

2018-19 Onwards (MR-18)	MALLA REDDY ENGINEERING COLLEGE (Autonomous)	B.Tech. II Semester		
Code: 80B07	Engineering Physics (Common to CE,ME and Min.E)	L	T	P
Credits: 4		3	1	-

Prerequisites: Fundamentals of Physics

Objective:

The main objective of this course is to provide the basic physics principles, would help engineers to understand the tools and techniques used in the industry and provide the necessary foundations for inculcating innovative approaches. This would create awareness about the vital role played by science and engineering in the development of new technologies.

Module -I

Waves & Oscillations

[9 periods]

Waves-Mechanical and electrical simple harmonic oscillators Damped harmonic Oscillator: heavy, critical and light damping, Energy decay in damped harmonic oscillator, Quality factor, Mechanical and electrical oscillators, Mechanical and electrical impedance

Module –II

Wave optics:

[9 periods]

Huygens' principle, superposition of waves and interference of light by division of wave front and division of amplitude; Young's double slit experiment, Interference in thin films due to reflected light, Newton's rings: Concept of diffraction, Fresnel and Fraunhofer diffraction, Fraunhofer diffraction from a single slit and double a slit; Diffraction grating-resolving power

Module -III

[9 Periods]

Dielectric Properties of Materials

Electric dipole, Dipole moment, Dielectric constant, Polarizability, Electric Susceptibility, Displacement Vector, Electronic, Ionic and Orientation Polarizations and Calculation of Polarizabilities - Electronic and ionic; Qualitative treatment of Internal Fields in solids, Clausius - Mossotti Equation, Piezo-electricity, Ferro- electricity, Barium titanate, Applications of Ferroelectric materials.

Module – IV

Lasers and Fiber Optics:

[9 periods]

Lasers: Characteristics of LASER, relation between Einstein's coefficients. Population Inversion, lasing action, Ruby Laser, He- Ne Laser, applications of Lasers.

Fiber Optics: Introduction, Optical fiber as a dielectric wave guide, Total Internal Reflection, Acceptance angle, Acceptance cone and Numerical aperture, Step and Graded index fibers, Losses associated with optical fibers, Applications optical fibers.

Module - V Magnetic Properties of materials

[9 Periods]

Introduction, origin of magnetic moment, Bohr magneton, classification of dia, para and ferro magnetic materials, hysteresis curve, soft and hard ferromagnetic materials, properties of anti-ferro and ferri magnetic materials. Concept of Perfect Diamagnetism; Meissner effect.

Outcomes:

After completion of the course, student will be able to:

1. Distinguish free, damped and forced vibrations,
2. Be aware of the concepts of Interference, diffraction and its applications.
3. Understand the importance of Dielectrics and their properties.
4. Be aware of the concepts and applications of LASER and Optical fibers.
5. Distinguish ferro, ferri and anti-ferro magnetic materials and understands different types of superconductors.

Text Books:

1. M N Avadhanulu, P G Kshirsagar, “ **A Textbook of Engineering Physics**”, Revised Edition 2014.
2. K Vijaya Kumar, S Chandralingam, “**Modern Engineering Physics**” Volume I & II, S. Chand, 1st Edition, 2017.

References:

1. P K Palanisamy, "**Engineering Physics**", 4th Edition, SciTech Publications, 2014.
2. G Prasad and Bhimashankaram, "**Engineering Physics**", B S Publications, 3rd Edition, 2008.
3. M.K.Verma, “Introduction to Mechanics”, Universities Press.
4. Ajoy Ghatak, “Optics”, McGraw-Hill Education, 2012

e-RESOURCES

1. http://www.gistrayagada.ac.in/gist_diploma/PHYSICS-StudyMaterial.pdf
2. <http://www.faadooengineers.com/threads/3300-Applied-Physics-Ebooks-pdf-free-download?s=1b6cb6b1de4e7152298bd9d60156cd11>

Journals :

1. <http://aip.scitation.org/journal/jap>
2. <http://www.springer.com/physics/journal/340>

NPTEL VIDEOS:

1. <http://nptel.ac.in/courses/115101005/1>
2. <http://nptel.ac.in/courses/115106061/13>

