FACULTY OF SCIENCES

Syllabus

For

M.Sc. PHYSICS
(FIVE YEARS INTEGRATED COURSE)
(UNDER THE SCHEME OF HONOURS SCHOOL)
(Credit Based Evaluation & Grading System)

(SEMESTER: I & II)
Examinations: 2019-20

Guru Nanak Dev University
Amritsar

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER SYSTEM)
(UNDER THE SCHEME OF HONOURS SCHOOL)

SCHEME

SEMESTER-I

		Contact Hrs.			Marks	Credits
Subject Code	**Subject**	**L**	**T**	**P**		
(I)	**Core Course Theory and Practical**					
PCL-101	Mechanics	4	0	0	100	4
PCL-102	Thermal Physics	4	0	0	100	4
PCP-101	Physics Lab-I	0	0	4	50	2
PCP-102	Physics Lab-II	0	0	4	50	2
(II)	**Generic Elective and Practical**					
MTL-135	Mathematics-I	5	1	0	150	6
CYL-191	Organic Chemistry	4	0	0	100	4
CYP-193	Organic Chemistry Lab	0	0	4	50	2
(III)	**Ability Enhancement Compulsory Course**					
ENL-101	Communicative English-I	2	0	0	100	2
PBL-121/ PBL-122/ HSL-101	Punjabi (Compulsory) **OR** * ਮੁੱਢਲੀ ਪੰਜਾਬੀ **OR** **Punjab History & Culture	2	0	0	100	2
SOA 101	***Drug Abuse: Problem, Management and Prevention (Compulsory ID Course)	3	0	0	100	3
		21	**1**	**12**		**28**

Note-:

1. ***Special Paper in lieu of Punjabi Compulsory.**
2. ****For those students who are not domicile of Punjab.**
3. *****Student can opt this Paper whether in 1st or 2nd Semester.**

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER SYSTEM)
(UNDER THE SCHEME OF HONOURS SCHOOL)

SEMESTER-II

		Contact Hrs.			Marks	Credits
Subject Code	**Subject**	**L**	**T**	**P**		
(I)	**Core Course Theory and Practical**					
PCL-151	Electricity and Magnetism	4	0	0	100	4
PCL-152	Waves and Optics	4	0	0	100	4
PCP-151	Physics Lab-III	0	0	4	50	2
PCP-152	Physics Lab-IV	0	0	4	50	2
(II)	**Generic Elective and Practical**					
MTL-136	Mathematics-II	5	1	0	150	6
CYL-192	Inorganic Chemistry	4	0	0	100	4
CYP-194	Inorganic Chemistry Lab	0	0	4	50	2
(III)	**Ability Enhancement Compulsory Course**					
ENL-151	Communicative English-II	2	0	0	100	2
PBL-131 / PBL-132 HSL-102	Punjabi (Compulsory) **OR** * ਮੁੱਢਲੀ ਪੰਜਾਬੀ **OR** **Punjab History & Culture	2	0	0	100	2
SOA-101	***Drug Abuse: Problem, Management and Prevention (Compulsory ID Course)	3	0	0	100	3
		24	**1**	**12**		**31**

Note-:

1. ***Special Paper in lieu of Punjabi Compulsory.**
2. ****For those students who are not domicile of Punjab.**
3. *****Student can opt this Paper whether in 1st or 2nd Semester.**

Note : PSL-053 ID Course Human Rights & Constitutional Duties (Compulsory ID Paper). Students can opt. this paper in any semester except the 1st Semester. This ID Paper is one of the total ID Papers of this course.

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-I)
(UNDER THE SCHEME OF HONOURS SCHOOL)

MECHANICS

Course No.	**LTP**
PCL-101	**4 0 0**

Time: 3 Hours **Max. Marks: 100**
Mid Semester Marks : 20
End Semester Marks : 80

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Objectives: The course covers the different co-ordinate systems and their relationship. It deals with many aspects of physical world based upon the Newton's Laws of motion and gravitation, conservation Laws of energy and momentum. It explains the scattering at the atomic level to the motion of celestial objects.

SECTION-A

Fundamentals of Dynamics: Reference frames, Inertial frames; Review of Newton's Laws of Motion. Galilean transformation; Galilean invariance. Momentum of variable-mass system: motion of rocket. Motion of a projectile in Uniform gravitational field Dynamics of a system of particles. Centre of Mass. Principle of conservation of momentum. Impulse.

Work and Energy: Work and kinetic energy Theorem.Conservationand non-conservative forces.Potential Energy.Energy diagram.Stable and unstable equilibrium, Elastic potential energy. Force as gradient of potential energy. Work & Potential energy.Work done by non-conservative forces.Law of conservation of Energy.

Collision: Elastic and inelastic collisions between particles. Centre of Mass and Laboratory frames.

(15 lectures)

SECTION-B

Rotational Dynamics: Angular momentum of a particle and system of particles. Torque, Principle of conservation of angular momentum.Rotation about a fixed axis.Moment of Inertia.Calculation of moment of inertia for rectangular, cylindrical and spherical bodies, Kinetic energy of rotation, Motion involving both translation and rotation.

Elasticity: Relation between elastic constants. Twisting torque on a cylinder or wire.

Fluid Motion: Kinematics of moving fluids. Poiseuille's Equation for flow of a liquid through a capillary tube.

(15 lectures)

SECTION-C

Gravitation and Central Force Motion: Law of gravitation. gravitational potential energy. Inertial and gravitational mass. Potential and field due to spherical shell and solid spheres.

Motion of a particle under a central force field.Two-body problem and its reduction to one-body problem and its solution. The energy equation and energy diagram. Kepler's Laws.Satellite in circular orbit and applications. Geosynchronous orbits. Weightlessness. Basic ideas of global positional system (GPS). **(15 lectures)**

SECTION-D

Non-Inertial Systems: Non-inertial systems and fictitious forces. Uniformly rotating frame.Laws of Physics in rotating coordinate systems.Centrifugal force. Coriolis forces and its applications. Components of velocity and acceleration in Cylindrical and Spherical coordinate systems.

Special Theory of Relativity: Michelson-Morley Experiment and its outcome. Postulates of special theory of relativity. Lorentz transformations. Simultaneity and order of events. Lorentz contraction. Time dilation. Relativistic transformation of velocity, frequency and wave number.Relativistic addition of velocities.Variation of mass and velocity. Massless particles. Mass-Energy equivalence. Relativistic Doppler effect. Relativistic kinematics. Transformation of Energy and Momentum.

(15 lectures)

Reference Books:

1. An Introduction to Mechanics, Daniel Kleppner & Robert Kolenkow, 2007, Tata McGrawHill
2. Mechanics, DS Mathur, PS Hemne, 2012, S. Chand
3. University Physics, FW Sears, MW Zemansky & HD Young 13/e, 1986, AddisonWesley
4. Mechanics Berkeley Physics course, v.1: Charles Kittel, et.al. 2007, Tata McGrawHill Physics – Resnick, Halliday & Walker 9/e, 2010, Wiley
5. Engineering Mechanics, Basudeb Bhattacharya, 2nd edn., 2015, Oxford University Press
6. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-I)
(UNDER THE SCHEME OF HONOURS SCHOOL)

THERMAL PHYSICS

Course No.	**LTP**
PCL-102	**4 0 0**

Time: 3 Hours **Max. Marks: 100**
Mid Semester Marks : 20
End Semester Marks : 80

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Objectives: The course discusses the laws of thermodynamics, Carnot engine, entropy, indicator diagrams, Maxwell's equations and applications. It covers the concept of phase space, microstates and Boltzmann definition of entropy. Maxwell–Boltzmann, Fermi-Dirac & Bose-Einstein distributions and their applications.

SECTION-A

Introduction to Thermodynamics

Zeroth and First Law of Thermodynamics: Extensive and Intensive Thermodynamic Variables, Thermodynamic Equilibrium, Zeroth Law of Thermodynamic & Concept of Temperature, Concept of Work & Heat, State Functions, First Law of Thermodynamics and its differential Form, Internal Energy, First Law & Various Processes, Applications of First Law: General Relation between C_p And C_v, Work Done during Isothermal and Adiabatic Processes, Compressibility and Expansion Co-efficient.

Second Law of Thermodynamics: Reversible and Irreversible process with examples. Conversion of Work into Heat and Heat into Work. Heat Engines.Carnot's Cycle, Carnot engine & efficiency, Refrigerator & coefficient of performance, 2nd Law of Thermodynamics: Kelvin-Planck and Clausius Statements and their Equivalence. Carnot's Theorem. Application of Second Law of Thermodynamics: Thermodynamic Scale of Temperature and its Equivalence to Perfect Gas Scale.

(15 lectures)

SECTION-B

Entropy: Concept of Entropy, Clausius Theorem, Clausius Inequality, Second Law of Thernodynamics in terms of Entropy, Entropy of a perfect gas, Principle of increase of Entropy, Entropy Changes in Reversible and Irreversible processes with examples, Entropy of the Universe, Entropy Changes in Reversible and Irreversible Processes, Principle of Increase of Entropy, Temperature-Entropy diagrams for Carnot's Cycle, Third Law of Thermodynamics Unattainability of Absolute Zero

Thermodynamic Potentials: Thermodynamic Potentials: Internal Energy, Enthalpy, Helmholtz Free Energy, Gibb's Free Energy, Their Definitions, Properties and Applications, Surface Films and Variation of Surface Tension with Temperature, Magnetic Work, Coolig due to adiabatic demagnetization, First and second order Phase Transitions with examples, Clausius Clapeyron Equation and Ehrenfest equations. **(15 lectures)**

SECTION-C

Maxwell's Thermodynamic Relations: Derivations and applications of Maxwell's Relations, Maxwell's Relations: (1) Clausius Clapeyron equation, (2) Values of C_p-C_v, (3) TdS Equations, (4) Joule-Kelvin Co-efficient for Ideal and Van-der Wall Gasses, (5) Energy Equations, (6) Change of Temperature during Adiabatic Process.

Distribution of Velocities: Maxwell-Boltzmann Law of Distribution of Velocities in anIdeal Gas and its Experimental Verification. Doppler Broadening of Spectral Lines andStern's Experiment Mean, RMS and Most Probable Speeds. Degrees of Freedom Lawof Equi-partition of Energy. Specific heats of Gases **(15 lectures)**

SECTION-D

Real Gases: Behaviour of Real Gases: Deviations from the Ideal Gas Equation. TheVirial Equation.Andrew's Experiments on CO2 Gas Critical Constants. Continuity of Liquid and Gaseous State.Vapour and Gas Boyle Temperature.Van der WaalsEquation of State for Real Gases. Values of Critical Constants Law of Corresponding States Comparison with Experimental Curves P-V Diagrams.Joule's Experiment Free Adiabatic Expansion of a Perfect Gas. Joule-Thomson Porous Plug Experiment Joule Thomson Effect for Real and Van der Waal Gases. Temperature of Inversion. Joule Thomson Cooling. Adiabatic demagnetization.

Introduction to Statistical Mechanics: Distinguishable and indistinguishable particles, Maxwell-Boltzmann, Fermi-Dirac and Bose-Einstein distributions and applications to photon gas and electron gas. **(15 lectures)**

Reference Books:

1. Heat and Thermodynamics, M.W. Zemansky, Richard Dittman, 1981, McGraw-Hill.
2. A Treatise on Heat, Meghnad Saha, and B.N.Srivastava, 1958, Indian Press
3. Thermal Physics, S. Garg, R. Bansal and Ghosh, 2nd Edition, 1993, Tata McGraw-Hill
4. Thermodynamics, Kinetic Theory & Statistical Thermodynamics, Sears & Salinger. 1988, Narosa.
5. Heat Thermodynamics & Statistical Physics, Brij Lal and Subramaniam, 1st Edn., 2008, S. Chand.

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-I)
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PHYSICS LAB-I

Course No.	**L T P**
PCP-101	**0 0 4**

Maximum Marks 50

Practicals :-

1. Measurements of length (or diameter) using Vernier calliper, screw gauge and travelling microscope.
2. To study the random error in observations.
3. To determine the height of a building using a Sextant.
4. To study the motion of the spring and calculate (a) Spring constant and, (b) g.
5. To determine the Moment of Inertia of a Flywheel.
6. To determine g and velocity for a freely falling body using Digital Timing Technique.
7. To determine Coefficient of Viscosity of water by Capillary Flow Method (Poiseuille's method).
8. To determine the Young's Modulus of a Wire by Optical Lever Method.
9. To determine the Modulus of Rigidity of a Wire by Maxwell's needle.
10. To determine the elastic Constants of a wire by Searle's method.
11. To determine the value of g using Bar Pendulum.
12. To determine the value of g using Kater's Pendulum.

Reference Books:

1. Advanced Practical Physics for students, B. L. Flint and H.T.Worsnop, 1971, Asia Publishing House
2. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
3. Engineering Practical Physics, S.Panigrahi& B.Mallick, 2015, Cengage Learning India Pvt. Ltd.
4. Practical Physics, G.L. Squires, 2015, 4th Edition, Cambridge University Press.
5. A Text Book of Practical Physics, I.Prakash & Ramakrishna, 11th Edn, 2011, Kitab Mahal

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-I)
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PHYSICS LAB-II

Course No.	**L T P**
PCP-102	**0 0 4**

Maximum Marks 50

Practicals :-

1. To Determine Mechanical Equivalent Of Heat, J, By Callender And Barne's Constant Flow Method.
2. To Determine The Coefficient Of Thermal Conductivity of Cu By Searle's Apparatus.
3. To Determine The Coefficient Of Thermal Conductivity of Cu By Angstrom's Method.
4. To Determine The Coefficient Of Thermal Conductivity of A Bad Conductor By Lee And Charlton's Disc Method.
5. To Determine The Temperature Coefficient of Resistance By Platinum Resistance Thermometer (Prt).
6. To Study The Variation Of Thermo-Emf of A Thermocouple With Difference of temperature Of Its Two Junctions Using A Null Method. And Also Calibrate The Thermocouple In A Specified Temperature Range.
7. To Calibrate A Thermocouple To Measure Temperature In A Specified Range Usingop-Amp Difference Amplifier And To Determine Neutral Temperature.

Reference Books:

1. Advanced Practical Physics For Students, B. L. Flint And H.T.Worsnop, 1971, Asia Publishing House
2. A Text Book Of Practical Physics, I. Prakash & Ramakrishna, 11th Ed., 2011,Kitab Mahal
3. Advanced Level Physics Practicals, Michael Nelson And Jon M. Ogborn, 4th Edition, Reprinted 1985, Heinemann Educational Publishers
4. A Laboratory Manual Of Physics For Undergraduate Classes, D.P. Khandelwal, 1985, Vani Pub.

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-I)
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MATHEMATICS – I

Course No. **LT P**
MTL-135 **5 1 0**

Time: 3 Hours **Max. Marks: 150**
Mid Semester Marks : 30
End Semester Marks : 120

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Objectives: The course provides background of mathematics required for explaining the various physical phenomena, main focus is given to functions, differential calculus which help the students in solving the Schrodinger wave equations in getting the eigen values and eigen functions.

SECTION-A

Functions and Derivatives: Limit, continuity and derivative of a function, Successive differentiation,Leibnitz theorem, Geometrical significance of derivative, Maxima and Minima of a function of single variable, Partial derivatives,Total derivative, Chain rule.

15 Lectures

SECTION-B

Differential Calculus: Rolle's theorem, Mean value theorem, Taylor and Maclaurin formulas, Taylor series; Concavity, point of inflexion, cusp point; Asymptotes; graphs of standardplanar curves in Cartesian coordinates.

15 Lectures

SECTION-C

Anti derivatives: Anti derivatives, Method of substitution,Partial fractions, Integration by parts; Reduction formulae;

Definite integrals. Definite integral as a limit of a sum, Geometrical interpretation; Double and triple integrals, Applications of multiple integrals to determine Centre of Gravity and Moments of inertia.

15 Lectures

SECTION-D

Matrices: Orthogonal matrices, Hermitian matrices, Unitary matrices; Cayley Hamilton theorem and its applications; Rank of a matrix, consistency of a system of linear equations, Eigenvalues and Eigenvectors, diagonalization of matrices.

15 Lectures

Reference Books:

1. Differential Calculus: Shanti Narayan, New Delhi, ShyamLal, 1983.
2. Integral Calculus: Shanti Narayan, Delhi, S. Chand, 1968.
3. Higher Engineering Mathematics: B.S. Grewal, Delhi, Khanna, 1995.

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-I)
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CYL-191 : ORGANIC CHEMISTRY

Course No.	**LTP**
CYL-191	**4 0 0**

Time: 3 Hours **Max. Marks: 100**
Mid Semester Marks : 20
End Semester Marks : 80

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Objectives: The objective of this course is to familiarize the students with the basic chemistry of alkane, alkene, alkyne, carbonyl compounds and stereochemistry of organic compounds. The course content will also provide basic knowledge of organic reaction mechanisms.

SECTION-A

Chemistry Alkanes and Alkenes: Conformations of alkanes and cycloalkanes: conformational analysis of ethane, butane, cyclohexane, monosubstituted and disubstituted cyclohexane, conformation of small, medium and large ring cycloalkanes and of polycyclic ring systems. Stereochemistry of alkenes, naming stereo isometric alkenes by the E-Z system, mechanism of hydrogenation of alkenes. Stereochemistry of hydrogenation of cycloalkenes, Dehydration of alcohols and regioselectivity of these reactions . Acid catalysed dehydration of alcohols with complete mechanistic discussion. Mechanism of dehydrohalogenation of alkythalides (E mechanism), stereoselective and antielimination in E reactions, the E Mechanism, electrophilic addition of hydrogen halides to alkenes its regioselectivity explained on the basis of mechanism, free radical addition of hydrogen bromide to alkenes, acid catalysed hydration of alkene with mechanism stereochemistry of halogen addition to alkenes and its mechanistic explanation. Hypohalous acid addition to alkenes, epoxidation of alkenes. Acidity of acetylene and terminal alkynes, metal ammonia reduction of alkyne, addition of hydrogen halides and water to alkynes, with detailed discussion of mechanism of these reactions, the Diels Alder reaction, orbital symmetry and the Diels Adler reaction.

15 Lectures

SECTION-B

Stereochemistry Molecular chirality, enantiomers/symmetry in a chiral structures, chiral centres in chiral molecules, properties of chiral molecules –optical activity, absolute and relative configuration, the Cahn-Ingold Perlog R-S notional system physical properties of enantiomers. Stereochemistry of chemical reactions that produce chiral centres, chemical reactions that produce stereoisomers, Resolution of enantiomers, chiral centres other than carbon. Stereochemistry of alkenes, naming stereo isometric alkenes by the E-Z system, Mechanism of Hydrogenation of alkenes. Stereochemistry of hydrogenation of cycloalkenes, stereochemistry of halogen addition to alkenes and its mechanistic explanation.

15 Lectures

SECTION-C

Nucleophilis Substitution and Addition Reaction: (a) Functional group transformation by nucleophilic substitution, the biomolecular (SN), mechanism of nucleophilic substitution, stereochemistry of SN reactions, how SN reactions occur, steric effect in SN reaction, nucleophilcs and nucleophilicity, the unimolecular (SN) mechanism of nucleophilic substitution, carbocation stability and the rate of substitution, by the SN mechanism stereochemistry of SN reactions, carbocation real arrangements in SN reactions, solvent effect, substitution and elimination as competing reactions.

(b) Principles of nucleophilic addition to carbonyl groups: Hydration acetal formation, cyanohydrins formation; reactions with primary and secondary amines, Witting reaction, steroselective addition to carbonyl groups mechanism of halogenations, acid and base catalysed cholization, haloform reaction, aldol condensation, conjugate nucleophillic addition to unsaturated carbonyl compounds.

15 Lectures

SECTION-D

Spectroscopy: Principles of molecular spectroscopy, electromagnetic radiation, quantized energy states, NMR (H) Spectroscopy, nuclear shielding and chemical shift measurements, chemical shift and molecular structure, interpreting proton NMR spectra, spin- spin splitting in NMR and conformations carbons- 13 nuclear magnetic resonance, the sensitivity problem, interpretation of spectra. Infrared spectroscopy, ultraviolet visible (UV-VIS) spectroscopy and mass spectrometry.

15 Lectures

Reference Books:

1. Organic Chemistry, R.T. Morison and R.N Boyd, 6th Edition, Perason, 2012.
2. Organic Chemistry, I.L. Finar, Vol. I, 4th Edition, Pearson Education India, 2002.
3. Advanced Organic Chemistry, Reactions Mechanism and Structure, J. March.
4. Schaum's Outlines Series Theory and Problems of Organic Chemistry, McGraw-Hill.
5. Problems and their solutions in Organic Chemistry, I.L. Finar.
6. Modern Organic Chemistry, J.D. Roberts and M.C. Caserio.
6. Organic Chemistry, D.J. Cram and G.S. Hammond.
7. Naming Organic Compounds Programmed Introduction to Organic Chemistry, J.E. Banks
8. Stereochemistry of carbon compounds, E.L. Eliel.
9. Organic Spectroscopy, W. Camp.
10. Organic Chemistry, F.A. Carey.

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-I)
(UNDER THE SCHEME OF HONOURS SCHOOL)

ORGANIC CHEMISTRY LAB

Course No.	**LT P**
CYP-193	**0 0 4**

Maximum Marks 50

The preliminary examination of physical and chemical characteristics (Physical state, color, odor and ignition tests), elemental analysis (nitrogen, sulphur, chlorine, bromine, iodine), solubility tests including acid-base reactions, classification tests involving functional reactivity other than acid-base test, preparation of derivatives for given pure organic compounds.

The following categories of compounds should be analyzed

- phynols, carboxylic acids
- carbonyl compounds-ketones aldehydes
- aromatic amines
- amides

Reference Books:

1. Practical Organic Chemistry by F.G. Mann and B.C. Saunders.

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-I)
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ENL-101 : COMMUNICATIVE ENGLISH–I

Credits: 02 (L= 2, T=0, U=0)

Time: 3 Hours **Max. Marks: 100**
Mid Semester Marks : 20
End Semester Marks : 80

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Objective: To introduce students to the skills and strategies of reading and writing by identifying organizational patterns, spotting classification systems and understanding associations between ideas. This course will prepare students to read a variety of texts and also to communicate more effectively through writing. The course will also pay special attention to vocabulary building.

Prescribed Text books:

- *The Written Word* by Vandana R. Singh, Oxford University Press, New Delhi.
- *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition.

Section–A

"Word List", "Correct Usage of Commonly used words and Phrases" from the chapter "Vocabulary" given in ***The Written Word*** by Vandana R. Singh.

Section–B

Letter- writing as prescribed in ***The Written Word*** by Vandana R. Singh.
Report writing as prescribed in ***The Written Word*** by Vandana R. Singh.

Section–C

Section 1 from ***Making Connections: A Strategic Approach to Academic Reading*** by Kenneth J. Pakenham, Second Edition.

Section–D

Section 2 from ***Making Connections: A Strategic Approach to Academic Reading*** by Kenneth J. Pakenham, Second Edition.

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-I)
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PBL 121 : ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ - I

Credit : 2-0-0

Time: 3 Hours **Max. Marks: 100**
Mid Semester Marks : 20
End Semester Marks : 80

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਭਾਗ ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਭਾਗ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

ਸੈਕਸ਼ਨ-ਏ

I. **ਦੋ ਰੰਗ** (ਸੰਪਾ. ਹਰਜਿੰਦਰ ਸਿੰਘ ਢਿੱਲੋਂ, ਪ੍ਰੀਤਮ ਸਿੰਘ ਸਰਗੋਧੀਆ)
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ ਵਿਚੋਂ ਹੇਠ ਲਿਖੇ ਕਵੀ :
(ੳ) ਭਾਈ ਵੀਰ ਸਿੰਘ
(ਅ) ਧਨੀ ਰਾਮ ਚਾਤ੍ਰਿਕ
(ਇ) ਪ੍ਰੋ. ਪੂਰਨ ਸਿੰਘ
(ਕਵੀ ਦਾ ਜੀਵਨ, ਕਵਿਤਾ-ਸਾਰ, ਵਿਸ਼ਾ-ਵਸਤੂ, ਕਾਵਿ-ਕਲਾ)

II. ਗੁਰਮੁਖੀ ਔਰਥੋਗਰਾਫੀ ਦੀ ਜੁਗਤ (ਪੈਂਤੀ, ਮੁਹਾਰਨੀ, ਬਿੰਦੀ, ਟਿੱਪੀ ਤੇ ਅੱਧਕ); ਵਿਸ਼ਰਾਮ ਚਿੰਨ੍ਹ, ਸ਼ਬਦ ਜੋੜ (ਸ਼ੁਧ-ਅਸ਼ੁਧ)

ਸੈਕਸ਼ਨ-ਬੀ

I. **ਦੋ ਰੰਗ** (ਸੰਪਾ. ਹਰਜਿੰਦਰ ਸਿੰਘ ਢਿੱਲੋਂ, ਪ੍ਰੀਤਮ ਸਿੰਘ ਸਰਗੋਧੀਆ)
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ ਵਿਚੋਂ ਹੇਠ ਲਿਖੇ ਕਵੀ :
(ੳ) ਫਿਰੋਜ਼ਦੀਨ ਸ਼ਰਫ
(ਅ) ਪ੍ਰੋ. ਮੋਹਨ ਸਿੰਘ
(ਕਵੀ ਦਾ ਜੀਵਨ, ਕਵਿਤਾ-ਸਾਰ, ਵਿਸ਼ਾ-ਵਸਤੂ, ਕਾਵਿ-ਕਲਾ)

II. ਲੇਖ ਰਚਨਾ (ਜੀਵਨੀ-ਪਰਕ, ਸਮਾਜਕ ਅਤੇ ਚਲੰਤ ਵਿਸ਼ਿਆਂ ਉੱਤੇ) : 10 ਲੇਖ ਲਿਖਵਾਉਣੇ
(ਕਲਾਸ ਵਿਚ ਅਤੇ ਘਰ ਲਈ ਅਭਿਆਸ)

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-I)
(UNDER THE SCHEME OF HONOURS SCHOOL)

ਸੈਕਸ਼ਨ-ਸੀ

I. **ਦੋ ਰੰਗ** (ਸੰਪਾ. ਹਰਜਿੰਦਰ ਸਿੰਘ ਢਿੱਲੋਂ, ਪ੍ਰੀਤਮ ਸਿੰਘ ਸਰਗੋਧੀਆ)
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ ਵਿਚੋਂ ਹੇਠ ਲਿਖੇ ਕਵੀ :
(ੳ) ਨੰਦ ਲਾਲ ਨੂਰਪੁਰੀ
(ਅ) ਅਮ੍ਰਿਤਾ ਪ੍ਰੀਤਮ
(ਇ) ਡਾ. ਹਰਿਭਜਨ ਸਿੰਘ
(ਕਵੀ ਦਾ ਜੀਵਨ, ਕਵਿਤਾ-ਸਾਰ, ਵਿਸ਼ਾ-ਵਸਤੂ, ਕਾਵਿ-ਕਲਾ)

II. ਸ਼ੁੱਧ, ਅਸ਼ੁੱਧ : ਦਿੱਤੇ ਪੈਰ੍ਹੇ ਵਿਚੋਂ ਅਸ਼ੁੱਧ ਸ਼ਬਦਾਂ ਨੂੰ ਸ਼ੁੱਧ ਕਰਨਾ
(15 ਪੈਰ੍ਹਿਆਂ ਦੇ ਸ਼ੁੱਧ ਅਸ਼ੁੱਧ ਅਭਿਆਸ ਕਰਵਾਉਣੇ)

ਸੈਕਸ਼ਨ-ਡੀ

I. **ਦੋ ਰੰਗ** (ਸੰਪਾ. ਹਰਜਿੰਦਰ ਸਿੰਘ ਢਿੱਲੋਂ, ਪ੍ਰੀਤਮ ਸਿੰਘ ਸਰਗੋਧੀਆ)
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ ਵਿਚੋਂ ਹੇਠ ਲਿਖੇ ਕਵੀ :
(ੳ) ਸ਼ਿਵ ਕੁਮਾਰ ਬਟਾਲਵੀ
(ਅ) ਸੁਰਜੀਤ ਪਾਤਰ
(ਕਵੀ ਦਾ ਜੀਵਨ, ਕਵਿਤਾ-ਸਾਰ, ਵਿਸ਼ਾ-ਵਸਤੂ, ਕਾਵਿ-ਕਲਾ)

II. ਅਖ਼ਬਾਰੀ ਇਸ਼ਤਿਹਾਰ : ਨਿੱਜੀ, ਦਫ਼ਤਰੀ ਤੇ ਸਮਾਜਕ ਗਤੀਵਿਧੀਆਂ ਨਾਲ ਸੰਬੰਧਤ

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-I)
(UNDER THE SCHEME OF HONOURS SCHOOL)

PBL-122: ਮੁੱਢਲੀ ਪੰਜਾਬੀ
(In lieu of Punjabi Compulsory)

Credits: 2-0-0

Time: 3 Hours **Max. Marks: 100**
Mid Semester Marks : 20
End Semester Marks : 80

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਭਾਗ ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਭਾਗ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

ਪਾਠ-ਕ੍ਰਮ

ਸੈਕਸ਼ਨ-ਏ

ਪੈਂਤੀ ਅੱਖਰੀ, ਅੱਖਰ ਕ੍ਰਮ,
ਮਾਤ੍ਰਾਵਾਂ (ਮੁਢਲੀ ਜਾਣ-ਪਛਾਣ)
ਲਗਾਖਰ (ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ) : ਪਛਾਣ ਤੇ ਵਰਤੋਂ

ਸੈਕਸ਼ਨ-ਬੀ

ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ : ਮੁੱਢਲੀ ਜਾਣ-ਪਛਾਣ
ਸਾਧਾਰਨ ਸ਼ਬਦ, ਸੰਯੁਕਤ ਸ਼ਬਦ, ਮਿਸ਼ਰਤ ਸ਼ਬਦ
ਮੂਲ ਸ਼ਬਦ, ਅਗੇਤਰ ਅਤੇ ਪਿਛੇਤਰ

ਸੈਕਸ਼ਨ-ਸੀ

ਸ਼ੁੱਧ ਅਸ਼ੁੱਧ : ਦਿੱਤੇ ਪੈਰ੍ਹੇ ਵਿਚੋਂ ਅਸ਼ੁੱਧ ਸ਼ਬਦ ਨੂੰ ਸ਼ੁੱਧ ਕਰਨਾ।
ਸਮਾਨਾਰਥਕ ਤੇ ਵਿਰੋਧਾਰਥਕ ਸ਼ਬਦ

ਸੈਕਸ਼ਨ-ਡੀ

ਹਫਤੇ ਦੇ ਸੱਤ ਦਿਨਾਂ ਦੇ ਨਾਂ, ਬਾਰ੍ਹਾਂ ਮਹੀਨਿਆਂ ਦੇ ਨਾਂ, ਰੁੱਤਾਂ ਦੇ ਨਾਮ, ਇਕ ਤੋਂ ਸੌ ਤੱਕ ਗਿਣਤੀ ਸ਼ਬਦਾਂ ਵਿੱਚ।

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-I)
(UNDER THE SCHEME OF HONOURS SCHOOL)

HSL-101 : Punjab History & Culture (1450-1716)
(Special paper in lieu of Punjabi Compulsory)
(For those students who are not domicile of Punjab)

Credits: 2-0-0

Time: 3 Hours **Max. Marks: 100**
Mid Semester Marks : 20
End Semester Marks : 80

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section-A

1. Land and the People.
2. Bhakti Movement

Section-B

3. Life and Teaching of Guru Nanak Dev.
4. Contribution of Guru Angad Dev, Guru Arjun Dev ,Guru Amar Das and Guru Ram Das.

Section-C

5. Guru Hargobind.
6. Martyrdom of Guru Teg Bahadur

Section-D

7. Guru Gobind Singh and the Khalsa.
8. Banda Singh Bahadur: Conquests and Execution.

Suggested Reading

1. Kirpal Singh(ed.), *History and Culture of the Punjab, Part-ii, Punjabi University,* Patiala, 1990.
2. Fauja Singh (ed.), *History of Punjab, Vol, III Punjabi University, Patiala, 1987.*
3. J.S. Grewal, *The Sikhs of the Punjab, Cup, Cambridge, 1991.*
4. Khushwant Singh, *A History of the Sikhs*, Vol. I, OUP, New Delhi, 1990

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-I)
(UNDER THE SCHEME OF HONOURS SCHOOL)

SOA-101 : DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION (COMPULSORY ID PAPER)
(Student can opt. this paper whether in 1st or 2nd semester)

PROBLEM OF DRUG ABUSE

Credit 3-0-0

Time: 3 Hours **Max. Marks: 100**

Mid Semester Marks : 20
End Semester Marks : 80

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section – A

Meaning of Drug Abuse:

1) Meaning, Nature and Extent of Drug Abuse in India and Punjab.

2) Consequences of Drug Abuse for:

Individual	:	Education, Employment, Income.
Family	:	Violence.
Society	:	Crime.
Nation	:	Law and Order problem.

Section – B

Management of Drug Abuse:

(i) Medical Management: Medication for treatment and to reduce withdrawal effects.
(ii) Psychiatric Management: Counselling, Behavioural and Cognitive therapy.
(iii) Social Management: Family, Group therapy and Environmental Intervention.

Section – C

Prevention of Drug abuse:

(i) Role of family: Parent child relationship, Family support, Supervision, Shaping values, Active Scrutiny.
(ii) School: Counselling, Teacher as role-model. Parent-teacher-Health Professional Coordination, Random testing on students.

Section – D

Controlling Drug Abuse:

(i) Media: Restraint on advertisements of drugs, advertisements on bad effects of drugs, Publicity and media, Campaigns against drug abuse, Educational and awareness program

(ii) Legislation: NDPs act, Statutory warnings, Policing of Borders, Checking Supply/Smuggling of Drugs, Strict enforcement of laws, Time bound trials.

References:

1. Ahuja, Ram (2003), *Social Problems in India*, Rawat Publication, Jaipur.
2. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
3. Inciardi, J.A. 1981. *The Drug Crime Connection.* Beverly Hills: Sage Publications.
4. Kapoor. T. (1985) *Drug epidemic among Indian Youth*, New Delhi: Mittal Pub.
5. Kessel, Neil and Henry Walton. 1982, *Alcohalism. Harmond Worth:* Penguin Books.
6. Modi, Ishwar and Modi, Shalini (1997) *Drugs: Addiction and Prevention*, Jaipur: Rawat Publication.
7. National Household Survey of Alcohol and Drug abuse. (2003) New Delhi, Clinical Epidemiological Unit, All India Institute of Medical Sciences, 2004.
8. Ross Coomber and Others. 2013, *Key Concept in Drugs and Society.* New Delhi: Sage Publications.
9. Sain, Bhim 1991, *Drug Addiction Alcoholism,* Smoking obscenity New Delhi: Mittal Publications.
10. Sandhu, Ranvinder Singh, 2009, *Drug Addiction in Punjab*: A Sociological Study. Amritsar: Guru Nanak Dev University.
11. Singh, Chandra Paul 2000. *Alcohol and Dependence among Industrial Workers*: Delhi: Shipra.
12. Sussman, S and Ames, S.L. (2008). *Drug Abuse: Concepts, Prevention and Cessation*, Cambridge University Press.
13. Verma, P.S. 2017, "*Punjab's Drug Problem: Contours and Characterstics"*, Economic and Political Weekly, Vol. LII, No. 3, P.P. 40-43.
14. World Drug Report 2016, United Nations office of Drug and Crime.
15. World Drug Report 2017, United Nations office of Drug and Crime.

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-II)
(UNDER THE SCHEME OF HONOURS SCHOOL)

ELECTRICITY AND MAGNETISM

Course No.	**LTP**
PCL-151	**4 0 0**

Time: 3 Hours **Max. Marks: 100**
Mid Semester Marks : 20
End Semester Marks : 80

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Objectives: The course covers some basic aspects of mathematics required for understanding the subject. It deals with the interaction of charges, production of electric & magnetic fields and their measurements. The effect of motion of the frame of reference on charge and field measurements in discussed.

SECTION-A

Electric Field and Electric Potential: Conservation and quantization of charge. Coulomb's law. Electric field: Electric field lines. Electric flux. Gauss Law with applications to charge distributions with spherical, cylindrical and plant symmetry. Derivation of field from potential. Conservative nature of Electrostatic Field. Electrostatic Potential, Potential as line of integral field. Laplace's and Poisson equations. The Uniqueness Theorem Potential and Electric Field of a dipole. Force and Torque on dipole. Electrostatic energy of system of charges. Electrostatic energy of a charged sphere. Conductors in an electrostatic Field. Surface charge and force on a conductor. Capacitance of a system of charged conductor. Parallelize capacitor. Capacitance of an isolated conductors. Method of Images and its application to: (1) Plane Infinite Sheet and (2) Sphere. (**15 lectures**)

SECTION-B

Dielectric Properties of Matter: Dielectrics, Effects of electric field on dielectrics, Gauss's law for dielectrics. Polarization, Polarization Charges, Electric field due to polarization of dielectric. Electrical Susceptibility and Dielectric Constant. Capacitor (parallel plate, spherical, cylindrical) filled with dielectric. Displacement vector **D**. Relations between **E**, **P** and **D**. (**15 lectures)**

SECTION-C

Magnetic Field: Magnetic force between current elements and definition of MagneticField B.Biot-Savart's Law and its simple application straight wire and circular loop.Current Loop as a Magnetic Dipole and its Dipole Moment (Analogy with ElectricDipole). Amperes Circuital Law and its application to (1) Solenoid and (2) Toroid. Properties of **B**: curl and divergence. Vector Potential. Magnetic Force on (1) pointcharge (2) current carrying wire (3) between current elements. Torque on a current loopin a uniform Magnetic Field

Magnetic Properties of Matter: Behavious of materials in magnetic field. Magnetization vector (**M**). Magnetic Intensity (**H**). Magnetic Susceptibility and Permeability, Relation between B, H and M. Ferromagnetism B-H curve and hysteresis. **(15 lectures)**

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-II)
(UNDER THE SCHEME OF HONOURS SCHOOL)

SECTION-D

Electric field due to moving charges : Measurement of charges in motion, Electric field in different frame of references, Electric field due to moving charges, Electric field in two inertial frames, Interaction between moving charges. Relativistic Transformations of Electric and Magnetic Fields and their applications.

Electrical Circuits: AC Circuits: Kirchhoff's laws for AC circuits. Complex Reactanceand impedance, LCR Circuit: (1)Resonance (2) Power Dissipation and Quality Factor, and(4) Band Width.

Network Theorems: Ideal constant-voltage and constant-current sources, Thevenin theorem, Norton theorem, Superposition theorem, Reciprocity theorem, Maximum Power Transfer theorem. Application to DC circuit. Relativistic Transformations of Electric and Magnetic Fields and their applications..

(15 lectures)

Reference Books:

1. Fundamentals of Electricity and Magnetism, Arthur F. Kip, 2nd Edn.1981, McGrawHill.
2. Electricity, Magnetism & Electromagnetic Theory, S. Mahajanand Choudhury, 2012, Tata McGraw 16
3. Electricity and Magnetism, Edward M. Purcell, 1986 McGraw-Hill Education
4. Introduction to Electrodynamics, D.J. Griffiths, 3rd Edn., 1998, Benjamin Cummings.
5. Feynman Lectures Vol.2, R.P.Feynman, R.B.Leighton, M.Sands, 2008, Pearson Education
6. Electricity and Magnetism, J.H.Fewkes& J.Yarwood. Vol.I, 1991, Oxford Univ. Press.
7. Network, Lines and Fields, John D. Ryder, 2nd Edn., 2015, Pearson.
8. Schaum" s Outline of Electric Circuits, J. Edminister& M. Nahvi, 3rd Edn., 1995, McGraw Hill.

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-II)
(UNDER THE SCHEME OF HONOURS SCHOOL)

WAVES AND OPTICS

Course No. **LTP**
PCL-152 **4 0 0**

Time: 3 Hours **Max. Marks: 100**
Mid Semester Marks : 20
End Semester Marks : 80

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Objectives: This course covers the fundamental description of harmonic oscillator, damped, forced and N-coupled oscillators with real examples from everyday life i.e. vibration isolation, shocker etc. The course also covers the wave phenomenon, concept of waves, phase and group velocity and Doppler effect. This course serves as a foundation to understand various other master level courses such as Solid State Physics and Thermal Physics.

SECTION-A

Superposition of Collinear Harmonic oscillations: Linearity and Superposition. Principle of Superposition of two collinear oscillations having (1) equal frequencies and (2) different frequencies. Superposition of N collinear Harmonic Oscillations with (1) equal phase differences and equal frequency differences.

Superposition of two perpendicular Harmonic Oscillations: Graphical and Analytical Methods. Lissajous Figures with equal and unequal frequency and their uses.

(15 Lectures)

SECTION-B

Wave Motion: Plane and Spherical Waves. Longitudinal and Transverse Waves. Plane Progressive (Travelling) Waves.Wave Equation.Particle and Wave Velocities.Differential Equation. Pressure of a Longitudinal Wave. Energy Transport. Intensity of Wave. Water Waves: Ripple and Gravity Waves.

Velocity of Waves: Velocity of Transverse Vibrations of Stretched Strings. Velocity of Longitudinal Waves in a Fluid in a Pipe. Newton's Formula for Velocity of Sound. Laplace's Correction.

Superposition of Two Harmonic Waves: Standing (Stationary) Waves in a String Fixed and Free Ends. Analytical Treatment Phase and Group Velocities. Changes with respect to Position and Time. Energy of Vibrating String. Transfer of Energy. Normal Modes of Stretched Strings. Plucked and Struck Strings. Melde's Experiment Longitudinal Standing Waves and Normal Modes. Open and Close Pipes Superposition of N Harmonic Waves.

(15Lectures)

SECTION-C

Wave Optics: Electromagnetic nature of light. Definition and properties of wave front Huygens Principle. Temporal and Spatial Coherence.

Interference: Division of amplitude and wavefront. Young's double slit experiment Lloyd's Mirror and Fresnel's Biprism. Phase change on reflection: Stokes treatment Interference in Thin Films: parallel and wedge shaped films Fringes of equal inclination(Haidinger Fringes); Fringes of equal thickness (Fizeau Fringes). Newton's Rings: Measurement of wavelength and refractive index.

Interferometer: Michelson Interferometer-(1) Idea of form or fringes (No theoryrequired), (2) Determination of Wavelength, (3) Wavelength Difference, (4) RefractiveIndex, and (5) Visibility of Fringes. Fabry-Perot interferometer. **(15 Lectures)**

SECTION-D

Diffraction: Kirchhoff's Integral Theorem, Fresnel-Kirchhoff's Integral formula. (Qualitative discussion only)

Fraunhofer diffraction: Single slit. Circular aperture, Resolving Power of a telescopeDouble.slit, Multiple slits. Diffraction grating.Resolving power of grating.

Fresnel Diffraction: Fresnel's Assumptions. Fresnel's Half Period Zones for PlaneWave.Explanation of Rectilinear Propagation of Light. Theory of a Zone Plate: MultipleFoci of a Zone Plate.Fresnel's Integral, Fresnel diffraction pattern of a straight edge.slit and a wire

Holography: Principle of Holography Recording and Reconstruction Method. Theoryof Holography as Interference between two Plane Waves.Point source holograms.

(15 Lectures)

Reference Books

1. Vibrations and Waves, A.P. French, 1stEdn., 2003, CRC press.
2. Waves: Berkeley Physics Course, vol. 3, Francis Crawford, 2007, Tata McGraw-Hill.
3. Fundamentals of Optics, F.A. Jenkins and H.E. White, 1981, McGraw-Hill
4. Principles of Optics, Max Born and Emil Wolf, 7th Edn., 1999, Pergamon Press.
5. Optics, Ajoy Ghatak, 2008, Tata McGraw Hill
6. The Physics of Vibrations and Waves, H. J. Pain, 2013, John Wiley and Sons.
7. The Physics of Waves and Oscillations, N.K. Bajaj, 1998, Tata McGraw Hill.
8. Fundamental of Optics, A. Kumar, H.R. Gulati and D.R. Khanna, 2011, R. Chand Publications
9. Optics, Eugene Hecht, 4thEdn., 2014, Pearson Education.

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-II)
(UNDER THE SCHEME OF HONOURS SCHOOL)

PHYSICS LAB-III

Course No.	**L T P**
PCP-151	**0 0 4**

Maximum Marks 50

Practicals :-

The laboratory content compliments the theoretical knowledge of Electricity and Magnetism and hence, gives hands-on experience. Also, it provides the observational understanding of the subject. It enhances the qualitative and quantitative skills of the students.

1. To study the characteristics of a series RC Circuit.
2. To determine an unknown Low Resistance using Potentiometer.
3. To determine an unknown Low Resistance using Carey Foster's Bridge.
4. To compare capacitances using De's Sauty's bridge.
5. Measurement of field strength B and its variation in a solenoid (determine dB/dx)
6. To verify the Thevenin and Norton theorems.
7. To verify the Superposition, and Maximum power transfer theorems.
8. To determine self inductance of a coil by Anderson's bridge.
9. To study response curve of a Series LCR circuit and determine its (a) Resonant frequency, (b) Impedance at resonance, (c) Quality factor Q, and (d) Band width.
10. To study the response curve of a parallel LCR circuit and determine its (a) Antiresonant frequency and (b) Quality factor Q.
11. Measurement of charge sensitivity, current sensitivity and CDR of Ballistic Galvanometer
12. Determine a high resistance by leakage method using Ballistic Galvanometer.
13. To determine self-inductance of a coil by Rayleigh's method.
14. To determine the mutual inductance of two coils by Absolute method.

Reference Books

1. Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia Publishing House
2. A Text Book of Practical Physics, I.Prakash & Ramakrishna, 11th Ed., 2011, Kitab Mahal
3. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985,
4. Heinemann Educational Publishers Engineering Practical Physics, S.Panigrahiand B.Mallick,2015, Cengage Learning.

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-II)
(UNDER THE SCHEME OF HONOURS SCHOOL)

PHYSICS LAB-IV

Course No.	**L T P**
PCP-152	**0 0 4**

Maximum Marks 50

Practicals :-

The laboratory content compliments the theoretical knowledge of Waves and Optics and gives hands-on experience. Also, it provides the observational understanding of the subject. It enhances the qualitative and quantitative skills of the students.

1. To determine the frequency of an electric tuning fork by Melde's experiment and verify λ2 –T law.
2. To investigate the motion of coupled oscillators.
3. To study Lissajous Figures.
4. Familiarization with: Schuster`s focusing; determination of angle of prism.
5. To determine refractive index of the Material of a prism using sodium source.
6. To determine the dispersive power and Cauchy constants of the material of a prism using mercury source.
7. To determine the wavelength of sodium source using Michelson's interferometer.
8. To determine wavelength of sodium light using Fresnel Biprism.
9. To determine wavelength of sodium light using Newton's Rings.
10. To determine the thickness of a thin paper by measuring the width of the interference fringes produced by a wedge-shaped Film.
11. To determine wavelength of (1) Na source and (2) spectral lines of Hg source using plane diffraction grating.
12. To determine dispersive power and resolving power of a plane diffraction grating.

Reference Books:

1. Advanced Practical Physics for students, B.L.Flint and H.T.Worsnop, 1971, Asia Publishing House
2. A Text Book of Practical Physics, I. Prakash & Ramakrishna, 11th Ed., 2011,Kitab Mahal
3. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
4. A Laboratory Manual of Physics for undergraduate classes, D.P. Khandelwal, 1985, Vani Pub.

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-II)
(UNDER THE SCHEME OF HONOURS SCHOOL)

MATHEMATICS – II

Course No.	**LTP**
MTL-136	**5 1 0**

Time: 3 Hours **Max. Marks: 150**
Mid Semester Marks : 30
End Semester Marks : 120

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Objectives: The course is meant for explaining the various physical phenomena, main focus is given to Fourier and Laplace transformations, second order differential equations which help the students in explaining the periodic phenomena in the physical universe.

SECTION–A

Coordinates Geometry(2D): Transformation of axes, shifting of origin, Rotation of axes, Parabola, Ellipse, Hyperbola and their properties; Tangent and normal, pair of tangents, Chord of contact for all the conics; Identifications of curves represented by second degree equation (without derivation)
15 Lectures

SECTION–B

Solid Geometry: Straight line and planes in R^3, Intersection of two and three planes, Intersection of a line and plane; Sphere, Section of a sphere by a plane, Intersection of a line and asphere, Intersection of two spheres; Right circular Cone, Right circular Cylinder, Tangent lines, Tangent planes, and normal lines to these surfaces. **15 Lectures**

SECTION–C

Polynomial equations: Relation between the roots and co-efficients of polynomial equations (in one variable), Horner's method, Transformation of equations and symmetric functions of roots, Descartes rule of signs, Newton's method of divisors, Cardano's method, Solutions of biquadratic polynomial equations by Descartes and Ferrari's methods. **15 Lectures**

SECTION–D

Introduction to Groups: Binaryoperations, Groups, Subgroups, Group table, GLn(R), On(R), SLn(R), SU(2), SU(3), Heisenberg's Group, Circle Group, The Torus Group, Dihedral groups, Cyclic groups,Order of an element of a group, Conjugate elements and Conjugacy classes, Group Homomorphism and Isomorphism, Algebraic property, some standard algebraic properties (without proofs). **15 Lectures**

Reference Books:

1.Narayan, S.: Coordinate Geometry, Sultan Chand & Sons (2005).

2. Narayan, S.: Analytical Solid Geometry, Sultan Chand & Sons (2005).

3. Higher Engineering Mathematics: B.S. Grewal, Delhi, Khanna, 1995.(?)

4. Mohan Singh, Topics in Maths, Lakshmi Publication, New Delhi, (1997)

5. N. S. Gopalakrishnan.: University Algebra, New Age International Publishers. (2007)

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-II)
(UNDER THE SCHEME OF HONOURS SCHOOL)

INORGANIC CHEMISTRY

Course No. **LTP**
CYL-192 **4 0 0**

Time: 3 Hours **Max. Marks: 100**
Mid Semester Marks : 20
End Semester Marks : 80

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Objectives:

- To develop understanding of the concepts of structure and bonding of inorganic complexes.
- To enrich the factual knowledge of chemistry related to theories of coordination complexes.
- To familiarize with II-acid legends.

SECTION-A

Introduction, Werner's coordination theory, naming of co-ordinate complexes.Co-ordination numbers 1-12 and their stereo-chemistries. Factors affecting co-ordination numbers and stereo-chemistry (a) Configurational Isomers (b) Conformational isomerism, VSPER theory, molecular orbital theory applied to homoneuclear diatomic molecules and heteronuclear Diatomic molecules.Bonding in metal complexes, Valence bond theory for co-ordinate complexes, inner and outer orbital complexes,bElectro-neutrality and back bonding, limitations of V.B. theory.

15 Lectures

SECTION-B

Stability of coordination compounds Introduction, Stability constant, stepwise stability constant, overall stability constant. Factors affecting the stability of metal ion complexes with general ligands, HSAB principle. Crystal field theory- Splitting of d-orbitals in octahedral, tetrahedral, cubic and square planer fields of ligands. Calculation of C.F.S.E. in high spin and low spin octahedral and High spin tetrahedral complexes, factors affecting the 10 Dq Value. Structural effects of crystal field splitting (Jahn-Teller distortion, variation of Ionic radii with increase in atomic number). Thermodynamics effects of C.F. splitting, variation in lattice energies, Hydration energies, Dissociation energies, Formation constants of hexammines. Site selection in spinels, Paramagnetism, diamagnetism, ferro and anti ferromagnetism. **15 Lectures**

SECTION-C

Microstates and spectroscopic terms, a calculation of spectroscopic terms for d^1 - d^{10} electronic configurations, L S coupling, Hund's rule for finding the ground state terms, Electronic spectral properties of Ist transition series, Orgel Diagrams for d^1 - d^{10} systems, for weak field octahedral and tetrahedral complexes, limitations of C.F.T Molecular Orbital Theory- Evidence for covalent character in Bonding, MOEL diagram for octahedral and tetrahedral complexes involving bonding, charge transfer transitions. **15 Lectures**

SECTION-D

Π Acid Ligands definition Carbon monoxide complexes, bonding in linear MCO groups, polynuclear metal carbonyls, vibrational spectra, Reactions, carbonyl hydrides and halides. Metal-metal bonding metal-metal multiple bonding, isolable analogies, Structure of high nuclearity carbonyl clusters, counting of electrons in carbonyl clusters. Alkali metal and alkaline earth metal chelators, Macrocyclic ligands, macrocyclic effect, crown ethers and podands, coronands, cryptands, structure of 18 crown-6 complex with KNCS, ion cavity complex, effect of anion and cation type on complex structure, simultaneous complexation of metal ion and water or of two metal ions, sandwich formation, cryptands and their cation complexes, podands with aromatic donors and groups.

15 Lectures

Reference Books:

1. J.E. Huheey, Inorganic Chemistry, 3rd Ed.
2. F.A. Cotton and G. Wilkinson, Advanced Inorganic Chemistry.
3. B.E. Douglas and D.H. McDaniel, Concepts and Models of Inorganic Chemistry.
4. R. Hilgenfeld and W. Saengar, Topics in current chemistry Vol-II.

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-II)
(UNDER THE SCHEME OF HONOURS SCHOOL)

INORGANIC CHEMISTRY LAB

Course No.	**LT P**
CYP-194	**0 0 4**

Maximum Marks 50

Identification of cations and anions in a mixture which may contain four ions (cations and anions) Perform systematic group analyses to identify the cations in the mixture. Any cation from Group I, Group II (Group IIA and IIB) Group IV, Group V and Group VI may be present.

Reference Books:

Vogel's book on Inorganic Qualitative Analysis

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-II)
(UNDER THE SCHEME OF HONOURS SCHOOL)

ENL-151 :COMMUNICATIVE ENGLISH–II

Credits: 02 (L= 2, T=0, U=0)

Time: 3 Hours **Max. Marks: 100**
Mid Semester Marks : 20
End Semester Marks : 80

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Objective: To introduce students to the skills and strategies of reading and writing by identifying organizational patterns, spotting classification systems and understanding associations between ideas. This course will prepare students to read a variety of texts and also to communicate more effectively through writing. The course will also pay special attention to vocabulary building.

Prescribed Text books:
- *The Written Word* by Vandana R. Singh, Oxford University Press, New Delhi.
- *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition.

SECTION–A

Practical question on Note Making, Summarizing and Abstracting as given in ***The Written Word*** by Vandana R. Singh

SECTION–B

Practical question on Paragraph writing as prescribed in ***The Written Word*** by Vandana R. Singh

SECTION–C

Theoretical questions based on ABC of Good Notes as prescribed in ***The Written Word*** by Vandana R. Singh.

Section C from ***Making Connections: A Strategic Approach to Academic Reading*** by Kenneth J. Pakenham, Second Edition.

SECTION–D

Practical question on Essay writing from ***The Written Word*** by Vandana R. Singh
Section 4 from ***Making Connections: A Strategic Approach to Academic Reading*** by Kenneth J. Pakenham, Second Edition.

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-II)
(UNDER THE SCHEME OF HONOURS SCHOOL)

PBL 131 : ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ - II

Credit : 2-0-0

Time: 3 Hours **Max. Marks: 100**

Mid Semester Marks : 20
End Semester Marks : 80

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਭਾਗ ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਭਾਗ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

ਸੈਕਸ਼ਨ-ਏ

I. **ਦੋ ਰੰਗ** (ਸੰਪਾ. ਹਰਜਿੰਦਰ ਸਿੰਘ ਢਿੱਲੋਂ, ਪ੍ਰੀਤਮ ਸਿੰਘ ਸਰਗੋਧੀਆ)
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ ਵਿਚੋਂ ਹੇਠ ਲਿਖੇ ਕਹਾਣੀਕਾਰ :
(ੳ) ਨਾਨਕ ਸਿੰਘ : **ਭੂਆ**
(ਅ) ਗੁਰਮੁਖ ਸਿੰਘ ਮੁਸਾਫਿਰ : **ਬਾਗੀ ਦੀ ਧੀ**
(ਏ) ਸੰਤ ਸਿੰਘ ਸੇਖੋਂ : **ਪੋਮੀ ਦੇ ਨਿਆਣੇ**
(ਕਹਾਣੀਕਾਰ ਦਾ ਜੀਵਨ, ਕਹਾਣੀ ਸਾਰ, ਵਿਸ਼ਾ-ਵਸਤੂ, ਕਹਾਣੀ ਕਲਾ)

II. ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ : ਧਾਤੂ/ਮੂਲ, ਵਧੇਤਰ (ਅਗੇਤਰ, ਪਿਛੇਤਰ, ਵਿਉਂਤਪਤ ਅਤੇ ਰੁਪਾਂਤਰੀ), ਸਮਾਸ।

ਸੈਕਸ਼ਨ-ਬੀ

I. **ਦੋ ਰੰਗ** (ਸੰਪਾ. ਹਰਜਿੰਦਰ ਸਿੰਘ ਢਿੱਲੋਂ, ਪ੍ਰੀਤਮ ਸਿੰਘ ਸਰਗੋਧੀਆ)
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ ਵਿਚੋਂ ਹੇਠ ਲਿਖੇ ਕਹਾਣੀਕਾਰ :
(ੳ) ਸੁਜਾਨ ਸਿੰਘ : **ਬਾਗਾਂ ਦਾ ਰਾਖਾ**
(ਅ) ਕਰਤਾਰ ਸਿੰਘ ਦੁੱਗਲ : **ਤੈਂ ਕੀ ਦਰਦ ਨਾ ਆਇਆ**
(ਕਹਾਣੀਕਾਰ ਦਾ ਜੀਵਨ, ਕਹਾਣੀ ਸਾਰ, ਵਿਸ਼ਾ-ਵਸਤੂ, ਕਹਾਣੀ ਕਲਾ)

II. ਪੈਰ੍ਹਾ ਰਚਨਾ : ਕਲਾਸ ਵਿਚ 10 ਵਿਸ਼ਿਆਂ (ਸਭਿਆਚਾਰ, ਧਾਰਮਕ ਅਤੇ ਰਾਜਨੀਤਕ) 'ਤੇ ਪੈਰ੍ਹਾ ਰਚਨਾ ਦੇ ਅਭਿਆਸ ਕਰਵਾਉਣੇ।

ਸੈਕਸ਼ਨ-ਸੀ

I. **ਦੋ ਰੰਗ** (ਸੰਪਾ. ਹਰਜਿੰਦਰ ਸਿੰਘ ਢਿੱਲੋਂ, ਪ੍ਰੀਤਮ ਸਿੰਘ ਸਰਗੋਧੀਆ)
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ ਵਿਚੋਂ ਹੇਠ ਲਿਖੇ ਕਹਾਣੀਕਾਰ :
(ੳ) ਕੁਲਵੰਤ ਸਿੰਘ ਵਿਰਕ : **ਧਰਤੀ ਹੇਠਲਾ ਬੋਲਦ**
(ਅ) ਨਵਤੇਜ ਸਿੰਘ : **ਦੂਜੀ ਵਾਰ ਜੇਬ ਕੱਟੀ ਗਈ**
(ਏ) ਪ੍ਰੇਮ ਪ੍ਰਕਾਸ਼ : **ਲੱਛਮੀ**
(ਕਹਾਣੀਕਾਰ ਦਾ ਜੀਵਨ, ਕਹਾਣੀ ਸਾਰ, ਵਿਸ਼ਾ-ਵਸਤੂ, ਕਹਾਣੀ ਕਲਾ)

II. ਮੁਹਾਵਰੇ ਤੇ ਅਖਾਣ (ਅਖਾਣ ਤੇ ਮੁਹਾਵਰਾ ਕੋਸ਼ ਵਿਚ) 200 ਮੁਹਾਵਰਿਆਂ ਅਤੇ 100 ਅਖਾਣਾਂ ਨੂੰ ਵਾਕਾਂ ਵਿਚ ਵਰਤਣ ਦੇ ਅਭਿਆਸ ਕਰਵਾਉਣੇ (ਕਲਾਸ ਵਿਚ ਤੇ ਘਰ ਲਈ)।

ਸੈਕਸ਼ਨ-ਡੀ

I. **ਦੋ ਰੰਗ** (ਸੰਪਾ. ਹਰਜਿੰਦਰ ਸਿੰਘ ਢਿੱਲੋਂ, ਪ੍ਰੀਤਮ ਸਿੰਘ ਸਰਗੋਧੀਆ)
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ ਵਿਚੋਂ ਹੇਠ ਲਿਖੇ ਕਹਾਣੀਕਾਰ :
(ੳ) ਅਜੀਤ ਕੌਰ : **ਬੁੱਤ ਸ਼ਿਕਨ**
(ਅ) ਦਲੀਪ ਕੌਰ ਟਿਵਾਣਾ : **ਬੱਸ ਕੰਡਕਟਰ**
(ਕਹਾਣੀਕਾਰ ਦਾ ਜੀਵਨ, ਕਹਾਣੀ ਸਾਰ, ਵਿਸ਼ਾ-ਵਸਤੂ, ਕਹਾਣੀ ਕਲਾ)

II. ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ : ਨਾਂਵ, ਪੜਨਾਂਵ, ਵਿਸ਼ੇਸ਼ਣ, ਕਿਰਿਆ, ਕਿਰਿਆ ਵਿਸ਼ੇਸ਼ਣ, ਸੰਬੰਧਕ

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-II)
(UNDER THE SCHEME OF HONOURS SCHOOL)

PBL-132: ਮੁੱਢਲੀ ਪੰਜਾਬੀ
(In lieu of Punjabi Compulsory)

Credits: 2-0-0

Time: 3 Hours **Max. Marks: 100**
Mid Semester Marks : 20
End Semester Marks : 80

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਭਾਗ ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਭਾਗ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ।ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

ਪਾਠ-ਕ੍ਰਮ

ਸੈਕਸ਼ਨ-ਏ

ਸਬਦ ਸ਼੍ਰੇਣਆ : ਪਛਾਣ ਅਤ ਵਰਤ

(ਨਾਂਵ, ਪੜਨਾਂਵ, ਵਿਸ਼ੇਸ਼ਣ, ਕਿਰਿਆ, ਕਿਰਆ ਵਿਸ਼ਸ਼ਣ)

ਸੈਕਸ਼ਨ-ਬੀ

ਨਤ ਵਰਤ ਦਾ ਪਜਾਬਾ ਸ਼ਬਦਾਵਲਾ : ਬਾਜ਼ਾਰ, ਵਪਾਰ, ਰਸ਼ਤ-ਨਾਤੇ, ਖੇਤੀ ਅਤੇ ਹੋਰ ਧੰਦਿਆਂ ਨਾਲ ਸਬੰਧਤ ।

ਸੈਕਸ਼ਨ-ਸੀ

ਪੰਜਾਬੀ ਵਾਕ-ਬਣਤਰ

ਸਾਧਾਰਨ-ਵਾਕ (ਪਛਾਣ ਅਤ ਵਰਤ)

ਸੰਯੁਕਤ-ਵਾਕ (ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ)

ਮਿਸ਼ਰਤ-ਵਾਕ (ਪਛਾਣ ਅਤ ਵਰਤੋਂ)

ਸੈਕਸ਼ਨ-ਡੀ

ਪਰ੍ਹਾ ਰਚਨਾ

ਸੰਖੇਪ ਰਚਨਾ

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-II)
(UNDER THE SCHEME OF HONOURS SCHOOL)

HSL-102 : Punjab History & Culture (1717-1947)
(Special paper in lieu of Punjabi Compulsory)
(For those students who are not domicile of Punjab)

Credits: 2-0-0

Time: 3 Hours **Max. Marks: 100**

Mid Semester Marks : 20
End Semester Marks : 80

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section-A

1. Sikh Struggle for Sovereignty.
2. Ranjit Singh : Conquests, Administration and the Anglo-Sikh Relations.

Section-B

3. Anglo-Sikh Wars and the Annexation.
4. The Punjab under the British: New Administration, Education and social Change.

Section-C

5. Economic Changes: Agricultural
6. Socio-Religious Reform Movements.

Section-D

7. Role of Punjab in the Freedom Struggle.
8. Fairs and Festivals.

Suggested Reading

1. Kirpal Singh (ed.), *History and Culture of the Punjab,* Part-II, Punjabi University, Patiala, 1990.
2. Fauja Singh (ed.), *History of Punjab,* Vol, III, Punjabi University, Patiala, 1987.
3. J.S. Grewal, *The Sikhs of the Punjab, Cup, Cambridge, 1991.*
4. Khushwant Singh, *A History of the Sikhs,* Vol. I, OUP, New Delhi, 1990

M.Sc. PHYSICS (FYIC) (CBEGS) (SEMESTER-II)
(UNDER THE SCHEME OF HONOURS SCHOOL)

SOA-101 : DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION (COMPULSORY ID PAPER)
(Student can opt. this paper whether in 1st or 2nd semester)

PROBLEM OF DRUG ABUSE

Time: 3 Hours **Credit 3-0-0**

Max. Marks: 100
Mid Semester Marks : 20
End Semester Marks : 80

Mid Semester Examination: 20% weightage
End Semester Examination: 80% weightage

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section – A

Meaning of Drug Abuse:

1. Meaning, Nature and Extent of Drug Abuse in India and Punjab.
2. Consequences of Drug Abuse for:

Individual	:	Education, Employment, Income.
Family	:	Violence.
Society	:	Crime.
Nation	:	Law and Order problem.

Section – B

Management of Drug Abuse:

(iv) Medical Management: Medication for treatment and to reduce withdrawal effects.
(v) Psychiatric Management: Counselling, Behavioural and Cognitive therapy.
(vi) Social Management: Family, Group therapy and Environmental Intervention.

Section – C

Prevention of Drug abuse:

(iii) Role of family: Parent child relationship, Family support, Supervision, Shaping values, Active Scrutiny.
(iv) School: Counselling, Teacher as role-model. Parent-teacher-Health Professional Coordination, Random testing on students.

Section – D

Controlling Drug Abuse:

(iii) Media: Restraint on advertisements of drugs, advertisements on bad effects of drugs, Publicity and media, Campaigns against drug abuse, Educational and awareness program

(iv) Legislation: NDPs act, Statutory warnings, Policing of Borders, Checking Supply/Smuggling of Drugs, Strict enforcement of laws, Time bound trials.

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