyone you wish; however, all written homework must be prepared independently (by you). Homework is due at the end of class on the specified day. Homework that is between 1 minute and 1 week late will be accepted with a 50% penalty. Homework later that this will not be accepted.

Exams - Two in-class exams, tentative dates: February 17 and March 23, plus a comprehensive final. The final is required. It is scheduled for Sat. May 13, 9-noon. If you are absent from a examination for the observance of a religious holy day you may complete the work missed within a reasonable time after the absence, if proper notice has been given. Notice must be given at least seven days prior to the exam.

Comments - Read the material *before* it is covered in class and attend class. The material covered in this class is not mathematically difficult; it is, at times, conceptually subtle and it helps to go over it several times.

Other: The last date to drop the course without possible academic penalty is February 14, 2000. The last day to drop the course for academic reasons is March 27, 2000.

Please notify me of any modification/adaptation you may require to accommodate a disability-related need. You will be requested to provide documentation to the Dean of Students' Office, in order that the most appropriate accommodations can be determined. Specialized services are available on campus through Services for Students with Disabilities.

Alternatives: This document (as well as other course related material) is (will be) available at:

`http://www.ph.utexas.edu/~gositz/phy355.html`

Syllabus

Week of January 17:	Introduction, Special Relativity, transformations
January 24:	Special Relativity, spacetime, Doppler effect
January 31:	Special Relativity, energy & momentum
February 7:	General relativity (Chapter 15), cosmology (Chapter 16)
February 14:	Finish relativity, and Test 1
February 21:	X-rays, line spectra, discovery of the electron
February 28:	Thermal radiation, Planck's constant, Photoelectric effect
March 6:	Atomic structure, Bohr model, Rutherford scattering
March 13:	Mathamatics of General Relativity, string theory
March 20:	Matter waves and Test 2
March 27:	The Schrodinger wave equation
April 3:	One-dimensional problems, barriers
April 10:	One-dimensional problems continued, The Hydrogen atom
April 17:	Finish 1-D quantum
April 24:	Statistical physics
May 1:	Fermi-Dirac and Bose-Einstein Statistics

Quotes

"The interpretation of these results is that there is no displacement of the interference bands" -A. A. Michelson (1881)

"In classical physics it was always assumed that clocks in motion and at rest have the same rhythm, that rods in motion and at rest have the same length. If the velocity of light is the same in all coordinate systems, if the relativity theory is valid, then we must sacrifice this assumption. It is difficult to get rid of deep-rooted prejudices, but there is no other way." - Albert Einstein (1938)

"What led me more or less directly to the special theory of relativity was the conviction that the electromotive force acting on a body in motion in a magnetic field was nothing else but an electric field" - Albert Einstein (1952)

"In the autumn of (1905) ... Einstein published a paper which set forth the relativity theory of Poincare and Lorentz with some amplifications, and which attracted much attention" - E. T. Whittaker (1953)

"How often have I said to you that when you have eliminated the impossible, whatever remains, however improbable, must be the truth?" - Authur Conan Doyle