Kadi Sarva Vishwavidyalaya

Faculty of Engineering & Technology

First Year Bachelor of Engineering (All Branches)

(With effect from: Academic Year 2017-18)

Subject Code: CC107-N	**Subject Title: ENGINEERING PHYSICS**
Pre-requisite	

Course Objective:

- The syllabus of Engineering Physics highlights the basic concepts of Physics and its technological applications to all branches of Engineering via ability to design and conduct experiments, as well as to analyse and interpret data.
- Train students towards adaptability to new developments in science and technology by successfully completing or pursuing education in engineering or related fields, or participating in professional development and/or industrial training courses.
- To develop physical perception, mathematical reasoning and problem solving skills.
- To develop an expertise to classify, formulate and solve/explain various engineering problems through numerical analysis and laboratory methods.

Teaching scheme				**Total Credit**	**Evaluation Scheme**					**Total Marks**
L	**T**	**P**	**Total**		**Theory**		**Mid Sem Exam Marks**	**CIA Marks**	**Pract. Marks**	
Hrs	**Hrs**	**Hrs**	**Hrs**		**Hrs**	**Marks**				
03	00	02	05	04	03	70	30	20	30	150

Outline of the Course:

Sr. No	**Title of the Unit**	**Minimum Hours**
1.	SOUND AND PROPERTIES OF MATTER	11
2.	OPTICS	11
3.	MODERN PHYSICS AND INSTRUMENTATION	12
4.	MATERIAL SCIENCE	11

Total hours (Theory):45
Total hours (Lab):30
Total hours:75

Detailed Syllabus

Sr. No.	Topics	Lecture (Hours)	Weightage(%)
UNIT-1	**SOUND AND PROPERTIES OF MATTER**	**11**	**25%**
1.	**ULTRASONICS & ARCHITECTURAL ACOUSTIC**; Introduction, Properties of ultrasound, Production of ultrasonics (Piezoelectric & magnetostriction oscillator), determination of wavelength-velocity of ultrasound in liquid, Applications of ultrasonics; Acoustics of buildings, loudness and intensity of sound, reverberation time and absorption of sound, determination of absorption coefficient of material, Sabine's Formula.		
2.	**ELASTICITY**; Introduction, Determination of co-efficient of rigidity of wire, Bending beam, Bending Moment of the beam, Cantilever, Theory of Cantilever loaded at One End, Cantilever Supported at two Ends and Loaded in the Middle, determination of Young's modulus.		
UNIT-2	**OPTICS**	**11**	**25%**
3.	**LASER**; Characteristics of Laser, spontaneous and stimulated emission, population Inversion, Einstein coefficients, Solid State (Nd-YaG) Laser, Gas (CO_2) laser, Semiconducting laser, Holography, Applications of Lasers, Introduction of MASER.		
4.	**FIBRE OPTICS**; Introduction, basic principle and criteria, construction of Fibre Optics (FO), FO Communication system, Acceptance Angle and Numerical Aperture, Types of FO, Applications of FO.		
5.	**Optoelectronic devices**; LED, Solar cell, LDR, Laser diode.		
UNIT-3	**MODERN PHYSICS AND INSTRUMENTATION**	**12**	**25%**
6.	**ARTIFICIAL RADIOACTIVITY**; Artificial or Induced radioactivity, Artificial transmutation, Half-life period and Energy Ranges of Radioisotopes, applications of Artificial radioactivity.		
7.	**CRYSTAL STRUCTURE AND X-RAYS DIFFRACTION**; Introduction of Crystal Structure, Space lattice, Basis, Unit cell, Lattice parameter, Bravais lattices, Crystal systems, Directions and planes in crystals, Miller indices, Relation between Interplaner spacing and cubic edge, Atomic radius and packing fractions of SC, BCC, FCC, X-ray Diffraction, Bragg's condition for X-ray diffraction, Experimental method to find crystal structure (Laue method, Powder method), Industrial application of X-rays.		
8.	**INSTRUMENTATION**; Introduction to Electron Microscopy (TEM, SEM), Geiger-Muller counter (Radiation detector), Multimeters(Analog,Digital), Cathode Ray Oscilloscope (CRO).		
UNIT-4	**MATERIAL SCIENCE**	**11**	**25%**
9.	**BAND THEORY OF SOLIDS**; Introduction, Metals, Insulators and Semiconductors, Energy band gap, Fermi Level and Fermi energy, Hall effect and its importance, Superconductivity, Properties of superconductors, Types of superconductors (Type-I and Type-II), London's Penetration depth, Applications of Superconductors.		
10.	**NANOMATERIALS AND NDT**; Introduction, Synthesis, Properties and Applications of Nanomaterials and SMA; Introduction to Non-Destructive Testing (NDT), Objectives of NDT and types of defects, Liquid/Dye Penetrant method, Ultrasonic Inspection method, Radiography method, Eddy Current method.		

Instructional Method and Pedagogy:

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lecture and laboratory which carries 10 marks in overall evaluation.
- One internal exam will be conducted as a part of internal theory evaluation.
- Assignments based on the course content will be given to the students for each unit and will be evaluated at regular interval evaluation which carries 05 marks.
- Surprise tests/Quizzes/Seminar/tutorial will be conducted having a share of 05 marks in the overall internal evaluation.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Experiments shall be performed in the laboratory related to course contents.
- Viva-Voce/Practical exam will be conducted at the end of the semester.

Learning Outcome:

Upon graduation, students will have:

- an ability to apply knowledge of mathematics, science, and engineering.
- an ability to design and conduct experiments, as well as to analyse and interpret data.
- an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- an ability to function on multidisciplinary teams.
- an ability to identify, formulate, and solve engineering problems.
- an understanding of professional and ethical responsibility.
- an ability to communicate effectively.
- the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- a recognition of the need for, and an ability to engage in life-long learning.
- a knowledge of contemporary issues.
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- clearly defined career objectives, and be able to market themselves via an effective, professional resume and behaviour-based interview techniques.

REFERENCE BOOKS/TEXT BOOK:

1. Modern Engineering Physics; A.S. Vasudeva, S. Chand & Company Ltd, New Delhi.
2. Engineering Physics; Dattu R. Joshi, Tata McGraw Hill Edu. Pvt. Ltd., New Delhi.
3. A Textbook of Engineering Physics; M.N. Avadhanulu& P.G. Kshirsagar, S. Chand and Company Ltd, New Delhi.
4. Engineering Physics; G. Aruldhas, PHI Learning Private Ltd., New Delhi.
5. Applied Physics for Engineers, Neeraj Mehta, PHI Learning Private Ltd., New Delhi.
6. Engineering Physics; G. Vijayakumari, Vikas Publication House Pvt. Ltd., New Delhi.

LIST OF PRACTICALS IN ENGINEERING PHYSICS:

Practical 1.	Simulation of nuclear radioactive decay.
Practical 2.	Measurement of Intensity Level (in dB) of various Sounds.
Practical 3.	Analyze the Miller Indices of crystal using x-rays diffraction pattern.
Practical 4.	Verify de-Broglie Relation using x-rays diffraction pattern of crystal.
Practical 5.	Use of Multimeters.
Practical 6.	Measure the Threshold & Breakdown voltage of diodes (Si, Zener, LED).
Practical 7.	Measure the value of Planck's constant using various LED.
Practical 8.	Approximate the wavelength of LASER using diffraction grating.
Practical 9.	Estimate the Numerical Aperture of Fiber Optics.
Practical 10.	Energy Band gap Eg of Semiconductor.
Practical 11.	Application of Solar Cell.
Practical 12.	Use of materials via Young's Modulus method.
Practical 13.	Application of given body by using Moment of Inertia Table method.
Practical 14.	Application of Nanomaterials and Shape Memory Alloys by demonstration.

Note: New experiments can be introduced AND/OR replaced as per the need by the permission of the Principal/Dean

Kadi Sarva Vishwavidyalaya

Faculty of Engineering & Technology

First Year Bachelor of Engineering (All Branches)

(With effect from: Academic Year 2017-18)

Structure of the Paper in End Semester Examination

Total 70 Marks and 3 Hours duration of time for the KSV Exam papers.

There will be two sections (section-A &section-B) carries 35 marks each. In each section first question carries 15 marks while second and Third question carries 10 marks each from Unit-I to Unit-IV. Both Sections of the question paper is based on MCQ / theory / application / example / problem / numerical.

KADI SARVA VISHWAVIDYALAYA

B.E SEMESTER I/II EXAMINATION (Jan/May-2017)

Subject Code: CC107	**Subject Name: ENGINEERING PHYSICS**	
Date:	**Time:**	**Total Marks: 70**

Section - A			
Q.1	[A]	**MCQ (Each carries equal marks) (a),(b),(c),(d),(e)**	**[5]**
	[B]		**[5]**
	[C]		**[5]**
		OR	
	[C]		
Q.2	[A]		**[5]**
	[B]		**[5]**
		OR	
Q.2	[A]		**[5]**
	[B]		**[5]**
Q.3	[A]		**[5]**
	[B]		**[5]**
		OR	
Q.3	[A]		**[5]**
	[B]		**[5]**

Section - B			
Q.4	[A]	**MCQ (Each carries equal marks) (a),(b),(c),(d),(e)**	**[5]**
	[B]		**[5]**
	[C]		**[5]**
		OR	
	[C]		
Q.5	[A]		**[5]**
	[B]		**[5]**
		OR	
Q.5	[A]		**[5]**
	[B]		**[5]**
Q.6	[A]		**[5]**
	[B]		**[5]**
		OR	
Q.6	[A]		**[5]**
	[B]		**[5]**