



Koneru Lakshmaiah Education Foundation

(Category -1, Deemed to be University estd. u/s. 3 of the UGC Act, 1956)

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Department of Physics

Program: M.Sc Physics

Academic Year : 2019-2020

Course Code	Course Title	CO NO	Description of the Course Outcome
19PH5101	Mathematical Physics	CO1	Classify the analytical functions, complex integration and evaluation of definite integrals
		CO2	Analyze Beta and Gamma functions and some special functions
		CO3	Describe and Apply the transform technique for functions
		CO4	Apply the numerical technique to solve functions and system of equations
19PH5102	Classical Mechanics	CO1	Explain the applications of Newtonian mechanics and the formulation of Lagrange's equations of motion from D'Alembert principle.
		CO2	Reduction of problem of two body problem to One body problem and Classification of orbits
		CO3	Explain the applications of Hamilton's equations, Canonical transformations, Poisson brackets, Invariance of Poisson bracket under canonical transformations- Principle of least action
		CO4	Illustrate the Hamilton Jacobi equations and characteristic functions, Action and angle variable, small oscillations, applications such as linear tri-atomic molecule, two carts connected with three springs, triple pendulum, and double pendulum.
19PH5103	Electrodynamics	CO1	Explain about Laplace and Poisson's equations, Static fields in material media, Polarization vector, macroscopic equations, and classification of dielectric media, Molecular polarizability and electrical susceptibility, Clausius-Mossetti relation.
		CO2	Discuss about 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.

		CO3	Explain about 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
		CO4	Discuss about Faraday's law of induction, and vector potential, Gauge transformation, Lorentz and Coulomb gauges, conservation of energy, Poynting Theorem, Conservation of momentum displacement current, Maxwell equations, scalar.
19PH5104 19PH5106	Analog Electronics + Lab	CO1	Understand the working of Different Semiconductor devices (Construction, Working Principles and V-I characteristics) and their applications.
		CO2	Understand the working of Different semiconductor devices as amplifiers and oscillators.
		CO3	Understand the basic operational amplifier characteristics, OPAMP parameters ,applications as inverter, integrator, differentiator etc
		CO4	Understand the basic applications of operational amplifier as inverter, integrator, differentiator etc
		CO5	Analyze the semiconductor and operational circuits implementation.
19PH5105 19PH5107	Computational Physics + Lab	CO1	Analyze the C characters, operators, analytic expression, arrays, functions and simple programs
		CO2	Describe and apply the basics of MATLAB to solve linear systems and interpolation
		CO3	Apply MATLAB to solve linear equation, non-linear equation and simultaneous equations
		CO4	Describe and Apply C language and MATLAB to solve interpolations, numerical differentiation and integration
19PH5108	Seminar-1	CO1	To motivate the students towards presenting and preparing presentation effectively
19PH5201	Statistical Mechanics	CO1	Explain the microstates and macro states of Ideal gas and microstate and macrostate in classical systems, and derivation of Maxwell's relations, and thermodynamic laws.
		CO2	Applications of these ensembles to classical ideal gas and explaining about types of oscillators.
		CO3	Explanation of postulates of Quantum Statistical Mechanics and types of ensembles and energy distributions
		CO4	Explaining of Thermodynamic behavior of Ideal, Bose, Fermi gases and applications of statistical mechanics

19PH5202	Quantum Mechanics - 1	CO1	Introduction to Quantum Mechanics and its principles
		CO2	Derivation of Schrodinger's wave equation and its application to one dimensional problems
		CO3	Introduce angular momentum and spin concept
		CO4	Applying Schrodinger's wave equation to three dimensional problems and time independent perturbed problems
19PH5203	Fiber optics and nonlinear optics	CO1	Explains the light properties like total internal reflection and interference
		CO2	Fundamental properties of optical fibres, types of fibres and their related information
		CO3	Different concepts of light and information related to interferometers and sensors
		CO4	Explains the fibre optics in modulation sensors and different effects of light
19PH5204	Solid State Physics-1	CO1	Understands structure of crystalline solids, appreciates structure-property relationship in crystals, crystal diffraction and the concepts of reciprocal lattice
		CO2	Understand the motion of electron in gas and metal and heat capacity of metal
		CO3	Understand the Periodic Zone schemes, Fermi surfaces and different types of orbits and quantization of orbits in a magnetic field
		CO4	Understand the concept of energy bands and effect of the same on electrical properties.
		CO5	Understand and attaining knowledge in different solid state related experiments
19PH5205	Digital Electronics	CO1	Describe the concepts of number systems with codes and logic gates usage in digital circuit design and identify the logical expressions in different forms and their minimization techniques for logical circuit optimization
		CO2	Employ Combinational logic circuits with minimization techniques and logical verification through hardware description language
		CO3	Substantiation of Sequential logic circuits and logical verification through hardware description language
		CO4	Implementation of digital circuits using PAL, PLA, FPGA and CPLD
19PH5207	Digital Electronics Lab	CO5	Apply the knowledge of Digital electronics for devices


19PH5208	Seminar-2	CO1	To motivate the students towards presenting and preparing presentation effectively
19PH5301	Quantum Mechanics - 2	CO1	Applying time dependent perturbation theory to solve different problems
		CO2	Matrix representations of wave function, operator and the solution of harmonic oscillator using matrix mechanism
		CO3	Scattering problems solutions using quantum rules
		CO4	Solutions of central force problems like hydrogen atom using relativistic quantum mechanics
19PH5302	Atomic and Molecular Physics	CO1	Detailed discussion about the electronic structure in atoms using different spectra
		CO2	Study of molecular energy levels using rotational and vibrational spectroscopy
		CO3	Study of Raman effect of rotational, vibrational and polyatomic molecules
		CO4	Detailed discussion about the electronic spectra and resonance spectroscopy like NMR and ESR.
19PH5303	Nuclear Physics	CO1	Will apply the models describing the basic nucleon and nuclear properties and establish the basic fundamentals necessary for further course outcomes.
		CO2	Properties and decay principles of Beta and Gamma rays will be reviewed, their selection rules will be understood.
		CO3	History of different techniques to detect various kinds of radiation will be learned. Detection and importance of radiation detection using Hyper Pure Germanium Detectors to study various basic science principles and their applications in various fields will be reviewed.
		CO4	Basics of particle physics and their classification will be discussed. Their fundamental properties and functions along with basic particle physics models leading to GUT will be discussed.
19PH5304	Particle Physics	CO1	Explain the Kinematics of Nuclear - Elementary Particle Reactions - Scattering and Form Factors - Broad classification of elementary particles - particle interactions in nature of conservation laws.
		CO2	Applications of Elementary Particles, ideas, CPT invariance, particle reaction and quarks.
		CO3	Explanation of Electroweak interaction, Quark hypothesis, Quark model, cyclotron and LHC accelerators

		CO4	Explaining of Mössbauer Spectroscopy, radioactive applications, and conservation laws
19PH5305	Solid State Physics -2	CO1	Understands structure of crystalline solids, kinds of crystal imperfections and appreciates structure-property relationship in crystals.
		CO2	understand the source of a materials magnetic behavior and be able to distinguish types of magnetism and their properties
		CO3	understand semiconductor physics: direct and indirect band-gaps, the effects of doping a semiconductor and Drift and Diffusion – Einstein relation
		CO4	understand the phenomenon of superconductivity: key experiments, some attempts to explain superconductivity, the BCS model
19PH5306	Lasers and Photonics	CO1	Ability to understand the principles and mechanisms involved in laser systems.
		CO2	Apply the basic concepts of lasers to demonstrate the different types of lasers and its wide range of application.
		CO3	Understand the linear and nonlinear phenomena of light and wave propagation in optical media.
		CO4	Ability in describing the light scattering theories to understand the optical properties of materials.
19PH5307	Term paper	CO1	Collecting literature from any interested topic related to dissertation of IV semester
19PH5308	Solid State Physics - 2 Lab	CO5	Apply the knowledge of Solid state physics and preparation and characterization of nano materials
20UC1102	Design Thinking And Innovation-1	CO1	Understand the basics of design thinking and its implications in product or service development
		CO 2	Understand and Analyse the requirements of a typical problem
		CO3	Plan the necessary activities towards solving the problem through ideation and prototyping
		CO4	Evaluate the solution and refine them based on the customer feedback
19PH54E1	Experimental Techniques	CO1	To understand different experiment techniques used for material characterization
		CO2	To understand the latest characterization techniques in view of morphological studies
		CO3	To understand the various spectroscopic techniques used in the measurement of dielectrics

		CO4	To understand the distinct techniques related to nanotechnology and material preparation
19PH54E2	Basic Communication Theory	CO1	To provide relevant information on the generation of amplitude modulation waves
		CO2	To understand the concepts of frequency and phase modulation in AM waves
		CO3	To provide effective information on random variables and characterization techniques used for filtering the noise in AM waves
		CO4	To understand methods and codes used in transfer of information theory
19PH54E3	Physics of Nanomaterials	CO1	Understand the basics of nanomaterials, parameters which get effected by scaling down the size of the material, Major approaches and synthesis procedure
		CO2	Explain the basics of principles associated with characterization techniques and usage of the techniques
		CO3	Identifying the change in properties of the nanomaterial in case of metals, semiconductors, insulators, ceramics and polymers and make use of nanomaterials in those devices
		CO4	Understand synthesis of carbon nanotubes and explore their applications.
19PH54E4	Radar Systems and Satellite communication	CO1	To be learn the Radar operations, types of radar and applications
		CO2	To be learn the signal and data processing for radars, antenna characteristics
		CO3	To be learn the satellite communications, orbital constitutions and Telemetry, Tracking
		CO4	To be learn the coding techniques for INMARSAT VSAT, GPS, RADARSAT, INTELST applications
19PH54E5	Thin Film Technology	CO1	Explain the concept of thin film technology and the preparation and techniques
		CO2	Explaining the growth and techniques and kinetics
		CO3	Explaining about XRD, TEM and other techniques for Thin film characterization
		CO4	Explaining the various properties of thin films.
20UC1203	Design Thinking And Innovation- 2	CO1	Understand the problem statement, requirements and formulating approaches to solve real world problems.
		CO2	Implementing Design Thinking Framework.
		CO3	Develop innovative thinking ability through design thinking and also develop methods for successful implementation of Design Thinking.

		CO4	Understand the copyright, IPR, Trademark, Patent and license agreement policies for protecting own R&D innovations and Enhancing brand image.
19PH54E6	Antenna theory and Radio wave Propagation	CO1	To be learn the antenna characteristics, radiation and applications
		CO2	To be learn antenna arrays, advantages; impedance measurements
		CO3	To be learn types of antennas, excitation techniques for designing the antennas
		CO4	To be learn ground wave space wave and sky wave propagation for wireless communications


Academic Professor I/C


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