

H.K.E.SOCIETY 'S
A.V.PATIL ARTS SCIENCE AND COMMERCE COLLEGE ALAND

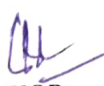
Department of Physics

Teaching plan for academic year 2021-22 (Even Sem)

Name of the teaching staff : S S KAMMAR

Month	Class	Syllabus
B.Sc. VI Semester		
June/ July	B.Sc. VI Sem	Unit 1: General Properties of Nuclei Constituents of nucleus and their Intrinsic properties, quantitative facts about size, mass , Charge density (Matter energy), binding energy, and its variation with mass number , main features of binding energy verses mass number curve, angular momentum, parity, magnetic moment ,electric moments, nuclear excites states. 8 Hrs
July/ August	B.Sc. VI Sem	Unit-2 Nuclear Models: Liquid drop model approach, semi empirical, mass formula and significance of various terms, condition of nuclear stability. Nuclear shell model: Basic assumptions of shell model & evidence for nuclear shell structure, nuclear magic numbers. Concept of nuclear force and its properties. 9 Hrs
August/ September	B.Sc. VI Sem	Unit-3 Radio activity Decay 10 Hrs (a) Alpha decay: basis of α -decay processes, theory of α -decay, Gamow factor, Geiger Nuttall law. (b) Beta decay: Energy kinematics for β -decay, positron emission, electron capture, neutrino hypothesis. (c) Gamma decay: Gamma rays emission & kinematics, internal conversion.


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Name of the teaching staff : C S MUNOLLI

Month	Class	Syllabus
B.Sc. VI Semester		
June/ July	B.Sc. VI Sem	Unit-4 Nuclear Reactions: Types of nuclear reactions, Conservation Laws, kinematics of reactions, value reaction rate, reaction cross section, Concept of compound and direct reaction, resonance reaction. S H 25
July/ August	B.Sc. VI Sem	Unit-5 Detector For Nuclear Radiations Gas detectors: estimation of electric field, mobility of particle for ionization chamber and GM counter basic principle of scintillation detector and construction of photo-multiplier tube (PMT). Semiconductor Detectors (Si & Ge) for charge particle Particle Accelerators: Type of accelerators, accelerators facilities available in India, Van de Graaff generator (Tandem accelerators). Linear accelerators, Cyclotron and Betatron. 679 H 25
August/ September	B.Sc. VI Sem	Unit-6 Particle Physics Particle interactions: basic features, types of particles and its families. Symmetries and conservation Laws: energy and momentum, angular momentum, parity, baryon number, Lepton number, Isospin, Strangeness and charm, concept of quark model, color quantum number and gluons 10 + H 25


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Month	Class	Syllabus
B.Sc. VI Semester		
June/ July	B.Sc. VI Sem SEC	Unit-1 Fossil Fuels And Alternate Sources Of Energy Fossil fuels and Nuclear Energy, their limitations, Need of renewable energy, non-conventional energy source ,developments in offshore wind energy, Tidal energy, Wave energy systems, Ocean thermal energy conservation, solar energy , Bio- mass , Biochemical conservation, Bio-gas generation, Geothermal energy, Tidal energy ,Hydroelectricity. Wind energy Harvesting: Wind energy Fundamentals of wind energy, Wind Turbines, types of wind machines, performance of wind machine. Application of wind energy and environmental aspects $3+3 = 6 \text{ Hrs}$
July	B.Sc. VI Sem SEC	Unit-2 Solar Energy Solar energy, its importance, storage of solar energy, solar electric power generation, solar pond applications of solar pond and solar energy, solar water heater , flat plate collector, solar distillation, solar cooker, solar green house ,solar cell , solar photovoltaic and sun tracking systems. 5 Hrs
August	B.Sc. VI Sem SEC	Unit-3 Ocean Energy Ocean energy, ocean thermal electrical conversion, methods of ocean thermal electrical power generation. Advantages and disadvantages of wave energy, wave energy device. Tidal Energy: Tidal energy, basic principal of tidal power estimation of energy, pore in a double cycle system, Osmotic power, ocean bio-mass. Geothermal Energy: Geothermal Resources, Geothermal Technologies. Hydro Energy: Hydropower resources, Hydropower Technologies, environmental impact of hydro power sources. $3+2+2+2=9 \text{ Hrs}$

Note: Practical classes are engaged as per the time table


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Name of the teaching staff : C S MUNOLLI

Month	Class	Syllabus
July	B.Sc. VI Sem SEC	Unit-4 Piezoelectric Energy Harvesting: Introduction, Physics and characteristics of piezoelectric effect, materials piezoelectric parameters and modeling piezoelectric generators, piezoelectric energy harvesting applications, Human power. Electromagnetic Energy Harvesting: Linear generators, Recent applications carbon captured technologies, cell, batteries, and power consumption. Environmental issues and Renewable sources of energy, sustainability.

$4+4+2=10$ Hrs

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Name of the teaching staff : C. S Munnolli

Month	Class	Syllabus
June/ July	B.Sc IV SEM	<p>Unit 1</p> <p>1) Superposition Of Two Collinear Harmonic Oscillation: linearity and superposition principle, oscillations having equal frequencies and oscillations having different frequencies $4+2+7=13$ hrs</p> <p>2) Superposition Of Two Perpendicular Harmonic Oscillations: Graphical and Analytical methods lissajous figures with equal an unequal frequency and their uses.</p> <p>3) Wave Motion: Transverse waves on a string. Travelling and standing waves on string normal modes of a string group velocity, phase velocity, plane waves, spherical waves, wave intensity.</p>
July/ -August	B.Sc IV SEM	<p>Unit 2</p> <p>1) Fluid: Surface Tension: Synclastic and anticlastic surface - excess of pressure-Application to spherical and cylindrical drops and bubbles-variation of surface tension with temperature-jaegers' method.DB;</p> <p>2) Viscosity: Viscosity-rate flow of liquid in a capillary tube-Poiseuille's formula-determination of coefficient of viscosity of liquid- variations of viscosity of a liquid with temperature lubrication. Physics of low pressure-production and measurement of low pressure-Rotary pump- diffusion pump-molecular pump-Knudsen absolute gauge-penning and pirani gauge-detection of leakage. 6 Hrs</p>
June Agust/Sept	B.Sc IV SEM	<p>Unit-3</p> <p>Sound: simple harmonic motion -forced vibrations and resonance- Intensity and loudness of sound -decibels -intensity levels-musical notes-musical scale. Acoustics of buildings. Reverberation and time of reverberation -Absorption coefficient - Sabine's formula - measurements of reverberation time-Acoustics aspects of hall and auditorium.</p> <p>Wave Optics: Electromagnetic nature of light. Definition and Properties of wave front. Huygens principal. Construction of wave front. $6+3=9$ hrs</p>

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Name of the teaching staff : **S S KAMMAR**

Month	Class	Syllabus
June/ July	B.Sc IV SEM	Unit-4 Interference: Division of amplitude and division of wave front. Young's double slit experiments. Lloyd's mirror and Fresnel biprism. Phase change on reflection Stokes's treatment interference in thin films, parallel and wedge -shaped films. Fringes of equal inclination, fringes of equal thickness. Newton's rings measurements of wavelength and refractive index. <i>10 Hrs</i>
July/ August/ June	B.Sc IV SEM	Unit 5 Michelson's Interferometer : Idea of form of Fringes. Determination of wavelength difference refractive Index and visibility of fringes. Diffraction: Fraunhofer diffraction single slit, double slit, multiple slits or diffraction grating, Fresnel diffraction Half-period zone. Zone plate, Fresnel diffraction pattern of a straight edge, a slit and a wire using Half-period zone analysis <i>3+6=9 Hrs</i>
Aug/ Sept/ July	B.Sc IV SEM	Unit 6 Polarization: Transverse nature of light waves plane polarized light production and analysis circular and elliptical polarization double refraction in a uniaxial crystal. Huygens theory of positive and negative crystal optics activity Fresnel theory, Quarter wave plate and half wave plate, Laurent half shade polarimeter. <i>13 Hrs</i>

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Name of the teaching staff : S S KAMMAR

Month	Class	Syllabus
APRIL	B.Sc II Sem	Chapter 6: Magnetism , Definition of magnetic field, Amperes law and Biot-Savart law, Magnetic force on a current carrying conductor, Hall effect. Electromagnetic induction, conducting rod moving in a magnetic field, Faradays law of induction, self inductance, mutual inductance and energy stored in a magnetic field 8 Hrs
MAY	B.Sc II Sem	Chapter 7: Alternating current circuits , resonant circuit, alternating current, quality factor, RL, RC, LC, LCR circuits, Admittance and impedance power and energy in AC circuits 6 Hrs
JUNE	B.Sc II SEM	Chapter 8: Electromagnetic waves : Equation of continuity, Maxwell's equation, displacement current electromagnetic wave, energy transported by electromagnetic waves. Field of a current loop, magnetic moment, electric current in atoms, electron spin and magnetic moment, magnetization and magnetic susceptibility. 8 Hrs
JULY	B.Sc II SEM	Chapter 9: Types of magnetic materials : diamagnetic, paramagnetic and ferromagnetic materials, B-H hysteresis curves 6 Hrs

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Name of the teaching staff : C S MUNOLLI

Month	Class	Syllabus
MARCH	B.Sc II Sem	Unit 1: Electric charge and field , coulomb's law, electric field strength, electric field lines, point charge in an electric field and electric dipole work done by a charge Chapter 2: Gauss law and its application 4+3 = 7 Hrs
APRIL	B.Sc II Sem	Chapter 3: Electric potential line integral gradient of scalar function relation between field and potential. Potential due to point charge and distribution of charges. Constant potential surfaces, Potential due to a dipole and electric quadrupole 7 Hrs
MAY	B.Sc II Sem	Chapter 4: Conductors in electrostatic field , conductors and insulators, Conductors in electric field, Capacitance and capacitors. Calculating capacitance in a parallel plate capacitor, parallel plate capacitor with dielectric, Energy stored in a capacitor, Dielectric and Gauss law for dielectrics 7 Hrs
JUNE	B.Sc II Sem	Chapter 5: Electric and current density , Electric conductivity and Ohm's law, Physics of electrical conduction, Conduction in metals and semiconductors, Circuit s and circuit elements, Variable currents in capacitor circuits, Register inductor and capacitor and their combination force on moving charges 7 Hrs

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Name of the teaching staff : S S KAMMAR

Month	Class	Syllabus
OCT/NOV	B.Sc V th	Unit 1: crystal structure: solids, amorphous and crystalline materials, lattice translation vectors, lattice with a basis. unit cell, miller indices, types of lattices, bravias lattice, brilliounin zones .diffraction of x- rays by crystals bragg's law and bragg's spectrometer ,determination of crystal, structure of Nacl. 12 Hrs
NOV/ DEC	B.Sc V th	Unit 2: elementary lattice dynamics: Lattice vibrations and phonons, linear monatomic and diatomic chains .acoustical and optical phonons, qualitative description of the phonon spectrum in solids dulong and pettit's law, einstein and debye theories of specific heat of solids t ³ law 10 Hrs
DEC/JAN	B.Sc V th	Unit 3 : Magnetic properties of matter Dia , para – ferri-and ferromagnetic materials classical langevin theory of dia – and paramagnetic domains . Quantum mechanical treatment of paramagnetism Curie's law Weiss's theory of ferromagnetism discussion of B ₋ H curve . Hysteresis and energy loss. 12 Hrs

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MONTHS	CLASS	SYLLABUS
OCT/NOV	B.Sc V th	Unit 4: dielectric properties of materials Polarization, local electric field at an atom depolarization field. Electric susceptibility polarizability, Clausius Mossotti equation, classical theory of electric polarizability, Langevin Debye equation. Complex dielectric constant, optical phenomenon: plasma oscillations, plasma frequency, Plasmon's. 10 HRS
DEC/JAN	B.Sc V th	Unit 5: elementary band theory concept of Fermi energy, band gaps, conductors, semiconductors, and insulators, p and n type semiconductors, conductivity of semiconductors, mobility, hall effect, hall coefficient 8 HRS
JAN /FEB	B.Sc V th	Unit 6: superconductivity superconductivity, BCS theory of superconductivity, experimental results, critical temperature, critical magnetic fields, Meissner effect type I, type II superconductors, London's equation, high T _c superconductors. 8 HRS

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Name of the Teaching Staff : S S KAMMAR

Month	Class	Syllabus
OCT/ NOV	B.Sc III Sem	Unit 1 LAWS OF THERMODYNAMICS 15 Hrs Thermodynamics Description of system: Zeroth Law of Thermodynamics and Temperature. First law an internal energy , conversion of heat into work various Thermo dynamical processes, Applications' of first law : General relation between C_p an C_v , work Done during isothermal and adiabatic process. Compressibility and Expansion coefficient, Reversible an irreversible process, Second law and Entropy, Carnot's Cycle and Theorem.
DEC/JA N	B.Sc III Sem	UNIT 5 STATISTICAL MECHANICS 15 Hrs Phase space, Macrostate, Microstate, Entropy and Thermodynamic Probability, Statistical Equilibrium, Maxwlls Boltzmann Distribution law- Distribution of Velocity mean, RMS and most probable velocities- Quantum Statistics- Fermi-Dirac distribution law- Electron Gas- Bose-Einstein Distribution law – Photon gas – Comparison of three statistics

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Month	Class	Syllabus
OCT/NOV	B.Sc III Sem	Unit 2 THERMODYNAMIC POTENTIALS 15 Hrs Enthalpy, Gibbs, Helmholtz and internal energy function, Maxwells relation and applications – Joule-Thompson effect, Clausius Clayperon equation, Expression for $(C_p - C_v)$, C_p/C_v , Tds equations. Refrigerator, Entropy changes in reversible an irrversibl processes. Entopy-Temperature diagrams, Third law of Thermodynamics, Unattainability of absolute Zero.
DEC/JAN	B.Sc III Sem	UNIT 3 KINETIC THEORY OF GASES 9 Hrs Derivation of maxwlls law of distribution of velocities and its experimental verification, Man free path (Zroth Order). Transport phenomenon : Viscosity, Conuction and Diffusion (for vertical case), Law of Equipartition of energy and its applications to specific heat of gases ; mono atomic, di atomic and triatomic gases.
JAN/FEB	B.Sc III Sem	UNIT 4 THEORY OF RADIATION 6 Hrs Black body radiation, spectral distribution, concepts of Energy Density. Derivation of Planks law, Deduction of Weins Distribution Law, Rayleigh Jeans Law, Stephens Boltzmann law and Weins Displacement law From Planks Law.

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MONTH	CLASS	SYLLABUS
OCT	B.Sc I ST	Unit 1: Units & Measurements: Fundamental and derived units, principle system of units (CGS & SI), Measurement of Length, Mass and Time, Dimensions- Dimensional formulae & Equations- Use of dimensions. Conversion of one system of units into another, Errors 4 Hrs
NOV	B.Sc I ST	Unit 2: Momentum & Energy Concept of work, energy and linear momentum, Conversion of linear momentum and examples, conversion of energy & examples. Motion of rockets (Single Stage) : System of variable mass 4 Hrs
DEC	B.Sc I ST	Unit 3: Special Theory of Relativity Einstein's Concept of Special Theory of Relativity, basic postulates of Special Theory of Relativity, Lorentz transformation of space and time, length 5 Hrs
JAN	B.Sc I ST	Unit 4 : Laws of Motion Newton's laws of motion, Dynamics of single & a System of particles, Centre of mass of system of two and many particles 4 Hrs

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OCT	B.Sc I ST	Unit 5: Dynamics of Rigid Bodies Rigid body-Translational and rotational motion. Rotational motion about an axis, relation between torque and angular momentum, Rotational energy. Moment of inertia- Theorem of parallel & perpendicular axis(Only statement) Moment of inertia of a rectangular lamina and solid cylinder. Moment of inertia of a fly wheel. Theory of compound pendulum and determination of g 5 Hrs
NOV	B.Sc I ST	Unit 6: Gravitation Law of Gravitation. Motion of a Particle in a central force field (Motion is in a plane angular momentum is conserved, areal velocity is constant). Kepler's laws(statements) satellite in a circular orbit. Elasticity 4 Hrs
DEC/JAN	B.Sc I ST	Unit 7: Elasticity Load, stress and strain, hooke's law and elastic limit, stress-strain diagram, elasticmoduli – relation between elastic constants, poisons ratio- expression for poisonsratio is terms of elastic constants, work done in stretching wire, twisting couple on cylinder, torsional pendulum, determination of rigidity modulus by torsional pendulum, youngs modulus by uniform bending 13 Hrs
JAN/FEB	B.Sc I ST	Unit 5: Surface tension Definition of surface tension. Surface energy. relation between surface tension and surface energy, Pressure difference across curved surface example, excess pressure inside spherical liquid drop, Angle of Contact 6 Hrs
FEB	B.Sc I ST	Unit 9: Viscosity Laminar or viscous, coefficient of viscosity, streamline flow and turbulent flow, equation of continuity, determination of coefficient of viscosity by poissulles and stokes method, Problems 7 Hrs

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