Course Code	Course Title	Lecture			
BTCS102BST	Engineering Physics	**L**	**T**	**P**	**Semester:** I
Version:	**Date of Approval:**	3	1	0	

Scheme of Instruction			**Scheme of Examination**		
No. of Periods	:	60 Hrs.	Maximum Score	:	100
Periods/ Week	:	4	Internal Evaluation	:	30
Credits	:	4	End Semester	:	70
Instruction Mode	:	Lecture	Exam Duration	:	3 Hrs.

Course Objectives:

1. To acquire competency in the field of engineering with adaptability to new development in science and technology.
2. Learning basic concepts of optics and its applications, electricity and magnetism, and quantum physics.

Course Outcomes:

1. Students will be familiar with the principles of lasers, types of lasers and applications ·
2. Various terms related to properties of materials such as, permeability, polarization, etc. ·
3. Some of the basic laws related to quantum mechanics as well as magnetic and dielectric properties of materials ·
4. Simple quantum mechanics calculations.

Detailed Contents:

Unit: 1	Diffraction: Introduction to interference and example; concept of diffraction, Fraunhofer and Fresnel diffraction, Fraunhofer diffraction at single slit, double slit, and multiple slits; diffraction grating, characteristics of diffraction grating and its applications. Polarisation: Introduction, polarisation by reflection, polarisation by double refraction, scattering of light, circular and elliptical polarisation, optical activity.
Unit: 2	Fibre Optics: Introduction, optical fibre as a dielectric wave guide: total internal reflection, numerical aperture and various fibre parameters, losses associated with optical fibres, step and graded index fibres, application of optical fibres. Lasers: Introduction to interaction of radiation with matter, principles and working of laser: population inversion, pumping, various modes, threshold population inversion, types of lasers: solid state, semiconductor, gas; application of lasers.
Unit: 3	Electromagnetism: Laws of electrostatics, electric current and the continuity equation, laws of magnetism. Ampere's Faraday's laws. Maxwell's equations. Polarisation, permeability and dielectric constant, polar and non-polar dielectrics, internal fields in a solid, Clausius-Mossotti equation, applications of dielectrics.
Unit: 4	Magnetic Properties of Materials: Magnetisation, permeability and susceptibility, classification of magnetic materials, ferromagnetism, magnetic domains and hysteresis, applications. Introduction to quantum physics, black body radiation, explanation using the photon concept, photoelectric effect, Compton effect.
Unit: 5	Quantum Mechanics: de Broglie hypothesis, wave-particle duality, Born's interpretation of the wave function, verification of matter waves, uncertainty principle, Schrodinger wave equation, particle in box, quantum harmonic oscillator, hydrogen atom.

Examination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which is mainly end semester examination.

Text Books:	
1	A. Ghatak, "Optics"
2	A. Beiser, "Concepts of Modern Physics"
Reference Books:	
1	Resnick and Halliday : Physics
3	A.J. Decker (Macmillan): Solid State Physics

Course Code	Course Title	Lecture			
BTCS150BST	Engineering Physics lab	**L**	**T**	**P**	**Semester:** I
Version:	**Date of Approval:**	0	0	4	

Scheme of Instruction			**Scheme of Examination**		
No. of Periods	:	30 Hrs.	Maximum Score	:	100
Periods/ Week	:	4	Internal Evaluation	:	50
Credits	:	2	End Semester	:	50
Instruction Mode	:	Practical	Exam Duration	:	3 Hrs.

3. Prerequisite(s): It is expected that the students have done Engineering Physics Course (BTCS102BST)

Course Objectives:

1. To acquire competency in the field of engineering.
2. Demonstrate to new development in physics laboratory by successfully completing the experiments.
3. Understand and learn basic theory and principles of science.

Course Outcomes:

5. Learn basic properties and characteristics of light, Diffraction, Newton's rings, interference in thin films and polarisation.
6. Understand the working principle of LASER, optical fibres etc
7. Understand the Characteristics of diodes, thermistors, photocells and concept of energy gap in semiconductors

Detailed Contents:

1. Determination of the radius of Curvature of Plano convex lens by forming Newton's rings.
2. Determination of the Numerical aperture of the given optical fibre by using Laser diode.
3. Study the current Voltage (V-I) Characteristics of the given P-N-Junction diode.
4. Determination of the plank's constant using photocell.
5. Determination of the Physical Characteristics of the given Thermistor.
6. Determination of the specific rotation of liquid by using polarimeter
7. Determination of the Energy gap of given semiconductor
8. Determination of the wavelength of a given laser source using diffraction grating

Examination and Evaluation Pattern: It include both internal evaluation (50 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (50 marks) which is mainly end semester examination

Text Books:	
1	Harnam Singh | PS Hemne," Practical Physics"
2	S.K Gupta ,"Engineering physics practical"
Reference Books:	
1	A. Ghatak, "Optics"
2	Resnick and Halliday : Physics
3	A. Beiser, "Concepts of Modern Physics"
4	A.J. Decker (Macmillan): Solid State Physics