



GENERAL PHYSICS - PHYS 161

Second Semester 2009/2010 (092)

Catalog Description:

PHYS 161 General Physics (3-3-4) is an introductory course covering the Fundamental Principles of Physics. Problem solving techniques and experimental applications are emphasized throughout teaching this course. It is a requirement to all students majoring in **EEET, MET, NDE** and **CSET**. The course focuses on applied **Mechanics, Heat, Electricity & Magnetism, and Modern Physics**.

Prerequisite: Completion of the Prep. Year

Textbook (TB): D. C. Giancoli, "Physics, Principles with Applications", Prentice Hall, 6th ed. 2005.

Lectures Notes (LN): HBCC, Lectures Notes of Dr. Arif Akhundov,

<http://www.hbcc.edu.sa/facpages/DrArif/Teaching.html>

Terminology manual: English-Arabic Dictionary for PHYS 161 Course.

Lab Manual (LM): HBCC, PHYS 161 Laboratory manual.

Lecturer: Dr. Arif Akhundov

Goals: Students shall be given an overview of basic physical principles that underlie the Modern Technique and Technology. Through the precise formulation of the problems from different parts of elementary Physics to develop the skills of the freshman majoring in technical program in applying college level algebra and trigonometry to solve physical problems. Additionally to learn to use instruments and apparatus through experimental technique and to present experimental results objectively in clearly written reports.

- Essential Topics:**
1. Mechanics & Energy
 2. Fluids & Vibrations, Waves
 3. Sound & Thermal Physics
 4. Electricity & Magnetism
 5. Electromagnetic Waves & Optics
 6. Atomic physics & Nuclear Physics

Assessment Policy:

Weighting:

Letter Grading Scale:

Laboratory reports	5%	95 ≤ 100	A+
Mid-term Lab. Exam	10%	90 ≤ 95	A
Final Lab. Exam	10%	85 ≤ 90	B+
Quizzes	5%	80 ≤ 85	B
First Major exam	20%	75 ≤ 78	C+
Second Major exam	20%	70 ≤ 75	C
Final examination	<u>30%</u>	65 ≤ 70	D+
	100%	60 ≤ 65	D
		0 ≤ 60	F

Prepared by: Dr. Arif Akhundov

Date: 27-FEB-10

Approved: Dr. Mubarak Al-Mutairi
Assistant Dean, HBCC

Date:



WEEKLY SCHEDULE

Wk. No.	Topic/Subject	Text Book/ Lectures	Assignments & Quizzes	Experiments in Laboratory
1	Introduction Measurements, Units , System of Units: SI & CGS. Mathematical Review. Vectors & Scalars .	TB: 1.2 - 1.6, 3.1, 3.4 LN: Week 1	HW # 1 p. 16: 17, 18, 22, 23 p. 65: 6, 7, 8, 9, 10	
2	MECHANICS Kinematics . Velocity, acceleration. Motion with constant acceleration. Free fall.	TB: 2.3 - 2.7 LN: Week 2	HW#2 p. 39: 6, 7, 18, 25, 36, 42	Graphing
3	Dynamics Newton's Laws of Motion. Application of Newton's Laws. Newton's Law of Gravity. Force of Gravity & Weight.	TB: 4.1 - 4.7 LN: Week 3	HW#3 p. 98: 5, 10, 24 p. 100: 26, 27, 34 Quiz # 1	Measurement
4	Work & Energy Work done by a force. Kinetic and Potential Energy. Conservation of Mechanical Energy. Power.	TB: 6.1, 6.3, 6.4, 6.6, 6.7, 6.10 LN: Week 4	HW # 4 p. 162: 5,16, 24, 32, 38	Uniformly Accelerated Motion
5	Fluids Density & Specific gravity. Pressure in Fluid. Atmospheric pressure. Pascal's principle. Buoyant force. Viscosity.	TB: 10.2 - 10.5, 10.7, 10.11 LN: Week 5	HW#5 p. 281: 5, 7, 14, 16, 17, 22, 29, 32, 33 Quiz # 2	Free fall
Week 6 -- First Major Exam (Weeks 1 - 5) 2 hours exam				
6	Vibrations & Waves Hook's Law. Spring-mass System. Simple Harmonic Motion. Simple Pendulum. Wave Motion. Types of Waves. Intensity. Reflection. Transmission of waves. Refraction. Diffraction.	TB: 11.1 - 11.4, 11.6 - 11.8, 11.10, 11.11,11.14, 11.15 LN: Week 6	HW # 6 p. 317: 5, 8, 9, 16, 21, 30, 31, 37 38, 47	Hook's Law and Conservation of Energy
7	Sound Characteristics. Intensity. Sources of sound. Interference. Beats. Doppler Effect. Shock waves and Sonic boom.	TB: 12.1-12.4 12.6-12.8 LN: Week 7	HW # 7 p. 347: 3, 5, 6, 8, 9, 12, 14, 42, 50, 51, 52, 53, 54, 62 Quiz # 3	Simple Pendulum
8	THERMAL PHYSICS Temperature. Thermometers. Internal Energy. Thermal Expansion. Heat. Specific Heat & Calorimetry.	TB: 13.1-13.4, 14.1, 14.2, 14.3, 14.4, 14.5 LN: Week 8	HW # 8 p. 380: 11, 12, 13 p. 404: 9, 10, 12, 14, 17, 25, 26, 28, 30.	Specific Heat
9	ELECTROMAGNETISM Electricity : Coulomb's Law. Electric Field. Electric Potential & Potential Difference.	TB: 16.2 - 16.7, 17.1 - 17.4 LN: Week 9	HW # 9 p. 465: 2, 5, 12, 13, 17, 24, 28, 30, 32 p. 489: 3, 5, 8, 11, 15, 18 Quiz # 4	Mid-Term Lab. Exam
10	Electric Currents Ohm's Law. Electric Power. DC and AC Currents. Resistors in Series & Parallel.	TB: 18.2 - 18.5, 18.7, 19.1, 19.2 LN: Week 10	HW # 10 p. 515: 5, 6, 13, 14, 29, 33, 36, 45; p. 547: 1, 7, 14, 18	Electrical Equivalent of Heat



Week 11 -- Second Major Exam (Weeks 6 - 10) 2 hours exam

11	Magnetism Magnets. Electric Current & Magnetic Fields. Force on electric charge moving in a magnetic field. Magnetic field of a long straight wire. Ampere's Law.	TB: 20.1 - 20.8, 20.12 LN: Week 11	HW # 11 p. 578: 9,14, 16, 18, 21, 27, 36 Quiz # 5	Ohm's Law
12	Electromagnetic waves Faraday's Law of Induction. Transformers. Electromagnetic Waves. Electromagnetic Spectrum.	TB: 21.1- 21.3, 21.6 21.7, 21.9, 21.11 22.2, 22.3 LN: Week 12	HW # 12 p. 610: 1, 4, 5, 15, 23, 30, 35, 36 p. 629: 5, 6, 10, 11	Effect of Magnetic Field on Charged Particles
13	OPTICS Ray model of the light. Reflection & Refraction. Thin Lens. Fiber optics.	TB: 23.1 - 23.7, 23.8 LN: Week 13	HW # 13 p. 658: 3, 24, 25, 26, 27, 30, 32, 33, 37, 38, 39,43, 52, 53, 55	The Focal Length of a thin Lens
14	MODERN PHYSICS Atomic Physics. Discovery & Properties of the electron. Photoelectric effect. X- Rays. Production & Applications. Lasers.	TB: 27.1 - 27.4, 27.10, 25.11, 28.11 LN: Week 14	HW # 14 p. 783: 10, 11, 13, 17, 18, 21, 24 Quiz # 6	Photoelectric Effect
15	Nuclear Physics. Structure & Properties of Nucleus. Radioactivity. Radiation protection.	TB: 30.1 - 30.9, 31.4, 31.5 LN: Week 15	HW # 15 p. 860: 11, 12, 23, 37, 38, 39, 41, 45, 47	Final Lab. Examination
16	Week 16 --- Final Exam (Weeks 1 - 15) 3 hours comprehensive exam			

Note: First major exam will be conducted in week 6.
Second major exam will be conducted in week 11.
Final examination will be conducted in week 16

HBCC Rules for Students

Attendance: you are expected to attend all classes. If you are temporarily absent, you alone are responsible for making up all missed course theory and exercises.

Absenteeism: a record of absences is consistently compiled and updated. If the student absences exceed 20% without excuse, he will be denied from the Course, i.e. get DN.

Behavior: any student who disrupts the learning environment may be subjected to disciplinary action under the KFUPM code.

Exam cheating: failure to obey KFUPM exam regulations can result in official disciplinary action.