

ENGINEERING PHYSICS

(for non-circuital branches like ME, CE, PE, PCE etc)

OBJECTIVES: Physics curriculum which is re-oriented to the needs of Circuital branches of graduate engineering courses offered by JNTUniv.Kkd. that serves as a transit to understand the branch specific advanced topics. The courses are designed to:

- 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.
- Study the Structure-property relationship exhibited by solid crystal materials for their utility.
- Tap the Simple harmonic motion and its adaptability for improved acoustic quality of concert halls.
- To explore the Nuclear Power as a reliable source required to run industries
- To impart the knowledge of materials with characteristic utility in appliances.

UNIT-I

INTERFERENCE: Principle of Superposition – Coherent Sources – Interference in thin films (reflection geometry) – Newton's rings –working 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 Microscope.

UNIT-III

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

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

UNIT-IV

ACOUSTICS: Reverberation time - Sabine's formula – Acoustics of concert-hall.

ULTRASONICS: Production - Ultrasonic transducers- Non-Destructive Testing – Applications.

UNIT-V

CRYSTALLOGRAPHY & X-RAY DIFFRACTION: 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 – Braggs X-ray spectrometer.

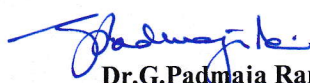
NUCLEAR ENERGY – SOURCE OF POWER: Mass defect & Binding Energy – Fusion and Fission as sources – Fast breeder Reactors.

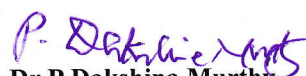
UNIT-VI

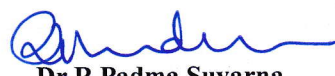
MAGNETISM: Classification based on Field, Temperature and order/disorder –atomic origin – Diamagnetism – Paramagnetism – Ferromagnetism- Hysteresis- applications of magnetic materials (Para & Ferro).

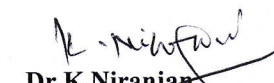
DIELECTRICS: Electric Polarization – Dielectrics in DC and AC fields – Internal field – Clausius Mosotti Equation - Loss, Breakdown and strength of dielectric materials – Ferroelectric Hysteresis and applications.

Outcome: Construction and working details of instruments, ie., Interferometer, Diffractometer and Polarimeter are learnt. Study Acoustics, crystallography magnetic and dielectric materials enhances the utility aspects of materials.


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