

Course Outline: PHY 111: Physics I

Summer 2020

Text : Physics Vol. 1, Halliday, Resnick & Krane
Course Teacher : Professor Choudhury Muhammed Mukammel
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Course Objectives:

1. Students will become familiar with wave motion and the properties of waves.
2. Students will get acquainted with Oscillation, oscillating systems, Simple Harmonic Motion, and related problems.
3. Students will be presented with the idea of Heat and Thermodynamics, heat capacity, thermodynamic processes, and laws of thermodynamics.
4. Students will be introduced to the second law of thermodynamics, entropy. Carnot engine, its efficiency, and related problems.

Learning Outcome

1. After completing the course students will be able to describe wave motion and properties of wave
2. Students will describe simple harmonic motion, derive differential equations for SHM, solve the equation and related problems.
3. Students will be able to describe thermodynamic systems, heat capacity, thermodynamic processes and laws of thermodynamics. They will be able to apply first law to different systems.
5. Students will be able to derive the second law of thermodynamics, can solve related problems, and apply the law for different types of heat engines, entropy. Carnot engine, the efficiency of Carnot engine and related problem

Course Summary:

Wave motion, frequency, amplitude, wavelength, and phase. Mechanical waves, types of waves, concept of the wavefront, traveling waves, sinusoidal waves, velocity, phase, and phase constant, transverse and longitudinal waves.

Oscillation, oscillating system, Simple Harmonic Motion (SHM), differential equations describing SHM. The solution of the equation of SHM, time period, angular frequency. The energy in SHM, application of SHM, simple pendulum. Equation of damped harmonic motion forced oscillation and resonance

Concepts of Thermodynamics, heat, specific heat, adiabatic, isothermal, isobaric processes, zeroth law, first law and the second law of thermodynamics, entropy. Carnot engine, the efficiency of Carnot engine, related problems.

Important:

- Plagiarism is defined as presenting another person's work as one's own work, such as copying or reproducing it without acknowledgment or permission. Plagiarism is **NOT at all ALLOWED** and will not be tolerated; if any case of plagiarism is found it will be strictly dealt with according to the policy of the university.

Assessment/Marking Scheme:

Class participation and discussion	: 30
Assignment and Presentation	: 30
Quiz (Mid Term and Final)	: 40
TOTAL	: 100



Pic: Astronauts looking at the earth from the International Space Station. The moon is visible in the "black" sky. Picture courtesy: NASA.