Course-1 Title: Physics 1
Course Code: PHY 111 Credit: 3.00 Contact Hour: 3 per week Total marks: 100

11.1 Rationale:

Someone wants to develop his/her career as a computer engineer needs to know the basic theories and principles of physics to generate problem solving, analytical, mathematical and solution finding skills; this course will equip him/her with the concepts of Kinetic Theory of Gases, Heat and Thermodynamics, Simple Harmonic Motion, Wave Motion, Sound Waves, Acoustics and Electrostatics.

11.2 Objectives:

At the end of the course students should be able to:

1. Apply the concepts, ideas and methods of Physics required to solve problems in engineering studies.
2. Acquire knowledge about different laws and models of Physics, which will develop analytical capabilities among them.
3. Apply the laws and skills in higher studies or research areas.
4. Understand the origins in thermodynamics, electronics and Acoustics.
5. Explain everyday things happening around us.

11.3 Learning Outcomes	*11.4 Course Content*	*11.5 Teaching / Learning Strategy*	*11.6 Assessment Strategy*
1. Deduce gas law. 2. Describe equipartition of energy. 3. Define critical constants. 4. Differentiate among different types of transmission of heat.	**1. Kinetic theory of gases** - Deduction of gas law, Principle of equipartition of energy, Equation of state – Andrew's Experiment, Vander Waals equation, Critical Constants, Transmission of heat – conduction, convection and radiation.	1. Lecture	1. Short answer 2. Essay 3. Practical exam
1. Demonstrate 1st and 2nd law of Thermodynamics. 2. Explain work done by expanding gas. 3. Apply Carnot's cycle to find out engine efficiency. 4. Analyze/ Prove Maxwell's thermodynamic relation "……."	**2. Heat and Thermodynamics** -1st law of Thermodynamics, Internal energy, Specific heats of gases, Work done by expanding gas, Elasticity of a perfect gas, 2nd law of thermodynamics, Carnot's cycle, Efficiency of heat engines, Absolute scale of temperature, Entropy and its physical concepts, Maxwell's thermodynamic relations, Statistical Mechanics.	1. Lecture 2. Exercise	1. Short answer 2. Essay 3. Practical exam

1. Describe Simple Harmonic Motion. 2. Draw the mismatch between Damped Oscillation and Forced Oscillation. 3. Define "Resonance".	**3. Simple Harmonic Motion** -Simple harmonic motion, Combination of S.H.M. and Lissajous figures, Damped Oscillations, Forced oscillations, Resonance, Vibrations of membranes and columns.	1. Lecture 2. Assignment 3. Exercise	1. Short answer 2. Drawing 3. Practical exam
1. Illustrate Superposition, Interference and diffraction of waves with figures. 2. List the types of velocity play role in wave motion and interpret each with respective example. 3. Describe an experiment forming standing wave on a string; compare between Nodes and Anti Nodes.	**4. Wave motion** - Travelling waves, Principle of superposition, wave velocity, Group velocity, Phase velocity, Power and intensity in wave motion, Interference, diffraction and transmission of waves, Standing Waves.	1. Lecture 2. Demonstration 3. Exercise	1. Short answer 2. Essay 3. Practical exam
1. Define and Categorize Ultrasonic, Audible, Infrasonic and Supersonic waves on the basis of frequency. 2. Analyze the formation of harmonics in case of standing longitudinal waves. 3. State and explain Doppler's effect with example. 4. Summarize how "Beats" are formed and explain the significance of "Beats" on musical notes?	**5. Sound waves** - Audible, Ultrasonic, Infrasonic and Supersonic waves, Propagation and speed of longitudinal waves, Travelling longitudinal waves, Standing longitudinal waves, Vibrating systems and sources of sound, Beats, The Doppler's effect.	1. Lecture 2. Demonstration 3. Exercise	1. Short answer 2. Essay 3. Practical exam
1. Demonstrate Re-vibration. 2. Interpret necessity of noise insulation with practical life example.	**6. Acoustics** - Re-vibration, Noise insulation and reduction, Compound absorption, sound distribution, Room acoustics, Recording.	1. Lecture 2. Demonstration 3. Assignment	1. Short answer 2. Essay
1. State coulomb's law/ gauss's law. 2. Differentiate between Ohmic and Non Ohmic material. 3. Interpret the varying characteristic of resistance with temperature.	**7. Electrostatics** - Charge and matter, Coulomb's Law, The electric field, Gauss's Law, Electrical potential, Capacitance and Resistance, Ohmic and Non ohmic material, Variation of resistance with temperature.	1. Lecture 2. Assignment	1. Short answer 2. Essay 3. Practical exam

RECOMMENDED BOOKS AND PERIODICALS

Text Books: