

## SYLLABUS

PHYSICS 2414

Section 01

Fall 2012

VILLANOVA UNIVERSITY

Department of Physics

Dr. Javad Siah

**TEXT BOOK:** Physics - for Scientists and Engineers with Modern Physics

**Author:** Douglas C. Giancoli

(Pearson/Prentice Hall, 4th edition)

Notes and other related material as well as announcements in regard to the course will be posted on the webct site of the course. **Webct Site:** <http://elearning.villanova.edu> - PHY2414-01

**OBJECTIVES:** This is a calculus based course surveying the topics of waves, thermodynamics, light and optics. Under waves, oscillatory motions are explored. Students will learn about the different waves and in some detail the phenomena dealing with superposition of waves. Under thermodynamics temperature, the laws of thermodynamics and kinetic theory of gases are discussed. In light and optics section of the course the students become familiar with image formation and geometrical optics. The interference and diffraction of waves are introduced and the nature of light and its polarization are also briefly discussed.

**ATTENDANCE:** Attendance is required.

**GRADING:** There are four tests. The fourth test, the final is accumulative. It tests the material covered on tests 1 - 3. Each test is worth 100 points. I will drop your lowest test score. There are suggested problems for each chapter which help you to understand the material better. I do not collect homeworks, but during the recitation for each chapter I will ask you to go to the board and solve some of those problems. Your accumulative performances is considered as a test. In physics usually some of the material is covered and explored via problems, therefore it is natural if the problems are not straightforward and easy. My office and office hours are open to you whenever I am around. In addition solving the suggested problems can help you stay on top of the material.

**COMMUNICATIONS:** My regular office hours are announced below. All of your electronic communications with me should be conducted through communication tools (Mail = Messages, Discussions and the Chat) of Bb. Please take a tutorial tour of the Bb before the session to become familiar with its capabilities.

**MAKE UP:** There is no make up for a missed test or homework. You get ZERO for a missed test. With a written excuse the corresponding part of the final test is considered as the make up.

**The format of the questions on the tests is:** Closed book. 3 or 4 multi part problems similar to the problems at the end of the chapters. You are given a formula sheet. Prior to the first test I will post a trial test for you.

**Office Hours:**

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## **COURSE MATERIAL**

### **1. OSCILLATIONS AND MECHANICAL WAVES**

#### *I. Oscillations*

*Chapter 14- Sections:1 - 8*

#### *II. Wave Motion*

*Chapter 15 - Sections:1 - 11*

#### *III. Sound*

*Chapter 16 - Sections:1 - 8*

### **2. THERMODYNAMICS**

#### *I. Temperature, Thermal Expansion, and Ideal Gas Law*

*Chapter 17 - Sections:1 - 10*

#### *II. Kinetic Theory of Gases*

*Chapter 18 - Sections:1 - 7*

#### *III. Heat and the First Law of Thermodynamics*

*Chapter 19- Sections:1 - 10*

#### *IV. The Second Law of Thermodynamics*

*Chapter 20 - Sections:1 - 11*

### **3. LIGHT AND OPTICS**

#### *I. Light: Reflection and Refraction*

*Chapter 32- Sections:1 - 8*

#### *II. Lenses and Optical Instruments*

*Chapter 33- Sections:1 - 10*

#### *III. The Wave Nature of Light: Interference*

*Chapter 34- Sections:1 - 7*

#### *IV. Diffraction and Polarization*

*Chapter 35- Sections:1 - 13*

## Tentative Chapter coverage, Test and Homework (HW)

Date	<i>chapters</i>	
8/27 - 9/5	14	
9/5	<i>Recitation: chapter 14</i>	
9/7 - 14	15	
9/14	<i>Recitation: chapter 15</i>	
9/17 - 21	16	
9/21	<i>Recitation: chapter 16</i>	
9/24	<i>1st Test: Chapters; (14, 15, &amp; 16)</i>	<b>100 points</b>
9/26 - 10/1	17	
10/1	<i>Recitation: chapter 17</i>	
10/3 - 8	18	
10/8	<i>Recitation: chapter 18</i>	
10/10 - 12	19	
10/12	<i>Recitation: chapter 19</i>	
10/22 - 26	20	
10/26	<i>Recitation: chapter 20</i>	
10/29	<i>2nd Test: Chapters; (17, 18, 19, &amp; 20)</i>	<b>100 points</b>
10/31 - 11/7	32	
11/7	<i>Recitation: chapter 32</i>	
11/9 - 16	33	
11/16	<i>Recitation: chapter 33</i>	
11/19 - 11/30	34	
11/30	<i>Recitation: chapter 34</i>	
12/3 - 7	35	
12/7	<i>Recitation: chapter 35</i>	
12/10	<i>3rd Test: Chapters; (32, 33, 34, &amp; 35)</i>	<b>100 points</b>
12/11 - 12/12	<i>Review</i>	
<b>To be announced</b>	<i>4th Test: Chapters; (14 - 16, 17 -20, &amp; 35 - 38)</i>	<b>100 points</b>

### Assigned problems:

Chapter	Problems
14	9, 15, 19, 25, 31, 43,49, 55, 71, 82,89
15	9,13,21,23,27, 33,35, 42,47, 51, 52, 63,65, 83,91
16	6, 10, 13, 19,27, 33,45, 50,58, 67,71, 77, 90, 96
17	1, 6, 11, 21, 29, 35, 51, 57, 67, 75
18	5, 13, 17, 21, 25, 33, 39, 47, 57, 65
19	5, 15, 23, 25,31, 38, 45, 53, 55, 61, 73, 81
20	6, 11, 19, 27, 35, 43, 51, 55, 63, 69, 71
32	5, 13, 19, 29, 37, 43, 45, 55, 72, 79
33	5, 11, 19, 25, 33, 37, 55, 63, 77, 87, 103
34	5, 11, 19, 25, 31, 35, 49, 59, 63
35	5, 9, 13, 15, 25, 35, 47, 49, 53, 67, 73, 77