Lesson Plan
MCM DAV College for Women, Sector – 36A, Chandigarh
Monthly Teaching Plans (Odd Semester/Even Semester)
Session – (2023-24)
Odd Semester

Name of the Teacher: <u>Dr. Kulwinder Kaur</u>
Department: <u>Physics Department</u>
<u>**Physics, Paper A**</u>

Class: <u>B.Sc. III (NM, Voc) Vth Semester</u>   **Subject: <u>Condensed Matter Physics I</u>**

S. No.	Date (Monthly)		Topics to be Covered	Academic Activity Undertaken*
	From	**To**		
1	21/07/2023	15/8/2023	Crystal structure: Symmetry operations for a two-dimensional crystal. Two dimensional Bravais lattices, Three dimensional Bravais lattices, Basic primitive cells, Crystal planes and Miller indices Diamond and NaCl structure.	Lecture Method, assignments
2	16/8/2023	15/9/2023	Crystal diffraction: Bragg's Law, Determination of crystal structure, Reciprocal lattices of SC, BCC and FCC, Bragg's law in reciprocal lattice, Brillouin zones and its derivation in two dimensions, structure factor and atomic form factor	Lecture Method, Online Sources; Group Discussion, assignments
3	16/9/2023	15/10/2023	Free electron theory of metals, effective mass, drift current, mobility and conductivity (carrier concentration and mobility of carriers), variation of carriers with temperature in semi-conductors, Fermi level positions in intrinsic and extrinsic semiconductors, Wiedemann-Franz law	Lecture Method, Online Sources, assignments
4	16/10/2023	18/11/2023	Band Theory of solids, periodic potential and Bloch theorem, Kronig-Penney model, band gaps, band structures in conductors, Direct and indirect semiconductors and insulators, Numerical practice, Hall effect in metals and semiconductors.	Lecture Method, Online Sources; Group Discussion assignments

Lesson Plan
MCM DAV College for Women, Sector – 36A, Chandigarh
Monthly Teaching Plans (Odd Semester/Even Semester)
Session – (2023-24)
Even Semester

Name of the Teacher: Dr. Kulwinder Kaur
Department: Physics Department
Physics, Paper A

Class: B.Sc. III (NM, Voc) VIth Semester   **Subject: Condensed Matter Physics II**

S.No.	Date** (Monthly)		Topics to be Covered	Academic Activity Undertaken*
	From	To		
1	9/1/2024	31/1/2024	Lattice Dynamics: Lattice vibrations and phonons, Scattering of photons by phonons, Dynamics of a linear chain of similar atoms and chain of two types of atoms, optical and acoustic modes, Density of modes. Einstein and Debye theories of specific heats of solids. Magnetic classification of materials (Dia, para, ferro, ferri, antiferro)	Lecture Method, assignments
2	01/2/2024	28/02/2024	Langevin theory of dia and paramagnetism, Quantum theory, Weiss's theory of Ferromagnetism, temperature dependence, hysteresis of ferromagnetic materials. Dielectric constant & polarizability, electric susceptibility, Clausius Mosotti equation, frequency dependence, ferroelectrics and Piezoelectrics.	Lecture Method, Online Sources; Group Discussion, assignments
3	01/3/2024	31/3/2024	Liquid crystals, various types and properties. Applications. Superconductivity: Meisner effect, London's equation and penetration depth, critical magnetic field and temperature, DC and AC Josephson effect, BCS theory (formation of cooper pairs), ground state and energy gap.	Lecture Method, Online Sources, assignments
4	01/4/2024	22/4/2024	Nanoparticles, introduction to fabrication and characterization techniques, Carbon Nanostructures - nanotubes, grapheme. Applications of nanotechnology in various fields.	Lecture Method, Online Sources; Group Discussion, assignments

** Dates for even semester are tentative; they can be varied according to Panjab University Academic Calendar Dates.

Lesson Plan
MCM DAV College for Women, Sector – 36A, Chandigarh
Monthly Teaching Plans (Odd Semester/Even Semester)
Session – (2023-24)
Odd Semester

Name of the Teacher: **Dr. R. Ridhi**

Department: **Department of Physics**

Class: **B.Sc. III Vth Semester** (Non-Medical and VOC)

Subject: **ELECTRONICS AND SOLID STATE DEVICES - I**

S. No.	Date (Monthly) From	To	Topics to be Covered	Academic Activity Undertaken *
1	24/07/2023	30/08/2023	Concepts of current and voltage sources, Thevenin's theorem, Norton's theorem, Source conversion. CRO, Block diagram, construction and principle of working, Use of CRO for frequency, time period, special features of dual trace, phase measurements, Energy band diagrams in semiconductors, Direct and indirect semiconductors, Formula to calculate Position of Fermi level in p and n semiconductors, Barrier formation, energy band diagram of p-n junction,	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical (v) Class tests Doubt sessions
2	01/09/2023	30/09/2023	Formula for Depletion width, Qualitative ides of current flow mechanism in forward and reverse biased diode, v-i characteristics, static and dynamic resistance, Depletion and diffusion capacitance, zener diode, LED, photodiode and solar cell. Diode circuits, Clipping circuits, Rectification: half wave, full wave and bridge rectifiers, filter circuits (C, LC and π filters), rectification efficiency and ripple factor in LC filter,	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical (v) Class tests (vi) Doubt sessions
3.	01/10/2023	31/10/2023	voltage regulation circuit using zener diode, voltage multiplier circuits. Bipolar Junction transistors: Structure and working, different currents in transistor, switching action. Characteristics of CB, CE and CC configurations, Active, cutoff and saturation regions. Load line analysis of transistors, Q-point, Transistor biasing and stabilization of operating point, fixed bias, collector to base bias, bias circuit with emitter resistor, voltage divider biasing circuit.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical (v) Class tests (vi) Doubt sessions
4.	01/11/2023	18/11/2023	Working ans analysis of CE amplifier using h-parameters, current, voltage and power gain, input and output impedance. Class A, B and C amplifiers	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical (v) Class tests (vi) Doubt sessions

Lesson Plan
MCM DAV College for Women, Sector – 36A, Chandigarh
Monthly Teaching Plans (Odd Semester/Even Semester)
Session – (2023-24)
Even Semester

Name of the Teacher: **Dr. R. Ridhi**

Department: **Department of Physics**

Class: B.Sc. III VIth Semester (Non-Medical and VOC)

Subject: ELECTRONICS AND SOLID STATE DEVICES – II

S. No.	Date (Monthly)		Topics to be Covered	Academic Activity Undertaken*	
1	09/01/2024	31/01/2024	Structure and working of JEFT, characteristics, drain and transconductance curve, FET amplifier and its voltage gain, Structure and working of MOSFET. Feed back in amplifiers, voltage gain of negative feedback amplifier, advantages of negative voltage feedback, negative current feedback circuit, emitter follower	(i) (ii) (iii) (iv) (v) (vi)	Lecture method Group discussion Notes Numerical Class tests Doubt sessions
2	01/02/2024	29/02/2024	Theory of sinusoidal oscillations, loop gain and phase, Lead-lag RC circuit, Wein bridge oscillator. Barkhausen criterion of sustained oscillations, positive feedback amplifier, LC oscillators, Colpitts and Hartley oscillators. Operational amplifier (black box approach): Characteristics of ideal and practical opamp 741, open-loop and closed-loop gain, characteristics and applications - inverting and non-inverting amplifiers, adder, subtractor, differentiator and integrator	(i) (ii) (iii) (iv) (v) (vi)	Lecture method Group discussion Notes Numerical Class tests Doubt sessions
3.	01/03/2024	31/03/2024	Comparator, Timer IC555, pin diagram and its applications as astable and monostable multivibrator. Analog and digital circuits, binary numbers, decimal to binary conversions, AND, OR, NOT gates, NAND NOR gates as universal gates, XOR and XNOR gates. De Morgan's theorem, Simplification of logic circuit using Boolean algebra, Minterms and Maxterms.	(i) (ii) (iii) (iv) (v) (vi)	Lecture method Group discussion Notes Numerical Class tests Doubt sessions
4.	01/4/2024	29/04/2024	Conversion of a truth table into an equivalent logic circuit by Sum of products method, Analog and digital communication systems, Amplitude and Frequency modulation, Power in AM wave, generation and detection, Brief account of Satellite communication, Sky-wave communication, and mobile communication.	(i) (ii) (iii) (iv) (v) (vi)	Lecture method Group discussion Notes Numerical Class tests Doubt sessions

Lesson Plan
MCM DAV College for Women, Sector – 36A, Chandigarh
Monthly Teaching Plans (Odd Semester/Even Semester)
Session – (2023-24)
Odd Semester

Name of the Teacher: **Dr. Swati Khatta**
Department: **Department of Physics**
Class: B.Sc.III   **Subject: Nuclear and Particle Physics-I**   **Section(s): N.M & Vocational**

S .No.	Date (Monthly) From	To	Topics to be Covered	Academic Activity Undertaken*
1.	22/7/2023	31/08/2023	General properties of Nuclei : Constituents of nucleus and their intrinsic properties, Quantitative facts about nuclear size, mass, density, binding energy and its variation with mass number, Wave mechanical properties of nucleus, angular momentum, parity; magnetic moment and electric moments of the nucleus.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems
2.	01/09/2023	30/09/2023	Properties of nuclear forces and saturation, meson theory of nuclear forces Nuclear Models: Liquid drop model, semi-empirical mass formula, most stable isobar. Evidence for nuclear shell structure, Nuclear shell model, concept of mean field.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems
3.	01/10/2023	31/10/2023	Nuclear Reactions: Types, Concept of compound and direct (pickup and stripping) reactions, Reaction differential and integral cross section, units, Conservation laws and kinematics, Q-value equation, Coulomb (Rutherford) scattering cross section and distance of nearest approach. Energy classification of neutrons, Nuclear fission in reactors, Reactor facilities available in India, Nuclear fusion in stars	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems
4.	01/11/2023	18/11/2023	Radioactive decay, Units of radioactivity (Ci and Bq), Successive disintegration, Natural radioactivity, Radioactive series, Carbon dating. Alpha decay, energetic, alpha spectrum, Gamow's theory of alpha decay, Geiger-Nuttal rule. Beta decay, Qualitative discussion of beta spectrum, Evidence of existence of Neutrino, Conservation of nuclear energy in Beta minus, Beta plus and Electron capture decays. Gamma-ray emission, selection rules, Internal conversion	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems

Lesson Plan
MCM DAV College for Women, Sector – 36A, Chandigarh
Monthly Teaching Plans (Odd Semester/Even Semester)
Session – (2023-24)
Even Semester

Name of the Teacher: **Dr. Swati Khatta**

Department: **Department of Physics**

Class: B.Sc.III   **Subject: Nuclear and Particle Physics-II**   **Section(s): N.M & Vocational**

S. No.	Date (Monthly) From	Date (Monthly) To	Topics to be Covered	Academic Activity Undertaken*
1.	09/01/2024	31/01/2024	Interaction of nuclear radiation with matter: Energy loss due to ionization (Bethe Bloch formula), Range and energy straggling, Energy loss of electrons and positrons, radiation loss by fast electrons.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems
2.	01/02/2024	29/02/2024	Bremsstrahlung, electron-positron annihilation, production of Cerenkov radiation, Gamma-ray interaction with matter, photoelectric effect, Compton scattering, pair production (qualitative description). Detectors for nuclear radiation: Gas-filled detectors, Ionization chamber, G.M. counter.	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems
3.	01/03/2024	31/03/2024	Detectors for nuclear radiation: Scintillation detector and Photomultiplier tube, Brief account of Semiconductor detectors, Particle Physics : Particle interactions : basic features and their exchange particles, Classification of elementary particles, properties, decay modes of leptons and mesons, Antiparticles, charge conjugation Symmetries and Conservation principles, Lepton number, baryon number, Isospin, Hypercharge, Strangeness and charm, Gell-mannNishijima formula	(i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems
4.	01/04/2024	30/04/2024	Concept of the quark model, color quantum number and gluons. Origin and composition of Cosmic rays, Secondary cosmic rays, Effect of magnetic field of earth, Van Allen belts, Particle accelerators: Cockcroft-Walton accelerator, Van-de Graaff generator, Tandem accelerator Linear accelerator, Cyclotron. Brief account of Syncrhrotron, Accelerator facilities available in India.	((i) Lecture method (ii) Group discussion (iii) Notes (iv) Numerical Problems