

SMU Fall 2008
Physics 1313 : Fundamentals of Physics
Syllabus

Instructor : Will McElgin

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Office Hours : Monday and Wednesday – 2-4pm

TA : Travis Howe

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Text : Cutnell and Johnson, “Physics - 7th edition”

Course Website : www.physics.smu.edu/mcelgin/P1313_fall2008/P1313.html

Lecture Times : Monday and Wednesday – 1-2pm

Lecture Location : Fondren 158

Lab Times (2) : Tuesday – 1-3pm or 3-5pm

Lab Location : Fondren 60

Description of the Course

This course is an algebra-based overview of a broad number of topics in physics. Initial topics will include single particle motion, Newton’s laws of mechanics, and uniform circular motion. The concept of conservation of (kinetic plus potential) energy will then be explored, along with a treatment of motion in a gravitational field. The motion of systems of particles and the concept of conservation of momentum will then be discussed. Following this tour of mechanics, a treatment of charge and electric force, as well as current and magnetic force, will then be given. This will lead to a discussion of light as an electromagnetic phenomenon, and an exploration of the refraction, interference, and diffraction of light waves. Attention will then be turned to atomic and nuclear physics, as well as Einstein’s relativity, and some basic aspects of contemporary physics. There will be an emphasis on in-class problem solving using similar ideas and techniques as required on homework and exams.

Evaluation

There will be two exams (15% each), three quizzes (7.5% each), and a semi-cumulative final (17.5%). Homework (15% total) will be due on a weekly basis. The laboratory will be conducted and graded (15%) by the lab instructor. Attendance in class is expected.

Schedule

- 8/25** : Preliminaries and Mathematics. Sections 1.1-1.9.
Assignment of homework 1.
- 8/26** : Lab 1 – Measurement and Error
- 8/27** : Mathematics and One-dimensional Motion. Sections 1.6-1.9, 2.1-2.5.
- 9/2** : One-dimensional Motion. Sections 2.1-2.8.
- 9/3** : Vectors, Two-dimensional and Projectile Motion. Sections 3.1-3.3.
Assignment of homework 2.
- 9/8** : Collection of homework 1.
Two-dimensional and Projectile Motion. Sections 3.1-3.4.
- 9/9** : Lab 2 – Vectors
- 9/10** : Force and Newton’s Laws. Sections 4.1-4.8, 4.10.
Assignment of homework 3.
- 9/15** : Collection of homework 2.
Quiz 1.
Force and Newton’s Laws. Sections 4.1-4.8, 4.10-4.13.
- 9/16** : Lab 3 – Hooke’s Law
- 9/17** : Force and Newton’s Laws. Sections 4.1-4.8, 4.10-4.13
- 9/22** : Collection of homework 3.
Circular Motion and Gravity. Sections 5.1-5.8
Assignment of homework 4.
- 9/23** : Lab 4 – Forces in Equilibrium
- 9/24** : Circular Motion and Gravity. Sections 5.1-5.8
- 9/29** : Review for Exam. Chapters 4 and 5.
- 9/30** : Lab 5 – Acceleration due to Gravity
- 10/1** : Collection of homework 4.
Exam 1.
- 10/6** : Slides on Modern Physics and Cosmology.
- 10/7** : Lab 6 – Energy Conservation
- 10/8** : Movie on Early Universe.
- 10/15** : Slides on Modern Physics and Cosmology.
- 10/20** : Slides on Modern Physics and Cosmology.

- 10/21** : Lab 7 – Electrical Measurement
- 10/22** : Quiz 2.
Gravitational and Electrical Force.
- 10/27** : Gravitational and Electrical Force and Energy. Orbital Motion.
Sections 4.7, 5.5, 6.3, 6.5, 18.1-18.5, 19.1-19.6.
Assignment of homework 5.
- 10/29** : Gravitational and Electrical Energy. Orbital Motion.
Sections 4.7, 5.5, 6.3, 6.5, 18.1-18.5, 19.1-19.6.
- 11/3** : Electrical Energy. Orbital states of the atom.
Sections 18.1-18.5, 19.1-19.6, 30.1-30.3
- 11/4** : Lab 8 – Speed of Light
- 11/5** : Conservation of Momentum and Collisions. Sections 7.1-7.3.
- 11/10** : Conservation of Momentum and Collisions. Sections 7.1-7.3.
- 11/11** : Lab 9 – Radioactivity
- 11/12** : Collection of homework 5.
Exam 2.
Assignment of homework 6.
- 11/17** : Current and Magnetic Forces. Sections 20.1,20.2, 21.1-21.7.
- 11/18** : Lab 10 – Diffraction
- 11/19** : Magnetic Forces. Sections 21.1-21.7.
- 11/24** : Electromagnetic Waves. Sections 24.1-24.3, 24.5-24.6.
- 12/1** : Einstein’s Relativity. Sections 28.1-28.7.
- 12/2** : Lab 11 – Atomic Spectra
- 12/3** : Collection of homework 6.
Einstein’s Relativity. Sections 28.1-28.7.
- 12/10** : Final Exam. Exam Time – 11:30am-2:30pm.