

ANNUAL CURRICULAR PLAN I/III/V

YEAR: 2025-2026
SEMESTER & PAPER: I BSC SEMESTER- I PAPER- MULTIDISCIPLINARY COURSE (MDC): PRINCIPLES OF PHYSICAL SCIENCES
NAME OF THE LECTURER: MS Ranganayakulu, V Durga Sandhya, M Shankar & K Naveen Kumar

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
August 2025	04	UNIT 1: INTRODUCTION TO PHYSICS Nature of Physics: Overview of physics as a discipline, its scope, and its relationship to other sciences. Scientific Method in Physics: Introduction to the scientific method and its application in the study of physics. Measurement and Units: Understanding the principles of measurement, SI units, and the importance of accurate and precise measurements. Scalars and Vectors: Differentiating between scalars and vectors, understanding vector addition and subtraction.	Understanding the principles of measurement, SI units, and the importance of accurate and precise measurements.	Understanding vector addition and subtraction.	01	YES		Assignment I	1	YES	
September, 2025	08	UNIT 2: MECHANICS FOR ARTS STUDENTS Motion and Forces: Introduction to the principles of motion, including velocity, acceleration, and the laws of motion. Energy and	Different forms of energy, and the relationship between work and energy.	Gravity: Introduction to the concept of gravity, Newton's law of universal gravitation, and its implications.	08	YES		Assignment II Seminar Assignment III	1 hour 1 1 Hour	YES YES	

		Work: Understanding the concept of energy, different forms of energy, and the relationship between work and energy. Circular Motion: Exploring the principles of circular motion, centripetal force, and applications in real-world scenarios. Gravity: Introduction to the concept of gravity, Newton's law of universal gravitation, and its implications.								YES	
October 2025	08	UNIT 3: WAVES AND OPTICS FOR ARTS STUDENTS Waves: Understanding the properties and characteristics of waves, including wave types, wave motion, and wave interference. Sound Waves: Exploring the nature of sound waves, including properties of sound, sound propagation, and the Doppler Effect.	characteristics of waves, including wave types	Doppler Effect	08	YES		Assignment IV	1 hour	YES	
November 2025	08	Light and Optics: Introduction to the behavior of light, reflection, refraction, and the formation of images by mirrors and lenses. Wave Optics: Understanding the principles of interference, diffraction, and polarization of light waves.	Understanding the principles of interference	diffraction, and polarization of light waves	15	Yes		Assignment V	1 hour	YES	

ANNUAL CURRICULAR PLAN I/III/V

YEAR: 2025-2026
SEMESTER & PAPER: II BSC SEMESTER- III COURSE-5 (Major) COURSE-2 (Minor) OPTICS
NAME OF THE LECTURER: Dr A P V APPA RAO & M S RANGANAYAKULU

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
August, 2025	12	Aberrations: Introduction – Monochromatic aberrations: Spherical aberration, methods of minimizing Spherical aberration: Coma, Astigmatism, Distortion and Curvature of field. Chromatic aberration, Achromatic doublet, Achromatism for two lenses when (i) in contact and (ii) separated by a distance.	Distortion and Curvature of field	Aberrations	01	YES					
					01	YES		Assignment I	1	YES	

September, 2025	16	Interference: Principle of superposition – Coherence, Conditions for interference of light, Fresnel’s bi-Prism experiment and determination of wavelength of light –change of phase on Reflection, Oblique incidence of a plane wave on a thin film - Interference due to reflected light (cosine law) – Colors of thin films -- Interference by a film with two non-parallel reflecting surfaces (Wedge shaped film), Determination of diameter of wire, Newton’s rings in reflected light -- Determination of wavelength of monochromatic light, Michelson Interferometer -- Determination of wavelength of monochromatic light.	Interference by a film with two non-parallel reflecting surfaces	Interference	07	YES		Assignment II	1 hour	YES	
								Seminar	1	YES	
								Assignment III	1 Hour	YES	
					08	YES		Seminar	1 Hour	YES	
October 2025	16	Diffraction: Introduction, Distinction between Fresnel and Fraunhofer diffraction, Fraunhofer Diffraction due to single slit -- Fraunhofer diffraction pattern with N slits (diffraction grating), Resolving power of a Grating, Determination of wavelength of light in normal incidence using diffraction Grating, Fresnel’s half period zones -- Area of the half period zones -- Zone plate -- Comparison of Zone plate with	Difference between Interference and Diffraction.	Quarter wave plate, Half wave plate,	15	YES		Assignment IV	1 hour	YES	

		Convex lens -- Difference between Interference and Diffraction.									
November, 2025	08	Polarization: Introduction, Methods of polarization by reflection, refraction, double refraction, Brewster's law, Maull's law, Nicol prism – Construction and working as a Polarizer and Analyzer, Quarter wave plate, Half wave plate, Optical activity, Determination of specific rotation by Laurent's half shade Polarimeter.	Determination of specific rotation by Laurent's half shade Polarimeter	refraction, double refraction	15	Yes		Assignment V	1 hour	YES	
November, 2025	08	Lasers and Holography Lasers: introduction, Spontaneous emission, Stimulated emission, Population Inversion, Laser principle, Einstein Coefficients, Types of lasers: He-Ne laser, Ruby laser, Applications of lasers. Holography: Basic principle of holography, Gabor hologram and its limitations, Applications of holography.	Types of lasers: He-Ne laser, Ruby laser, Applications of lasers.	Lasers and Holography	15	Yes		Assignment V	1 hour	YES	

ANNUAL CURRICULAR PLAN I/III/V

YEAR: 2025-2026
SEMESTER & PAPER: II BSC SEMESTER- III COURSE-6 (Major) HEAT AND THERMODYNAMICS
NAME OF THE LECTURER: CH SUNDAR SINGH

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
August 2025	12	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 Claussius statements – Thermodynamic scale of temperature.	Degrees of freedom Thermodynamic scale of temperature and its identity with perfect gas scale	Transport Phenomena	01	YES					
				Carnot’s engine and it’s efficiency	01	YES		Assignment I	1	YES	
September, 2025	16	Entropy:- Entropy, physical significance – Change in entropy in reversible and irreversible processes – Entropy and disorder – Entropy of	.	Change of Entropy of a	07	YES		Assignment II	1 hour	YES	

		universe – Temperature- Entropy (T-S) diagram. Change of Entropy of a perfect gas – Change of entropy when ice changes into steam. Thermodynamic potentials and Maxwell's equations: 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.		perfect gas				Seminar	1	YES	
				Clausius-Clayperon's equation	08	YES		Assignment III	1 Hour	YES	
								Seminar	1 Hour	YES	
October 2025	16	Low temperature Physics: 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.		Adiabatic demagnetization Production of low temperatures	15	YES		Assignment IV	1 hour	YES	

November, 2025	08	Quantum theory of radiation: Black body-Ferry's black body – distribution of energy in the spectrum of Black body – Wein's displacement law, Wein's law, Rayleigh-Jean's law – Quantum theory of radiation - Planck's law – deduction of Wein's law and Rayleigh-Jeans law from Planck's law - Measurement of radiation – Earth as a Black Body. Types of pyrometers – Disappearing filament optical pyrometer – experimental determination – determination of solar constant, effective temperature of sun.		Disappearing filament optical pyrometer – experimental determination	15	Yes		Assignment V	1 hour	YES	
November, 2025	08	Quantum theory of radiation: Black body-Ferry's black body – distribution of energy in the spectrum of Black body – Wein's displacement law, Wein's law, Rayleigh-Jean's law – Quantum theory of radiation - Planck's law – deduction of Wein's law and Rayleigh-Jeans law from Planck's law - Measurement of radiation – Earth as a Black Body. Types of pyrometers – Disappearing filament optical pyrometer – experimental determination – determination of solar constant, effective temperature of sun.		Disappearing filament optical pyrometer – experimental determination	15	Yes		Assignment V	1 hour	YES	

ANNUAL CURRICULAR PLAN I/III/V

YEAR: 2025-2026
SEMESTER & PAPER: II BSC SEMESTER- III COURSE-7 (Major) ELECTRONIC DEVICES AND CIRCUITS
NAME OF THE LECTURER: K NAVEEN KUMAR

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
August 2025	12	P-N JUNCTION DIODES : P-N junction Diode, Formation of depletion region, Forward and Reverse bias of Ideal Diode, Tunnel Diode – Construction and working, V-I characteristics and Applications, Zener diode – V-I characteristics, Zener Diode as a Voltage Regulator -- Applications.			01	YES		Assignment I	1	YES	
					01	YES					
September, 2025	16	BI-POLAR JUNCTION TRANSISTOR AND ITS BIASING (D.C) :Transistor construction, Working of PNP and NPN Transistors, CB, CE, and CC Configurations of Transistor, Input and Output Characteristics of CB and CE configurations, Hybrid parameters of a Transistor and equivalent circuit, Bi-Polar Junction Transistor Biasing –	.		07	YES		Assignment II	1 hour	YES	
								Seminar	1	YES	
					08	YES		Assignment III	1 Hour	YES	
								Seminar	1 Hour	YES	

		Need for stabilization, Biasing methods – Voltage - Divider Bias.									
October 2025	16	FIELD EFFECT TRANSISTORS & POWER ELECTRONIC DEVICES: Difference between JFET and BJT, Construction and working of JFET, Drain and Transfer Characteristics, MOSFET - Depletion-type, and Enhancement-Type MOSFETs. UJT - Construction, working and V-I characteristics, SCR – Construction, Working and Characteristics.	Difference between JFET and BJT	SCR – Construction, Working and Characteristics.	15	YES		Assignment IV	1 hour	YES	
November, 2025	08	PHOTO ELECTRIC DEVICES: Light-Emitting Diodes (LEDs) - Construction, working, characteristics and Applications, Photo diode - Construction, working characteristics and Applications, Photo-Transistors - Construction, working, characteristics and Applications, Structure and operation of LDR and its Applications.	Photo diode - Construction, working characteristics	LDR and its Applications.	15	Yes		Assignment V	1 hour	YES	
November, 2025	08	POWER SUPPLIES: Rectifiers: Half wave, Full wave and Bridge rectifiers - Efficiency (with derivations), Ripple factor - Filters - Choke input (inductor), L-section, π -section filters. Three terminal fixed voltage IC-regulators (78XX and 79XX).	Half wave, Full wave and Bridge rectifiers	IC- regulators (78XX and 79XX).	15	Yes		Assignment V	1 hour	YES	

ANNUAL CURRICULAR PLAN I/III/V

YEAR: 2025-2026

SEMESTER & PAPER: II BSC SEMESTER- III COURSE-8

ANALOG AND DIGITAL ELECTRONICS

NAME OF THE LECTURER: V DURGA SANDHYA

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
August 2025	12	OPERATIONAL AMPLIFIERS : a) Concept of feedback in CE amplifier, Negative and Positive feedback, Advantages and Disadvantages of Negative feedback, Basic concepts of differential amplifier, Block diagram of Op-Amp and its equivalent circuit, IC Diagram (IC 741), Ideal voltage transfer curve, Open loop Op-Amp configurations- differential, inverting and non-inverting Op-Amps. b) Voltage Series Feedback Amplifier (Non-Inverting Op amp): Gain and Bandwidth derivations, Voltage Shunt Feedback Amplifier (Inverting Op amp): Gain and Bandwidth derivations	Ideal voltage transfer curve, Open loop Op-Amp configurations	differential, inverting and non-inverting Op-Amps.	01	YES					
				Feedback Amplifier	01	YES		Assignment I	1	YES	

September, 2025	16	PRACTICAL OPERATIONAL AMPLIFIER AND APPLICATIONS: a) Characteristics of an Ideal and Practical Operational Amplifier (IC 741), Input offset voltage, Input bias current, Input offset current, Total output offset voltage, CMRR, Slew rate and concept of Virtual ground. b) Applications of Op-Amp: Linear Applications: Voltage Follower, Summing Amplifier, Subtracting Amplifier, Averaging Amplifier, Difference Amplifier, Integrator and Differentiator, Square Wave response of Integrator and Differentiator (Brief explanation only)	CMRR, Slew rate and concept of Virtual ground. Difference Differentiator and Integrator	Operational Amplifier (IC 741), Applications of Op-Amp	07 08	YES YES	 Assignment II Seminar Assignment III Seminar	1 hour 1 1 Hour 1 Hour	YES YES YES YES	
October 2025	16	NUMBER SYSTEMS, CODES AND LOGIC GATES: a) Number Systems and Codes: Decimal, Binary, Octal and Hexadecimal number systems, conversions, Binary addition, Binary subtraction using 1's and 2's complement methods, BCD code and Gray code – Conversions b) Logic Gates: Construction and truth tables of OR, AND, NOT gates, Universal gates – Basic construction and truth tables of NOR & NAND, Realization of logic gates using NAND and	BCD code and Gray code – Conversions XOR and XNOR Logic gates	Number Systems and Codes Simplification of Boolean Expressions	15	YES	 Assignment IV	1 hour	YES	

[illegible]

		Superconductivity (qualitative treatment only). UNIT-II MEASUREMENT OF LOW TEMPERATURE Gas thermometer and its correction and calibration, Secondary thermometers, resistance thermometers, thermocouples, Vapour pressure thermometers, Magnetic thermometers, Advantages and drawbacks of each type of thermometer.									
September 2025	12	UNIT-III PRINCIPLES OF REFRIGERATION Introduction to Refrigeration- Natural and artificial refrigeration , Stages of refrigeration, Types of refrigeration -Vapor compression and vapor absorption refrigeration systems, Refrigeration cycle and explanation with a block diagram, applications of Refrigeration Introductory ideas on air-conditioning (qualitative treatment only). Refrigerants-Introduction, Ideal refrigerant, Properties of refrigerant, Requirement of refrigerants, Selection of refrigerants , Classification of refrigerants, commonly used refrigerants, Eco-friendly refrigerants.	applications of Refrigeration Requirement of refrigerants, Selection of refrigerants	Types of refrigeration - Vapor compression and vapor absorption refrigeration systems,	01	YES		Assignment	1	YES	
October 2025	12	UNIT-IV COMPONENTS OF REFRIGERATOR Refrigerator and its working, Block diagram, Coefficient of Performance (COP), Tons of refrigeration (TR) and Energy Efficiency Ratio (EER), Refrigerator components: Types of compressors, evaporators and condensers, differences between Heat engine and	differences between Heat engine and refrigerator,	Refrigerator and its working, Block diagram, Coefficient of Performance (COP), Tons of refrigeration	01	YES		Assignment	01	YES	

		refrigerator, Refrigerant leakage and detection.		(TR) and Energy							
November 2025	06	UNIT-V APPLICATIONS OF LOW TEMPERATURE & REFRIGERATION Applications of Low temperatures: Preservation of biological material, Food freezing, liquid nitrogen and liquid hydrogen in medical field, Superconducting magnets in MRI. Applications of refrigeration: Domestic refrigerators, Water coolers, Cold storages, Ice plants, Food preservation methods, Chemical and Process industries, Cold treatment of metals.		Preservation of biological material, Food freezing,	01	YES		Seminar	01	YES	
								Assignment	01	YES	

ANNUAL CURRICULAR PLAN I/III/V

YEAR: 2025-2026

SEMESTER & PAPER: III BSC SEMESTER – V PAPER-VII Title: SOLAR ENERGY AND APPLICATIONS

NAME OF THE LECTURER: P Rama Krishna 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 Allotted	Whether Conducted	If not Alternate Date
August 2025	9	Unit - I: BASIC CONCEPTS OF SOLAR ENERGY (10hrs) Spectral distribution of solar radiation, Solar constant , zenith angle and Air-Mass, standard time, local apparent time, equation of time, direct, diffuse and total radiations. Prediction of available solar radiation, Solar energy-Importance and global warming, Storage of solar energy, Solar pond. Pyrheliometer -	Prediction of available solar radiation, Solar energy-Importance and global warming,	Pyrheliometer - working principle, direct radiation measurement,	9	Yes		Assignment I	1	Yes	
								Student seminar I	1	Yes	

[illegible]

December 2025	12	UNIT-I VECTOR ANALYSIS Scalar and vector fields, gradient of a scalar field and its physical significance. Divergence and curl of a vector field with derivations and physical interpretation. Vector integration (line, surface and volume), Statement and proof of Gauss and Stokes theorems.	Precession of atom and nucleus in magnetic field	Mechanics of Particles	6	Yes		PPT	1	Yes	
								Assignment	1	Yes	
January 2026	16	UNIT-II MECHANICS OF PARTICLES Laws of motion, motion of variable mass system, Equation of motion of a rocket. Conservation of energy and momentum, Collisions in two and three dimensions, Concept of impact parameter, scattering cross-section, Rutherford scattering-derivation. UNIT-III MECHANICS OF RIGID BODIES AND CONTINUOUS MEDIA 9hrs Definition of rigid body, rotational kinematic relations, equation of motion for a rotating body, Precession of a top, Gyroscope, Precession of the equinoxes. Elastic constants of isotropic solids and their relations, Poisson's ratio and expression for Poisson's ratio. Classification of beams, types of bending, point load, distributed load.	Motion of satellites.		8	Yes		PPT	1	Yes	
								Assignment	1	Yes	
			Precession of a top, Gyroscope, Precession of the equinoxes.		8	Yes		PPT	1	Yes	
								Student seminars	1	Yes	

February, 2026	16	UNIT-IV CENTRAL FORCES Central forces, definition and examples, characteristics of central forces, conservative nature of central forces, conservative force as a negative gradient of potential energy, equations of motion under a . Derivation of Kepler's laws. Motion of satellites.		Motion in a Central Force Field	8	Yes		Assignment	1	YES	
March, 2026	08	UNIT-V SPECIAL THEORY OF RELATIVITY Galilean relativity, Absolute frames. Michelson-Morley experiment, the negative result. Postulates of special theory of relativity. Lorentz transformation, time dilation, length contraction, addition of velocities, mass-energy relation.	Absolute frames.	Lorentz transformation, time dilation	8	Yes		Assignment	1	Yes	

ANNUAL CURRICULAR PLAN II/IV/VI

YEAR: 2025-2026
 SEMESTER & PAPER: I BSC SEMESTER- II PAPER- COURSE 4 (Major): WAVES AND OSCILLATIONS
 NAME OF THE LECTURER: Ch Sundar Singh

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, 2025	12	UNIT-I SIMPLE HARMONIC	Physical	compound pendulum-	01	YES					

December 2025	12	Electrostatics: (6hrs) Gauss's law-Statement and its proof, Electric field intensity due to (i) uniformly charged solid sphere and (ii) an infinite conducting sheet of charge, Deduction of Coulomb's law from Gauss law, Electrical potential-Equipotential surfaces, Potential due to a (i) dipole (ii) uniformly charged sphere 2. Dielectrics: Dielectrics-Polar and Non-polar dielectrics-Effect of electric field on dielectrics, Dielectric strength, Capacitance of a parallel plate condenser with dielectric slab between the plates, Electric displacement D, electric polarization P, Relation between D, E and P, Dielectric constant and electric susceptibility.		Electrostatics	8	YES		Assignment I	1	YES	
				Dielectrics	6	YES		Assignment II	1	yes	
January 2026	12	3. Magnetostatics: Biot-Savart's law and its applications: (i) circular loop and (ii) solenoid, Divergence and curl of magnetic field , Ampere's Circuital Law and its application to Solenoid, Hall effect, determination of Hall coefficient and applications. 4. Electromagnetic Induction: Faraday's laws of electromagnetic induction, Lenz's law, Self induction and Mutual induction, Self inductance of a long solenoid, Mutual inductance of two coils, Energy stored in magnetic field, Eddy	Divergence and curl of magnetic field,	Magnetostatics	10	YES		Assignment-III	01 Hour	YES	
				Moving charges in electric and magnetic fields	8	YES		Seminar	02 Hours	YES	
					4	YES					

		currents and Electromagnetic damping. 5. Alternating currents: Alternating current - Relation between current and voltage in LR and CR circuits, Phasor and Vector diagrams, LCR series and parallel resonant circuit, Q –factor, Power in ac circuits, Power factor.		Electromagnetic Induction				Assignment IV	01 Hour	YES	
February 2026	12	6. Electromagnetic waves-Maxwell's equations: Idea of displacement current, Maxwell's equations-Derivation, Maxwell's wave equation (with derivation), Transverse nature of electromagnetic waves, Poynting theorem (Statement only). Basic Electronic devices: PN junction diode, Zener diode and Light Emitting Diode (LED) and their I-V characteristics, Zener diode as a regulator-Transistors and its operation, CB, CE and CC configurations, Input and output characteristics of a transistor in CE mode, Relation between alpha, beta and gamma; Hybrid parameters, Determination of hybrid parameters from transistor characteristics; Transistor as an amplifier.	Hybrid parameters, Determination of hybrid parameters from transistor characteristics								
March, 2026	12	Digital Electronics: (12 hrs) Number systems, Conversion of binary to decimal system and vice versa, Binary addition & Binary subtraction (1's and 2's complement methods), Laws of Boolean algebra, DeMorgan's laws-Statements and		Digital electronics	6	YES		Assignment V	1	YES	

		Proofs, Basic logic gates, NAND and NOR as universal gates, Exclusive-OR gate, Half adder and Full adder circuits.									
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ANNUAL CURRICULAR PLAN II/IV/VI

YEAR: 2025-2026
SEMESTER & PAPER: II BSC SEMESTER - IV COURSE 10 (Major), Course 4 (Minor) : MODERN PHYSICS
NAME OF THE LECTURER: DR APV APPARAO, K Naveen Kumar

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 2025	12	Atomic and Molecular Physics : Vector atom model and Stern-Gerlach experiment, Quantum numbers associated with it, Angular momentum of the atom, Coupling schemes, Spectral terms and spectral notations, Selection rules, Intensity rules , Fine structure of Sodium D-lines, Zeeman effect, Experimental arrangement to study Zeeman effect; Raman effect, Characteristics of Raman effect, Experimental arrangement to study Raman effect, Quantum theory of Raman effect, Applications of Raman effect	Spectral terms and spectral notations, Selection rules, Intensity rules		09	Yes		Assignment I	1	Yes	
January, 2026	12	2. Matter waves & Uncertainty Principle: Matter waves, de Broglie’s hypothesis, Wave length of matter waves, Properties of matter waves, Davisson and Germer’s experiment, Phase and group velocities (Qualitative treatment), Heisenberg’s uncertainty principle	Bohr’s principle of complementarity.		09	Yes		Student seminar I Assignment II	1	Yes	

		for position and momentum& energy and time, Illustration of uncertainty principle using diffraction of beam of electrons (Diffraction by a single slit) and photons (Gamma ray microscope), Bohr's principle of complementarity. 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 (i) one dimensional potential box of infinite height (Infinite Potential Well) and (ii) one dimensional harmonic oscillator	one dimensional harmonic oscillator		09	Yes		Assignment III	1	YES	
February 2026	12	4. Nuclear Physics : (12 hrs) <i>Nuclear Structure:</i> General Properties of Nuclei, Mass defect, Binding energy; <i>Nuclear forces:</i> Characteristics of nuclear forces- Yukawa's meson theory; <i>Nuclear Models:</i> Liquid drop model, The Shell model, Magic numbers; <i>Nuclear Radiation detectors:</i> G.M. Counter, Cloud chamber, Solid State detector; <i>Elementary Particles:</i> Elementary Particles and their classification. UNIT-V: 5. Nano materials :(7hrs) Nanomaterials – Introduction, Electron confinement, Size effect, Surface to volume ratio, Classification of nano materials– (0D, 1D, 2D); Quantum dots, Nano wires, Fullerene, CNT, Graphene (Mention of structures and properties), Distinct properties of nano materials (Mention-	Characteristics of nuclear forces- Yukawa's meson theory		09	Yes		PPT Assignment IV	1 1	Yes YES	
						Yes		Career Guidance Class	1	Yes	

		<i>mechanical, optical, electrical, and magnetic properties</i>); Mention of applications of nano materials: (<i>Fuel cells, Phosphors for HD TV, Next Generation Computer chips, elimination of pollutants, sensors</i>) .									
March 2026	06	6. Superconductivity: (5 hrs) Introduction to Superconductivity, Experimental results-critical temperature, critical magnetic field, Meissner effect , Isotope effect, Type I and Type II superconductors, BCS theory (elementary ideas only) , Applications of superconductors.	BCS theory (elementary ideas only),		09	Yes		PPT seminar Career Guidance Class Assignment V	1 1 1 1	Yes Yes Yes Yes	

ANNUAL CURRICULAR PLAN II/IV/VI

YEAR: 2025-2026
SEMESTER & PAPER: II BSC SEMESTER - IV COURSE 11 (Major) : INTRODUCTION TO NUCLEAR AND PARTICLE PHYSICS
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 Allotted	Whether Conducted	If not Alternate Date
December 2025	12	INTRODUCTION TO NUCLEAR PHYSICS: Nuclear Structure: General Properties of Nuclei, Mass defect, Binding energy; Nuclear forces: Characteristics of nuclear forces- Nuclear Models-Liquid drop model-Semi empirical mass formula, nuclear shell model.	Semi empirical mass formula	Liquid drop model	09	Yes		Assignment I	1	Yes	

January, 2026	12	ELEMENTARY PARTICLES AND INTERACTIONS: Discovery and classification of elementary particles, properties of leptons, mesons and baryons; Types of interactions-strong, electromagnetic and weak interactions; Conservation laws – Isospin, parity, charge conjugation. NUCLEAR REACTIONS AND NUCLEAR DETECTORS: Nuclear Reactions: Types of reactions, Conservation Laws in nuclear reactions, Reaction energetic, Threshold energy, nuclear cross-section; Nuclear detectors: Geiger-Muller counter, Scintillation counter, Wilson's cloud chamber.	Types of interactions	Conservation laws – Isospin, parity, charge conjugation.	09 09	Yes Yes		Student seminar I Assignment II Assignment III	1 1	Yes YES	
February 2026	12	NUCLEAR DECAYS AND NUCLEAR ACCELERATORS: Nuclear Decays: Gamow's theory of alpha decay, Fermi's theory of Beta- decay, Energy release in Beta-decay, selection rules. Nuclear Accelerators: Types-Electrostatic and electrodynamics accelerators; Cyclotron-construction, working and applications; Synchrocyclotron-construction, working and applications.	Conservation Laws in nuclear reactions	Nuclear detectors	09	Yes Yes		PPT Assignment IV Career Guidance Class	1 1 1	Yes YES Yes	
March 2026	06	APPLICATIONS OF NUCLEAR AND PARTICLE PHYSICS: Medical Applications: Radiation therapy and imaging techniques, nuclear energy: nuclear reactors and power generation, Particle physics in high-energy Astrophysics.	Energy release in Beta-decay	Electrostatic and electrodynamics accelerators	09	Yes		PPT seminar Career Guidance Class Assignment V	1 1 1 1	Yes Yes Yes Yes	