

**JAWAHARLAL NEHRUTECHNOLOGICALUNIVERSITY: KAKINADA****KAKINADA–533003, Andhra Pradesh, India****R-16 Syllabus for ME JNTUK**

I Year-II Semester	L	T	P	C
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ENGINEERING PHYSICS (R161204)				

Prerequisite Course: Basic Concept of Physics**Description and Objectives:**

- 1) Impart concepts of Optical Interference, Diffraction and Polarization required to design instruments with higher resolution - Concepts of coherent sources, its realization and utility optical instrumentation.
- 2) Study the Structure-property relationship exhibited by solid crystal materials for their utility.
- 3) Tap the Simple harmonic motion and its adaptability for improved acoustic quality of concert halls.
- 4) To explore the Nuclear Power as a reliable source required to run industries
- 5) To impart the knowledge of materials with characteristic utility in appliances.

Course Outcomes:

Upon completion of the course, the student will be able to achieve the following outcomes

COs	Course Outcomes	POs
1	Impart concepts of Optical Interference, Diffraction and Polarization required to design instruments with higher resolution.	3
2	Expose the concepts of coherent sources, its realization and utility in optical instrumentation.	3
3	Study the Structure-property relationship exhibited by solid crystal materials for their utility.	1
4	Tap the Simple harmonic motion and its adaptability for improved acoustic quality of concert halls.	3
5	To explore the Nuclear Power as a reliable source required to run industries.	2
6	To impart the knowledge of materials with characteristic utility in appliances.	3

UNIT-I : INTERFERENCE:

Principle of Superposition – Coherent Sources – Interference in thin films (reflection geometry) – Newton’s rings – construction and basic principle of Interferometers.

UNIT-II : DIFFRACTION:

Fraunhofer diffraction at single slit cases of double slit, N-slits & Circular Aperture (Qualitative treatment only)- Grating equation - Resolving power of a grating, Telescope and Microscopes.

UNIT-III : POLARIZATION & LASERS:

Types of Polarization-production - Nicol Prism -Quarter wave plate and Half Wave plate – Working principle of Polarimeter (Sacharimeter)

Characteristics– Stimulated emission – Einstein’s Transition Probabilities- Pumping schemes - Ruby laser – Helium Neon laser.

UNIT-IV: ACOUSTICS & ULTRASONICS:

Reverberation time - Sabine’s formula– Acoustics of concert hall.

Production - Ultrasonic transducers - Destructive Testing –Applications.



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UNIT-V : CRYSTALLOGRAPHY AND X-RAY DIFFRACTION & NUCLEAR ENERGY – SOURCE OF POWER:

Basis and lattice – Bravais systems- Symmetry elements- Unit cell- packing fraction – coordination number- Miller indices – Separation between successive (h k l) planes – Bragg's law.

Mass defect & Binding Energy – Fusion and Fission as sources – Fast breeder Reactors.

UNIT-VI: MAGNETISM & DIELECTRICS:

Classification based on Field, Temperature and order/disorder –atomic origin – Ferromagnetism- Hysteresis- applications of magnetic materials (Para & Ferro).

Electric Polarization – Dielectrics in DC and AC fields – Internal field – Claussius Mossoti Equation - Loss, Breakdown and strength of dielectric materials – Ferroelectric Hysteresis and applications.

TEXT BOOKS:

1. A Text book of Engineering Physics – by Dr. M.N.Avadhanulu and Dr.P.G.Kshirasagar, S.Chand & Company Ltd., (2014)
2. Physics for Engineers by M.R.Srinasan, New Age international publishers (2009)
3. Engineering Physics by D.K.Bhattacharya and Poonam Tandon , Oxford press (2015)

REFERENCE BOOKS:

1. Applied Physics by P.K.Palanisamy , Scitech publications (2014)
2. Lasers and Non-Linear optics by B.B.Laud. New age international publishers (2008)