

ANNUAL CURRICULAR PLAN I/III/V

YEAR: **2020-2021**

PAPER: **III**

NAME OF THE LECTURER: **Dr A P V Appa Rao Sri J Rama Mohan,
P Rajeswari & GS Devi**

Month & Week	Hours available	Syllabus Topic	Additional Inputs / Value Additions	Curricular Activity				Co-Curricular Activity			
				Activity	Hours Allotted	Whether Conducted	If not Alternate Date	Activity	Hours Allotted	Whether Conducted	If not Alternate Date
december	16	Aberrations: Introduction to Chromatic aberration – calculation of longitudinal chromatic aberration of a thin lens – achromatism for two lenses (a) when in contact and (b) when separated by a distance – achromatism of a camera lens – Introduction to Spherical aberration – minimization of spherical aberration – Coma -- Astigmatism -- Curvature of field – distortion.		Matrix methods in Paraxial Optics.	10	YES		Assignment I			
				Aberrations	05	YES					
Jan	16	Interference Principle of superposition – coherence– conditions for Interference of light. Interference by division of wave front: Fresnel’s biprism – determination of wave length of light -- Determination of thickness of a transparent material using Biprism – change of phase on reflection – Lloyd’s mirror experiment. Interference by division of amplitude:	.	Interference	15	YES		Assignment II	1 hour	YES	

		<p>Introduction – Optical fibers – Types of optical fibers – Step and graded index fibers –Fiber material – Principles of fiber communication (qualitative treatment only) -- advantages of fiber communication. Basic Principle of Holography and its applications. Gabor hologram.</p> <p>Diffraction: Introduction – Fraunhofer diffraction:- Diffraction due to single slit– Limit of resolution – Fraunhofer diffraction due to double slit – Fraunhofer diffraction pattern with N slits (diffraction grating). Resolving Power of grating – Determination of wave length of light in normal and oblique incidence methods using diffraction grating.</p>		<p>Fiber Optics & Holography</p> <p>Diffraction</p>	<p>05</p> <p>08</p>	<p>Yes</p> <p>YES</p>		<p>Assignment-IV</p> <p>Assignment</p>	<p>1 hour</p> <p>1hour</p>	<p>YES</p> <p>YES</p>	
March	8	<p>Fresnel diffraction -- Fresnel's half period zones – area of the half period zones –zone plate – Comparison of zone plate with convex lens – Phase reversal zone plate – difference between interference and diffraction. Distinction between Fresnel and Fraunhofer diffraction.</p>		Fresnel Diffraction	08	YES					

ANNUAL CURRICULAR PLAN I/III/V

YEAR: **2020-2021**

PAPER: V

NAME OF THE LECTURER: **Sri J Rama Mohan, Sri P Ramakrishna Rao & ASS Jyothi**

Month & Week	Hours available	Syllabus Topic	Additional Inputs / Value Additions	Curricular Activity				Co-Curricular Activity			
				Activity	Hours Allotted	Whether Conducted	If not Alternate Date	Activity	Hours Allotted	Whether Conducted	If not Alternate Date
Dec	12	Electric field intensity and potential: Gauss's law statement and its proof- Electric field intensity due to (1) Uniformly charged sphere and (2) an infinite conducting sheet of charge. Electrical potential – equi potential surfaces- potential due to i) a point charge, ii) charged spherical shell .		Electrostatics	8	YES		Assignment I	1	YES	
				Dielectrics	6	YES					
Dec	12	Dielectrics: Electric dipole moment and molecular polarizability- Electric displacement D, electric polarization P – relation between D, E and P- Dielectric constant and susceptibility. Boundary conditions at the dielectric surface.		Capacitance	10	YES		Assignment II	1	YES	
Jan	12	Electric and magnetic fields Biot-Savart's law, explanation and calculation of B due to long straight wire, a circular current loop and solenoid – Hall effect – determination of Hall coefficient and applications. Electromagnetic induction Faraday's law-Lenz's law- Self and mutual inductance, coefficient of coupling, calculation of self inductance of a long solenoid, energy stored in magnetic field. Transformer - energy losses - efficiency.		Magnetostatics	10	YES		Assignment-III	01 Hour	YES	
Feb	12	Alternating currents and electromagnetic waves Alternating current - Relation between		Moving charges in electric and magnetic fields	8	YES		Seminar	02 Hours	YES	

		current and voltage in LR and CR circuits, vector diagrams, LCR series and parallel resonant circuit, Q –factor, power in ac circuits. Maxwell's equations :Idea of displacement current - Maxwell's equations (integral and differential forms) (no derivation), Maxwell's wave equation (with derivation). Pointing theorem (statement), production of electromagnetic waves (Hertz experiment).		Electromagnetic Induction	4	YES		Assignment IV	01 Hour	YES	
March	6	Basic electronics: PN junction diode, Zener diode, I-V characteristics, PNP and NPN transistors, CB, CE and CC configurations – Relation between α , β and γ - transistor (CE) characteristics, Transistor as an amplifier. Digital electronics: Number systems - Conversion of binary to decimal system and vice versa. Binary subtraction (2's complement methods).Laws of Boolean algebra - De Morgan's laws- statement and proof, Basic logic gates, NAND and NOR as universal gates, exclusive-OR gate, Half adder and Full adder.		Electromagnetic Induction	6	YES		Assignment V	1	YES	

ANNUAL CURRICULAR PLAN II/IV/VI

YEAR: **2020-2021**PAPER: **IV**NAME OF THE LECTURER: **Dr A P V Appa Rao, Sri J Rama Mohan,
P Rajeswari & GS Devi**

Month & Week	Hours available	Syllabus Topic	Additional Inputs / Value Additions	Curricular Activity				Co-Curricular Activity			
				Activity	Hours Allotted	Whether Conducted	If not Alternate Date	Activity	Hours Allotted	Whether Conducted	If not Alternate Date
December	15	Kinetic theory of gases: Introduction – Deduction of Maxwell’s law of distribution of molecular speeds, Transport Phenomena – Viscosity of gases – thermal conductivity – diffusion of gases. Thermodynamics : Introduction – Reversible and irreversible processes – Carnot’s engine and its efficiency – Carnot’s theorem – Second law of thermodynamics, Kelvin’s and Clausius statements – Thermodynamic scale of temperature.		Transport Phenomena	01	YES					
				Carnot’s engine and it’s efficiency	01	YES		Assignment I	1	YES	
January	15	Entropy:- Entropy, physical significance – Change in entropy in reversible and irreversible processes – Entropy and disorder – Entropy of universe – Temperature-Entropy (T-S) diagram. Change of Entropy of a perfect gas – Change of		Change of Entropy of a perfect gas	07	YES		Assignment II	1 hour	YES	
								Seminar	1	YES	

		<p>entropy when ice changes into steam.</p> <p>Thermodynamic potentials and Maxwell's equations:</p> <p>Thermodynamic potentials – Derivation of Maxwell's thermodynamic relations – Clausius-Clayperon's equation – Derivation for ratio of specific heats – Derivation for difference of two specific heats for perfect gas. Joule Kelvin effect – expression for Joule Kelvin coefficient for perfect and Vanderwaal's gas.</p>		Clausius-Clayperon's equation	08	YES		<p>Assignment III</p> <p>Seminar</p>	<p>1 Hour</p> <p>1 Hour</p>	<p>YES</p> <p>YES</p>	
February	15	<p>Low temperature Physics:</p> <p>Introduction – Joule Kelvin effect – liquefaction of gas using porous plug experiment. Joule expansion – Distinction between adiabatic and Joule Thomson expansion – Expression for Joule Thomson cooling – Liquefaction of helium, Kapitza's method – Adiabatic demagnetization – Production of low temperatures – Principle of refrigeration, vapour compression type. Working of refrigerator and Air conditioning machines. Effects of Chloro and Fluro Carbons on Ozone layer.</p>		Adiabatic demagnetization Production of low temperatures	15	YES		Assignment IV	1 hour	YES	

December	12	Introduction to Energy: Definition and units of energy, power, Forms of energy, Energy flow diagram to the earth. Role of energy in economic and social development. Environmental Effects: Environmental degradation due to energy production and utilization, air and water pollution, depletion of ozone layer, global warming, biological damage due to environmental degradation.		Role of energy in economic and social development.	01	YES		Assignment	1	YES	
January	12	Global Energy Scenario: Energy consumption in various sectors, energy resources, coal, oil, natural gas, nuclear and hydroelectric power. Indian Energy Scene: Energy resources available in India, urban and rural energy consumption, nuclear energy - promise and future, energy as a factor limiting growth, need for use of new and renewable energy sources.		Energy resources available in India	01	YES		Assignment	1	YES	
February	12	Solar energy: Solar energy, Spectral distribution of radiation, solar water heating system, Applications, Solar cooker. Solar cell, Types of solar cells. Wind Energy: Introduction, Principle of wind energy conversion, and Components of wind turbines, Operation and characteristics of a wind turbine, Applications of wind energy.		Solar energy, Spectral distribution of radiation	01	YES		Assignment	01	YES	
March	12	Ocean Energy: Introduction, Principle of ocean thermal energy conversion, Tidal power generation, Tidal energy technologies, Energy from waves. Hydrogen Energy: History of hydrogen		Energy from biomass – Sources of	01	YES		Seminar	01	YES	

		energy-Hydrogen production methods-Electrolysis of water, uses of hydrogen as fuel. Bio-Energy Energy from biomass – Sources of biomass – Conversion of biomass into fuels – Energy through fermentation – Pyrolysis, gasification and combustion – Aerobic and anaerobic bio-conversion – Properties of biomass –Properties and characteristics of biogas.		biomass – Conversion of biomass into fuels					Assignment	01	YES	
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ANNUAL CURRICULAR PLAN II/IV/VI

YEAR: **2020-2021 (II SEMESTER New Syllabus)**

PAPER: I I

NAME OF THE LECTURER: **DR. L. MALLESWARA RAO, P RAMAKRISHNA RAO, ASS JYOTHI, V SANDYA & P Rajeswari**

Month & Week	Hours available	Syllabus Topic	Additional Inputs / Value Additions	Curricular Activity				Co-Curricular Activity			
				Activity	Hours Allotted	Whether Conducted	If not Alternate Date	Activity	Hours Alloted	Whether Conducted	If not Alternate Date
June & July	20	Interference of light: Introduction, Conditions for interference of light, Interference of light by division of wave front and amplitude, Interference in thin films: Plane parallel and wedge-shaped films, colours in thin films, Newton's rings in reflected light-Theory and		Interference of light	06	Yes		Assignment	1	Yes	
								PPT	1	YES	

		experiment, Determination of wavelength of monochromatic light, Michelson interferometer and determination of wavelength.									
August	16	Diffraction of light: Introduction, Types of diffraction: Fresnel and Fraunhofer diffractions, Distinction between Fresnel and Fraunhofer diffraction, Fraunhofer diffraction at a single slit. Determination of wavelength of light using diffraction grating, Resolving power of grating, Fresnel's half period zones, Zone plate, comparison of zone plate with convex lens.		Diffraction of light:	06	Yes		PPT Assignment	1 1	Yes Yes	
Feb	16	Polarisation of light: Polarized light: Methods of production of plane polarized light, Double refraction, Brewster's law, Malus law, Nicol prism, Nicol prism as polarizer and analyzer, Quarter wave plate, Half wave plate, Plane, Circularly and Elliptically polarized light-Production and detection, Optical activity, Laurent's half shade polarimeter: determination of specific rotation. Aberrations: Monochromatic aberrations, Spherical aberration, Methods of minimizing spherical aberration, Coma, Astigmatism and Curvature of field, Distortion; Chromatic aberration-the achromatic doublet; Achromatism for two lenses (i) in contact and (ii) separated by a distance.		Polarisation of light: Aberrations:	12 06	Yes Yes		Assignment Assignment IV Student seminar	1 1 1	Yes YES Yes	

		<p>impact parameter, scattering cross-section, Rutherford scattering-Derivation.</p> <p>Mechanics of Rigid bodies: Rigid body, rotational kinematic relations, Equation of motion for a rotating body, Angular momentum and Moment of inertia tensor, Euler equations, Precession of a spinning top, Gyroscope, Precession of atom and nucleus in magnetic field, Precession of the equinoxes.</p>	Precession of atom and nucleus in magnetic field	Mechanics of Rigid bodies	6	Yes		PPT	1	Yes	
March	16	<p>Motion in a Central Force Field: Central forces, definition and examples, characteristics of central forces, conservative nature of central forces, Equation of motion under a central force, Kepler's laws of planetary motion-Proofs, Motion of satellites.</p> <p>Relativistic Mechanics: Introduction to relativity, Frames of reference, Galilean transformations, absolute frames, Michelson-Morley experiment, negative result, Postulates of Special theory of relativity, Lorentz transformation, time dilation, length contraction, variation of mass with velocity, Einstein's mass-energy relation</p>	<p>Motion of satellites.</p> <p>variation of mass with velocity</p>	<p>Motion in a Central Force Field</p> <p>Relativistic Mechanics:</p>	<p>4</p> <p>6</p>	<p>Yes</p> <p>Yes</p>		<p>PPT</p> <p>Assignment</p> <p>PPT</p> <p>Student seminars</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p>	
April	16	<p>Undamped, Damped and Forced oscillations: Simple harmonic oscillator and solution of the differential equation, Damped harmonic oscillator, Forced harmonic oscillator – Their differential equations and solutions, Resonance, Logarithmic decrement, Relaxation time and Quality factor.</p>		<p>Undamped, Damped and Forced oscillations</p> <p>Complex vibrations</p>	<p>5</p> <p>5</p>	<p>Yes</p> <p>Yes</p>		<p>Assignment</p> <p>Assignment</p>	<p>1</p> <p>1</p>	<p>YES</p> <p>YES</p>	

		Complex vibrations: Fourier theorem and evaluation of the Fourier coefficients, analysis of periodic wave functions-square wave.									
May	16	Vibrating Strings: Transverse wave propagation along a stretched string, General solution of wave equation and its significance, Modes of vibration of stretched string clamped at ends, Overtones and Harmonics, Melde's strings. Ultrasonics: Ultrasonics, General Properties of ultrasonic waves, Production of ultrasonics by piezoelectric and magnetostriction methods, Detection of ultrasonics, Applications of ultrasonic waves, SONAR		Vibrating Strings:	8	Yes		Assignment	1	Yes	
June	12			Ultrasonics	8	Yes		Student seminar	1	Yes	

ANNUAL CURRICULAR PLAN II/IV/VI

YEAR: 2020-2021 (V SEMESTER)

PAPER: VI

NAME OF THE LECTURER: DR APV APPARAO, DR L MALLESWARA RAO,
G Suvarchala Devi & P RAJESWARI

Month & Week	Hours available	Syllabus Topic	Additional Inputs / Value Additions	Curricular Activity				Co-Curricular Activity			
				Activity	Hours Allotted	Whether Conducted	If not Alternate Date	Activity	Hours Alloted	Whether Conducted	If not Alternate Date
Dec	12	Atomic and molecular physics Introduction –Drawbacks of Bohr's atomic model.			09	Yes		Assignment I	1	Yes	

		Vector atom model and Stern-Gerlach experiment - quantum numbers associated with it. L-S and j- j coupling schemes. Zeeman effect (Definition only) - Raman effect, hypothesis, Stokes and Anti Stokes lines. Quantum theory of Raman effect. Experimental arrangement –Applications of Raman effect.									
Jan	12	Matter waves & Uncertainty Principle Matter waves, de Broglie's hypothesis - wavelength of matter waves, Properties of matter waves - Davisson and Germer experiment – Heisenberg's uncertainty principle for position and momentum (x and p) & Energy and time (E and t). Quantum (wave) mechanics Basic postulates of quantum mechanics-Schrodinger time independent and time dependent wave equations-derivations. Physical interpretation of wave function. Eigen functions, Eigen values. Application of Schrodinger wave equation to particle in one dimensional infinite box.			09	Yes		Student seminar I Assignment II	1	Yes	
					09	Yes		Assignment III	1	YES	
Feb	12	General Properties of Nuclei Basic ideas of nucleus -size, mass, charge density (matter energy), binding energy, magnetic moment, electric moments. Liquid drop model and Shell model (qualitative aspects only) - Magic numbers. Radioactivity decay Alpha decay: basics of α -decay processes. Theory of α -decay, Gamow's theory, Geiger Nuttal law. β -decay, Energy kinematics for β -decay, positron emission, electron capture, neutrino hypothesis.			09	Yes		PPT Assignment IV Career Guidance Class	1 1 1	Yes YES Yes	
Mar	06	Crystal Structure Amorphous and crystalline materials, unit cell, Miller indices, reciprocal lattice, types of lattices, diffraction of X-rays by crystals, Bragg's law, experimental techniques, Laue's method.			09	Yes		PPT seminar	1 1	Yes Yes	

		Superconductivity Introduction - experimental facts, critical temperature - critical field - Meissner effect –Isotope effect - Type I and type II superconductors - applications of superconductors.						Career Guidance Class	1	Yes	
								Assignment V	1	Yes	

ANNUAL CURRICULAR PLAN

YEAR: **2020-2021 (VI SEMESTER)**

PAPER: **VIII CE 1**

NAME OF THE LECTURER: **P RAMAKRISHNA RAO**

Month & Week	Hours available	Syllabus Topic	Additional Inputs / Value Additions	Curricular Activity				Co-Curricular Activity			
				Activity	Hours Allotted	Whether Conducted	If not Alternate Date	Activity	Hours Alloted	Whether Conducted	If not Alternate Date
Nov	6	Basics of Solar Radiation: Structure of Sun, Solar constant, Concept of Zenith angle and air mass, Definition of declination, hour angle, solar and surface azimuth angles; Direct, diffuse and total solar radiation, Solar intensity measurement – pyrliometer.			9	Yes		Assignment I	1	Yes	
Dec	12							Student seminar I	1	Yes	
Jan	12	Radiative Properties and Characteristics of Materials: Kirchoff's law – Relation between absorptance, emittance and reflectance; Selective Surfaces - preparation and characterization, Types and applications; Anti-reflective coating. Flat Plate Collectors (FPC) : Description of flat plate collector, Liquid heating type FPC, Energy balance equation, Efficiency, Temperature distribution in FPC, Definitions of fin efficiency			9	Yes		Assignment II	1	Yes	
								PPT I	1	Yes	
					9	Yes		Assignment III	1	Yes	
								Career Guidance Class	1	Yes	

Nov	6	Introduction: Wind generation, meteorology of wind, world distribution of wind, wind speed variation with height, wind speed statistics, Wind energy conversion principles; General introduction; Types and classification of WECS; Power, torque and speed characteristics.			9	Yes		Assignment I	1	Yes	
Dec	12							Student seminar I	1	Yes	
Jan	12	Wind Energy Conversion System: Aerodynamic design principles; Aerodynamic theories; axial momentum, blade element; Rotor characteristics; Maximum power coefficient. Wind Energy Application: Wind pumps: Performance analysis, design concept and testing; Principle of wind energy generation; Wind energy in India; Environmental Impacts of Wind farms.			9	Yes		Assignment II	1	Yes	
					9	Yes		PPT I	1	Yes	
								Assignment III	1	Yes	
Feb	12	Small Hydropower Systems: Overview of micro, mini and small hydro systems; Hydrology; Elements of pumps and turbine; Selection and design criteria of pumps and turbines; Site selection; Speed and voltage regulation. Ocean Thermal, Tidal and Wave Energy Systems: Ocean Thermal - Introduction, Technology process, working principle, Electricity generation methods from OCET, Advantages and disadvantages, Applications of OTEC.						Career Guidance Class	1	Yes	
					9	Yes		Assignment IV	1	Yes	
								PPT II	1	Yes	
Mar	06	Tidal Energy - Introduction, Origin and nature of tidal energy, Wave Energy – Introduction, Basics of wave motion, Power in waves, Wave energy conversion devices, Advantages and disadvantages, Applications of wave energy.			05	Yes		Student seminar II	1	Yes	
								Assignment V	1	Yes	
								Career Guidance Class	1	Yes	

ANNUAL CURRICULAR PLAN

YEAR: **2020-2021 (VI SEMESTER)**

PAPER: **VIII CE3**

NAME OF THE LECTURER: **DR L MALLESWARA RAO**

Month & Week	Hours available	Syllabus Topic	Additional Inputs / Value Additions	Curricular Activity				Co-Curricular Activity			
				Activity	Hours Allotted	Whether Conducted	If not Alternate Date	Activity	Hours Alloted	Whether Conducted	If not Alternate Date
Nov	6	Energy Storage: Need of energy storage; Different modes of energy storage, Flywheel storage, Electrical and magnetic energy storage: Capacitors, electromagnets; Chemical Energy storage: Thermo-chemical, photo-chemical, electro-chemical, Hydrogen for energy storage.			9	Yes		Assignment I	1	Yes	
Dec	12							Student seminar I	1	Yes	
Jan	12	Electrochemical Energy Storage Systems: Batteries: Primary, Secondary, Lithium, Solid-state and molten solvent batteries; Lead acid batteries; Nickel Cadmium Batteries; Advanced Batteries. Role of carbon nano-tubes in electrodes. Magnetic and Electric Energy Storage Systems: Superconducting Magnet Energy Storage (SMES) systems; Capacitor and battery: Comparison and application; Super capacitor:			9	Yes		Assignment II	1	Yes	
								PPT I	1	Yes	
					9	Yes		Assignment III	1	Yes	
								Career Guidance Class	1	Yes	
Feb	12	Fuel Cell: Fuel cell definition, difference between batteries and fuel cells, fuel cell components, principle and working of fuel cell, performance characteristics, efficiency. Advantages and disadvantages of fuel cell.			9	Yes		Assignment IV	1	Yes	
								PPT II			
								Student seminar II	1	Yes	

Mar	06	Types of Fuel Cells: Classification, Alkaline fuel cell, phosphoric acid fuel cell, molten carbonate fuel cell; solid oxide fuel cell, applications of fuel cells.			05	Yes		Assignment V Career Guidance Class	1 1	Yes Yes	