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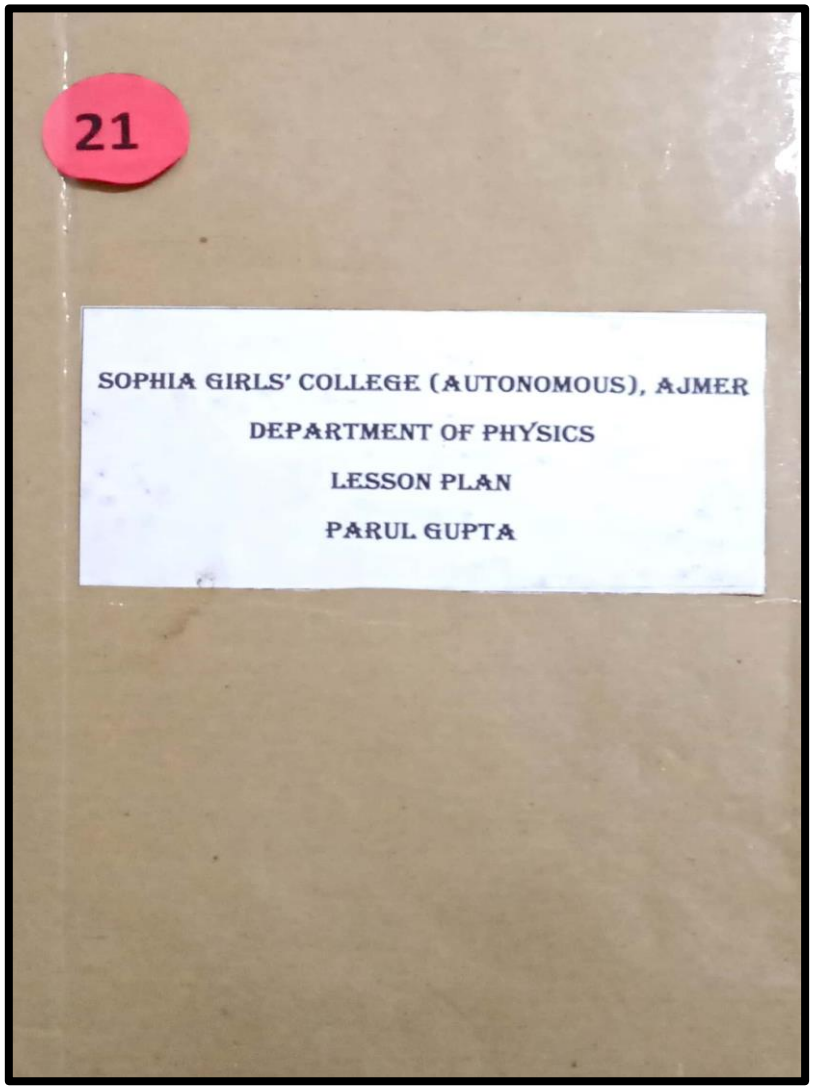

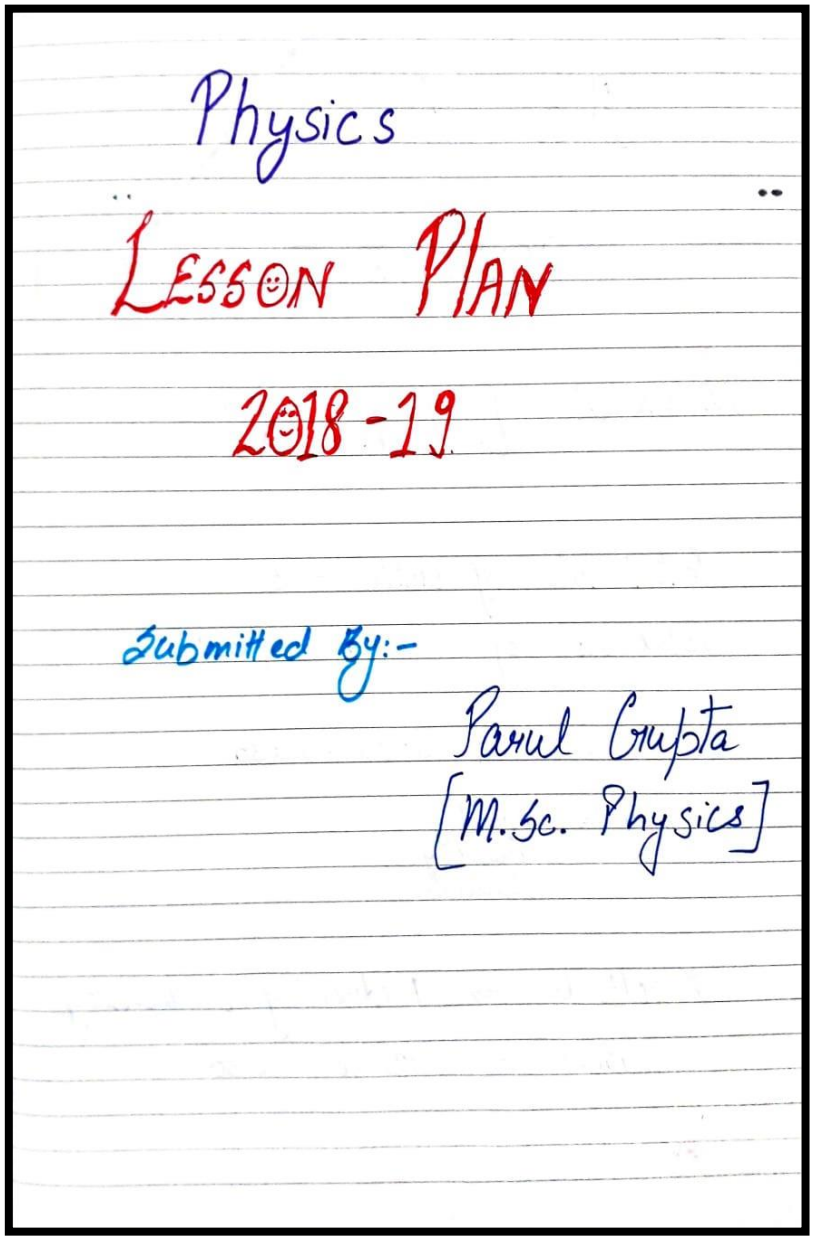
Physics
LESSON PLAN
2018-19
Submitted By:-
Parul Gupta
[M.Sc. Physics]

SOPHIA GIRL'S COLLEGE, AJMER (*AUTONOMOUS*)

B.Sc. I (SEMESTER I)

Mechanics (PAPER I) (PHY 101)

Max. Marks : 75 (50Ext; 25 Int) Min. Marks: 30(20 Ext;10 Int) Credit: 03

COURSE PLAN 2018-19

SEM I Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
JULY	**UNIT I** Kinematics of moving fluids, Equation of continuity, Bernoulli's theorem and its applications – atomizer Reynold's number, Stokes law, terminal velocity, Surface Energy, Excess pressure inside soap bubble, liquid drop and air bubble. Surface tension and surface energy, molecular interpretation of surface tension. Torricelli's theorem and ventruimeter. Viscous fluids, Stream line and Turbulent flow, Poiseuille's law, Capillary tube	Viscosity. Bernoullie's theorem Bernoullie's theorem applications .	Giving different examples by relating with nature, white board teaching, students-teacher discussion ,PPT only for Theoretical concept	Calculation of Excess pressure and also meniscus of different liquids. Knowledge about the liquid flow	*Knowledge Based* -What is Stokes Law? - Define Surface Tension.	Knowledge--60 Understanding-30 Higher Order-10

	flow					
AUGUST	**UNIT II** System of particles, centre of mass, centre of mass of two particles and N particles systems , energy and momentum conservation, concepts of elastic and inelastic collisions. , motion of centre of mass, concept of reduced mass .	Meaning of angular momentum,Idea of centre of mass. Application of reduced mass and calculation of reduced mass of different system	All derivation clearly solved on board ,PPT, Discussion on Numericals.	Calculate centre of mass of two particles system,Conservation of angular momentum.	*Understanding Based* -Compare types of Flow of liquid. -Derive Torricell's theorem.	
	.Angular momentum of a system of particles, Conservation of angular momentum, angular momentum about an arbitrary point.		Class test, Problem solving session, Remedial classes			
SEPTEMBER	Equation of motion of a rotating body, kinetic energy of rotation and idea of principles axes, Rigid body motion.	Fundamental knowledge of collision Momentum and detail study of principles axes.	Diagrams, Examples,Numerical s,PPT			

			examples relating with nature, white board teaching, Experimental Discussion ,PPT only for Theoretical concept			
OCTOBER-NOVEMBER	**UNIT III** Elasticity, Small deformations, Young's modulus, Bulk modulus and Modulus of rigidity for an isotropic solid, Poisson ratio, relation between elastic constants. Theory of bending of beams and Cantilever, Torsion of a cylinder, Bending moments and Shearing forces.	Properties of solids, elastic constants. Theory of bending of beams	Experimental Knowledge,PPT only for Theoretical concept,Open book test,Tutorial classes	Knowledge about various rigidity of solids and calculation of bending moment.	*Higher Order* *Thinking Skills Based* -Derive the expression for elastic and inelastic collision. -Deduce an expression for Torsion constant.	

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SOPHIA GIRL'S COLLEGE, AJMER (*AUTONOMOUS*)
B.Sc. II (SEMESTER III)
ELECTRONICS (PHY-301)

Max. Marks: 75 (50 External; 25 Internal) Min. Marks: 30 (20 External; 10 Internal) Credit: 03

COURSE PLAN

SEM I Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
SEM I JULY	**UNIT I** Energy bands in solids, Intrinsic and extrinsic semiconductors, carrier mobility and electrical resistivity of semiconductors, photoconduction in semiconductors, solar cell, p-n junction diode and their characteristics.	Semiconductors	PPT, Quiz, Lecture method, Problem solving method.	Describe Zener diode and its function as a voltage regulator.	*Knowledge Based* - what is intrinsic and extrinsic semiconductors? Give example of both. -what are filters? Explain them with their types. *Understanding Based*	Knowledge—60 Understanding-30 Higher Order-10
JULY-AUGUST	Zener and Avalanche Breakdown, Zener diode ,Zener diode as voltage regulator, Light emitting diode(LED), Photodiode, Solar cell, p-n junction as a rectifier, half wave and full wave rectifiers (with derivation), Filters (series inductor, Shunt capacitance, L-section or choke, pie and RC filter circuits.	Application of diode as a rectifier.	Lecture method, problem solving method, Quiz.			

	UNIT II Junction transistor, Working of NPN and PNP transistors, Three configuration of transistor(C-B , C-E, C-C modes), Common base, common emitter, and common collector characteristics of transistor.	Transistor in different configurations.	PPT, Quiz, Lecture method, Problem solving method.	Compare Transistors, parameters and biasing of transistors.	-Describe three types of configuration of Transistor. - Describe the working of JFET.	
AUGUST-SEPTEMBER	Parameters of a transistor and their relation, D.C. load line, Transistor biasing; various method of transistor biasing and stabilization. Junction Field Effect Transistor(JFET), volt ampere relations.	Operating point of JFET.	Demonstration through examples			
OCTOBER	**UNIT III** Amplifier, Classification of Amplifiers, common base and common emitter amplifiers, coupling of amplifiers.	Amplifiers.	Lecture Method, PPT, quiz, Demonstration through examples.	-Explain R-C coupled amplifier.	*Higher Order Thinking Skills Based* - Explain different types of Amplifiers -Discuss feedback in Amplifiers.	
	Various methods of coupling, Feedback in amplifiers, advantages of negative feedback, emitter follower, distortion in amplifiers, Resistance-Capacitance(RC) coupled amplifier.	Negative Feedback.	Lecture Method, PPT, quiz, numerical solving method			

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SOPHIA GIRL'S COLLEGE, AJMER (*AUTONOMOUS*)

B. Sc. III (SEMESTER-V) **SOLID STATE PHYSICS (PHY-501)**

Max. Marks: 75 (50 External; 25 Internal) Min. Marks: 30 (20 External; 10 Internal) Credit: 03

COURSE PLAN

SEM V Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
JULY	**UNIT I** Crystal binding and crystal structure: Crystal bonding, Ionic bonding, binding energy of ionic crystal, determination of repulsive exponent, covalent bonding, metallic bonding, molecular and vanderwall's bonding, hydrogen bonding.	Types of bonding	Lecture method, problem solving method, quiz	Summarise different bonding between atoms	*Knowledge Based* -What is Crystal bonding? -What is binding energy of ionic crystal?	Knowledge--60 Understanding-30 Higher Order-10
JULY-AUGUST	Space lattice and crystal structure, Bravis lattice ,Miller indices and crystal structure, spacing of planes in crystal lattice, atomic packing, simple cubical lattice structure, face centered cubic lattice structure, body centered cubic	Lattice structure	Lecture method, problem solving method			

	lattice structure, X-ray diffraction(Laue's equation), reciprocal lattice and its physical significance ,reciprocal lattice vectors, reciprocal lattice to a simple cubic lattice, b.c.c. ,f.c.c.					
AUGUST-SEPTEMBER	**UNIT II** Thermal properties of solids : concepts of thermal energy and phonons, internal energy and specific heat, the various theories of lattice specific heat of solids: the Einstein model, vibrational modes of continuous medium, Debye model, electronic configuration of the internal energyhence to the specific heat of metals.	Basic concept of Einstein and Debye model.	Group Discussion, Lecture method, Quiz.	Explain vibrational modes of continuous medium of Einstein model.	*Understanding Based* -Discuss Bloch theorem. -what is Effective Mass of electron?	
SEPTEMBER-OCTOBER	Band theory of solids: formation of bands, periodic potential of solid, wave function in periodic lattice and bloch theorem, number of states in a band, kronnig penny model, velocity of bloch electrons and dynamical effective mass, momentum, crystal momentum and	Kronnig Penny model.	Demonstration through examples, PPT, Quiz.			

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	physical origin ofeffective mass, negative effective mass, concept of holes, distinction between metals, insulators, and intrinsic semiconductors.					
OCTOBER - NOVEMBER	**UNIT III** Superconductivity: Introduction, experimental features of superconductivity, the isotope effect, electron phonon interaction, the effect of superconducting transition of properties of superconductors, special features of superconducting materials,.	Superconductivity.	Lecture Method, PPT, quiz, numerical solving method.	What are cooper pairs? Explain BCS theory of superconductivity	*Higher Order Thinking Skills Based* - Estimate the special features of superconducting materials. - Explain magnetic susceptibility	
NOVEMBER	Theoretical survey(basic idea), Flux quantization, BCS theory of superconductivity: cooper pairs ,high temperature superconductors(basic ideas), magnetic properties: classification of magnetic materials, origin of atomic magnetism, magnetic susceptibility, phenomenon of diamagnetism, para magnetic susceptibility of ionic crystal, ferromagnetism.	Magnetic properties of materials.	Lecture Method, PPT, quiz, numerical solving method			

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SOPHIA GIRL'S COLLEGE, AJMER (*AUTONOMOUS*)
B. Sc. I (SEMESTER II)
Waves and Oscillations (PHY-202)

Max. Marks: 75 (50 External; 25 Internal)

Min. Marks: 30 (20 External; 10 Internal)

Credit: 03

COURSE PLAN

SEM II Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
SEM II DECEMBER	**UNIT I** Potential well and periodic oscillations, cases of harmonic oscillations, differential equations and its solutions	Theory of Potential	Lecture method, problem solving method, quiz	Calculate time period of various oscillators.	*Knowledge Based* -What is the Periodic Oscillations? -what is the LC circuit? *Understanding Based* -Calculate the time period of Compound Pendulum. *Order Thinking Skills Based* - Estimate the	Knowledge—60 Understanding-30 Higher Order-10
JANUARY	, Kinetic and Potential energy, Simple harmonic oscillations in-Spring and mass system, Simple and compound pendulum, Torsional pendulum, Bifilar oscillations, Helmholtz resonator, LC circuits, Vibration of magnet, Oscillation of two masses connected by a spring, Superposition of two simple harmonic motions of same frequency along the same line, Interference.	Time Period of Oscillator	Lecture method, problem solving method			
FEBRUARY	**UNIT II** Waves in media: Speed of					

	transverse waves on a uniform string. Speed of longitudinal waves in a fluid. Energy density and energy transmission in Waves. Typical measurement. Group velocity and phase velocity, their measurements. superposition of waves. linear homogenous equations and the superposition principle	Superposition Principle	Group Discussion. Lecture method	Explain superpositi on of waves and their application in standing waves.	formula for displacement, velocity and find an expression for KE and PE Write Method of Production and detection of ultrasonic and infrasonic waves and applications	
FEBRUARY	Standing waves: Standing waves as normal modes of bounded systems, Harmonies and quality of sound: examples. Production and detection of ultrasonic and infrasonic waves and applications	Standing Waves	Demonstration through examples			
FEBRUARY	**UNIT III** Noise and Music: The human ear and its responses, limits of human audibility, intensity and loudness, bel and decibel, the musical scale, temperament and musical instruments.	Musical Scale	Lecture Method, PPT, quiz, numerical solving method	Relate Noise and Music, its scale and circularly elliptically polarized light.		
MARCH-APRIL	Plane electromagnetic waves in vacuum, Wave equation for E and B of linearly, circularly and elliptically polarized EMW, Poynting vector; Reflection and refraction at a plane boundary of dielectrics, Polarisation by reflection & total internal reflection	Polarisation	Lecture Method, PPT, quiz, numerical solving method			

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B. Sc. II (SEMESTER IV)

ELECTRONICS - II (PHY-402)

Max. Marks: 75 (50 External; 25 Internal)

Min. Marks: 30 (20 External; 10 Internal)

Credit: 03

COURSE PLAN

SEM I Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
SEM I DECEMBER	**UNIT I** Oscillators, Principle of Oscillation, classification of oscillators, condition for self-sustained oscillation: Barkhausen criterion for oscillation,	Oscillators	Lecture method, problem solving method, quiz	Summarise Oscillators and its types.	*Knowledge Based* -What is Oscillator? -What is the condition for self-sustained oscillation?	Knowledge--60 Understanding-30 Higher Order-10
JANUARY	Tuned collector common emitter oscillator, Hartley oscillator, R-C oscillator and its advantages.	Hartley Oscillator.	Lecture method, problem solving method			
FEBURARY	**UNIT II** Logic circuits: Transistor as a Switch, logic fundamentals, AND,	Transistor as a	Group Discussion, Lecture method, Quiz.		*Understanding Based* -Disciss AND, OR ,	

	OR, NOT, NOR, NAND, XOR Gate. Boolean algebra.	Switch.		Explain Magnetic field and analysis of AC circuits	NOT Gates. -Discuss De-Morgan's theorem.	
FEBURARY	De Morgan's theorem, positive and negative logic, logic gates circuits realization using DTL and TTL Logic, Simplification of Boolean algebra.	DTL and TTL logic.	Demonstration through examples, PPT, Quiz.			
MARCH	**UNIT III** Circuit analysis: Networks and some important definitions, loop and nodal equations based on DC and AC circuits (Kirchhoff's Laws).	Netwoks.	Lecture Method, PPT, quiz, numerical solving method.	. Classify Electrostatic properties of conducts and various boundary conditions.	*Higher Order Thinking Skills Based* - Estimate Kirchhoff law.	
	Four terminal networks: current voltage conventions open, close and hybrid parameters of any four terminal network, input, output , and mutual independence for an active four terminal network. Various circuits theorems: Superposition, Thevenin, Norton, reciprocity, maximum power transfer and Miller Theorems.	Various circuit theorems.	Lecture Method, PPT, quiz, numerical solving method		- Expain hybrid parameters of any four terminal network. .	

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B. Sc. III (SEMESTER-VI) **NUCLEAR PHYSICS (PHY-601)**

Max. Marks: 75 (50 External; 25 Internal) Min. Marks: 30 (20 External; 10 Internal) Credit: 03

COURSE PLAN

SEM VI Month	UNIT/TOPIC	Concepts/facts	Teaching Pedagogy	Learning Outcomes	Questions	Marks Weightage (%)
DECEMBER	**UNIT II** Nuclear fission: The discovery of nuclear fission, the energy release in the fission, the fission products, mass distribution of fission products, fission cross section and threshold, neutron emission in fission, the prompt neutrons and delayed neutrons, energy of fission neutrons, theory of nuclear fission and liquid drop model.	Fission and fusion.	Lecture method, problem solving method, quiz	Summarise the discovery of Nuclear fission.	*Knowledge Based* -What is Nuclear fission? -What is the principle of nuclear reactors?	Knowledge--60 Understanding-30 Higher Order-10
JANUARY	Barrier penetration- theory of spontaneous fission, nuclear energy sources, nuclear fission as a source of energy, the nuclear chain reaction, condition of controlled chain reaction, the principle of	Nuclear reactors.	Lecture method, problem solving method			

	nuclear reactors, classification of reactors, typical reactors, power of nuclear reactors, critical size of thermal reactors, Breeder reactors, reprocessing of spont fuel, radiation damages and fission products poisoning, uses of atomic energy.					
FEBURARY	**UNIT III** Nuclear fission: the sources of stellar energy, the plasma: the fourth state of matter, fusion reaction, energy balance and Lawson criteria, magnetic confinement of plasma, classical plasma losses from the magnetic container, anomalous losses, turbulence and plasma instabilities.	.Lawson criteria.	Group Discussion, Lecture method, Quiz.	Concept of elementary particles.	*Understanding Based* -Discuss Plasma as the fourth state of matter. -what are elementary particles?	
FEBURARY-MARCH	Elementary particles: classification of elementary particles, fundamental interactions, unified approach(basic ideas), the conservation laws, Quarks(basic ideas), charmed and coloured quarks.	Elementary particles.	Demonstration through examples, PPT, Quiz.			

MARCH	**UNIT I** Nuclear properties: Rutherford's theory of particle scattering, properties of nuclei, quadrupole moment and nuclear ellipticity, Quadrupole moment and nuclear spin, parity and orbital angular momentum, parity and its conservation.	Nuclear properties.	Lecture Method, PPT, quiz, numerical solving method.	Explain Rutherford theory of particle scattering.		
MARCH-APRIL	Cosmic rays: Discovery of cosmic rays, nature of cosmic rays, soft and hard , components, variation in cosmic rays – (1) Lattitude effect. (2) East-West asymmetry and directional effect. (3) Altitude effect. Detection of cosmic ray particles, origin of cosmic rays.	Cosmic rays.	Lecture Method, PPT, quiz, numerical solving method		*Higher Order Thinking Skills Based* - Estimate nuclear spin, parity and angular momentum. - Explain Lattitude effect.	

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