Eastern University
Faculty of Engineering and Technology
Course Outline

Course No. and Name	**: PHY101/ PHY139, Physics I**
Pre-requisite	**: None**
Faculty	**: Engineering and Technology**
Program	**: CSE , EEE & ETE**
Semester	**: Spring 2011**
Hours/wk	**: 3 (2 sessions each one hour twenty minutes duration.)**
Total wks	**: 13**
Total contact Hrs	**: 39^{+}**
Instructor	**: Fahmida Rahman**

Course Objectives:

1. To provide a foundation for a conceptual approach to physical sciences, PHY 139 aims to develop students' appreciation for the achievements of physics as an advanced natural science with strong predicting power, and enormous influence on modern technology. The course will simulate curiosity and creativity by taking the students along the path from an observation of some phenomenon/effect to analyze it and uncover the deep physical laws that explain it.
2. To provide ability to recognize statements and conditions of proportionality and variation and write equations for a given condition.
3. To present students with the specific approach to problem solving and to facilitate the improvement of their analytical skills and critical thinking. The approach will be to go from a number of concrete observations/demonstrations to analyzing and discussing the physics behind them.

Course Contents:

Heat and Thermodynamics: Principle of temperature measurements, Kinetic theory of gases; Maxwell's distribution of molecular speeds, Mean free path, Equipartition of energy, Brownian motion, Van der Waal's equation of state, First law of thermodynamics and it's applications, Reversible and irreversible process, Second law of thermodynamics, Carnot cycle, Efficiency of heat engines, Carnot's theorem, Entropy and disorder, Thermodynamic functions, Maxwell's relations, Clausius-Clapeyron equation, Gibbs phase rule, Third law of thermodynamics.

Waves and Oscillations: Differential equation of a simple harmonic oscillator, Total energy and average energy, Combination of simple harmonic oscillations, Lissajous figures, Spring-mass, Calculation of time period of torsional pendulum, Damped

oscillation, Determination of damping co-efficient, Forced oscillation, Resonance, Two body oscillations, Reduced mass, Differential equation of a progressive wave, Power and intensity of wave motion, Stationary wave, Group velocity and phase velocity, Architectural acoustics, Reverberation and Sabine's formula.

Physical Optics: Theories of light, Interference of light, Young's double slit experiment; Displacement of fringes and its uses, Frenels Bi-prism, Interference at wedge shaped films, Newton's rings, Interferometers; Diffraction of light, Frenel and Fraunhoffer diffraction, Polarized light, Brewter's law, Malus law, Polarization by double refraction, Retardation plate4s, Nicol prism, Optical activity, Polarimeters, Polaroid.

Basis of Evaluation of Participants:

Attendance/ Assignments	10.0 %
Quiz/Class Test	20.0 %
Mid Term	30.0 %
Final Exam	40.0 %
Total =	100.0 %

Text (required):

1. Halliday/Resnick/Walker	**Fundamentals of Physics**
2. Hossain, T.	**Text Book of Heat**
3. Zemansky, M. W.	**Heat and Thermodynamics**
4. Brij Lal and Subrahnyam, N.	**Heat and Thermodynamics**
5. Zajac	**Optics**
6. Brij Lal and Subrahnyam, N.	**A text Book of Optics**

The contents from other books will be represented depending on the requirements of the course.

Course Policies and Procedures:

General policies are as described in the university (EU) Bulletin.

Should there be any necessity; any consideration/provision for improving grade of a student will be tied up with the performance demonstrated by the student in the areas related to the continuous assessment (attendance and quizzes) over the entire semester. Attendance records will be given the highest importance in determining a student's eligibility to avail any special consideration/provision. To be eligible for sitting in the final Exam a student has to have minimum 75% class attendance. Attendance of anyone who will enter the class after the attendance register is closed may not be recorded.

As and when needed, extra classes will be arranged to make up(possible) slow progress of the course. These classes will be considered as regular. Decisions regarding the schedules for these classes will be made in the class when most of the students remain present in the class. No separate notice will be served for this purpose.

Students will have to use separate note book(s) exclusively meant for this course.

Random Quizzes:
All quizzes will be conducted on random basis. Random quizzes will not be made up other than for a student who is evaluated to be regular (100% attendance)before the day of the quiz in question and who can produce the evidence that he/she has the reason(s) for missing the quiz.

Assignments:
The details of assignments will be mentioned in the class as and when appropriate. No late, erroneous or incomplete home assignments will be accepted. There will be NO partial grading for home assignments. Every assignment must have the following information at the top of the first page of the assignment.

ID #:
Name:

Assignment #:
Date assigned:
Due date:

Any assignment not conforming to this format may be subjected to random penalty. Assignments are to be submitted in 'letter size' or 'A4' size paper.

Wearing a sports cap during the periods of quizzes and exams is not allowed.
Seat arrangement during exams is at the description of the Course Instructor.

Class Schedule

Lec. No.	Topic(s) scheduled to be covered
01	Principle of temperature measurements, Kinetic theory of gases; Maxwell's distribution of molecular speeds. *Summary and Problems*
02	Mean free path, Equipartition of energy, Brownian motion, Van der Waal's equation of state. *Summary And Problems*
03	First law of thermodynamics and its applications, *Summary And Problems*
04	Reversible and irreversible process, Second law of thermodynamics. *Summary And Problems*
05	Carnot cycle, Efficiency of heat engines, Carnot's theorem. *Summary And Problems*
06	Entropy and disorder. *Summary And Problems*
07	Thermodynamic functions, Maxwell's relations. *Summary And Problems*
08	Clausius-Clapeyron equation, Gibbs phase rule, Third law of thermodynamics.

	Summary And Problems
09	Differential equation of a simple harmonic oscillator, Total energy and average energy, Combination of simple harmonic oscillations. *Summary And Problems*
10	, Lissajous figures, Spring-mass, Calculation of time period of torsional pendulum. *Summary And Problems*
11	Damped oscillation, Determination of damping co-efficient. *Summary And Problems*
12	**Mid Term**
13	**Exam Preview &** Forced oscillation, Resonance.
14	Applications of Damped and Forced oscillation. Two body oscillations, Reduced mass. *Summary And Problems*
15	Differential equation of a progressive wave, Power and intensity of wave motion. *Summary And Problems*
16	Stationary wave, Group velocity and phase velocity. *Summary And Problems*
17	Architectural acoustics, Reverberation and Sabine's formula. *Summary And Problems*
18	Theories of light, Interference of light, Young's double slit expe iment. *Summary And Problems*
19	Displacement of fringes and its uses, Frenels Bi-prism. *Summary And Problems*
20	Interference at wedge shaped films, Newton's rings, Interferometers. *Summary And Problems*
21	Diffraction of light, Frenel and Fraunhoffer diffraction. *Summary And Problems*
22	Difraction by single slit and N-slits-difraction grating. *Summary And Problems*
23	Polarization: Production and analysis of Polarized light
24	Brewter's law, Malus law, Polarization by double refraction *Summary And Problems*
25	Retardation plates, Nicol prism, Optical activity, Polarimeters, Polaroid. *Summary And Problems*
26	Advising & Preview

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