

SYLLABUS

PHYSICS 1502

Section 015

SS-I 2011

VILLANOVA UNIVERSITY

Department of Physics

Dr. Javad Siah

TEXT BOOK:

1. CONCEPTUAL Physical Science
Author: Paul G. Hewitt, John Suchocki & Leslie A. Hewitt
(PEARSON Addison Wesley, Forth Edition)
2. Additional power-point presentation/summary files

OBJECTIVE: The main goal of this course is to provide instructions for the understanding of Gravity. This course is different from the more traditional general survey type physics courses in the fact that it is built around a small number of ideas.

After a brief historical background on the force of gravity, the early observations of some of the manifestations of this force of nature is presented. We follow the formulation of the gravitational law and the laws governing the motion of objects under this force from the time of Newton to present. Some of the problems and dilemmas concerning this force is explored. We will see the force that Newton sees as a mysterious force reaching across the space to influence distance objects is explained simply as a consequence of the curvature of space-time in Einstein general theory of relativity. The course concludes with the role this force plays in the fabric and the evolution of the universe around us. The problems that the unification of this force with the other forces of nature poses for the modern physics are also briefly reviewed. This is a non-calculus based course.

THIS COURSE fulfills the one science elective requirement of the C & F majors. Although it has no prerequisite, with PHY1500 - The Concept of light, completes the two science requirements of the Arts majors. These students can supplement these two courses with laboratory courses PHY1501 and PHY1503 to fulfill their complete course + Lab. requirements.

FORMAT: The summer sessions of this course are in fully distance learning format.

REQUIREMENTS: This is a non-calculus based course, however a working knowledge(at high school level) of algebra and geometry is required to follow the lectures. Assigned topics are covered in the selected text book and/or presented as a file on line. Students are expected to read and understand the topics.

ATTENDANCE: No class attendance is required. However, if we can arrange it, there will be one/two live chats per week. If no free common time is found, we will have discussions and question and answers during my office hours on one on one base. You can communicate with each other or as groups in the chat rooms of WEBCT. A record of your communications with me is kept and it will affect your grade.

GRADING: There are four tests and 8 homeworks. Each homework has a deadline. Late homeworks are accepted but with penalty. It is essential that you submit your homeworks. Most of the homework grade is given for the work and the thought that you put into answering them. Each test is worth 100 points. All of the homeworks together is worth 100 points.

COMMUNICATIONS: All of your written communications with me should be conducted through communication tools(Mail, Discussions and the Chat) of WEBCT. Please take a tutorial tour of the WEBCT before the summer session to become familiar with its capabilities. You should submit your homeworks in form of Microsoft Word attachments to your mail. Please familiarize yourself with creation of simple graphics

and insertion of formulas in Microsoft Word.

MAKE UP: There is no make up for a missed test or homework.

Course Material

- I. A historical perspective
Chapter 1
- II. Kepler's laws of motion
Chapter 5
- III. Newton's laws of motion
chapter 2
- IV Momentum and Energy
Chapter 3
- V. Newton's law of Universal Gravity
Chapter 4
- VI. Inertial versus gravitational mass and Cavendish experiment
Notes will be provided
- VII Gravity at work
 - 1. The solar system - Chapter 33
 - 2. The stars - Chapter 34
- VIII. Introduction of Time into the problem - Theory of relativity
 - 1. Nature and presence of ether
 - 2. Problem of the action at a distance
 - 3. Nature and curvature of spaceChapter 35 + Notes

Tentative Chapter coverage, Test and Homework (HW)

| Date | <i>chapters</i> | |
|--------------------|-------------------------------------|--|
| 6/1 - 6/3 | 1 | |
| 6/3 | | <i>HW - 1: Assigned problems from chapter 1</i> |
| 6/3 - 6/6 | 2 | |
| 6/6 | | <i>HW - 2: Assigned problems from chapter 2</i> |
| 6/6 - 6/10 | 4 | |
| 6/9 | | <i>HW - 3: Assigned problem from chapter 4</i> |
| 6/10 | <i>1st Test: Chapters; (1,4,2)</i> | 100 points |
| 6/11 - 6/13 | 3 | |
| 6/13 | | <i>HW - 4: Assigned problems from chapter 3</i> |
| 6/13 - 6/17 | 4 | |
| 6/16 | | <i>HW - 5: Assigned problems from chapter 4</i> |
| 6/17 | <i>2nd Test: Chapters; (3, 4)</i> | 100 points |
| 6/18 - 6/20 | 26 | |
| 6/20 | | <i>HW - 6: Assigned problems from chapter 26</i> |
| 6/20 - 6/24 | 27 | |
| 6/23 | | <i>HW 7: Assigned problems from chapter 27</i> |
| 6/24 | <i>3rd Test: Chapters; (26, 27)</i> | 100 points |
| 6/25 - 6/28 | 28 | |
| 6/28 | | <i>HW - 8: Assigned problems from chapter 28</i> |
| 6/29 | <i>4th Test: Chapter; (28)</i> | 100 points |

The format of the questions on the tests is: *Problems, Essays (discussion) and Multiple Choices.*
The questions will cover all the material covered in the required text book. The questions are similar, but not identical to the assigned homework problems and the questions at the end of each chapter.

Office: *Mendel - Room 263 B*

Office Hours: *M T W T F : 11:00 - 12:00 During this time I'll try to stay in the chat room.*

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