

# **DYAL SINGH COLLEGE, KARNAL**

<b>Lesson Plan</b>		session 2021-22
Name of the Associate Professor		Prof. Rajesh Arora
Class and Section:		B.Sc NM A& B
Subject:		Quantum and Laser Physics , Atomic and Molecular Spectroscopy
<b>Week</b>	<b>Days</b>	<b>Topics</b>
1	Oct 25-30, 2021	Overview, scale of quantum physics, boundary between classical and quantum, phenomena, Photon, Photoelectric effect, Compton effect (theory and result), Frank- Hertz experiment
2	Nov. 8-13 , 2021	de-Broglie hypothesis. Davisson and Germer experiment, ·G.P. Thomson experiment. Phase velocity, group velocity and their relation. Heisenberg's uncertainty principle.
3	Nov.15-20 , 2021	Time energy and angular momentum, position uncertainty. Uncertainty principle from de Broglie wave. (Wave-particle duality). Gamma Ray Microscope
4	Nov. 22-27, 2021	Electron diffraction from a slit. Derivation of 1-D time-dependent Schrodinger wave equation (subject to force, free particle). Time-independent Schrodinger wave equation
5	Nov. 29-Dec. 4,2021	eigen values, eigen functions, wave functions and its significance. Orthogonality and Normalization of function
6	Dec.6-11, 2021	concept of observer and operator. Expectation values of dynamical quantities, probability current density
7	Dec.13-18 , 2021	Application of Schrodinger wave equation: solution of Schrodinger wave equation, eigen functions, eigen values, quantization of energy and momentum, nodes and anti nodes, zero point energy
8	Dec.20- 24, 2021	Application continued..
9	Dec 27, 2021 - Jan 1,2022	Absorption and emission of radiation, Main features of a laser: Directionality, high intensity, high degree of coherence

10	Jan 3-8, 2022	spatial and temporal coherence, Einstein's coefficients and possibility of amplification, momentum transfer, life time of a level
11	Jan.10-15, 2022	kinetics of optical absorption ((two and three level rate equation, Fuchbauer landerburg formula).population inversion: A necessary condition for light amplification, resonance cavity
12	Jan. 17-22, 2022	laser pumping, Threshold condition for laser emission, line broadening mechanism
13	Jan. 24-29, 2022	homogeneous and inhomogeneous line broadening (natural, collision and Doppler broadening)
14	Jan 31, Feb1-5, 2022	He-Ne laser and RUBY laser (Principle, Construction and working)
15	Feb. 7-12,2022	Optical properties of semiconductor (Principle, Construction and working)
16	Feb. 14-19, 2022	Applications of lasers in the field of medicine and industry.
17	Feb. 21-22, 2022	Orbital magnetic dipole moment (Bohr megnaton), behavior of magnetic dipole in external magnetic filed; Larmors' precession and theorem. Penetrating and Non-penetrating orbits, Penetrating orbits on the classical model; Quantum defect
18	April 1-2, 2022	spin orbit interaction energy of the single valance electron, spin orbit interaction for penetrating and non-penetrating orbits. quantum mechanical relativity correction, Hydrogen fine spectra
19	April 4-9, 2022	Main features of Alkali Spectra and their theoretical interpretation, term series and limits, Rydeburg-Ritze combination principle, Absorption spectra of Alkali atoms.
20	April 11-16,2022	observed doublet fine structure in the spectra of alkali metals and its Interpretation, Intensity rules for doublets, comparison of Alkali spectra and Hydrogen spectrum .

21	April 18-23, 2022	Essential features of spectra of Alkaline-earth elements, Vector model for two valence electron atom: application of spectra. Coupling Schemes; LS or Russell – Saunders Coupling Scheme and JJ coupling scheme, Interaction energy in L-S coupling (sp, pd configuration), Lande interval rule.
22	April 25-30, 2022	equivalent and non-equivalent electrons, Two valence electron system-spectral terms of non-equivalent and equivalent electrons, comparison of spectral terms in L-S And J-J coupling
23	May 2-7, 2022	Hyperfine structure of spectral lines and its origin; isotope effect, nuclear spin.
24	May 9-14, 2022	Zeeman Effect (normal and Anomalous), Experimental set-up for studying Zeeman effect, Explanation of normal Zeeman effect (classical and quantum mechanical)
25	May 16-21, 2022	Explanation of anomalous Zeeman effect (Lande g-factor), Zeeman pattern of D1 and D2 lines of Na atom, Paschen-Back effect of a single valence electron system
26	May 23-28, 2022	Weak field Stark effect of Hydrogen atom Introduction of early observations, emission and absorption spectra, atomic spectra, wave number, spectrum of Hydrogen atom in Balmer series, Bohr atomic model (Bohr's postulates), spectra of Hydrogen atom
27	May 30-31- June 1-4, 2022	explanation of spectral series in Hydrogen atom, un-quantized states and continuous spectra, spectral series in absorption spectra, effect of nuclear motion on line spectra (correction of finite nuclear mass) variation in Rydberg constant due to finite mass, shortcomings of Bohr's theory, Wilson Sommerfeld quantization rule, de-Broglie interpretation of Bohr quantization law, Bohr's corresponding principle
28	June 6-11, 2022	Sommerfeld's extension of Bohr's model, Sommerfeld relativistic correction, Shortcomings of Bohr-Sommerfeld theory

29	June 13-16, 2022	model; space quantization, electron spin, coupling of orbital and spin angular momentum, spectroscopic terms and their notation, quantum numbers associated with vector atom model, transition probability and selection rules.
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# DYAL SINGH COLLEGE, KARNAL

## Lesson Plan

Name of the Associate Professor

session 2021-22

Class and Section:

Dr. Rajni Seth

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	Oct 25-30, 2021	Basic concepts of Classical mechanics Mechanics of single and system of particles, Conversion law of linear momentum
2	Nov. 8-13 , 2021	Angular momentum and mechanical energy for a particle and a system of particles, Centre of Mass and equation of motion, Constrained Motion
3	Nov.15-20 , 2021	Generalized Notations Degrees of freedom and Generalized coordinates,
4	Nov. 22-27, 2021	Transformation equations, Generalized Displacement, Velocity, Acceleration, Momentum
5	Nov. 29-Dec. 4,2021	Force and Potential, Hamilton's variational principle
6	Dec.6-11, 2021	Lagrange's equation of motion from Hamilton's principle, Linear Harmonic oscillator
7	Dec.13-18 , 2021	Simple pendulum, Atwood's machine
8	Dec.20- 24, 2021	Frame of reference, limitation of Newton's law of motion, Inertial frame of reference, Galilean transformation
9	Dec 27, 2021 - Jan 1,2022	Frame of reference with linear acceleration, Classical relativity- Galilean invariance
10	Jan 3-8, 2022	Transformation equation for a frame of reference- inclined to an inertial frame and Rotating frame of reference,
11	Jan.10-15, 2022	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	Jan. 17-22, 2022	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	Jan. 24-29, 2022	theorem, Variation of mass with velocity, Mass energy equivalence, Transformation of relativistic momentum and energy,
14	Jan 31, Feb1-5, 2022	relation between relativistic momentum and energy, Mass, velocity, momentum and energy of zero rest mass.
15	Feb. 7-12,2022	revision of syllabus
16	Feb. 14-19, 2022	Rotation of rigid body, Moment of inertial, Torque, angular momentum, Kinetic Energy of rotation. Theorem of perpendicular and parallel axes (with proof)
17	Feb. 21-22, 2022	Moment of inertia of solid sphere, hollow sphere, spherical shell, solid cylinder
18	April 1-2, 2022	hollow cylinder and solid bar of rectangular cross-section, Fly wheel
19	April 4-9, 2022	Moment of inertia of an irregular body, Acceleration of a body rolling down on an inclined plane
20	April 11-16,2022	Elasticity, Stress and Strain, Hook's law, Elastic constant and their relations, Poisson's ratio, Torsion of cylinder and twisting couple
21	April 18-23, 2022	Determination of coefficient of modulus of rigidity for the material of wire by Maxwell's needle, Bending of beam
22	April 25-30, 2022	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.
23	May 2-7,2022	Assumption of Kinetic theory of gases, pressure of an ideal gas (with derivation), Kinetic interpretation of Temperature
24	May 9-14, 2022	Ideal Gas equation, Degree of freedom, Law of equipartition of energy and its application for specific heat of gases
25	May 16-21,2022	Real gases, Vander wall's equation, Brownian motion( Qualitative)
26	May23-28, 2022	Maxwell's distribution of speed and velocities (derivation required)
27	May 30-31- June 1-4,2022	Experimental verification of Maxwell's law of speed distribution
28	June 6-11, 2022	most probable speed, average and r.m.s. speed, Mean free path, Transport of energy and momentum, Diffusion of gases
29	June 13-16, 2022	revision of syllabus
30	June 13-18,2022	revision of syllabus
31	June 20-25, 2022	revision of syllabus

32	June 27-30, July 1-2, 2022	revision of syllabus
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**DYAL SINGH COLLEGE, KARNAL**  
2021-22  
**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	25.10.2021 to 30.10.2021	Introduction, Nuclear composition - proton-electron hypothesis and proton-neutron hypothesis.
2	08.11.2021 to 13.11.2021	Nuclear mass and binding energy, systematics of nuclear binding energy, nuclear stability.
3	15.11.2021 to 20.11.2021	Nuclear size, spin, parity, statistics. Nuclear magnetic dipole moment and quadrupole moment.
4	22.11.2021 to 27.11.2021	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	29.11.2021 to 04.12.2021	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	06.12.2021 to 11.12.2021	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	13.12.2021 to 18.12.2021	Range and straggling of alpha particles. Geiger-Nuttal law. Interaction of light charged particle (beta-particle). Energy loss of beta-particles(ionization). Range of electrons, absorption of beta particles.
8	20.12.2021 to 25.12.2021	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	27.12.2021 to 01.01.2022	Revision, Assignments, Test
10	03.01.2022 to 08.01.2022	Linear accelerator and Tandem accelerator.
11	10.01.2022 to 15.01.2022	Cyclotron and Betatron accelerators,
12	17.01.2022 to 22.01.2022	Ionization chamber, proportional counter. GM. Counter (detailed study),
13	24.01.2022 to 29.01.2022	Scintillation counter and semiconductor detector.
14	31.01.2022 to 05.02.2022	Nuclear reactions, Elastic scattering, Inelastic scattering, Nuclear disintegration, photonuclear reaction, Radiative capture Direct-reaction, Heavy ion reactions and spallation reactions.
15	07.02.2022 to 12.02.2022	Conservation laws, Q-value and reaction Threshold.
16	14.02.2022 to 22.02.2022	Nuclear fission and fusion reactors, (Principle, construction, working and uses).

**DYAL SINGH COLLEGE, KARNAL**  
2021-22  
**Lesson Plan**

Name of the teacher: **Dr. Devinder Singh**  
Class and Section: **B.Sc. - 6th Semester (A & B)**  
Subject: **Solid State and Nano Physics**

Week	Date	Topics
1	01.04.2022 to 09.04.2022	Crystalline and glassy forms, liquid crystals, crystal structure, periodicity, lattice and basis, Crystal translational vectors and axes. Unit cell and Primitive cell, Wigner Seitz primitive cell,
2	11.04.2022 to 16.04.2022	Symmetry operations for a two and three dimensional crystal, Bravais lattices in two and three dimensions.



3	18.04.2022 to 23.04.2022	Crystal planes and Miller indices, Interplaner spacing, Crystal structures of Zinc Sulphide, Sodium Chloride and Diamond.
4	25.04.2022 to 30.04.2022	X-ray diffraction, Bragg's law and experimental X-ray diffraction methods.
5	02.05.2022 to 07.05.2022	K-space and reciprocal lattice and its physical significance. Reciprocal lattice vectors.
6	09.05.2022 to 14.05.2022	Need of reciprocal lattice. Reciprocal lattice to a s.c. lattice, b.c.c. lattice and f.c.c lattice.
7	16.05.2022 to 21.05.2022	Historical introduction, Survey of superconductivity, Super conducting systems, High $T_c$ Super conductors. Isotopic Effect, Critical Magnetic Field. Meissner Effect.
8	23.05.2022 to 28.05.2022	London Theory and Pippards' equation. Classification of Superconductors (Type I and Type II), BCS Theory of Superconductivity, Flux quantization.
9	30.05.2022 to 04.06.2022	Josephson Effect (AC and DC), Practical applications of superconductivity and their limitations, Power application of superconductors.
10	06.06.2022 to 11.06.2022	Definition, Length scale, Importance of Nano-scale and technology History of Nanotechnology, Benefits and challenges in molecular manufacturing. Molecular assembler concept, Understanding advanced capabilities.
11	13.06.2022 to 16.06.2022	Vision and objective of Nano-technology, Nanotechnology in different fields, Automobile, Nanotechnology in Electronics, Nano-biotechnology, Materials, Medicine.

# DYAL SINGH COLLEGE, KARNAL

## Lesson Plan

session 2021-22

Name of the Assistant Professor

Dr. Ambika Rani

Class and Section:

B.Sc NM A& B (3rd sem & 4th sem)

Subject:

Physics ( Computer Programming and Thermodynamics, Statistical Physics )

Week	Days	Topics
1	Oct 25-30, 2021	Computer organization, Binary representation, Algorithm development, Flow charts and their interpretation.
2	Nov. 8-13 , 2021	FORTTRAN Preliminaries: Integer and floating point arithmetic expression, built in functions
3	Nov.15-20 , 2021	executable and non-executable statements, input and output statements, Formats, IF, DO and GO TO statements
4	Nov. 22-27, 2021	Dimension arrays, statement function and function subprogram.
5	Nov. 29-Dec. 4,2021	Algorithm, Flow Chart and Programming for Print out of natural numbers
6	Dec.6-11, 2021	Range of the set of given numbers, Ascending and descending order
7	Dec.13-18 , 2021	Mean and standard deviation, Least square fitting of curve, Roots of quadratic equation
8	Dec.20- 24, 2021	Product of two matrices, Numerical integration (Trapezoidal rule and Simpson 1/3 rule) .
9	Dec 27, 2021 - Jan 1,2022	Thermodynamic system and Zeroth law of thermodynamics. First law of thermodynamics and its limitations, reversible and irreversible process.
10	Jan 3-8, 2022	Second law of thermodynamics and its significance, Carnot theorem, Absolute scale of temperature, Absolute Zero and magnitude of each division on work scale and perfect gas scale
11	Jan.10-15, 2022	Joule's free expansion, Joule Thomson effect, Joule-Thomson (Porous plug) experiment, conclusions and explanation, analytical treatment of Joule Thomson effect.
12	Jan. 17-22, 2022	Entropy, calculations of entropy of reversible and irreversible process , T-S diagram, entropy of a perfect gas, Nernst heat law(third law of thermodynamics)
13	Jan. 24-29, 2022	Liquefaction of gases, (oxygen, air, hydrogen and helium), Solidification of He below 4K, Cooling by adiabatic demagnetization.

14	Jan 31, Feb1-5, 2022	Derivation of Clausius-Clapeyron and Clausius latent heat equation and their significance, specific heat of saturated vapours, phase diagram and triple point of a substance, development of Maxwell thermodynamical relations
15	Feb. 7-12, 2022	Thermodynamical functions: Internal energy (U), Helmholtz function (F), Enthalpy (H), Gibbs function (G) and the relations between them, derivation of Maxwell thermodynamical relations from thermodynamical functions
16	Feb. 14-19, 2022	Application of Maxwell relations, derivation of Stefan's law, adiabatic compression and expansion of gas & deduction of theory of Joule Thomson effect.
17	Feb. 21-22, 2022	revision of syllabus
18	April 1-2, 2022	Microscopic and Macroscopic systems, events-mutually exclusive, dependent and independent. Probability, statistical probability, A- priori Probability and relation between them, probability theorems
19	April 4-9, 2022	some probability considerations, combinations possessing maximum probability, combination possessing minimum probability, Tossing of 2,3 and any number of Coins, Permutations and combinations
20	April 11-16, 2022	distributions of $N = 2,3,4$ ) distinguishable and indistinguishable particles in two boxes of equal size, Micro and Macro states, Thermodynamical probability, Constraints and Accessible states, Statistical fluctuations
21	April 18-23, 2022	general distribution of distinguishable particles in compartments of different sizes, Condition of equilibrium between two systems in thermal contact-- $\beta$ parameter, Entropy and Probability (Boltzmann's relation)
22	April 25-30, 2022	Postulates of statistical physics, Phase space, Division of Phase space into cells, three kinds of statistics, basic approach in three statistics. M. B. statistics applied to an ideal gas in equilibrium
23	May 2-7, 2022	speed distribution law & velocity distribution law. Expression for average speed, r.m.s. speed, average velocity, r. m. s. velocity, most probable energy & mean energy for Maxwellian distribution
24	May 9-14, 2022	Need for Quantum Statistics: Bose-Einstein energy distribution law, Application of B.E. statistics to Planck's radiation law B.E. gas,

25	May 16-21,2022	F.D. gas and Degeneracy, Fermi energy and Fermi temperature, Fermi Dirac energy distribution law, Fermi Dirac gas and degeneracy,
26	May23-28, 2022	Zero point energy, Zero point pressure and average speed (at 0 K) of electron gas, Specific heat anomaly of metals and its solution
27	May 30-31- June 1-4,2022	M.B. distribution as a limiting case of B.E. and F.D. distributions, Comparison of three statistics
28	June 6-11, 2022	Dulong and Petit law. Derivation of Dulong and Petit law from classical physics
29	June 13-18, 2022	Specific heat at low temperature, Einstein theory of specific heat,Criticism of Einstein theory,Debye model of specific heat of solids, success and shortcomings of Debye theory, comparison of Einstein and Debye theories.
30	June 20-25, 2022	Fermi energy and Fermi temperature, Fermi Dirac energy distribution law for electron gas in metals
31	June 27-30, July1-2,2022	Degeneracy and B.E. Condensation, Fermi- Dirac energy distribution law
32	July 4- 9,2022	revision of syllabus

# DYAL SINGH COLLEGE, KARNAL

## Lesson Plan

session 2021-22

Name of the Assistant Professor

Ms. Nidhi Jast

Class and Section:

B.Sc NM A& B

Subject:

Physics ( Vector background and Electric field, semiconductor devices )

Week	Days	Topics
1	Oct 25-30, 2021	Gradient of a scalar and its physical significance, Line, Surface and Volume integrals of a vector and their physical significance
2	Nov. 8-13 , 2021	Flux of a vector field, Divergence and curl of a vector and their physical significance, Gauss's divergence theorem
3	Nov.15-20 , 2021	Stoke's theorem. Derivation of electric field E from potential as gradient
4	Nov. 22-27, 2021	Derivation of Laplace and Poisson equations, Electric flux, Gauss's Law
5	Nov. 29-Dec. 4,2021	Mechanical force of charged surface, Energy per unit volume.
6	Dec.6-11, 2021	Magnetic induction, Magnetic flux, Solenoidal nature of vector field of induction, properties of B
7	Dec.13-18 , 2021	Electronic theory of dia and paramagnetism, Domain theory of ferromagnetism (Langevin's theory)
8	Dec.20- 24, 2021	Cycle of magnetization- hysteresis,loop ( Energy dissipation, Hysteresis loss and importance of Hysteresis Curve)
9	Dec 27, 2021 - Jan 1,2022	Maxwell equations and their derivations, Displacement current, Vector and Scalar potentials
10	Jan 3-8, 2022	Boundary conditions at interface between two different media, Poynting vector and Poynting theorem.
11	Jan.10-15, 2022	A.C. circuit analysis using complex variable with (a) Capacitance and Resistance (CR)
12	Jan. 17-22, 2022	(b) Resistance and Inductance (LR) (c) Capacitance and Inductance (LC),and (d) Capacitance, Inductance and Resistance (LCR)
13	Jan. 24-29, 2022	numerical problems
14	Jan 31, Feb1-5, 2022	Series and parallel resonance circuit, Quality factor (sharpness of resonance).
15	Feb. 7-12,2022	revision of syllabus
16	Feb. 14-19, 2022	revision of syllabus
17	Feb. 21-22, 2022	revision of syllabus
18	April 1-2, 2022	Energy bands in solids, Intrinsic and extrinsic semiconductors, carrier mobility and electrical resistivity of semiconductors
19	April 4-9, 2022	Hall effect, p-n junction diode and their characteristics,

20	April 11-16,2022	Zener and Avalanche breakdown, Zener diode, Zener diode as a voltage regulator
21	April 18-23, 2022	Light emitting diodes (LED), Photoconduction in semiconductors, Photodiode, Solar Cell
22	April 25-30, 2022	p-n junction as a rectifier, half wave and full wave rectifiers
23	May 2-7,2022	filters (series inductor, shunt capacitance, L-section or choke, n and R.C. filter circuits)
24	May 9-14, 2022	Transistors : Junction transistors, Working of NPN and PNP transistors
25	May 16-21,2022	Three configurations of transistor (C-B, C-E, C-C modes),Common base, common emitter and common collector characteristics of transistor
26	May23-28, 2022	Constants of a transistor and their relation,Advantages and disadvantages of C-E configuration
27	May 30-31- June 1-4,2022	D.C. load line .Transistor biasing; various methods of transistor biasing and stabilization.
28	June 6-11, 2022	Amplifiers, Classification of amplifiers, common base and common emitter amplifiers, coupling of amplifiers
29	June 13-16, 2022	various methods of coupling, Resistance- Capacitance (RC), coupled amplifier (two stage, concept of band width, no derivation)
30	June 13-18,2022	Feedback in amplifiers, advantages of negative feedback, emitter follower, distortion in amplifiers
31	June 20-25, 2022	Oscillators, Principle of oscillation, classification of oscillators
32	June 27-30, July1-2,2022	Condition for self sustained oscillation: Barkhausen criterion for oscillation
33	July 4- 9,2022	Tuned collector common emitter oscillator, Hartley oscillator, C.R.O. (Principle and Working).

# DYAL SINGH COLLEGE, KARNAL

## Lesson Plan

session 2021-22

Name of the Assistant Professor

Dr. Rubi

Class and Section:

B.Sc NM A& B 2nd year

Subject:

Physics (Wave & Optics )

Week	Days	Topics
1	Oct.1	Orientation
2	Oct.4-9, 2021	Introduction to wave and optics
3	Oct.11-16, 2021	Important concepts: wave nature of light, Interference, Diffraction
4	Oct.18-23,2021	Introduction of wavefront, coherent sources
5	Oct.25-30,2021	Interference by Division of Wave front: Young's double slit experiment, Coherence, Conditions of interference
	Oct. 31-Nov.7,2021	Diwali Vacations
6	Nov 8-13,2021	Fresnel's biprism and its applications to determine the wavelength of sodium light and thickness of a mica sheet
7	Nov. 15-20,2021	Lloyd's mirror, Difference between Bi-prism and Llyod mirror fringes,
8	Nov. 22-27,2021	phase change on reflection, problems discussion, numericals
9	Nov 29- Dec. 4,2021	Interference by Division of Amplitude: Plane parallel thin film, production of colors in thin films
10	Dec 6-11,2021	classification of fringes in films, Interference due to transmitted light and reflected light, wedge shaped film
11	Dec. 13-18,2021	Newton's rings, it's applications
12	Dec 19-24, 2021	Interferometer: Michelson's interferometer and its applications
13	Dec 27, 2021-Jan 1,2022	Fresnel's diffraction: Fresnel's assumptions and half period zones
14	Jan 3-8,2022	rectilinear propagation of light, zone plate
15	Jan. 10-15,2022	diffraction at a straight edge, rectangular slit and circular aperture, narrow slit and wire
16	Jan 17-22, 2022	Fraunhoffer diffraction: single-slit diffraction, double-slit diffraction, N-slit diffraction, plane transmission grating spectrum
17	Jan 24-29, 2022	dispersive power of grating, limit of resolution, Rayleigh's criterion, resolving power of telescope and a grating
18	Jan. 31-Feb 5, 2022	prism and grating spectra
19	Feb 7-12,2022	revision
20	Feb 14-19,2022	Tests
21	Feb 21-22, 2022	revision
	4th Semester	
1	April1-2,2022	Polarization: Polarisation by reflection, refraction and scattering, Malus Law, Phenomenon of double refraction

2	April 4-9, 2022	Huygen's wave theory of double refraction (Normal and oblique incidence), Analysis of polarized Light
3	April 11-16,2022	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
4	April 18-23,2022	Optical activity, Fresnel's theory of optical rotation, Specific rotation, Polarimeters (half shade and Biquartz)
5	April 25-30,2022	Fourier theorem and Fourier series, evaluation of Fourier coefficient, importance and limitations of Fourier theorem
6	May 2-7,2022	even and odd functions, Fourier series of functions $f(x)$ between (i) 0 to $2\pi$ , (ii) $-\pi$ to $\pi$ , (iii) 0 to $\pi$
7	May 9-14,2022	(iv) $-L$ to $L$ , complex form of Fourier series, Application of Fourier theorem for analysis of complex waves
8	May 16-21,2022	half and full wave rectifier outputs
9	May 23-28,2022	Parseval identity for Fourier Series, Fourier integrals, Fourier transforms and its properties
10	May 30,31-June 1-4,2022	Application of Fourier transform (i) for evaluation of integrals, (ii) for solution of ordinary differential equations
11	June 6-12,2022	FT of $f(x) = e^{-x^2/2}$ , problems discussion and numerical
12	June 13-18,2022	Matrix methods in paraxial optics, effects of translation and refraction, derivation of thin lens and thick lens formulae, unit plane, nodal planes, system of thin lenses.
13	June 20-25, 2022	Optical fiber, Critical angle of propagation, Mode of Propagation, Acceptance angle, Fractional refractive index change
14	June 27-30, July 1-2,2022	Numerical aperture, Types of optics fiber, Normalized frequency, Pulse dispersion, Attenuation, Applications, Fiber optic Communication, Advantages
15	July 4-9,2022	revision and test

R. Arora