**w.e.f. 2015-2016 academic year**

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**(AUTONOMOUS)**

**COMPUTER SCIENCE & ENGINEERING**

**COURSE STRUCTURE**

(Applicable from the batch admitted during 2015-16 and onwards)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **I YEAR** |  |  |  |  |  | **I SEMESTER** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | **S.No.** |  | **Group** | **Subject** |  | **L** |  | **T** |  | **P** |  | **Credits** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 1 |  | BS | Mathematics - I | 4 | 1 | 0 | 4 |
|  | 2 |  | HSS | English | 3 | 0 | 0 | 3 |
|  | 3 |  | EAS | Computer Programming & | 4 | 1 | 0 | 4 |
|  |  |  |  | Data Structures |  |  |  |  |  |  |  |  |
|  | 4 |  | EAS | Engineering Graphics | 3 | 0 | 3 | 4 |
|  | 5 |  | EAS | Environmental Science | 3 | 0 | 0 | 3 |
|  | 6 |  | EAS | Computer Programming & | 0 | 0 | 3 | 2 |
|  |  |  |  | Data Structures Lab |  |  |  |  |  |  |  |  |
|  | 7 |  | HSS | English Language | 0 | 0 | 3 | 2 |
|  |  |  |  | Communication Skills Lab |  |  |  |  |  |  |  |  |
|  | 8 |  | EAS | Engineering Workshop | 0 | 0 | 3 | 2 |
|  |  |  |  | NSS/NCC/NSO |  |  |  |  |  |  |  |  |
|  |  |  |  | **Total Credits** |  |  |  |  |  |  | **24** |
|  | **I YEAR** |  |  |  |  |  | **II SEMESTER** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | **S.No.** |  | **Group** | **Subject** |  | **L** |  | **T** |  | **P** |  | **Credits** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 1 |  | BS | Mathematics–II |  | 3 |  | 1 |  | 0 |  | 3 |
|  | 2 |  | EAS | Basic Electrical & Electronics |  | 4 |  | 0 |  | 0 |  | 4 |
|  |  |  |  | Engineering |  |  |  |  |  |  |  |  |
|  | 3 |  | BS | Applied Physics |  | 3 |  | 1 |  | 0 |  | 3 |
|  | 4 |  | BS | Engineering Chemistry |  | 3 |  | 1 |  | 0 |  | 3 |
|  | 5 |  | EAS | Engineering Mechanics |  | 3 |  | 1 |  | 0 |  | 3 |
|  | 6 |  | BS | Computational Mathematics |  | 2 |  | 0 |  | 0 |  | 2 |
|  | 7 |  | EAS | Basic Electrical & Electronics |  | 0 |  | 0 |  | 3 |  | 2 |
|  |  |  |  | Engineering Lab |  |  |  |  |  |  |  |  |
|  | 8 |  | HSS | Applied Physics Lab |  | 0 |  | 0 |  | 3 |  | 2 |
|  | 9 |  | BS | Computational Mathematics |  | 0 |  | 0 |  | 3 |  | 2 |
|  |  |  |  | Lab |  |  |  |  |  |  |  |  |
|  |  |  |  | NSS/NCC/NSO |  |  |  |  |  |  |  |  |
|  |  |  |  | **Total Credits** |  |  |  |  |  |  |  | **24** |

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

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| --- | --- | --- | --- | --- |
| **I Year B.Tech. CSE II-Sem** | **L** | **T** | **P** | **C** |
|  | **3** | **1** | **0** | **3** |
| **APPLIED PHYSICS** |  |  |  |  |

**Prerequisites: Nil**

**Course Objectives:**

The course primarily aims at understanding the behavior of matter in the condensed state and tries to explore the causes with reference to micro level mechanism of the solid matter. The objective of the first chapter is to study the micro level behavior of the quantum particles of the matter and their nature as wave and particle and hence to estimate the statistics of the phenomenon arising out of their nature of existence. The second chapter aims at to assess the draw backs of the free electron theory leading to the introduction of the Band Theory of Solids. In the third, fourth, fifth, sixth, seventh and tenth chapters the different natures of the solid matter are taken as the main task discuss. In the eighth chapter, it is expected to understand the basic principles behind the coherent artificial light source (LASER) with reference to their construction, mechanism, operation and classification etc. The nineth chapter is explicitly aimed at to study an advanced communication system presently ruling the world throughout i.e. Fiber Optic communication system.

**Outcomes:**

The understanding of properties of matter is an essential part to utilize them in various applications in different walks of life. In most of the cases, the behavior of matter as solid material body purely depends upon the internal micro level nature, structure and characters. By studying first few chapters the students as graduates can acquire the knowledge of the connection between the micro level behavior of the matter as fundamental particles and the macro level real time characters of the material bodies. The quantum mechanism in phenomena can best be understood and analyzed by estimating the statistics of the phenomena. The study of chapters on Laser and fiber optics forms basis for understanding an advanced communication system. Other chapters establish a strong foundation on the different kinds of characters of several materials and pave a way for them to use in at various technical and engineering applications.

**UNIT-I**

1. **Principles of Quantum & Statistical Mechanics:** Waves andParticles, De Broglie Hypothesis,

Matter Waves, Davisson and Germer’s Experiment, G.P. Thomson Experiment, Heisenberg’s Uncertainty principle, Schrodinger’s Time -Independent Wave Equation, Physical Significance of the Wave Function, Particle in One Dimensional Potential Box.Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics (Qualitative).

1. **Electron theory of Metals:** Introduction, Classical Free ElectronTheory of metals, Root Mean Square (RMS )velocity, Mean Free Path, Mean collision Time, Drift Velocity, Relaxation Time, Electrical Resistivity, Draw backs of Classical Free Electron Theory, Density of States, Calculation of Fermi energy, Quantum Free Electron Theory, Electron in a periodic Potential, Kronig-Penny Model (Qualitative Treatment), Origin of Energy Band Formation in Solids, Classification of Materials into Conductors, Semiconductors and insulators, Concept of Effective Mass of an Electron.

**UNIT-II**

1. **Semiconductor Physics:** Position of Fermi Level, Estimation ofCarrier concentration in Intrinsic and Extrinsic (p-type & n-type) Semiconductors, Equation of Continuity, Direct and Indirect Band gap Semiconductors, Hall Effect.
2. **Physics of Semiconductor Devices:** Formation of PN Junction,Energy band Diagram and I-V Characteristics of PN Junction Diode, Diode Equation, LED, LCD and Photo Diodes, Solar Cells.

**UNIT-III**

**5. Dielectric Properties:** Basic definitions, Electronic, Ionic(Quantitative) and Orientation Polarizations(Qualitative) and Calculation of Polarizabilities - Internal Fields in Solids, Clausius - Mossotti Equation, Piezo-electricity, Pyro- electricity and Ferro - electricity.

1. **Magnetic Properties:** Basic definitions , Origin of Magnetic Moment,Bohr Magneton, Classification of Dia, Para and Ferro Magnetic Materials on the basis of Magnetic Moment, Domain Theory of Ferro magnetism on the basis of Hysteresis Curve , Soft and Hard Magnetic Materials, Properties of Anti – Ferro and Ferri Magnetic Materials.
2. **Superconductivity:** Introduction to Superconductivity, Properties ofSuperconductors, Meissner Effect, BCS theory, Type-I and Type –II

Superconductors, Magnetic Levitation and Applications of Superconductors.

**UNIT-IV**

1. **Lasers:** Characteristics of Lasers, Spontaneous and stimulatedEmission of Radiation, Meta- Stable state, Population Inversion, Lasing Action, Einstein’s Coefficients and Relation between them, Ruby Laser, Helium- Neon Laser, Semiconductor Diode Laser and Applications of Lasers.
2. **Fiber Optics:** Principle & construction (structure) of an Optical Fiber,Acceptance Angle, Numerical Aperture, Types of Optical Fibers, Losses in Optical Fibers and Applications of Optical Fibers in communication.

**UNIT-V**

1. **Nanotechnology:** Origin of Nanotechnology, Nano Scale, Surface toVolume Ratio, Quantum Confinement, Bottom-up Fabrication: Sol-Gel, Precipitation, Combustion Methods; Top-Down Fabrication: Chemical Vapor Deposition, Physical Vapor Deposition, Characterization Techniques(XRD, SEM &TEM) and Applications of Nanotechnology.

**Text books:**

1. Principles of Physics by Halliday, Resnick, Walker, Wiley India Pvt Ltd, 9th Edition.
2. Introduction to Solid State Physics by Charles Kittel, Wiley India Pvt Ltd, 7th Edition
3. Engineering Physics by R.K.GAUR & S.L.GUPTA, Dhanpat Rai Publications.
4. Solid State Physics by A J Dekker, MACMILLAN INDIA LTD.

**References:**

1. Modern Engineering Physics by Dr.K.Vijaya Kumar, Dr. S. Chandralingam, S.CHAND & COMPANY LTD

1. Applied Physics by P.K.Mittal, I K International Publishers
2. Applied Physics by P.K. Palanisamy :Scitech publishers
3. Introduction to Nanotechnology by Charles P.Poole, Jr.Frank J ownes, John Wiley & sons
4. Applied Physics for Engineers by P. Madusudana Rao, Academic Publishing Company
5. Engineering Physics by Sanjay D Jain, Girish G Sahasrbudha: University Press.

**JNTUH COLLEGE OF ENGINEERING HYDERABAD**

**I Year B.Tech. CSE II-Sem** **L T** **P C**

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**APPLIED PHYSICS LAB**

**LIST OF EXPERIMENTS:**

1. Study of characteristics of LED and LASER sources.
2. Magnetic field along the axis of current carrying coil-Stewart and Gee’s method.
3. Study of characteristics of p-i-n diode detectors.
4. Determination of frequency of A.C Mains-Sonometer.
5. Torsional pendulum.
6. Energy gap of material of PN- junction.
7. Bending Losses of Fibers & Evaluation of numerical aperture of given fiber.
8. L-C-R circuit.
9. Time constant of an R-C Circuit.
10. Characteristics of solar cell