Koneru Lakshmaiah Education Foundation
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Campus: Green Fields, Vaddeswaram - 522 502, Guntur District, Andhra Pradesh, INDIA.
Phone No. 0863 - 2399999; www.klef.ac.in; www.klef.edu.in; www.kluniversity.in
Admin Off: 29-36-38, Museum Road, Governorpet, Vijayawada - 520 002. Ph: +91 - 866 -2577715, Fax: +91-866-2577717.

Department of Physics

A.Y.2020-21

Course Code	Course Title	S. No	CO. No	Description of the course Outcome
20 PH 5101	MATHEMATICAL PHYSICS	1	CO1	Apply and classify the analytical functions, complex integration and evaluation of definite integrals
		2	CO2	Analyze Beta and Gamma functions and some special functions
		3	CO3	Apply the transform technique to describe mathematical functions
		4	CO4	Apply the numerical technique to solve functions and system of equations
20 PH 5102	CLASSICAL MECHANICS	5	CO1	Apply Newtonian mechanics to solve mechanics of particle and solving Lagrange's equations of motion from D'Alembert principle
		6	CO2	Apply the principles of classical mechanics to reduce the two body problem to One body problem and Classification of orbits
		7	CO3	Apply Hamilton's equations to solve Canonical transformations and Illustrate the Poisson brackets, Invariance of Poisson bracket under canonical transformations-Principle of Ieast action
		8	CO4	Apply the Hamilton Jacobi equations to solve various characteristic functions, Action and angle variables, small oscillations and their applications
20 PH 5103	ELECTRO DYNAMICS	9	CO1	Understand the concepts of Laplace and Poisson's equations, Static fields in material media, Polarization vector, macroscopic equations, classification of dielectric media, Molecular polarizability and electrical susceptibility, CIausius - Mossetti relation.
		10	CO2	Apply and discuss on the differential equations of magneto statics, vector potential, magnetic fields of a localized current distribution, Singularity in

				dipole field, Fermi-contact term, Force and torque on a localized current distribution.
		11	CO3	Apply the electric and magentostatics to describe the Formal solution of electrostatic boundary value problem with Green function, Method of images with examples, Magneto static boundary value problems. Wave guide and its types, Introduction of TE, TM modes and their boundary values
		12	CO4	Apply the principles of Faraday's law of induction to discuss the mechanisms of displacement current, Maxwell equations, scalar and vector potential, Gauge transformation, Lorentz and Coulomb gauges, conservation of energy, Poynting Theorem, Conservation of momentum.
20 PH 5104	ANALOG ELECTRONICS	13	CO1	Understand the working of Different Semiconductor devices (Construction, Working Principles and V-l characteristics) and their applications.
		14	CO2	Understand the working of Different Negative feedback amplifiers
		15	CO3	Apply the basic operational amplifier characteristics, OPAMP parameters, applications as inverter, integrator, differentiator etc
		16	CO4	Design the basic applications of LP, HP, BP, BS filters etc.
20 PH 5105	COMPUTATIONAL PHYSICS	17	CO1	Apply the concepts of C language and Python and be able to create simple programs using the C language and Python operators.
		18	CO2	Apply the concepts of MATLAB and be able to develop simple programs to solve some application problems.
		19	CO3	Understand the equations and simultaneous equations with algorithms and apply it in real time problems that arise in Computational Physics.
		20	CO4	Apply the notations of interpolations numerical differentiation and integration with algorithms to solve problems involving numerical techniques.
20 PH 5106	ANALOG ELECTRONICS LAB	21	CO1	Analyze the semiconductor and operational circuits implementation
20 PH 5107	COMPUTATIONAL PHYSICS LAB	22	CO1	Apply C language and Python operators and functions for symbolic processing and solving simple programs.
		23	CO2	Apply MATLAB operators and functions for

				symbolic processing and solving equations, Eigen values and Eigen vectors, curve fitting and interpolation
		24	CO3	Apply MATLAB tools and codes for solving a linear system and Gauss elimination method.
		25	CO4	Apply MATLAB tools and codes for solving linear interpolation, polynomial curve fitting, and least square curve fitting and general nonlinear fits.
20 PH 5201	S TATISTICAL MECHANICS	26	CO1	Understand the Microstates and macro states of Ideal gas and Microstate and microstate in classical systems, and derivation of Maxwell's relations. and thermodynamic laws.
		27	CO2	Applications of these ensembles to classical ideal gas and explaining about types of oscillators.
		28	CO3	Apply the postulates of Quantum Statistical Mechanics and types of ensembles and energy distributions
		29	CO4	Apply the Thermodynamic behavior of Ideal, Bose, Fermi gases and applications of statistical mechanics
20 PH 5202	QUANTUM MECHANICS-I	30	CO1	Apply the basic concepts of Quantum Mechanics and solve the related problems
		31	CO2	Apply the Vector Space methods in core problems of physics.
		32	CO3	Apply the Schrodinger's Wave equation to exactly solvable problems.
		33	CO4	Apply the Schrodinger's Wave equation to many body problems and arrive the solution.
20 PH 5203	FIBER OPTICS AND NONLINEAR OPTICS	34	CO1	Understand the fundamentals of optical fibers and their characteristics with applications.
		35	CO2	Apply the concepts of optical fibers to explain the types of fibers, error schemes and transverse electric and magnetic fields in fibers
		36	CO3	Understand the concepts of nonlinear phenomena of light and in formation about interferometers and sensors
		37	CO4	Apply the nonlinear optics to describe the applications of frequency modulation of light and relevant theories.
		38	CO1	Apply the structure of crystalline solids, application to crystal structure-properties and its relationship, crystal diffraction and the experimental concepts of reciprocal lattice

20 PH 5204	SOLID STATE PHYSICS- I	39	CO2	Apply and explain the origin of chemical bonds in ionic and Vander wall bonds; motion of electron in gas and metal and heat capacity of metal
		40	CO3	Illustrate the Periodic Zone schemes, Fermi surfaces and different types of orbits and quantization of orbits in a magnetic field
		41	CO4	Apply and demonstrate the concept of energy bands and effect of the electric field on Materials.
20 PH 5205	DIGITAL ELECTRONICS	42	CO1	Understand number systems and basic connects of digital electronics and techniques for minimization of gates.
		43	CO2	Design of combinational logic circuits.
		44	CO3	Design of sequential logic circuits.
		45	CO4	Implementation of digital circuits using PAL, PLA, FPGA and CPLD
20 PH 5206	SSP-I LAB	46	CO1	Apply the knowledge of physics principles and performing experiments and preparation of new glass materials and study their spectroscopic properties
		47	CO2	Apply the knowledge of physics principles and performing experiments and preparation of new glass materials and study their spectroscopic properties
		48	CO3	Apply the knowledge of physics principles and performing experiments and preparation of new glass materials and study their spectroscopic properties
		49	CO4	Apply the knowledge of physics principles and performing experiments and preparation of new glass materials and study their spectroscopic properties
20 PH 5207	DIGITAL ELECTRONICS LAB	50	CO1	Apply the knowledge of Digital electronics for devices
		51	CO2	Apply the knowledge of Digital electronics for devices
		52	CO3	Apply the knowledge of Digital electronics for devices
		53	CO4	Apply the knowledge of Digital electronics for devices
20 PH 5301	QUANTUM MECHANTCS-Il	54	CO1	Apply Perturbation theory in different areas of physics
		55	CO2	Apply Approximation methods in Perturbation theory and apply in many branches of physics.

		56	CO3	Apply the Operators algebra in various physical phenomenon.
		57	CO4	Apply the Relativistic Quantum Mechanics and extend the application in to other areas of Physics.
20 PH 5302	ATOMIC AND MOLECULAR SPECTROSCOPY	58	CO1	Understand the electronic structure in atoms using different spectra
		59	CO2	Explain molecular energy levels using rotational and vibrational spectroscopy
		60	CO3	Illustrate Raman effect of rotational, vibrational and polyatomic molecules
		61	CO4	Apply the knowledge of principles to study electronic spectra and resonance spectroscopy like NMR and ESR.
20 PH 5303	NUCLEAR PHYSICS	62	CO1	Understand the deuteron and Magnetic dipole moment and nuclear forces and scattering cross section High energy nucleon-nucleon and nuclear forces.
		63	CO2	Applications the knowledge of Nuclear Models, gas and liquid and explaining about types of beta, alpha particle, optical model.
		64	CO3	Apply of Radioactive Decays (Alpha, Beta, Gamma radiations) and types of radioactive decay and radioactive transformation in alpha decay.
		65	CO4	Apply of Nuclear Reaction, Fission and Fusion behavior of Energetic of nuclear reactions and Characteristics of fissions and fusion reactors.
20 PH 5304	PARTICLE PHYSICS	66	CO1	Understand the Kinematics of Nuclear - Elementary Particle Reactions - Scattering and Form Factors - Broad classification of elementary particles - particle interactions in nature of conservation Iaws
		67	CO2	Understand the concept of Elementary Particles, ideas, CPT invariance, particle reaction and quarks.
		68	CO3	Apply the knowledge of Electroweak interaction, Quark hypothesis, Quark model, cyclotron and LHC accelerators
		69	CO4	Application of existing knowledge in Mossbauer Spectroscopy, radioactive, and conservation laws
		70	CO1	Understand semiconductor physics: direct and indirect band-gaps, the effects of doping a semiconductor
		71	CO2	Applying the knowledge of basic concepts of superconductivity to explain the AC and DC

20 PH 5305	SOLID STATE PHYSICS-II			Josephson effect, some attempts to explain superconductivity. the BCS model etc.
		72	CO3	Understand the source of a materials, magnetic behavior and be able to distinguish types of magnetism
		73	CO4	Applying the knowledge of polarization to know the properties of piezo and ferro electric materials
20 PH 5306	LASERS AND PHOTONICS	74	CO1	Understand the mechanisms of energy distribution and principles involved in designing laser systems.
		75	CO2	Apply the basic principles and mechanisms of laser systems and demonstrate the types of lasers with its applications.
		76	CO3	Understand the linear and nonlinear concepts of light and its propagation in different optical media
		77	CO4	Apply the nonlinear phenomena of light to explain the scattering theory and advanced optical properties of materials.
20 PH 5307	TERM PAPER	78	1	Collecting literature from any interested topic related to dissertation of IV semester
20 PH 5308	SOLID STATE PHYSICS LAB-II	79	CO1	Apply physics principles to understand the mechanical and magnetic properties of materials.
		80	CO2	Apply thermodynamic principles to understand the Physics experiments.
		81	CO3	Apply the knowledge of optical and dielectric experiments by applying physics principles
		82	CO4	Analyze the properties of nano materials which leads to research and development
20 PH 54E1	EXPEMMENTAL TECHNIOUES	83	CO1	Apply the EM radiation and ray scattering techniques and Experimental techniques and XPowder X-r ay diffractometer.
		84	CO2	Apply the techniques to discuss on the applications of SEM, TEM, EDAX and WDS, ESCA and PES
		85	CO3	Apply of Rutherford back scattering method, Magnetic Characterization: M-H
		86	CO4	Analyze the data of DTA, TGA, and DSC with suitable glass and ceramic materials
20 PH 54E2	BASIC COMMUNICATION THEORY	87	CO1	Understand the relevant information on the generation of amplitude modulation waves
		88	CO2	Apply the concepts of frequency and phase modulation in AM waves
		89	CO3	Understand and provide the effective information on random variables and characterization techniques used for filtering the noise in AM

				waves
		90	CO4	Apply the methods and codes used in transfer of information theory to describe the communication theory
20 PH 54E3	PHYSICS OF NANOMATERILS	91	CO1	Understand the basics of nanomaterials, parameters which get effected by scaling down the size of the material, Major approaches, and synthesis procedure
		92	CO2	Apply and explain the basics of principles associated with characterization techniques and usage of the techniques
		93	CO3	Understand to identify the change in properties of the nanomaterial in case of metals, semiconductors, insulators, ceramics and polymers and make use of nanomaterials in those devices
		94	CO4	Apply the experimental techniques for synthesis of carbon nanotubes and explore their applications.
20 PH 54E4	RADAR SYSTEMS AND SATELLITE COMMUNICATION	95	CO1	Understand the basics of Radar operations, types of radar and applications
		96	CO2	Apply the Radar principles and learn the signal and data processing for radars, antenna characteristics
		97	CO3	Apply the principles and communications, orbital mechanisms to describe the satellite constitutions and Telemetry, Tracking
		98	CO4	Apply the mechanisms to explain the coding techniques for INMARSAT VSAT, GPS, RADARSAT, INTELST applications
20 PH 54E5	THIN FLIM TECHNOLOGY	99	CO1	Understand the basic concepts of thin film technology and the preparation and techniques
		100	CO2	Apply the mechanisms and explain the growth and techniques and kinetics
		101	CO3	Understand the principles about XRD,TEM and other techniques for Thin film characterization
		102	CO4	Apply the mechanisms of different characterization techniques in the various properties of thin films.
20 PH 54E6	ANTENA THEORY AND RADIOWAVE PROPAGATION	103	CO1	Understand the antenna characteristics, radiation and applications
		104	CO2	Understand the antenna arrays, advantages; impedance measurements
		105	CO3	Apply the characteristics of antenna theory and describe the types of antennas. excitation techniques for designing the antennas
		106	CO4	Apply the mechanisms of antenna theory to explain

				the characteristics of ground wave, space wave and sky wave propagation for wireless communications.
20 UC 1102	DESIGN THINKING AND INNOVATION-I	107	CO1	Understand the basics of design thinking and its implications in product or service development
		108	CO2	Understand and requirements of Analyze the a typical problem
		109	CO3	PIan the necessary activities towards solving the problem through ideation and prototyping
		110	CO4	Evaluate the solution and refine them based on the customer feedback