

SYLLABUS

PHYSICS 2414

Section 01

Fall 2013

VILLANOVA UNIVERSITY

Department of Physics

Dr. Javad Siah

TEXT BOOK: Physics - for Scientists and Engineers

Author: Serway - Jewett

(Brooks/Cole - Cengage Learning, 9th edition)

Notes and other related material as well as announcements in regard to the course will be posted on the Bb site of the course. **Bb 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. During the recitations I go over the suggested problems and at the end of each recitation there will be a closed book and notes **quiz** based on one of the suggested problems. Your accumulative performances on the quizzes 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 quiz. You get ZERO for a missed test/quiz. **Only for tests**, 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. 2 or 3 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: *M W F : 10:30 - 11:30 ℳ M: 11:30 - 12:30*

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COURSE MATERIAL

1. OSCILLATIONS AND MECHANICAL WAVES

- I. Oscillations*
Chapter 15- Sections:1 - 7
- II. Wave Motion*
Chapter 16 - Sections:1 - 6
- III. Sound Waves*
Chapter 17 - Sections:1 - 4
- III. Superposition and Standing Waves*
Chapter 18 - Sections:1 - 8

2. THERMODYNAMICS

- I. Temperature, Thermal Expansion, and Ideal Gas Law*
Chapter 19 - Sections:1 - 5
- II. The First Law of Thermodynamics*
Chapter 20 - Sections:1 - 7
- III. The Kinetic Theory of Gases*
Chapter 21- Sections:1 - 5
- IV. Heat Engines, Entropy, and the Second Law of Thermodynamics*
Chapter 22 - Sections:1 - 8

3. LIGHT AND OPTICS

- I. The Nature of Light and the Principles of Ray Optics*
Chapter 35- Sections:1 - 8
- II. Image Formation*
Chapter 36- Sections:1 - 10
- III. Wave Optics*
Chapter 37- Sections:1 - 6
- IV. Diffraction Patterns and Polarization*
Chapter 35- Sections:1 - 6

Tentative Chapter coverage, Test and Homework (HW)

Date	<i>chapters</i>	
8/26 - 9/4	15	
9/4	<i>Recitation & Quiz: chapter 15</i>	
9/6 - 11	16	
9/11	<i>Recitation & Quiz: chapter 16</i>	
9/13 - 18	17	
9/18	<i>Recitation & Quiz: chapter 17</i>	
9/20 - 25	18	
9/25	<i>Recitation & Quiz: chapter 18</i>	
9/27	<i>1st Test: Chapters; (15, 16, 17 & 18)</i>	100 points
9/30 - 10/4	19	
10/4	<i>Recitation & Quiz: chapter 19</i>	
10/7 - 11	20	
10/11	<i>Recitation & Quiz: chapter 20</i>	
10/21 - 25	21	
10/25	<i>Recitation & Quiz: chapter 21</i>	
10/28 - 11/4	22	
11/4	<i>Recitation & Quiz: chapter 22</i>	
11/6	<i>2nd Test: Chapters; (19, 20, 21, & 22)</i>	100 points
11/8 - 13	35	
11/13	<i>Recitation & Quiz: chapter 35</i>	
11/15 - 20	36	
11/20	<i>Recitation & Quiz: chapter 36</i>	
11/22 - 12/2	37	
12/2	<i>Recitation & Quiz: chapter 37</i>	
12/4 - 10	38	
12/10	<i>Recitation & Quiz: chapter 38</i>	
12/11	<i>3rd Test: Chapters; (35, 36, 37, & 38)</i>	100 points
12/12	<i>Review</i>	
To be announced	<i>4th Test: Chapters; (15 - 18, 19 - 22, & 35 - 38)</i>	100 points

Assigned problems:

Chapter	Problems
15	5, 14, 16, 27, 29, 36, 42, 48, 59, 77, 86
16	1, 9, 15, 22, 29, 35, 44, 53, 55, 60
17	1, 6, 13, 15, 21, 30, 33, 38, 39, 45
18	3, 9, 16, 21, 27, 36, 47, 57, 67, 72
19	3, 7, 12, 29, 41, 58, 64, 74
20	1, 9, 20, 23, 28, 30, 34, 55, 58
21	6, 12, 15, 22, 26, 29, 39, 42, 55, 58
22	6, 10, 14, 20, 29, 38, 44, 51, 59, 64
35	8, 17, 26, 29, 32, 35, 43, 45, 56, 63, 71
36	14, 18, 22, 33, 48, 56, 66, 69, 77, 85
37	13, 17, 21, 26, 31, 33, 37, 40, 51, 57, 63
38	8, 15, 25, 28, 40, 51, 60, 69, 71, 73