

DYAL SINGH COLLEGE, KARNAL

Lesson Plan

session 2018-19

Name of the Associate Professor
Class and Section:

Prof. Rajesh Arora
B.Sc NM A& B

Subject:

Vector background and Electric field, semiconductor devices

Week	Days	Topics
1	July 13-14,2018	Gradient of a scalar and its physical significance, Line, Surface and Volume integrals of a vector and their physical significance
2	July 16-21,2018	Flux of a vector field, Divergence and curl of a vector and their physical significance, Gauss's divergence theorem
3	July 23- 28, 2018	Stoke's theorem. Derivation of electric field E from potential as gradient
4	July 30- Aug. 4 ,2018	Derivation of Laplace and Poisson equations, Electric flux, Gauss's Law
5	Aug. 6 -11,2018	Mechanical force of charged surface, Energy per unit volume.
6	Aug. 13 -18 ,2018	Magnetic induction, Magnetic flux, Solenoidal nature of vector field of induction, properties of B
7	Aug. 20 -25 ,2018	Electronic theory of dia and paramagnetism, Domain theory of ferromagnetism (Langevin's theory)
8	Aug. 27- Sep. 1, 2018	Cycle of magnetization- hysteresis, loop (Energy dissipation, Hysteresis loss and importance of Hysteresis Curve)
9	Sep.3 -8 ,2018	Maxwell equations and their derivations, Displacement current, Vector and Scalar potentials
10	Sep.10 -15,2018	Boundary conditions at interface between two different media, Poynting vector and Poynting theorem.
11	Sep.17-22 ,2018	A.C. circuit analysis using complex variable with (a) Capacitance and Resistance (CR)
12	Sep. 24 -29, 2018	(b) Resistance and Inductance (LR) (c) Capacitance and Inductance (LC),and (d) Capacitance, Inductance and Resistance (LCR)
13	Oct. 1-6, 2018	numerical problems
14	Oct. 8-13, 2018	Series and parallel resonance circuit, Quality factor (sharpness of resonance).
15	Oct. 15-20, 2018	revision of syllabus

16	Oct. 22-27, 2018	revision of syllabus
17	Oct. 29- Nov. 5, 2018	revision of syllabus
18	Jan. 7-12,2019	Energy bands in solids, Intrinsic and extrinsic semiconductors, carrier mobility and electrical resistivity of semiconductors
19	Jan. 14-19, 2019	Hall effect, p-n junction diode and their characteristics,
20	Jan. 21-25,2019	Zener and Avalanche breakdown, Zener diode, Zener diode as a voltage regulator
21	Jan. 28 -Feb 2,2019	Light emitting diodes (LED), Photoconduction in semiconductors, Photodiode, Solar Cell
22	Feb 4-9,2019	p-n junction as a rectifier, half wave and full wave rectifiers
23	Feb.11-16,2019	filters (series inductor, shunt capacitance, L-section or choke, n and R.C. filter circuits)
24	Feb. 18-23,2019	Transistors : Junction transistors, Working of NPN and PNP transistors
25	Feb 25- March 2, 2019	Three configurations of transistor (C-B, C-E, C-C modes),Common base, common emitter and common collector characteristics of transistor
26	March 4-9,2019	Constants of a transistor and their relation,Advantages and disadvantages of C-E configuration
27	March, 11-16, 2019	D.C. load line .Transistor biasing; various methods of transistor biasing and stabilization.
28	March 25 - 30,2019	Amplifiers, Classification of amplifiers, common base and common emitter amplifiers, coupling of amplifiers
29	April 1-6, 2019	various methods of coupling, Resistance- Capacitance (RC), coupled amplifier (two stage, concept of band width, no derivation)
30	April, 8-13, 2019	Feedback in amplifiers, advantages of negative feedback, emitter follower, distortion in amplifiers
31	April 15-20,2019	Oscillators, Principle of oscillation, classification of oscillators
32	April 22-27,2019	Condition for self sustained oscillation: Barkhausen criterion for oscillation
33	April 29-30,2019	Tuned collector common emitter oscillator, Hartley oscillator, C.R.O. (Principle and Working).

DYAL SINGH COLLEGE, KARNAL

Lesson Plan

Name of the Associate Professor

session 2018-19

Dr. Rajni Seth

Class and Section:

B.Sc NM A& B

Subject:

Physics : Classical Mechanics and theory of relativity, Properties of Matter and Kinetic Theory of Gases

Week	Days	Topics
1	July 13-14,2018	Basic concepts of Classical mechanics Mechanics of single and system of particles, Conservation law of linear momentum
2	July 16-21,2018	Angular momentum and mechanical energy for a particle and a system of particles, Centre of Mass and equation of motion, Constrained Motion
3	July 23- 28, 2018	Generalized Notations Degrees of freedom and Generalized coordinates,
4	July 30- Aug. 4 ,2018	Transformation equations, Generalized Displacement, Velocity, Acceleration, Momentum
5	Aug. 6 -11,2018	Force and Potential, Hamilton's variational principle
6	Aug. 13 -18 ,2018	Lagrange's equation of motion from Hamilton's principle, Linear Harmonic oscillator
7	Aug. 20 -25 ,2018	Simple pendulum, Atwood's machine
8	Aug. 27- Sep. 1, 2018	Frame of reference, limitation of Newton's law of motion, Inertial frame of reference, Galilean transformation
9	Sep.3 -8 ,2018	Frame of reference with linear acceleration, Classical relativity- Galilean invariance
10	Sep.10 -15,2018	Transformation equation for a frame of reference- inclined to an inertial frame and Rotating frame of reference,
11	Sep.17-22 ,2018	Non-inertial frames-The accelerated frame of reference and rotating frame of reference , Effect of centrifugal and coriolis forces due to Earth's rotation, Fundamental frame of reference, Michelson- Morley's experiment,concept of Einstein's relativity.

12	Sep. 24 -29, 2018	Applications of theory of relativity: Special theory of relativity, Lorentz co-ordinate and physical significance of Lorentz invariance, Length Contraction, Time Dilation, Twin Paradox, Velocity addition
13	Oct. 1-6, 2018	theorem, Variation of mass with velocity, Mass energy equivalence, Transformation of relativistic momentum and energy,
14	Oct. 8-13, 2018	relation between relativistic momentum and energy, Mass, velocity, momentum and energy of zero rest mass.
15	Oct. 15-20, 2018	revision of syllabus
16	Oct. 22-27, 2018	revision of syllabus
17	Oct. 29- Nov. 5, 2018	revision of syllabus
18	Jan. 7-12,2019	Rotation of rigid body, Moment of inertial, Torque, angular momentum, Kinetic Energy of rotation. Theorem of perpendicular and parallel axes (with proof)
19	Jan. 14-19, 2019	Moment of inertia of solid sphere, hollow sphere, spherical shell, solid cylinder
20	Jan. 21-25,2019	hollow cylinder and solid bar of rectangular cross-section, Fly wheel
21	Jan. 28 -Feb 2,2019	Moment of inertia of an irregular body, Acceleration of a body rolling down on an inclined plane
22	Feb 4-9,2019	Elasticity, Stress and Strain, Hook's law, Elastic constant and their relations, Poisson's ratio, Torsion of cylinder and twisting couple
23	Feb.11-16,2019	Determination of coefficient of modulus of rigidity for the material of wire by Maxwell's needle, Bending of beam
24	Feb. 18-23,2019	Cantilever and Centrally loaded beam, Determination of Young's modulus for the material of the beam and Elastic constants for the material of the wire by Searle's method.
25	Feb 25- March 2, 2019	Assumption of Kinetic theory of gases, pressure of an ideal gas (with derivation), Kinetic interpretation of Temperature
26	March 4-9,2019	Ideal Gas equation, Degree of freedom, Law of equipartition of energy and its application for specific heat of gases
27	March, 11-16, 2019	Real gases, Vander wall's equation, Brownian motion(Qualitative)
28	March 25 - 30,2019	Maxwell's distribution of speed and velocities (derivation required)

29	April 1-6, 2019	Experimental verification of Maxwell's law of speed distribution
30	April, 8-13, 2019	most probable speed, average and r.m.s. speed, Mean free path, Transport of energy and momentum, Diffusion of gases
31	April 15-20,2019	revision of syllabus
32	April 22-27,2019	revision of syllabus
33	April 29-30,2019	revision of syllabus

R. Arora

DYAL SINGH COLLEGE, KARNAL

2018-19

Lesson Plan

Name of the teacher: **Dr. Devinder Singh**
Class and Section: **B.Sc. - 5th Semester (A & B)**
Subject: **Nuclear Physics**

Week	Date	Topics
1	13.07.2018 to 21.07.2018	Introduction, Nuclear composition - proton-electron hypothesis and proton-neutron hypothesis.
2	23.07.2018 to 28.07.2018	Nuclear mass and binding energy, systematics of nuclear binding energy, nuclear stability.
3	30.07.2018 to 04.08.2018	Nuclear size, spin, parity, statistics. Nuclear magnetic dipole moment and quadrupole moment.
4	06.08.2018 to 11.08.2018	Determination of nuclear mass by Bain-Bridge spectrometer, Bain-Bridge and Jordan mass spectrograph, Determination of charge by Mosley Law, Determination of size of nucleus by Rutherford Back Scattering
5	13.08.2018 to 18.08.2018	Alpha-disintegration and its theory. Energetics of alpha-decay. Origin of continuous beta spectrum (neutrino hypothesis), types of beta-decay and energetics of beta-decay.
6	20.08.2018 to 25.08.2018	Nature of gamma rays. Energetics of gamma rays. Interaction of heavy, charged particles (Alpha particles) Energy loss of heavy Charged particle (idea of Bethe formula, no derivation).
7	27.08.2018 to 01.09.2018	Range and straggling of alpha particles. Geiger-Nuttall law. Interaction of light charged particle (beta-particle). Energy loss of beta-particles(ionization). Range of electrons, absorption of beta particles.
8	03.09.2018 to 08.09.2018	Interaction of Gamma Ray: Passage of Gamma radiations through matter (Photoelectric. Compton and pair production effect) electron-positron annihilation. Absorption of Gamma rays (Mass attenuation coefficient) and its application.

9	10.09.2018 to 15.09.2018	Revision, Assignments, Test
10	17.09.2018 to 22.09.2018	Linear accelerator and Tandem accelerator.
11	24.09.2018 to 29.09.2018	Cyclotron and Betatron accelerators,
12	01.10.2018 to 06.10.2018	Ionization chamber, proportional counter. GM. Counter (detailed study),
13	08.10.2018 to 13.10.2018	Scintillation counter and semiconductor detector.
14	15.10.2018 to 20.10.2018	Nuclear reactions, Elastic scattering, Inelastic scattering, Nuclear disintegration, photonuclear reaction, Radiative capture Direct-reaction, Heavy ion reactions and spallation reactions.
15	22.10.2018 to 27.10.2018	Conservation laws, Q-value and reaction Threshold.
16	29.10.2018 to 05.11.2018	Nuclear fission and fusion reactors, (Principle, construction, working and uses).

R. Arora

DYAL SINGH COLLEGE, KARNAL

2018-19

Lesson Plan

Name of the teacher:

Dr. Devinder Singh

Class and Section:

B.Sc. - 6th Semester (A & B)

Subject:

Solid State and Nano Physics

Sr. No.	Week	Topics
1	01.01.2019 to 05.01.2019	Crystalline and glassy forms, liquid crystals, crystal structure, periodicity, lattice and basis.
2	07.01.2019 to 12.01.2019	Crystal translational vectors and axes. Unit cell and Primitive cell, Winger Seitz primitive cell, Symmetry operations for a two and three dimensional crystal.
3	14.01.2019 to 19.01.2019	Bravais lattices in two and three dimensions. Crystal planes and Miller indices, Interplaner spacing.
4	21.01.2019 to 26.01.2019	Crystal structures of Zinc Sulphide, Sodium Chloride and Diamond.
5	28.01.2019 to 02.02.2019	X-ray diffraction, Bragg's law and experimental X-ray diffraction methods.
6	04.02.2019 to 09.02.2019	K-space and reciprocal lattice and its physical significance.
7	11.02.2019 to 16.02.2019	Reciprocal lattice vectors, need of reciprocal lattice.
8	18.02.2019 to 23.02.2019	Reciprocal lattice to a s.c. lattice, b.c.c. lattice and f.c.c lattice.
9	25.02.2019 to 02.03.2019	Revision, Assignments, Tests.

10	04.03.2019 to 09.03.2019	Historical introduction, Survey of superconductivity, Super conducting systems, High T _c Super conductors.
11	11.03.2019 to 16.03.2019	Isotopic Effect, Critical Magnetic Field, Meissner Effect, London Theory and Pippards' equation.
12	18.03.2019 to 23.03.2019	Classification of Superconductors (Type I and Type II), BCS Theory of Superconductivity, Flux quantization.
13	25.03.2019 to 30.03.2019	Josephson Effect (AC and DC), Practical applications of superconductivity and their limitations, Power application of superconductors.
14	01.04.2019 to 06.04.2019	Definition, Length scale, Importance of Nano-scale and technology History of Nanotechnology,
15	08.04.2019 to 13.04.2019	Benefits and challenges in molecular manufacturing. Molecular assembler concept, Understanding advanced capabilities.
16	15.04.2019 to 20.04.2019	Vision and objective of Nano-technology, Nanotechnology in different fields, Automobile.
17	22.04.2019 to 30.04.2019	Nanotechnology in Electronics, Nano-biotechnology, Materials, Medicine.

R. Arora

DYAL SINGH COLLEGE, KARNAL

Lesson Plan

session 2018-19

Name of the Assistant Professor

Ms. Nidhi Jast

Class and Section:

B.Sc NM A& B

Subject:

Physics (Wave & Optics)

Week	year	Topics
	2018-19	
1	July 13-14,2018	Interference by Division of Wave front: Young's double slit experiment, Coherence, Conditions of interference
2	July 16-21,2018	Fresnel's biprism and its applications to determine the wavelength of sodium light and thickness of a mica sheet
3	July 23- 28, 2018	Lloyd's mirror, Difference between Bi-prism and Llyod mirror fringes,
4	July 30- Aug. 4 ,2018	phase change on reflection, problems discussion, numericals
5	Aug. 6 -11,2018	Interference by Division of Amplitude: Plane parallel thin film, production of colors in thin films
6	Aug. 13 -18 ,2018	classification of fringes in films, Interference due to transmitted light and reflected light, wedge shaped film
7	Aug. 20 -25 ,2018	Newton's rings, it's applications
8	Aug. 27- Sep. 1, 2018	Interferometer: Michelson's interferometer and its applications
9	Sep.3 -8 ,2018	Fresnel's diffraction: Fresnel's assumptions and half period zones
10	Sep.10 -15,2018	rectilinear propagation of light, zone plate
11	Sep.17-22 ,2018	diffraction at a straight edge, rectangular slit and circular aperture, narrow slit and wire
12	Sep. 24 -29, 2018	Fraunhoffer diffraction: single-slit diffraction, double-slit diffraction, N-slit diffraction, plane transmission grating spectrum
13	Oct. 1-6, 2018	dispersive power of grating, limit of resolution, Rayleigh's criterion, resolving power of telescope and a grating
14	Oct. 8-13, 2018	prism and grating spectra
15	Oct. 15-20, 2018	revision

16	Oct. 22-27, 2018	Polarization: Polarisation by reflection, refraction and scattering, Malus Law, Phenomenon of double refraction
17	Oct. 29- Nov. 5, 2018	Huygen's wave theory of double refraction (Normal and oblique incidence), Analysis of polarized Light
18	Jan. 7-12,2019	Nicol prism, Quarter wave plate and half wave plate, production and detection of (i) Plane polarized light (ii) Circularly polarized light and (iii) Elliptically polarized light
19	Jan. 14-19, 2019	Optical activity, Fresnel's theory of optical rotation, Specific rotation, Polarimeters (half shade and Biquartz)
20	Jan. 21-25,2019	Fourier theorem and Fourier series, evaluation of Fourier coefficient, importance and limitations of Fourier theorem
21	Jan. 28 -Feb 2,2019	even and odd functions, Fourier series of functions $f(x)$ between (i) 0 to 2π , (ii) $-\pi$ to π , (iii) 0 to π
22	Feb 4-9,2019	(iv) $-L$ to L , complex form of Fourier series, Application of Fourier theorem for analysis of complex waves
23	Feb.11-16,2019	half and full wave rectifier outputs
24	Feb. 18-23,2019	Parseval identity for Fourier Series, Fourier integrals
25	Feb 25- March 2, 2019	Fourier transforms and its properties
26	March 4-9,2019	Application of Fourier transform (i) for evaluation of integrals, (ii) for solution of ordinary differential equations
27	March, 11-16, 2019	FT of $f(x)= e^{-x^2/2}$, problems discussion and numerical
28	March 25 - 30,2019	Matrix methods in paraxial optics, effects of translation and refraction
29	April 1-6, 2019	derivation of thin lens and thick lens formulae, unit plane, nodal planes, system of thin lenses.
30	April, 8-13, 2019	Chromatic, spherical, coma, astigmatism and distortion aberrations and their remedies
31	April 15-20,2019	Optical fiber, Critical angle of propagation, Mode of Propagation, Acceptance angle, Fractional refractive index change

32	April 22-27,2019	Numerical aperture, Types of optics fiber, Normalized frequency, Pulse dispersion, Attenuation, Applications, Fiber optic Communication, Advantages
33	April 29-30,2019	revision of syllabus

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