بسم الله الرحمن الرحيم

سبحانك لا علم لنا إلا ما علمتنا إنك أنت العليم الحكيم

Physics B (B 1032)
Waves and thermodynamics

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Benha University

Benha University
Benha Faculty of Engineering
Department of Basic Engineering Sciences

جامعة بنها
كلية الهندسة ببنهـــــا
قسم العلوم الهندسية الأساسية

PHYSICS B (B1032)

Lecture 0

Introduction

By: Prof Dr Tarek Abdolkader

OUTLINE

- **About the course**
  - **Course outline**
  - **Advices**
  - **Assessment policy**

The nature of the course

Basic Information

Title:	**Physics B**
Code:	**B1032**
Lecture:	**4 hours**
Practical:	**2 hours**
Total:	**6 hours**

The nature of the course

Course Objectives:

Upon successful completion of this course, the student should be able to

1. demonstrate basic concepts of waves, physical optics, and thermodynamics

2. perform Laboratory experiments under controlled guidance and supervision.

3. develop the spirit of cooperation with others and working in a team.

The nature of the course

Brief list of topics to be covered:

1.	Wave Motion	6 hours
2.	Sound Waves	6 hours
3.	Superposition of Waves	6 hours
4.	Interference of Light	6 hours
5.	Diffraction of Light	6 hours
6.	Heat and 1st Law of Thermodynamics	6 hours
7.	Ideal Gas and Its Properties	6 hours
8.	Heat Engines	6 hours
9.	Heat Transfer	6 hours

Tentative Time Plan

Week	Date	Lecture 1	Lecture 2	Lab.	Notes
1	8/2	**Ch1**: Wave Motion	**Ch1**: Wave Motion	Errors	
2	15/2	**Ch2**: Sound Waves	**Ch1**: 1, 4, 6, 8, 10, 14, 16, 18	Exp. 1	
3	22/2	**Ch2**: Sound Waves	**Ch2**: 1, 3, 7, 9, 11, 15, 18, 19	Exp. 2	
4	29/2	**Ch3**: Superposition of Waves	**Ch3**:Superposition Of Waves	Exp. 3	***Quiz #1 Ch 1, 2)***
5	7/3	**Ch4**: Interference of Light	**Ch3**: 1, 4, 7, 8, 11, 13	Exp. 4	
6	14/3	**Ch4**: Interference of Light	**Ch4**: 1, 3, 5, 7, 9, 10, 12	***Lab Exam #1***	
7	21/3	**Revision Ch.(1-4)**	**Revision Tutorial (1-4)**	Exp. 5	
8	28/3	**Ch5**: Diffraction of Light	**Ch5**: Diffraction of Light	Exp. 6	***Midterm Exam***

Tentative Time Plan

9	4/4	**Ch6**: Heat & 1st Law of Thermodynamics	**Ch5**: 2, 4, 6, 7, 9	Exp. 7	
10	11/4	**Ch6**: Heat & 1st Law of Thermodynamics	**Ch6**: 1, 3, 5, 7, 9	Exp. 8	Holliday (**20/4**)
11	18/4	**Ch7**: Ideal Gas and Its Properties	**Ch7**: Ideal Gas and Its Properties	***Lab Exam #2***	***Quiz #2 (Ch. 5, 6)***
12	25/4	**Ch8**: Heat Engines	**Ch7**: 2, 4, 6, 8, 10, 11, 13	***Lab Revision***	Holliday (**25/4**)
13	2/5	**Ch9**: Heat Transfer	**Ch8**: 2, 4, 6, 8, 9		
14	9/5	**Revision Ch. (5-9)**	**Ch9**: 1, 3, 4, 5, 7		
15	16/5	**Lab Final Exam**			
16	**Final Written Exam**				

Notes:

1. There are two Quizzes on theoretical lectures (5 marks each) at weeks 4 and 11.
2. There are two Quizzes on the Lab (5 marks each) at weeks 6 and 11.
3. The Midterm Exam on theoretical lectures will be at week 8 or 9.
4. The Final Lab Exam will start at week 14 or 15.
5. The Final Written Exam will start at week 16.

The nature of the course

Learning Outcomes:

1. Describe wave motion mathematically
2. Extract the properties of a wave from its mathematical form
3. Derive the velocity of a wave in stretched string.
4. Quantify the velocity and intensity of sound waves
5. Demonstrate doppler effect in waves
6. Find the superposition of two coherent waves
7. Demonstrate the interference of two waves
8. Apply interference principles on thin films
9. Demonstrate the diffraction of light through single slit and multiple slits
10. Apply first law of thermodynamics on heat systems
11. Differentiate between various thermodynamic processes
12. Apply thermodynamic principles on simple heat engines
13. Demonstrate heat transfer by conduction, convection and radiation

Resources

Presentation slides: ***(not adequate alone)***

Lecture notes

Instructor website: Lecture Notes, Quizzes, and Major Exams, etc. are available on the link: http://www.bu.edu.eg/staff/tarekhassan015

Textbook:

Raymond A. **Serway** and John W. Jewett, "Physics for Scientists and Engineers with Modern Physics", 9th edition, Brooks Cole, 2013.

Additional references:

1. David Halliday, Robert Resnick, and Jearl Walker, *"Fundamentals of Physics"*, 9th edition, Wiley, 2011.
2. Paul A. Tipler and Gene Mosca, *"Physics for Scientists and Engineers"*, sixth Edition, W. H. Freeman, 2008.
3. Douglas C. Giancoli, *"Physics: Principles with Applications"*, 6th edition, Pearson Education, 2004.

Lab

List of Lab Experiments:

[1] Simple Pendulum

[2] Mechanical Waves

[3] Malus' Law

[4] Specific Heat

[5] Resonance in Air Column

[6] Single Slit Diffraction

[7] Diffraction Grating

[8] The Thermistor

Laboratory sessions are conducted once a week for 2 hours.

Advices

Advices to go through easily in this course:

1. Your goal is to acquire skills not to memorize knowledge.
2. Your value is measured with what you can do, not with what you can memorize.
3. The difference between the Engineer and the Technician is the ability to design, synthesize, cope with rapid changes in technology.
4. This course is an important basic course.
5. Attendance of lectures is a must.
6. Ask whenever you feel any ambiguity or confusion.
7. Note the updated information on the website:
   http://www.bu.edu.eg/staff/tarekhassan015

Grading Policy

Semester works	Lab	Final Exam	Total
30	**30**	**90**	**150**

Semester works **30**	Quiz #1 **5**	The first Quiz is at the 4th week
	Midterm Exam **20**	The first Major Exam is after the 8th week
	Quiz #2 **5**	The second Quiz is at the 11th week
Lab **30**	Lab semester works **10**	Performing experiments, solving pre-lab questions, and discipline
	Lab quizzes **10**	The first quiz is after finishing 5 experiments and the second is after finishing the other 5 experiments
	Final lab exam **10**	Final Lab exam is to be held after 14th week.
Final exam **90**		

Absence more than 25% of hours of the course leads to *Denial*.

Online resources

http://hyperphysics.phy-astr.gsu.edu/hbase/hph.html

http://www.learnerstv.com/lectures.php?course=ltv008&cat=Physics

http://www.nvcc.edu/home/nvmajew/new/Phy232/lectures.html

http://hazemsakeek.com/magazine/