

# Engineering Physics

<b>UG/PG: UG</b>	<b>Department: Physics</b>
<b>Course Code: PHT101</b>	<b>Course Name: Engineering Physics</b>
<b>Credits: 4</b>	<b>L-T-P: 3-1-0</b>
<b>Course Type: Core</b>	<b>Semester: I/II</b>

## **Module 1:** [13 Lectures, 4 Tutorials]

Fields: gradient, divergence and curl and their physical significance, Gauss divergence theorem and Stokes' theorem, basic laws of electromagnetism, equation of continuity, Maxwell's equations (Differential and Integral forms) and their physical significance, Displacement current, Electromagnetic wave equation, and its solution in free space, Poynting theorem.

## **Module 2:** [7 Lectures, 2 Tutorials]

Stimulated emission, Einstein coefficients; requirements for laser action, types of lasers- ruby and He-Ne laser; properties of laser radiation, directionality and coherence, applications of lasers.

## **Module 3:** [12 Lectures, 4 Tutorials]

Wave particle duality, Compton effect, Heisenberg's uncertainty principle and its applications, concept of phase and group velocity, wave function and its properties, Quantum mechanical operators, Schrodinger equation-both time dependent and time independent, Probability Current Density, solution of Schrodinger equation in simple cases such as 1-D potential well, 3D- box, step potential and quantum mechanical tunnelling.

## **Module 4:** [7 Lectures, 3 Tutorials]

Free electrons in solids, concept of density of states and Fermi energy, Kronig-Penny model and emergence of energy bands, classification of materials, direct and indirect band gap semiconductors, Hall Effect.

## **Text books:**

Text Books:

1. Concepts of Modern Physics by Beiser (McGraw Hill)
2. Elements of Electromagnetics by Sadiku (Oxford University Press)
3. Introduction to Electrodynamics by Griffiths (Pearson)
4. Elements of Electromagnetics by Seth (Dhanpat Rai & Co.)
5. Engineering Physics by G. S. Raghuvanshi (PHI Learning)

6. Engineering Physics by Joshi (Mc Graw Hill)

7. Essentials of Engineering Physics by A. S. Vasudeva (S. Chand)

**Reference books:**

1. Solid State Physics by Ashcroft and Mermin (Brooks Cole)

2. Solid State Physics by Pillai (Wiley Eastern Ltd.)