

# FACULTY OF SCIENCES

SYLLABUS FOR THE BATCH FROM THE YEAR 2023 TO YEAR 2026

**Programme Code: BSHP**

**Programme Name: B.Sc. (Hons.) Physics**

**(Semester I-II)**

**Examinations: 2023-24**



**Department of Physics**

**Khalsa College, Amritsar**

*(An Autonomous College)*

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(b) Subject to change in the syllabi at any time.  
(c) Please visit the college website time to time.

S.No.	PROGRAMME OBJECTIVES
1.	To develop human resource with knowledge, abilities and insight in Physics and related fields required for career in academia and industry.
2.	To apply principles of basic science concepts in understanding, analysis and prediction of physical systems.
3.	To understand the concepts and significance of the various physical phenomena.
4.	To carry out experiments to understand the laws and concepts of Physics.
5.	To acquire a wide range of problem solving skills and to apply them.

S.No.	PROGRAMME SPECIFIC OUTCOMES (PSOs)
PSO-1	To Demonstrate knowledge of classical mechanics, electromagnetism and modern physics and be able to apply this knowledge to analyse a variety of physical phenomena.
PSO-2	To demonstrate proficiency in mathematics and the mathematical concepts needed for a proper understanding of physics.
PSO-3	To demonstrate the ability to use skills in Physics and its related areas of technology for formulating and tackling Physics-related problems and identifying and applying appropriate physical principles and methodologies to solve a wide range of problems associated with Physics.
PSO-4	To analyse scientific reasoning for various things.
PSO-5	To enable students to be capable of analyzing the problems through different prospective and hence instill higher order thinking and learning.
PSO-6	To find ample career openings both in public as well as private sector enterprises. They can apply for all government jobs and find various opportunities in government organizations like DRDO, ISRO, BARC, IIT etc.

COURSE SCHEME											
SEMESTER-I											
Course Code	Course Title	Teaching Hours/Week	Credits			Total Credits	Max. Marks			Total Marks	Page No.
			L	T	P		Th	P	IA		
BHP-111	MECHANICS-I	4	3	1	0	4	75		25	100	5-6
BHP -112	ELECTRICITY AND MAGNETISM-I	4	3	1	0	4	75		25	100	7-8
MAP -111	MATHEMATICS -I	4	3	1	0	4	75		25	100	9-10
CHX -111	ORGANIC CHEMISTRY-I	3	3	0	0	3	56		19	75	11-12
BCEN-1123	COMMUNICATIVE ENGLISH	5	3	0	1	4	75		25	100	13-14
BHPB-1101	ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ -I	4	4	0	0	4	75		25		15-16
BPBI-1102	ਮੁੱਢਲੀ ਪੰਜਾਬੀ-I (In Lieu of Compulsory Punjabi) or PUNJAB HISTORY & CULTURE(For those students who are not domicile of Punjab)	4	4	0	0	4	75		25	100	17-18
BPHC-1104											19-20
BHP -113	PHYSICS LAB-I	4	0	0	2	2		37	13	50	21-22
BHP -114	PHYSICS LAB-II	4	0	0	2	2		37	13	50	23
CHP-112	ORGANIC CHEMISTRY LAB-I	2	0	0	1	1		19	06	25	24
ZDA-111	DRUG ABUSE	2	2	0	0	2	50		-	50	25-26
						32				700	

SEMESTER-II											
Course Code	Course Title	Teaching Hours/Week	Credits			Total Credits	Max. Marks			Total Marks	Page No.
			L	T	P		Th	P	IA		
BHP-121	ELECTRICITY & MAGNETISM-II	4	3	1	0	4	75		25	100	27-28
BHP-122	WAVES & OSCILLATIONS	4	3	1	0	4	75		25	100	29-30
MAP -121	MATHEMATICS – II	4	3	1	0	4	75		25	100	31-32
CHX -121	INORGANIC CHEMISTRY-II	3	3	0	0	3	56		19	75	33-34
BCEN-1223	COMMUNICATIVE ENGLISH	5	3	0	1	4	75		25	100	35-36
BHPB-1201	ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ –II	4	4	0	0	4	75		25		37-38
BPBI-1202	ਮੁੱਢਲੀ ਪੰਜਾਬੀ–II (In Lieu of Compulsory Punjabi)or										39-40
BPHC-1210	PUNJAB HISTORY & CULTURE.(For those students who are not domicile of Punjab)	4	4	0	0	4	75		25	100	41-42
BHP -123	PHYSICS LAB-I	4	0	0	2	2		37	13	50	43-44
BHP -124	PHYSICS LAB-II	4	0	0	2	2		37	13	50	45-46
CHP-122	INORGANIC CHEMISTRY LAB-II	2	0	0	1	1		19	06	25	47-48
ZDA-121	DRUG ABUSE	2	2	0	0	2	50		-	50	49-50
						32				700	

**B.SC. (HONS.) PHYSICS SEMESTER I  
BHP-111  
MECHANICS-I**

**Teaching Hours (per week): 4**

**Total Credits: 4**

**Credits:LTP:310**

**Total Hours: 60**

**Time: 3 Hours**

**Maximum Marks: 100**

**(Theory Marks: 75+Internal Assessment: 25)**

**Pass Marks: 35%**

**Note for paper setter and students:**

- 1. There will be five sections.**
- 2. Section A is compulsory and will be of 15 marks consisting of 8 short answer type questions carrying 2.5 mark each covering the whole syllabus. The answer should not exceed 50 words. The candidate will have to attempt any 6 questions in this section.**
- 3. Sections B, C, D and E will be set from units I, II, III & IV respectively and will consist of two questions of 15 marks each from the respective unit. The candidates are required to attempt one question from each of these sections. Each question in these sections should not have more than two subparts.**
- 4. Non-Programmable Scientific calculator is allowed.**

**Course Objectives:** The purpose of the course is to provide the basic information about co-ordinate system and motion of particles in it, to understand the conservation laws and also to determine the difference between elastic and inelastic collisions. It includes applications of central force to the stability of circular orbits, Kepler's laws of planetary motion, orbital precession and Rutherford scattering, dynamics of rotating objects i.e. rigid bodies, angular velocity, the moment of inertia, the motion of rigid bodies and Euler equations. It also helps to understand the differences between types of forces and the inverse square force field.

**Course Contents:**

**UNIT-I**

**Co-ordinate system and Motion of a Particle:** Cartesian, **Plane polar** and spherical polar co-ordinate systems, area, volume, velocity and Acceleration in these systems. Solid angle, **Homogeneity of space and time, isotropy of space**, Symmetry principles and Laws of Conservation.

**UNIT-II**

**Conservation of Momentum and Collisions:** Internal forces and momentum conservation. Centre of mass, Elastic collisions in laboratory and center of mass systems; velocities, angles, energies in these systems and their relationships. Conservation of angular momentum and examples-shape of the galaxy, angular momentum of solar system, Torques due to internal forces, angular momentum about center of mass, Rutherford scattering, **Cross-section elastic scattering and impact parameter.**

**UNIT-III**

**Inverse-Square-Law Force:** Forces in nature (qualitative), Central forces, Potential energy and force between a point mass and spherical shell, a point mass and solid sphere, Two body problem and concept of reduced mass, Motion of a body under central force, equation of orbit in inverse-square force field, **Physical insight into the nature of motion**, Kepler's laws and their derivation, **Newton's law of gravitation from Kepler's law of planetary motion.**

**UNIT-IV**

**Dynamics of Rigid Bodies: Rigid body, Moment of inertia of a rigid body**, Equation of motion of a rigid body, rotational motion of a rigid body in general and in a plane lamina, Rotation of angular momentum vector about a fixed axis. Angular momentum and kinetic energy of a rigid body about principal axis, Euler's equations, Precession and elementary gyroscope, Spinning top.

**Tutorial:** Relevant problem on the topics covered in the course.

**Books Prescribed:**

1. Mechanics-Berkeley Physics Course, Vol-I (second edition):C. Kittel, W. D. Knight, M. A. Ruderman, C. A. Helmholtz and R. J. Moyer-Tata Mc Graw Hill Publishing Company Ltd., New Delhi.
2. Fundamentals of Physics: D. Halliday, R. Resnick and J. Walker (sixth edition)-Wiley India Pvt. Ltd.

**Course Outcomes:**

<b>Sr. No.</b>	<b>On completing the course, the students will be able to:</b>
CO1	Understand the basic information about co-ordinate system and motion of particles in it.
CO2	Understand the conservation laws and also to determine the difference between elastic and inelastic collisions.
CO3	Explain the applications of central force to the stability of circular orbits, Kepler's laws of planetary motion, orbital precession and Rutherford scattering.
CO4	Understand the dynamics of rotating objects i.e. rigid bodies, angular velocity, the moment of inertia, the motion of rigid bodies and Euler equations.
CO5	Understand the differences between types of forces and also able to explain the inverse square force field.

**B.SC. (HONS.) PHYSICS SEMESTER I  
BHP-112  
ELECTRICITY AND MAGNETISM-I**

**Teaching Hours (per week): 4**

**Total Credits: 4**

**Credits:LTP:310**

**Total Hours: 60**

**Time: 3 Hours**

**Maximum Marks: 100**

**(Theory Marks: 75+Internal Assessment: 25)**

**Pass Marks: 35%**

**Note for paper setter and students:**

- 1. There will be five sections.**
- 2. Section A is compulsory and will be of 15 marks consisting of 8 short answer type questions carrying 2.5 mark each covering the whole syllabus. The answer should not exceed 50 words. The candidate will have to attempt any 6 questions in this section.**
- 3. Sections B, C, D and E will be set from units I, II, III & IV respectively and will consist of two questions of 15 marks each from the respective unit. The candidates are required to attempt one question from each of these sections. Each question in these sections should not have more than two subparts.**
- 4. Non-Programmable Scientific calculator is allowed.**

**Course Objectives:** Objectives of this course are to understand vectors calculus. To understand the fundamental laws and concepts in electricity and magnetism and their applications. To understand electric current and related concepts. To understand dielectrics, resistors, capacitors, and inductors. To understand the relativistic approach in electricity and magnetism.

**Course Contents:**

**UNIT-I**

Basic Ideas of Vector Calculus; Introduction to gradient, divergence & curl **and** their physical significance; **Laplacian and its formulation in rectangular, cylindrical and spherical coordinates systems**; Rules for vector derivatives; useful relations involving gradient, divergence & curl; Solenoidal and irrotational fields; Fundamental theorem for gradients- Gauss's and Stoke's theorems, Helmholtz and Greens theorem.

**UNIT-II**

Electric charge and its properties; Coulombs law; Principal of Superposition; The electric field due to a point charge and continuous charge distributions; Electric field due to finite and infinite lines of charges; Field due to **sheet of charge**, electric dipole; **Electric** field lines **and** flux; Gauss's law; **differential form of Gauss's law**; applications of Gauss's law; Curl of electric field; **work and potential difference; potential difference as line integral of field**; Relation between potential and electric field; Poisson's and Laplace's equations; Electric potential due to

different charge distribution-Wire, Ring, Disc, Spherical Sheet, Sphere, dipole etc.; The energy for a point and continuous charge distribution.

### UNIT-III

**Concept of electrical images; Calculation of electric potential and field due to a point charge placed near an infinitely conducting sheet;** Conductors in the electrostatic field; Capacitors; Current and current density; drift velocity; expression for current density vector; Equation of continuity; microscopic form of Ohm's law and electrical conductivity; limitations of Ohm's law; Multipoles and multipole moments; Equipotential surface method of electrical images.

### UNIT-IV

Dielectrics, Non Polar and Polar Molecules, Polarisation of Dielectric, Polarization Vector, Atomic polarizability, Dielectric Constant, Capacity of a Capacitor, Electric Susceptibility, Free and Bound Charges, Gauss Law in Dielectric, and Displacement Vector, Energy stored in Capacitor having Dielectric Medium, Energy Density of a Dielectric Medium.

**Tutorial:** Relevant problem on the topics covered in the course.

#### Books Prescribed:

1. Introduction to Electrodynamics -D.J. Griffiths, Pearson Prentice Hall, New Delhi.
2. Electricity & Magnetism-T.S. Bhatia and Gurpreet Singh, Vishal Publications.
3. Berkeley Physics Course Vol. II (Electricity & Magnetism)- E.M.Purcell, Mc Graw hill, New York.
4. Fundamental of Physics -D. Halliday, R. Resnick and J. Walker (6th edition)-John Wiley, India Pvt. Ltd.
5. Electricity and Magnetism – A. K. Sikri, Pradeep Publications

#### Course Outcomes:

Sr. No.	On completing the course, the students will be able to:
CO1	Understand vectors calculus.
CO2	Understand the fundamental laws and concepts in electricity and magnetism and their applications.
CO3	Understand electric current and related concepts.
CO4	Understand dielectrics, resistors, capacitors, and inductors.
CO5	Understand the relativistic approach in electricity and magnetism.



**B.SC. (HONS.) PHYSICS SEMESTER I**  
**MAP-111**  
**MATHEMATICS –I**

**Teaching Hours (per week): 4**

**Total Credits: 4**

**Credits:LTP:310**

**Total Hours: 60**

**Time: 3 Hours**

**Maximum Marks: 100**

**(Theory Marks: 75+Internal Assessment: 25)**

**Pass Marks: 35%**

**INSTRUCTIONS FOR PAPER SETTERS**

1. The question paper will consist of three sections namely Section-A which will be from entire syllabus (equally distributed from each unit) Section–B, C, D and E from Unit-I, II, III and IV, respectively.
2. The Section-A will consists of eight short answer type questions, each of 2.5 marks. Students are to attempt any six.
3. The Sections–B, C, D & E will consist of two questions each (each question should be subdivided into atmost two parts). Students are to attempt any four questions in total by selecting one question from each section. Each question carries 15 marks.
4. Teaching time for this paper would be six periods per week.

**Course Objectives:**

- To acquire the knowledge of Functions and Derivatives.
- To have an idea about the Taylor and Maclaurin formulas.
- To get familiar with the concept of definite integrals and matrices.

**Course contents:**

**UNIT-I**

Functions and Derivatives: Limit, continuity and derivative of a function, geometrical significance of derivative, successive differentiation, Leibnitz theorem, maxima and minima of a function of single variable, partial derivatives, total derivative, chain rule Syllabus for the Academic Batch 2023-26

**UNIT-II**

Differential Calculus: Rolle's theorem, mean value theorem, Taylor and Maclaurin formulas, Taylor series; concavity, point of inflexion, cusp point; asymptotes; graphs of standard planar curves in Cartesian coordinates.

**UNIT-III**

Anti derivatives: Indefinite integral as an anti derivative, 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.

**UNIT-IV**

Matrices: Orthogonal matrices, Hermitian matrices, Unitary matrices; Cayley Hamilton theorem and its applications; rank of a matrix, consistency of a system of linear equations, eigen values and eigenvectors, diagonalization of matrices.

**Reference Books:**

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

**COURSE OUTCOMES:**

<b>Sr. No.</b>	<b>On completing the course, the students will be able to:</b>
CO1	Understand the concept of functions and derivatives.
CO2	Knowledge of differential calculus and its applications.
CO3	Apply methods to solve system of equations in matrices.

**B.Sc. (Hons) Physics Semester-I**

CHX 111

Organic Chemistry-I

**Teaching Hours (per week): 3**

**Total Credits: 3**

**Credits:LTP:210**

**Total Hours: 45**

**Time: 3 Hours**

**Maximum Marks: 75**

**(Theory Marks: 56+Internal Assessment: 19)**

**Pass Marks: 35%**

**INSTRUCTIONS FOR PAPER SETTERS AND CANDIDATES**

**(Scientific calculator is allowed)**

- I. Examiner will make five sections of paper namely Section-I, II, III, IV and V
- II. Examiner will set total of NINE questions comprising ONE compulsory question of short answer type covering whole syllabi and TWO questions from each unit.
- III. Section-I will consist of 8 short questions carrying 2 Mark each and student have to attempt any six parts.
- IV. Section-II, III, IV and V of paper will consist of EIGHT questions in total having TWO questions from each unit of the syllabus and each question carry 11 Marks.
- V. The students are required to attempt FIVE questions in all, taking ONE Compulsory question of section-I and one question from each section i.e. II, III, IV and V.

**COURSE OBJECTIVES:**

*The objective of Organic Chemistry-I course is to enhance the knowledge of students on the topics of Stereochemistry especially in reference to the OPTICAL ISOMERISM. The course is also targeted to increase the knowledge of students for the various methods of preparation and properties of Alkanes, Alkenes, Alkynes, arenes, aromaticity and Nucleophilic addition and Substitution reactions*

**COURSE CONTENTS:**

**UNIT-I**

**11Hrs**

Stereochemistry: Molecular chirality, enantiomers/symmetry in achiral structures, chiral centres in chiral molecules, properties of chiral molecules-optical activity, absolute and relative configuration, the Cahn-Ingold-Prelog R-S notional system physical properties of enantiomers. Resolution of enantiomers.

**UNIT-II**

**11Hrs**

Chemistry alkanes and alkenes: Conformations of alkanes and cycloalkanes: conformational analysis of ethane and n-butane; conformational analysis of cyclohexane, axial and equatorial bonds, conformation of mono substituted cyclohexane derivative. Difference between configuration and conformation. Stereochemistry of alkenes, naming stereo isometric alkenes by the E-Z system, Mechanism of hydrogenation of alkenes, stereochemistry of hydrogenation of alkenes, Dehydration of alcohols and regioselectivity of these reactions. Acid catalysed dehydration of alcohols with complete mechanistic discussion,

Alkynes: Acidity of acetylene and terminal alkenes, metal ammonia reduction of alkyne, addition of hydrogen halides and water to alkynes, with detailed discussion of mechanism of these reactions.

**UNIT-III****11Hrs**

Nucleophilic substitution and addition reaction:

(a) Functional group transformation by nucleophilic substitution, mechanism of nucleophilic substitution ( $SN^1/SN^2$ ), stereochemistry of  $SN^1/SN^2$  reactions, steric effect in  $SN^2$  reactions, nucleophiles and nucleophilicity, carbocation stability and the rate of substitution, by the  $SN^1$  mechanism, stereochemistry of  $SN^1$  reactions, carbocation rearrangements in  $SN^1$  reactions, solvent effects, substitution and elimination as competing reactions.

(b) Principles of nucleophilic addition to carbonyl groups : Hydration acetal formation, cyanohydrin formation ; reactions with primary and secondary amines, Wittig reaction, stereoselective addition to carbonyl groups mechanism of halogenation, aldol condensation

**UNIT-IV****12Hrs**

Arenes and Aromaticity

Nomenclature of benzene derivatives. The aryl group. Aromatic nucleus and side chain. Structure of benzene: Molecular formula and Kekule structure. Stability and carbon carbon bond lengths of benzene, resonance structure, MO picture. Aromaticity : the Huckel's rule, aromatic ions. Aromatic electrophilic substitution—general pattern of the mechanism, role of  $\sigma$  and  $\pi$  complexes. Mechanism of nitration, halogenation, sulphonation, mercuration and Friedel Crafts reaction. Energy profile diagrams. Activating and deactivating substituents, orientation and ortho/para ratio. Side chain reactions of benzene derivatives.

**BOOKS PRESCRIBED**

1. R.T. Morrison and R.N. Boyd, Organic Chemistry.
2. I.L. Finar, Organic Chemistry, Vol. I IV ed.
3. Advanced Organic Chemistry, Reactions Mechanisms and Structure by J. March.
4. Schaum's Outlines Series Theory and Problems of Organic Chemistry by Herbert Meislick and Jacob Sharefkin
5. Problems and their solution in Organic chemistry by I.L. Finar, Modern Organic Chemistry by J.D. Roberts and M.C. Caserio.
6. Organic Chemistry by D.J. Cram and G.S. Hammond.
7. J.E. Banks, Naming Organic Compounds – Programmed Introduction to Organic Chemistry.
8. E.L. Eliel, Stereochemistry of carbon compounds.
9. W. Camp, Organic Spectroscopy.
10. F.A. Carey, Organic Chemistry.

**Course Outcomes:**

Sr. No.	On completing the course, the students will be able to:
CO1	Learn about $SN^1$ , $SN^2$ and $SN^i$ Mechanism and the related stereochemistry.
CO2	Understand the concept, principle and applications of UV, IR and NMR Spectroscopy and the problems pertaining to the structure elucidation of simple organic compounds.
CO3	Solve the elimination reaction problems
CO4	Distinguish between type of addition, elimination and substitution reaction.
CO5	Learn E and Z nomenclature, Stereo chemical principle, enantiomeric relationship R and S

**B.SC. (HONS.) PHYSICS SEMESTER I**

**BCEN-1123**

**SEMESTER – I**

**COMMUNICATIVE ENGLISH -I**

**B.Sc.(Hons.) Physics, Chemistry, Botany, Zoology, Maths and Computational Statistics and Data Analytics**

**Teaching Hours (per week): 5**

**Total Credits: 4**

**Credits:LTP:301**

**Time: 3 Hours (Theory 60 Marks +Practical 15 Marks+ Internal Assessment 25 Marks)**

**Pass Marks: 35%**

**Instructions for the Paper Setter and Distribution of Marks:**

The question paper will consist of four sections and the distribution of marks will be as under:

**Section A: 12 Marks**

**Section B: 12 Marks**

**Section C: 18 Marks**

**Section D: 18 Marks**

**Section A**

1. Fifteen (15) Questions on the usage of Preposition, Articles, and Change of Voice will be set. The students will be required to attempt any Twelve (12).

(12X1= 12 Marks)

**Section B**

2. ONE question (with sub parts) based on Skills and Strategies development exercises in Unit-1 and Unit-2 of the prescribed text book *Making Connections* will be set.

(1X12= 12marks)

**Section C**

3. Five short answer type questions from Unit 1 and 2 of *Making Connections : A Strategic Approach To Academic Reading* will be set. The students will be required to attempt any three.

(3X2= 06 marks)

4. Four Essay type question (Two from each unit) from Unit 1 and 2 of *Making Connections: A strategic Approach to Academic Reading* will be set. The students will be required to answer any two, choosing at least one from each unit.

(2X6= 12 marks)

**Section D**

5. A Comprehension questions of an unseen passage will be set. (1X6 = 6 marks)

6. A question requiring the students to write a Paragraph on ONE of the TWO given topics.

(1X6 =6 marks)

7. A question requiring the students to write an Official/Business Letter on ONE of the TWO given Topics.

(1X6 = 6 marks)

**Course Objectives:**

I: To develop competence in written communication.

II: To inculcate innovative and critical thinking among the students.

III: To enable them to grasp the application of communication theories.

IV: To acquire the knowledge of latest technology related with communication skills.

V: To provide knowledge of multifarious opportunities in the field of this programme.

**Course Contents:**

**1. Reading and Comprehension Skills:**

(a) Reading tactics and strategies; Reading purposes—kinds of purposes and associated comprehension; Reading for direct meanings.

(b) The Students will be required to read and comprehend the essays in Unit 1 and 2 of the book *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Third Edition.

**2. Writing Skills:** Guidelines for effective writing; writing styles for paragraph and official/business letter.

**3. Grammar:** Preposition, Articles, and Change of Voice.

**Prescribed Books:**

*Making Connections* by Kenneth J. Pakenham 3<sup>rd</sup> Edn. CUP

**Recommended Books:**

1. *Oxford Guide to Effective Writing and Speaking* by John Seely.
2. *The Written Word* by Vandana R Singh, Oxford University Press

**Course Outcomes:**

The completion of this course enables students to:

1. Identify common errors in language and rectify them.
2. Develop and expand writing skills through controlled and guided activities.
3. Develop coherence, cohesion and competence in written discourse through intelligible pronunciation.
4. Develop the ability to handle the interview process confidently and learn the subtle nuances of an effective group discourse.
5. Communicate contextually in specific and professional situations with courtesy.

**PRACTICAL (Marks: 15)**

**Course Contents:-**

1. Reading dialogues (5 Marks)
2. Rapid reading (5 Marks)
3. Project File (5 Marks)

**B.SC. (HONS.) PHYSICS SEMESTER I**

BHPB-1101

Compulsory Course

ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ

## Credit &amp; Marks Distribution, Eligibility and Pre-Requisites of the Course

Course title & Code	Total Teaching Hours	Total Credits/ Hours per week	Credit distribution			Total Marks 100		Time Allowed in Exam	Eligibility criteria	Pre-requisite of the course (if any)
			L	T	P	Theory	IA			
ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ BHPB-1101	60	4	4	0	0	75	25	3 Hours	Class 12th pass in any stream	Studied Punjabi up to 10th Standard

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective	ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)
<ul style="list-style-type: none"> <li>ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕਰਨਾ।</li> <li>ਆਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਵਿਕਸਤ ਕਰਨਾ।</li> <li>ਮਾਤ ਭਾਸ਼ਾ ਦੀ ਸਮਝ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ।</li> </ul>	<ul style="list-style-type: none"> <li>ਉਸ ਵਿਚ ਸਾਹਿਤ ਰੁਚੀਆਂ ਵਿਕਸਤ ਹੋਣਗੀਆਂ।</li> <li>ਉਸ ਵਿਚ ਸਾਹਿਤ ਸਿਰਜਣਾ ਦੀ ਸੰਭਾਵਨਾ ਵਧੇਗੀ।</li> <li>ਉਸ ਵਿਚ ਕਿਸੇ ਵੀ ਵਿਸ਼ੇ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਕਰਨ ਦਾ ਬੋਧ ਹੋਵੇਗਾ।</li> <li>ਉਹ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਨਿਕਾਸ ਤੇ ਵਿਕਾਸ ਬਾਰੇ ਗਿਆਨ ਹਾਸਲ ਕਰਨਗੇ</li> </ul>

**ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ**

ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਭਾਗ ਵਿਚ 1.5-1.5 (ਡੇਢ-ਡੇਢ) ਅੰਕ ਦੇ ਅਤਿ-ਸੰਖੇਪ (Objective Type) 10 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜੋ ਕਿ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ ਹੋਣਗੇ ਅਤੇ ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ। ਸਿਲੇਬਸ ਦੇ ਬਾਕੀ ਚਾਰ ਭਾਗਾਂ ਵਿਚ 02-02 ਲੇਖ ਨੁਮਾ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰੇਕ ਭਾਗ ਵਿਚੋਂ 01-01 ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ 15 ਅੰਕ ਹੋਣਗੇ। ਪੇਪਰ ਸੈਂਟਰ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

**ਨੋਟ:** ਇੰਟਰਨਲ ਅਸੈਸਮੈਂਟ 25 ਅੰਕਾਂ ਦੀ ਹੈ। ਇਸ ਪੇਪਰ ਦੇ ਕੁੱਲ ਅੰਕ 75+25=100 ਹਨ।

**ਪਾਠ-ਕ੍ਰਮ****ਭਾਗ-ਪਹਿਲਾ**

**ਸਾਹਿਤ ਦੇ ਰੰਗ,** ਡਾ. ਮਹਿਲ ਸਿੰਘ (ਸੰਪਾ.), ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।

**ਭਾਗ ਪਹਿਲਾ - ਕਵਿਤਾ ਅਤੇ ਕਹਾਣੀ,** ਡਾ. ਮਹਿਲ ਸਿੰਘ ਅਤੇ ਡਾ. ਆਤਮ ਰੰਧਾਵਾ (ਸਹਿ ਸੰਪਾ.)

(ਕਵਿਤਾ ਭਾਗ ਵਿਚੋਂ ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ/ਵਿਸ਼ਾ-ਵਸਤੂ। ਕਹਾਣੀ ਭਾਗ ਵਿਚੋਂ ਸਾਰ/ਵਿਸ਼ਾ-ਵਸਤੂ)

**ਭਾਗ-ਦੂਜਾ**

**ਪੰਜਾਬ ਦੇ ਮਹਾਨ ਕਲਾਕਾਰ** (ਸੰਪਾ. ਬਲਵੰਤ ਗਾਰਗੀ)

ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

(ਅੰਮ੍ਰਿਤਾ ਸ਼ੇਰਗਿੱਲ ਤੋਂ ਭਾਈ ਸਮੁੰਦ ਸਿੰਘ ਤਕ)

(ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ/ਨਾਇਕ ਬਿੰਬ)

**ਭਾਗ-ਤੀਜਾ**

(ੳ) ਪੈਰਾ ਰਚਨਾ (ਤਿੰਨਾਂ ਵਿਚੋਂ ਇਕ)

(ਅ) ਪੈਰਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ

**ਭਾਗ-ਚੌਥਾ**

- (ੳ) ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ: ਭਾਸ਼ਾ ਦਾ ਟਕਸਾਲੀ ਰੂਪ, ਭਾਸ਼ਾ ਅਤੇ ਉਪ-ਭਾਸ਼ਾ ਵਿਚਲਾ ਅੰਤਰ, ਪੰਜਾਬੀ ਉਪ-ਭਾਸ਼ਾਵਾਂ ਦੇ ਪਛਾਣ-ਚਿੰਨ੍ਹ।
- (ਅ) ਪੰਜਾਬੀ ਭਾਸ਼ਾ: ਨਿਕਾਸ ਤੇ ਵਿਕਾਸ।



**B.SC. (HONS.) PHYSICS SEMESTER-I**

BPBI-1102

Compulsory Course

ਮੁਢਲੀ ਪੰਜਾਬੀ

(In Lieu of Compulsory Punjabi)

## Credit &amp; Marks Distribution, Eligibility and Pre-Requisites of the Course

Course title & Code	Total Teaching Hours	Total Credits/ Hours per week	Credit distribution			Total Marks 100		Time Allowed in Exam	Eligibility criteria	Pre-requisite of the course (if any)
			L	T	P	Theory	IA			
ਮੁਢਲੀ ਪੰਜਾਬੀ BPBI-1102	60	4	4	0	0	75	25	3 Hours	Class 12th pass in any stream	NOT Studied Punjabi up to 10th Standard

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective	ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)
<ul style="list-style-type: none"> <li>ਵਿਦਿਆਰਥੀ ਨੂੰ ਗੁਰਮੁਖੀ ਲਿਪੀ ਤੋਂ ਜਾਣੂ ਕਰਾਉਣਾ।</li> <li>ਵਿਦਿਆਰਥੀ ਨੂੰ ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਪੜ੍ਹਨਾ-ਲਿਖਣਾ ਸਿਖਾਉਣਾ।</li> <li>ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀਆਂ ਵਿਆਕਰਨਕ ਬਾਰੀਕੀਆਂ ਤੋਂ ਜਾਣੂ ਕਰਾਉਣਾ।</li> <li>ਸ਼ੁੱਧ ਸੰਚਾਰ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ।</li> </ul>	<ul style="list-style-type: none"> <li>ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ ਦੀ ਸਿਖਲਾਈ ਵਿਚ ਮੁਹਾਰਤ ਹਾਸਲ ਕਰਨਗੇ।</li> <li>ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਵਿਚ ਮੁਹਾਰਨੀ, ਲਗਾਂ-ਮਾਤਰਾਂ, ਸਵਰ ਅਤੇ ਵਿਅੰਜਨ ਅੱਖਰਾਂ ਦੀ ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ ਸੰਬੰਧੀ ਸਮਝ ਵਿਕਸਿਤ ਹੋਵੇਗੀ।</li> <li>ਵਿਦਿਆਰਥੀ ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਲਿਖਣ-ਪੜ੍ਹਨ ਦੇ ਸਮਰੱਥ ਹੋਣਗੇ।</li> <li>ਉਹ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਸ਼ੁੱਧ ਰੂਪਾਂ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਲ ਕਰਨਗੇ।</li> </ul>

**ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ**

ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਭਾਗ ਵਿਚ 01-01 ਅੰਕ ਦੇ ਅਤਿ-ਸੰਖੇਪ ਉੱਤਰ ਵਾਲੇ (Objective Type) 11 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜੋ ਕਿ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ ਹੋਣਗੇ ਅਤੇ ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਦੂਜੇ ਭਾਗ ਵਿਚ, ਸਿਲੇਬਸ ਦੇ ਪਹਿਲੇ ਭਾਗ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨ੍ਹਾਂ ਵਿਚੋਂ ਕੋਈ ਦੋ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ 8-8 ਅੰਕ ਹੋਣਗੇ। ਇਸੇ ਤਰ੍ਹਾਂ ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਤੀਸਰੇ ਭਾਗ ਵਿਚ ਤਿੰਨ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿੰਨ੍ਹਾਂ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ 8-8 ਅੰਕ ਹੋਣਗੇ। ਭਾਗ ਚੌਥੇ ਵਿਚ ਪੰਜ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨ੍ਹਾਂ ਵਿਚੋਂ ਚਾਰ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ 4-4 ਅੰਕ ਹੋਣਗੇ। ਭਾਗ ਪੰਜਵੇਂ ਵਿਚ ਦਸ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨ੍ਹਾਂ ਵਿਚੋਂ 8 ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ। ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ 2-2 ਅੰਕ ਹੋਣਗੇ।

ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈਸਮੈਂਟ 25 ਅੰਕਾਂ ਦੀ ਹੈ। ਇਸ ਪੇਪਰ ਦੇ ਕੁੱਲ ਅੰਕ 75+25=100 ਹਨ।

**ਪਾਠ-ਕ੍ਰਮ****ਭਾਗ-ਪਹਿਲਾ**

(ੳ) ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ:

ਨਾਮਕਰਣ ਤੇ ਸੰਖੇਪ ਜਾਣ-ਪਛਾਣ: ਗੁਰਮੁਖੀ ਵਰਣਮਾਲਾ, ਅੱਖਰ ਕ੍ਰਮ, ਸਵਰ ਵਾਹਕ (ੳ, ਅ, ਏ), ਲਗਾਂ-ਮਾਤਰਾਂ, ਪੈਰ ਵਿਚ ਬਿੰਦੀ ਵਾਲੇ ਵਰਨ, ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਨ, ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ

(ਅ) ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ

**ਭਾਗ-ਦੂਜਾ**

ਗੁਰਮੁਖੀ ਆਰਥੋਗਰਾਫੀ ਅਤੇ ਉਚਾਰਨ:

ਸਵਰ, ਵਿਅੰਜਨ: ਮੁਢਲੀ ਜਾਣ-ਪਛਾਣ ਅਤੇ ਉਚਾਰਨ, ਮੁਹਾਰਨੀ, ਲਗਾਂ-ਮਾਤਰਾਂ ਦੀ ਪਛਾਣ

**ਭਾਗ-ਤੀਜਾ**

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਜੋੜ: ਮੁਕਤਾ (ਦੋ ਅੱਖਰਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਤਿੰਨ ਅੱਖਰਾਂ ਵਾਲੇ ਸ਼ਬਦ), ਸਿਹਾਰੀ ਵਾਲੇ ਸ਼ਬਦ, ਬਿਹਾਰੀ ਵਾਲੇ ਸ਼ਬਦ, ਔਕੜ ਵਾਲੇ ਸ਼ਬਦ, ਦੁਲੈਂਕੜ ਵਾਲੇ ਸ਼ਬਦ, ਲਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਦੁਲਾਵਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਹੋੜੇ ਵਾਲੇ ਸ਼ਬਦ, ਕਨੌੜੇ ਵਾਲੇ ਸ਼ਬਦ, ਲਗਾਖਰ (ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ) ਵਾਲੇ ਸ਼ਬਦ

**ਭਾਗ-ਚੌਥਾ**

ਸੁੱਧ-ਅਸੁੱਧ ਸ਼ਬਦ

**B.SC. (HONS.) PHYSICS SEMESTER I**  
**BPHC-1104**  
**PUNJAB HISTORY & CULTURE (From Earliest Times to C 320)**

(Special Paper in lieu of Punjabi compulsory)  
(For those students who are not domicile of Punjab)  
B. A.; B.A. (SS); B. A. (Hons. – English); B. Com. (Hons., R, Ac. & Finance); B. Sc. /Bio-Tech./Comp. Sc./Eco./FD/Food Sc./IT/Med./N.Med.; B.Sc. (Hons. –Botany, Chemistry, Mathematics, Physics, Zoology); B. of Mult.; B. in Int. & Mob. Tech.; BBA;BCA;BJMC; B. Voc. (Software Development, Theatre and Stage Craft, Food Processing, Textile Design & Apparel Technology)

**SEMESTER-I**

**PUNJAB HISTORY & CULTURE (From Earliest Times to C 320 BC)**  
(Special Paper in lieu of Punjabi compulsory)  
(For those students who are not domicile of Punjab)

**Teaching Hours (per week): 4**  
**Total Credits: 4**  
**Credits:LTP:400**  
**Total Hours: 60**  
**Time: 3 Hours**  
**Maximum Marks: 100**  
**(Theory Marks: 75+Internal Assessment: 25)**  
**Pass Marks: 35%**

**Instructions for the Paper Setters:**

**Question paper should consist of two sections—Section A and Section B.** The paper setter must ensure that questions in Section–A do not cover more than one point, and questions in Section–B should cover at least 50 per cent of the theme.

**Section–A:** The examiner will set 15 objective type questions out of which the candidate shall attempt any 10 questions, each carrying 1½ marks. The total weightage of this section will be 15 marks. Answer to each question should be in approximately one to two sentences.

**Section–B:** The examiner will set 8 questions, two from each Unit. The candidate will attempt 4 questions selecting one from each Unit in about 1000 words. Each question will carry 15 marks. The total weightage of this section will be 60 marks.

**Note: The examiner is to set the question paper in two languages: English & Hindi.**

**Course Objectives:** The main objective of this course is to educate the history and culture of the Ancient Punjab to the students who are not domicile of the Punjab. It aims to familiarize these students with the physical features of ancient Punjab and its impact on its history and culture. It also provides them information about the different sources to construct the history and culture of the ancient Punjab. The course intends to provide knowledge of social, economic, religious life of the Harappan civilization, Indo-Aryans, teachings and impact of Jainism and Buddhism in the Punjab.

**Unit-I**

1. Physical features of the Punjab and impact on history.
2. Sources of the ancient history of Punjab.

**Unit-II**

3. Harappan Civilization: Town planning; social, economic and religious life of the Indus Valley People.
4. The Indo-Aryans: Original home and settlement in Punjab.

**Unit-III**

5. Social, Religious and Economic life during Rig Vedic Age.
6. Social, Religious and Economic life during later Vedic Age.

**Unit-IV**

7. Teachings and impact of Buddhism.
8. Jainism in the Punjab.

**Suggested Readings:-**

L. Joshi (ed), *History and Culture of the Punjab*, Art-I, Patiala, 1989 (3rd edition)

L.M. Joshi and Fauja Singh (ed), *History of Punjab*, Vol. I, Patiala 1977.

Budha Parkash, *Glimpses of Ancient Punjab*, Patiala, 1983.

B.N. Sharma, *Life in Northern India*, Delhi. 1966.

**Course Outcomes:**

**On Completing the Course, the Students will be able to :**

- CO-1** Learn the history and culture of the Ancient Punjab.
- CO-2** Study the physical features of ancient Punjab.
- CO-3** Understand about the sources of the history of the Punjab.
- CO-4** Analyse the social, economic, religious life of the Harappan civilization and Vedic-Aryans.
- CO-5** Learn the teachings and impact of Jainism and Buddhism in the Punjab.

**B.SC. (HONS.) PHYSICS SEMESTER I**  
**BHP-113**  
**PHYSICS LAB-I**

**Teaching Hours (per week): 4**

**Total Credits: 2**

**Credits:LTP:002**

**Total Hours 60**

**Maximum Marks: 50**

**(Max. Marks: 37+Internal Assessment: 13)**

**Pass Marks: 35%**

**Time: 3 Hours**

**General Guidelines for Practical Examination**

I. The distribution of marks is as follows:

- i) One experiment **15 Marks**
- ii) Brief Theory **5 Marks**
- iii) Viva–Voce **10Marks**
- iv) Record (Practical file) **7 Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session and will consist of 8 experiments out of which an examinee will mark 6 experiments and one of these is to be allotted by the external examiner.

III. Number of candidates in a group for practical examination should not exceed 12.

IV. In a single group no experiment be allotted to more than three examinee in any group.

**Course Objectives:** The purpose of the course isto understand the concept of moment of inertia, torque and angular acceleration with the help of fly wheel, conservation laws in elastic collision using one dimensional hanging spheres, modulus of rigidity, Young’s modulus and Poisson’s ratio.

**LIST OF EXPERIMENTS**

1. To measure the time periods of oscillation for the objects of various geometrical shapes but of same mass.
2. To study rotational motion using a flywheel and hence show that toque is proportional to angular acceleration.
3. To find the moment of inertia of an irregular body about an axis through its centre of gravity with a torsion pendulum.
4. To determine the moment of inertia of a flywheel.
5. To determine the Young’s modulus by bending.
6. Determination of Poisson’s ratio for rubber.
7. To verify laws of conservation of (a) linear momentum, (b) kinetic energy in elastic collisions using one dimensional collisions of hanging spheres. (c) Also determine energy transfer and coefficient of restitution.
8. To determine modulus of rigidity of copper wire by Maxwell needle experiment.

**Books Prescribed**

1. Practical Physics Vol. I, T.S. Bhatia, Gursharan Kaur, Iqbal Singh, Vishal Publications.

2. Practical Physics, C.L. Arora, S. Chand & Co.

**Course Outcomes:**

<b>Sr. No.</b>	<b>On completing the course, the students will be able to:</b>
CO1	Understand the concept of moment of inertia, torque and angular acceleration with the help of fly wheel.
CO2	Understand the conservation laws in elastic collision using one dimensional hanging sphere.
CO3	Determine modulus of rigidity of a wire
CO4	Determine Young's modulus of a beam.
CO5	Determine Poisson's ratio of rubber.

**B.SC. (HONS.) PHYSICS SEMESTER I**  
**BHP-114**  
**PHYSICS LAB-II**

**Teaching Hours (per week): 4**

**Total Credits: 2**

**Credits:LTP:002**

**Total Hours 60**

**Maximum Marks: 50**

**(Max. Marks: 37+Internal Assessment: 13)**

**Pass Marks: 35%**

**Time: 3 Hours**

**General Guidelines for Practical Examination**

I. The distribution of marks is as follows:

v)One experiment **15 Marks**

vi)Brief Theory **5 Marks**

vii)Viva–Voce **10Marks**

viii) Record (Practical file) **7 Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session and will consist of 8 experiments out of which an examinee will mark 6 experiments and one of these is to be allotted by the external examiner.

III. Number of candidates in a group for practical examination should not exceed 12.

IV. In a single group no experiment be allotted to more than three examinee in any group.

**Course Objectives:** The purpose of the course is to understand the concept of charging and discharging of capacitor. It includes experiments to calculate low resistance with Carey Foster's Bridge and also to find out the capacitance and permittivity of a medium by de-Sauty's bridge.

**LIST OF EXPERIMENTS**

1. To determine low resistance with Carey-Foster's Bridge.
2. To determine the resistance and specific resistance of a copper wire with the help of Kelvins double bridge.
3. To find the unknown capacitance of a capacitor by flashing and quenching of a neon lamp.
4. Measurement of capacitance, determination of permittivity of a medium air and relative permittivity by de-Sauty's bridge.
5. To study the variation in resistance of filament of a bulb with temperature.
6. To study the flow of water through a capillary tube as a function of pressure head using two tubes of same length but different radii.
7. To study the flow of water through a capillary tube as a function of pressure head using two tubes of different length but of same radii.

**Books Prescribed**

3. Practical Physics Vol. I, T.S. Bhatia, Gursharan Kaur, Iqbal Singh, Vishal Publications.
4. Practical Physics, C.L. Arora, S. Chand & Co.

**Course Outcomes:**

<b>Sr. No.</b>	<b>On completing the course, the students will be able to:</b>
CO1	Find out unknown capacitance.
CO2	Find out specific resistance of wire
CO3	To study the filament resistance.
CO4	Find out low resistance with Carey Foster's Bridge.
CO5	Find out the capacitance and permittivity of a medium by de-Sauty's bridge.

**B.SC. (HONS.) PHYSICS SEMESTER I**  
**CHP-112**  
**Organic Chemistry Lab-I**

**Teaching Hours (per week): 2**

**Total Credits: 1**

**Credits:LTP:001**

**Total Hours 30**

**Time: 3 Hours**

**Maximum Marks: 25**

**(Max. Marks: 19+Internal Assessment: 06)**

**Pass Marks: 35%**

**INSTRUCTIONS FOR PAPER SETTERS AND CANDIDATES:**

I. Examiner will give one organic salt to the students.

II. Each student will get different salt and analyse it for elements, functional group and prepare its derivatives.

III. The question paper will be 19 marks with split as under:

(Write up = 6, Performance = 6, Viva-voce = 5, Practical note book = 2)

**COURSE OBJECTIVES:**

*In organic chemistry practical students will learn about the Evaluation of organic compounds for the detection of element, functional group and preparation of their derivatives. It includes following functional groups:Acids, ketones, aldehyde, carbohydrates, aromatic hydrocarbons, aromatic amines and phenols.*

**COURSE CONTENTS:**

The preliminary examination of physical and chemical characteristics (physical state, colour, odour 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.

-phenols, carboxylic acids

-carbonyl compounds - ketones, aldehydes

-carbohydrates

-aromatic amines

-aromatic hydrocarbons

**BOOKS PRESCRIBED:**

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

**COURSE OUTCOMES:**

S. No.	On completing the course, the outcomes
CO1	Performed functional group analysis
CO2	Preparation of derivatives of organic compounds
CO3	Determination of physical constant: Melting point, Boiling point.
CO4	Different separation techniques.
CO5	How to perform TLC



**B.Sc. (HONS.) PHYSICS SEMESTER-I**

**Course Code: ZDA111**

**Course Title- Drug Abuse: Problem, Management and Prevention**

**PROBLEM OF DRUG ABUSE**

**(Compulsory for all Under Graduate Classes)**

**Teaching Hours (per week): 2**

**Total Hours 30**

**Time: 3 Hours**

**Maximum Marks: 50**

**Pass Marks: 35%**

**Instructions for the Paper Setters:**

- 1) There will be a total of 9 questions of which 5 are to be attempted.
- 2) Question 1 is compulsory and having 10 short answer type questions (1 mark each).
- 3) The remaining 8 questions (10 marks each) shall include 2 questions from each unit. Candidates shall be required to attempt 4 questions, one from each unit. Preferably, the question should not be split into more than two sub-parts.

Course Objectives- The course aims to:

CO-1.	Generate the awareness against drug abuse.
CO-2.	Describe a variety of models and theories of addiction and other problems related to substance abuse.
CO-3.	Describe the behavioral, psychological, physical health and social impact of psychoactive substances.
CO-4.	Provide culturally relevant formal and informal education programs that raise awareness and support for substance abuse prevention and the recovery process.
CO-5.	Describe factors that increase likelihood for an individual, community or group to be at risk of substance use disorders.

**UNIT-I**

- **Meaning of Drug Abuse**  
Meaning of drug abuse  
Nature and Extent of Drug Abuse: State and National Scenario

**UNIT-II**

- **Consequences of Drug Abuse for**  
Individual: Education, Employment, Income.  
Family : Violence.  
Society : Crime.  
Nation : Law and Order problem.

**UNIT-III**

- **Management of Drug Abuse**  
Medical Management: Medication for treatment of different types of drug abuses.  
Medication to reduce withdrawal effects.

**UNIT-IV**

- Psychiatric Management: Counseling, Behavioral and Cognitive therapy.
- Social Management: Family, Group therapy and Environmental Intervention.

**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. 23
4. Jasjit Kaur Randhawa & Samreet Randhawa, “Drug Abuse-Problem, Management & Prevention”, KLS, ISBN No. 978-81-936570-6-5, (2018).
5. Jasjit Kaur Randhawa & Samreet Randhawa, “Drug Abuse Problem, Management & Prevention”, KLS, ISBN No. 978-81-936570-8-9, (2019).
6. Jasjit Kaur Randhawa & Samreet Randhawa, “voZrI d[otos'A^(BPky'oh) ;wZf;nk, gqzXB ns/o'eEkw”, KLS, ISBN No. 978-81-936570-7-1, (2018).
7. Jasjit Kaur Randhawa, “Drug Abuse -Management & Prevention”, KLS, ISBN No. 978-93-81278-80-2, (2018).
8. Kapoor. T. (1985) Drug epidemic among Indian Youth, New Delhi: Mittal Pub.
9. Modi, Ishwar and Modi, Shalini (1997) Drugs: Addiction and Prevention, Jaipur: Rawat Publication.
10. National Household Survey of Alcohol and Drug abuse. (2003) New Delhi, Clinical Epidemiological Unit, All India Institute of Medical Sciences, 2004.
11. Rama Gandotra & Jasjit Kaur Randhawa, “voZrI d[otos'A^(BPky'oh) gqzXB ns/ o'eEkw”, KLS, ISBN No. 978-93-81278-87-1, (2018).
12. Sain, Bhim 1991, Drug Addiction Alcoholism, Smoking obscenity New Delhi: Mittal Publications.
13. Sandhu, Ranvinder Singh, 2009, Drug Addiction in Punjab: A Sociological Study. Amritsar. Guru Nanak Dev University.
14. Singh, C. P. 2000. Alcohol and Dependence among Industrial Workers: Delhi: Shipra.
15. Sussman, S and Ames, S.L. (2008). Drug Abuse: Concepts, Prevention and Cessation, Cambridge University Press.
16. World Drug Report 2010, United Nations office of Drug and Crime.
17. World Drug Report 2011, United Nations office of Drug and Crime.

**Course Outcomes:**

The students will be able:

CO-1.	To describe issues of cultural identity, ethnic background, age and gender in prevention, treatment and recovery.
CO-2.	To describe warning sign, symptoms, and the course of substance use disorders.
CO-3.	To describe principles and philosophy of prevention, treatment and recovery.
CO-4.	To describe current and evidenced-based approaches practiced in the field of drug addiction.

**B.Sc. (HONS.) PHYSICS SEMESTER-II**  
**BHP-121**  
**ELECTRICITY & MAGNETISM-II**

**Teaching Hours (per week): 4**

**Total Credits: 4**

**Credits:LTP:310**

**Total Hours: 60**

**Time: 3 Hours**

**Maximum Marks: 100**

**(Theory Marks: 75+Internal Assessment: 25)**

**Pass Marks: 35%**

**Note for paper setter and students:**

- 1. There will be five sections.**
- 2. Section A is compulsory and will be of 15 marks consisting of 8 short answer type questions carrying 2.5 mark each covering the whole syllabus. The answer should not exceed 50 words. The candidate will have to attempt any 6 questions in this section.**
- 3. Sections B, C, D and E will be set from units I, II, III & IV respectively and will consist of two questions of 15 marks each from the respective unit. The candidates are required to attempt one question from each of these sections. Each question in these sections should not have more than two subparts.**
- 4. Non-Programmable Scientific calculator is allowed.**

**Course Objectives:** Objectives of this course are to understand the magnetic effects of electric current. To understand magnetic properties of matter. To understand the concept of diamagnetism, paramagnetism and ferromagnetism. To understand the concept and applications of electromagnetic induction. To understand science and applications of electromagnetic waves.

**Course Contents:**

**UNIT-I**

Magnetic Effect of Electric Current; Direction of Field Lines due to current Flowing in a straight Conductor; Magnetic Field Density; Magnitude of Magnetic Flux; Magnetic and Lorentz Forces; Biot-Savart's Law; Magnetic Field Due to along Straight Conductor; Magnetic Field Intensity at point on the axis of a current loop; Variation of Field along the axis of the coil; Magnetic Field intensity inside a long Solenoid; Definition of Ampere; Ampere's Circuital Law; **Ampere's law and shape of path; Generalised form of Ampere's law**; Applications of Ampere's Circuital Law; **Comparison between Gauss's law and Ampere's law**; Solenoid Nature of Vector Field; Diversion of magnetic field; Properties of the Magnetic Field; **Magnetic scalar and Vector Potentials; expression for magnetic vector potential**; Surface Current Density; Changes in Magnetic Field at a current Sheet; Hall Effect,; Comparison of Electrostatic Field and Magnetic Field.

**UNIT-II**

Some Important Terms associated with Magnetic Materials; Torque on current Loop; Magnetic Dipole in a Magnetic Field; Potential Energy of Magnetic Dipole; Force on Magnetic Dipole In

Non-Uniform Magnetic Field; Magnetic Dipole Moment of an Atom; Expression of orbital Magnetic dipole moment of Electron; Electron Spin Magnetic Moment; Free and Bound Currents; Uniformly and Non Uniformly Magnetised **Materials**; Diamagnetism; Langevin's theory of diamagnetic behaviour; Paramagnetism and Langevin's Theory of Paramagnetic Susceptibility; Ferromagnetism; Domain theory of Magnetism; Hysteresis Curve; Energy Loss Due to Hysteresis and its Importance; **applications of hysteresis loop; current advances in magnetic materials.**

### UNIT-III

Electromagnetic Induction; Faraday's Induction Experiments; Faraday's Laws of Electromagnetic Induction (Integral And Differential Forms); Lenz's law; **method of generating induced emf; mechanism of induced emf**; Self Induction; Neumann's Formula; Self Inductance of a Solenoid and a Torodial; Mutual Induction; Expression for Coefficient of Mutual Induction and Reciprocity theorem; Mutual Inductance of **two coils**, two **coaxial** Solenoids; Modification of Ampere's Law and the Displacement Current; Maxwell's Equation of Electromagnetism; Series and Parallel LCR Circuits; Average Power Associated With LCR Circuit

### UNIT-IV

**Mechanical waves versus electromagnetic waves**; Production of em waves, **EM wave spectrum, Linear, isotropic and homogenous dielectric medium; conducting and dielectric media; differential equations for electromagnetic waves**; Nature of em waves; **velocity of electromagnetic waves in vacuum**; EM wave equation for a medium having finite  $\mu$  and  $\epsilon$  but  $\sigma = 0$ ; Wave equation for plane polarized em waves and their solutions; Relation between electric and magnetic field of an em wave; **electromagnetic wave propagation in a dielectric medium**; Impedence of a dielectric to em waves, The Poynting vector and flow of energy in an em wave; Equation of continuity; EM waves for a medium having finite values of  $\mu$  and  $\epsilon$  but  $\sigma \neq 0$ ; Solution of wave equation for a conducting medium; Skin depth; EM wave velocity and wave dispersion in a conductor; Behaviour of a medium as a conductor or dielectric; Characteristic impedance of a conducting medium to em waves; magnetic and electric energy densities; Poynting vector and Equation of Continuity for a Conducting medium; **current advances in em waves.**

**TUTORIAL:** Relevant problem on the topics covered in the course.

#### Books Prescribed

1. Electricity & Magnetism-T.S. Bhatia and Gurpreet Singh, Vishal Publishing Co.
2. Waves and Vibrations, T.S. Bhatia, Vishal Publishing Co.
3. Field & wave Electromagnetics by David & Cheng, Addison Wesley Publishing co
4. Electricity & Magnetism- A.K. Sikri, Pradeep Publications

#### Course Outcomes:

Sr. No.	On completing the course, the students will be able to:
CO1	Understand the magnetic effects of electric current.
CO2	Understand magnetic properties of matter.
CO3	Understand diamagnetism, paramagnetism and ferromagnetism.
CO4	Understand the concept and applications of electromagnetic induction.
CO5	Understand electromagnetic waves.

**B.Sc. (HONS.) PHYSICS SEMESTER-II**  
**BHP-122**  
**WAVES & OSCILLATIONS**

**Teaching Hours (per week): 4**

**Total Credits: 4**

**Credits:LTP:310**

**Total Hours: 60**

**Time: 3 Hours**

**Maximum Marks: 100**

**(Theory Marks: 75+Internal Assessment: 25)**

**Pass Marks: 35%**

**Note for paper setter and students:**

- 1. There will be five sections.**
- 2. Section A is compulsory and will be of 15 marks consisting of 8 short answer type questions carrying 2.5 mark each covering the whole syllabus. The answer should not exceed 50 words. The candidate will have to attempt any 6 questions in this section.**
- 3. Sections B, C, D and E will be set from units I, II, III & IV respectively and will consist of two questions of 15 marks each from the respective unit. The candidates are required to attempt one question from each of these sections. Each question in these sections should not have more than two subparts.**
- 4. Non-Programmable Scientific calculator is allowed.**

**Course Objectives:** The purpose of the course is to understand the physical characteristics of SHM and obtaining solution of the oscillator using differential equations, to calculate logarithmic decrement relaxation time and quality factor of a harmonic oscillator. This course provides information to understand the difference between simple harmonic vibrations of same frequencies and different frequencies, wave equation and to understand the significance of transverse waves and longitudinal waves, coupled mechanical as well as electrical oscillators.

**Course Contents:**

**UNIT-I**

**Simple and Damped Oscillations:** Simple Harmonic Motion, **Differential equation of SHM, Graphical representation of SHM**, Energy of SHM, Compound pendulum, Torsional pendulum, Superposition of two perpendicular SHM, Lissajous figures–superposition of many SHM's, complex number notation and use of exponential series. Damped motion of mechanical and electrical oscillator, heavy damping, critical damping. Energy dissipation and energy of damped oscillator, amplitude decay, logarithmic decrement, relaxation time, Q-value, comparison between Free and Damped oscillations

**UNIT-II**

**Forced Oscillations:** Differential equation of forced mechanical oscillator, Transient and steady state behaviour of a forced oscillator, **Variation of displacement and velocity with**

**frequency of driving force**, frequency dependence of phase angle between force and displacement, velocity, Power supplied to oscillator by driving force and its variation with driving force frequency, Resonance absorption and Q-value as a measure of power absorption bandwidth, Q-value as amplification factor, Forced electrical oscillator, Variation of current with frequency, Variation of power supplied with frequency of applied voltage, Q-factor as amplification factor.

### UNIT-III

**Coupled Oscillations:** Stiffness coupled oscillators, In phase and Out phase modes, normal coordinates and normal modes of vibration, solutions for differential equations for normal modes and exchange of energy, inductance coupling of electrical oscillators, loose, **intermediate and strong coupling**, energy exchange between two electrically coupled oscillators.

### UNIT-IV

**Wave Motion:** Types of wave motion, wave equation, transverse waves on a string, the string as a forced oscillator, characteristic impedance of a string, reflection and transmission of transverse waves on a string at a boundary, Energy of a progressive wave, impedance matching, standing waves on a string of fixed length, **Energy of a vibrating string, normal modes and eigen frequencies**, Energy in a normal mode of oscillation wave groups, group velocity, dispersive and non-dispersive media, Longitudinal waves.

**TUTORIAL:** Relevant problem on the topics covered in the course.

#### Books Prescribed

1. Waves and Vibrations, T.S. Bhatia, Vishal Publishing Co.
2. The Physics of Vibrations and Waves- H.J. Pain, **John Wiley and Sons Ltd** , University of Chichester, 2005.
3. **Waves and Oscillations – N. Subrahmanyam and Brij Lal, Vikas Publishing House Pvt. Ltd, 2013**

#### Course Outcomes:

Sr. No.	On completing the course, the students will be able to:
CO1	Understand the physical characteristics of SHM and obtaining solution of the oscillator using differential equations.
CO2	Calculate logarithmic decrement relaxation time and quality factor of a harmonic oscillator.
CO3	Understand the difference between simple harmonic vibrations of same frequencies and different frequencies.
CO4	Solve wave equation and to understand the significance of transverse waves and longitudinal waves.
CO5	Explain the concept of coupled mechanical as well as electrical oscillators.

**B.Sc. (HONS.) PHYSICS SEMESTER-II**  
**MAP-121**  
**MATHEMATICS –II**

**Teaching Hours (per week): 4**

**Total Credits: 4**

**Credits:LTP:310**

**Total Hours 60**

**Maximum Marks: 100**

**(Max. Marks: 75+Internal Assessment: 25)**

**Pass Marks: 35%**

**Time: 3 Hours**

**INSTRUCTIONS FOR PAPER SETTERS**

2. The question paper will consist of three sections namely Section-A which will be from entire syllabus (equally distributed from each unit) Section–B, C, D and E from Unit-I, II, III and IV, respectively.
3. The Section-A will consists of eight short answer type questions, each of 2.5 marks. Students are to attempt any six.
4. The Sections–B, C, D & E will consist of two questions each (each question should be subdivided into atmost two parts). Students are to attempt any four questions in total by selecting one question from each section. Each question carries 15 marks.
5. Teaching time for this paper would be six periods per week.

**Course contents:**

**COURSE OBJECTIVES:**

- To acquire the knowledge of two dimensional geometry.
- To have an idea about the Solid geometry and its applications.
- To perceive knowledge about Polynomial equations.

**UNIT-I**

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)

**UNIT-II**

Solid Geometry: Straight line and planes in 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 sphere, Intersection of two spheres; Right circular Cone, Right circular Cylinder, Tangent lines, Tangent planes, and normal lines to these surfaces.

**UNIT-III**

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, Cardon's method, Solutions of biquadratic polynomial equations by Descartes and Ferrari's methods.

**UNIT-IV**

Introduction to Groups: Binary operations, Groups, Subgroups, Group table, Algebraic property, some standard algebraic properties (without proofs), Use of closure property, addition, identity and inverse with applications

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)

COURSE OUTCOMES: On completing the course students will be able to:

1. Understand the concept of axes.
2. Knowledge of parabola and its applications.
3. Implement knowledge of binary operations of groups.



**B.Sc. (HONS.) PHYSICS SEMESTER-II**  
**CHX 121**

**Inorganic Chemistry-II**

**Teaching Hours (per week): 3**

**Total Credits: 3**

**Credits:LTP:210**

**Total Hours: 45**

**Maximum Marks: 75**

**(Theory Marks: 56+Internal Assessment: 19)**

**Pass Marks: 35%**

**Time: 3 Hours**

**INSTRUCTIONS FOR PAPER SETTERS AND CANDIDATES**

**(Scientific calculator is allowed)**

- I. Examiner will make five sections of paper namely Section-I, II, III, IV and V
- II. Examiner will set total of NINE questions comprising ONE compulsory question of short answer type covering whole syllabi and TWO questions from each unit.
- III. Section-I will consist of 8 short questions carrying 2 Mark each and student have to attempt any six parts.
- IV. Section-II, III, IV and V of paper will consist of EIGHT questions in total having TWO questions from each unit of the syllabus and each question carry 11 Marks.
- V. The students are required to attempt FIVE questions in all, taking ONE Compulsory question of section-I and one question from each section i.e. II, III, IV and V.

**COURSE OBJECTIVES:**

*Students will learn naming of coordination complexes, Factors affecting co-ordination numbers and stereo-chemistry. The objective of the course is to teach the various theories dealing with the bonding in co-ordination compounds like VBT theory, CFT and MOT theory applied to homonuclear diatomic molecules and heteronuclear Diatomic molecules.charge transfer transitions,  $\pi$ -Acid Ligands, and Alkali metal and alkaline earth metal chelators*

**COURSE CONTENTS:**

**UNIT-I**

**11Hrs**

Co-ordination Chemistry: 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,

Bonding in metal complexes: Valence bond theory for co-ordinate complexes, inner and outer orbital complexes, Electro-neutrality and back bonding, limitations of V.B. theory.

## UNIT-II

11Hrs

Crystal field theory: Splitting of d-orbitals in octahedral, tetrahedral. Pairing Energy, 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 and Hydration energies.

## UNIT-III

11Hrs

Electronic spectra, Beer Lambert Law, Angular Momentum of electron spectra, Total angular momentum, Microstates and spectroscopic terms, a calculation of spectroscopic terms for electronic configurations, L S coupling, Hund's rule for finding the ground state terms, Electronic spectral properties of 1st transition series, Orgel Diagrams for  $d^1 - d^{10}$  systems, for weak field octahedral and tetrahedral complexes, limitations of C.F.T

## UNIT-IV

12Hrs

Alkali metal and alkaline earth metal chelators: Macrocyclic ligands, macrocyclic effect, crownethers 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.

**BOOKS PRESCRIBED:**

1. J.E. Huheey, Inorganic Chemistry, 3<sup>rd</sup> 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.

**COURSE OUTCOMES:**

Sr. No.	On completing the course,
CO1	Students learned about the coordination compounds, theory, their nature of bonding,
CO2	Students gained knowledge to apply ligand field theory CFT on simple molecules.
CO3	able to learned about Molecular orbital theory
CO4	Learned about VSEPR theory, VBT
CO5	HSAB principle, Orgel Diagram, Macrocyclic ligands

**B.Sc. (HONS.) PHYSICS SEMESTER-II**

**BCEN-1223**

**SEMESTER – II**

**COMMUNICATIVE ENGLISH-II**

**B.Sc.(Hons.) Physics, Chemistry, Botany, Zoology, Maths and Computational Statistics and  
Data Analytics**

**Teaching Hours (per week): 5**

**Total Credits: 4**

**Credits:LTP:301**

**Time: 3 Hours (Theory 60 Marks +Practical 15 Marks+ Internal Assessment 25 Marks)**

**Pass Marks: 35%**

**Instructions for the Paper Setter and Distribution of Marks:**

The question paper will consist of four sections and the distribution of marks will be as under:

**Section A: 12 Marks**

**Section B: 12 Marks**

**Section C: 18 Marks**

**Section D: 18 Marks**

**Section A**

1. Fifteen (15) Questions on the usage of Tenses, Conjunctions, and Subject-Verb Agreement will be set. The students will be required to attempt any Twelve (12).

(12X1= 12 Marks)

**Section B**

2. ONE question (with sub parts) based on Skills and Strategies development exercises in Unit-3 and Unit-4 of the prescribed text book *Making Connections* will be set.

(1X12= 12marks)

**Section C**

3. Five short answer type questions from Unit 3 and 4 of *Making Connections : A Strategic Approach To Academic Reading* will be set. The students will be required to attempt any three.

(3X2= 06 marks)

4. Four Essay type question (Two from each unit) from Unit 3 and 4 of *Making Connections: A strategic Approach to Academic Reading* will be set. The students will be required to answer any two, choosing at least one from each unit.

(2X6= 12 marks)

**Section D**

5. Transcoding (given dialogue to prose or given prose to dialogue).

(1X6= 6 Marks)

6. Taking notes on a speech/lecture/telephonic conversations.

(1X6= 6 Marks)

7. Translation from Vernacular (Punjabi/ Hindi) to English (Isolated Sentences)

(1X6= 6 Marks)

**Course Objectives:**

- I: To develop competence in oral and visual communication.
- II: To inculcate innovative and critical thinking among the students.
- III: To enable them to grasp the application of communication theories.
- IV: To acquire the knowledge of latest technology related with communication skills.
- V: To provide knowledge of multifarious opportunities in the field of this programme.

**Course Contents:**

**1. Reading and Comprehension Skills:**

Students will be required to read and comprehend the essays in Unit 3 and 4 of the book *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Third Edition.

**2. Speaking and Conversational Skills:** Components of a meaningful and easy conversation; understanding the cue and making appropriate responses; asking and providing information on general topics, situation based Conversation in English.

**3. Grammar:** Tenses, Conjunctions, and Subject-Verb Agreement.

**Prescribed Books:**

*Making Connections* by Kenneth J. Pakenham 3<sup>rd</sup> Edn. CUP

**Recommended Books:**

- 1. *Oxford Guide to Effective Writing and Speaking* by John Seely.
- 2. *The Written Word* by Vandana R Singh, Oxford University Press

**Course Outcomes:**

The completion of this course enables students to:

- 1. Identify common errors in language and rectify them.
- 2. Develop and expand writing skills through controlled and guided activities.
- 3. Develop coherence, cohesion and competence in oral discourse through intelligible pronunciation.
- 4. Develop the ability to handle the interview process confidently and learn the subtle nuances of an effective group discourse.
- 5. Communicate contextually in specific and professional situations with courtesy.

**PRACTICAL (Marks: 15)**

**Course Contents:-**

- 1. Oral Presentation. (5 Marks)
- 2. Group Discussion. (5 Marks)
- 3. Mock Interview (5 Marks)

**B.Sc. (HONS.) PHYSICS SEMESTER-II**

BHPB-1201

Compulsory Course

ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ

Credit & Marks Distribution, Eligibility and Pre-Requisites of the Course

Course title & Code	Total Teaching Hours	Total Credits/ Hours per week	Credit distribution			Total Marks 100		Time Allowed in Exam
			L	T	P	Theory	IA	
ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ  BHPB-1201	60	4	4	0	0	75	25	3 Hours

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective	ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)
<ul style="list-style-type: none"> <li>ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕਰਨਾ।</li> <li>ਆਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ।</li> <li>ਵਿਦਿਆਰਥੀ ਨੂੰ ਦਫਤਰੀ ਅਤੇ ਘਰੇਲੂ ਚਿੱਠੀ ਪੱਤਰ ਤੋਂ ਜਾਣੂ ਕਰਵਾਉਣਾ।</li> <li>ਭਾਸ਼ਾਈ ਗਿਆਨ ਵਿਚ ਵਾਧਾ ਕਰਨਾ।</li> </ul>	<ul style="list-style-type: none"> <li>ਉਸ ਅੰਦਰ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪ੍ਰਫੁੱਲਿਤ ਹੋਣਗੀਆਂ।</li> <li>ਉਸ ਅੰਦਰ ਸਾਹਿਤ ਸਿਰਜਣਾ ਦੀ ਸੰਭਾਵਨਾ ਵਧੇਗੀ।</li> <li>ਵਿਦਿਆਰਥੀ ਚਿੱਠੀ-ਪੱਤਰ ਦੀ ਲਿਖਣ ਸ਼ੈਲੀ ਤੋਂ ਜਾਣੂ ਹੋਵੇਗਾ।</li> <li>ਉਹ ਭਾਸ਼ਾਈ ਬਣਤਰ ਤੋਂ ਜਾਣੂ ਹੋਵੇਗਾ।</li> </ul>

**ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ**

ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਭਾਗ ਵਿਚ 1.5-1.5 (ਡੇਢ-ਡੇਢ) ਅੰਕ ਦੇ ਅਤਿ-ਸੰਖੇਪ (Objective Type) 10 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜੋ ਕਿ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ ਹੋਣਗੇ ਅਤੇ ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ। ਸਿਲੇਬਸ ਦੇ ਬਾਕੀ ਚਾਰ ਭਾਗਾਂ ਵਿਚ 02-02 ਲੇਖ ਨੁਮਾ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰੇਕ ਭਾਗ ਵਿਚੋਂ 01-01 ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ 15 ਅੰਕ ਹੋਣਗੇ। ਪੇਪਰ ਸੈੱਟਰ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

ਨੋਟ: ਇੰਟਰਨਲ ਅਸੈਸਮੈਂਟ 25 ਅੰਕਾਂ ਦੀ ਹੈ। ਇਸ ਪੇਪਰ ਦੇ ਕੁੱਲ ਅੰਕ 75+25=100 ਹਨ।

**ਪਾਠ-ਕ੍ਰਮ**

**ਭਾਗ-ਪਹਿਲਾ**

ਸਾਹਿਤ ਦੇ ਰੰਗ, ਡਾ. ਮਹਿਲ ਸਿੰਘ (ਸੰਪਾ.), ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।

ਭਾਗ ਦੂਜਾ - ਵਾਰਤਕ ਅਤੇ ਰੇਖਾ-ਚਿੱਤਰ, ਡਾ. ਪਰਮਿੰਦਰ ਸਿੰਘ, ਡਾ. ਭੁਪਿੰਦਰ ਸਿੰਘ ਅਤੇ ਡਾ.ਕੁਲਦੀਪ ਸਿੰਘ ਢਿੱਲੋਂ (ਸਹਿ ਸੰਪਾ.)

(ਵਾਰਤਕ ਭਾਗ ਵਿਚੋਂ ਸਾਰ/ਵਿਸ਼ਾ-ਵਸਤੂ। ਰੇਖਾ-ਚਿੱਤਰ ਭਾਗ ਵਿਚੋਂ ਸਾਰ/ਨਾਇਕ ਬਿੰਬ)

**ਭਾਗ-ਦੂਜਾ**

ਪੰਜਾਬ ਦੇ ਮਹਾਨ ਕਲਾਕਾਰ (ਸੰਪਾ. ਬਲਵੰਤ ਗਾਰਗੀ)

ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

(ਸਤੀਸ਼ ਗੁਜਰਾਲ ਤੋਂ ਸੁਰਿੰਦਰ ਕੌਰ ਤਕ)

(ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ/ਨਾਇਕ ਬਿੰਬ)

**ਭਾਗ-ਤੀਜਾ**

(ੳ) ਦਫ਼ਤਰੀ ਚਿੱਠੀ ਪੱਤਰ

(ਅ) ਮੁਹਾਵਰੇ ਅਤੇ ਅਖਾਣ

**ਭਾਗ-ਚੌਥਾ**

(ੳ) ਸ਼ਬਦ-ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ-ਰਚਨਾ - ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਮੁਢਲੇ ਸੰਕਲਪ

(ਅ) ਸ਼ਬਦ-ਸ਼੍ਰੇਣੀਆਂ

**B.Sc. (HONS.) PHYSICS SEMESTER-II**

BPBI-1202

Compulsory Course

ਮੁਢਲੀ ਪੰਜਾਬੀ

(In Lieu of Compulsory Punjabi)

**Credit & Marks Distribution, Eligibility and Pre-Requisites of the Course**

Course title & Code	Total Teaching Hours	Total Credits/ Hours per week	Credit distribution			Total Marks 100		Time Allowed in Exam
			L	T	P	Theory	IA	
ਮੁਢਲੀ ਪੰਜਾਬੀ  BPBI-1202	60	4	4	0	0	75	25	3 Hours

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective	ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)
<ul style="list-style-type: none"> <li>ਵਿਦਿਆਰਥੀ ਅੰਦਰ ਸ਼ਬਦ ਬਣਤਰ ਦੀ ਸਮਝ ਵਿਕਸਤ ਕਰਨਾ।</li> <li>ਵਿਦਿਆਰਥੀ ਨੂੰ ਸ਼ਬਦ ਪ੍ਰਕਾਰ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਦਾਨ ਕਰਨਾ।</li> <li>ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਵਿਆਕਰਨਕ ਪ੍ਰਬੰਧ ਸੰਬੰਧੀ ਗਿਆਨ ਕਰਾਉਣਾ।</li> <li>ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ ਦੁਆਰਾ ਪੰਜਾਬੀ ਸ਼ਬਦ ਭੰਡਾਰ ਵਧਾਉਣਾ।</li> </ul>	<ul style="list-style-type: none"> <li>ਉਹ ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਲ ਕਰਕੇ ਭਾਸ਼ਾਈ ਗਿਆਨ ਨੂੰ ਵਿਕਸਿਤ ਕਰਨਗੇ।</li> <li>ਪੰਜਾਬੀ ਸ਼ਬਦ-ਰਚਨਾ ਸੰਬੰਧੀ ਮੁਹਾਰਤ ਹਾਸਲ ਕਰਨਗੇ।</li> <li>ਵਿਦਿਆਰਥੀ ਸ਼ਬਦਾਂ ਦੀਆਂ ਭਿੰਨ-ਭਿੰਨ ਕਿਸਮਾਂ ਤੋਂ ਜਾਣੂ ਹੋਵੇਗਾ।</li> <li>ਵਿਦਿਆਰਥੀਆਂ 'ਚ ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ ਭੰਡਾਰ 'ਚ ਵਾਧਾ ਹੋਵੇਗਾ।</li> </ul>

**ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ**

ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਭਾਗ ਵਿਚ 01-01 ਅੰਕ ਦੇ ਅਤਿ-ਸੰਖੇਪ ਉੱਤਰ ਵਾਲੇ (Objective Type) 11 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜੋ ਕਿ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ ਹੋਣਗੇ ਅਤੇ ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਦੂਸਰੇ ਭਾਗ ਵਿਚ, ਸਿਲੇਬਸ ਦੇ ਪਹਿਲੇ ਭਾਗ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨ੍ਹਾਂ ਵਿਚੋਂ ਕੋਈ ਦੋ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ 8-8 ਅੰਕ ਹੋਣਗੇ। ਇਸੇ ਤਰ੍ਹਾਂ ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਤੀਸਰੇ ਭਾਗ ਵਿਚ ਤਿੰਨ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿੰਨ੍ਹਾਂ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ 8-8 ਅੰਕ ਹੋਣਗੇ। ਭਾਗ ਚੌਥੇ ਵਿਚ ਪੰਜ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨ੍ਹਾਂ ਵਿਚੋਂ ਚਾਰ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ 4-4 ਅੰਕ ਹੋਣਗੇ। ਭਾਗ ਪੰਜਵੇਂ ਵਿਚ ਤਿੰਨ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨ੍ਹਾਂ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ 8-8 ਅੰਕ ਹੋਣਗੇ।

**ਨੋਟ:** ਇੰਟਰਨਲ ਅਸੈਸਮੈਂਟ 25 ਅੰਕਾਂ ਦੀ ਹੈ। ਇਸ ਪੇਪਰ ਦੇ ਕੁੱਲ ਅੰਕ 75+25=100 ਹਨ।

**ਪਾਠ-ਕ੍ਰਮ  
ਭਾਗ-ਪਹਿਲਾ**

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ:

ਧਾਤੂ, ਵਧੇਤਰ (ਅਗੇਤਰ, ਮਧੇਤਰ, ਪਿਛੇਤਰ), ਪੰਜਾਬੀ ਕੋਸ਼ਗਤ ਸ਼ਬਦ ਅਤੇ ਵਿਆਕਰਨਕ ਸ਼ਬਦ

**ਭਾਗ-ਦੂਜਾ**

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਪ੍ਰਕਾਰ:

(ੳ) ਸੰਯੁਕਤ ਸ਼ਬਦ, ਸਮਾਸੀ ਸ਼ਬਦ, ਦੋਜਾਤੀ ਸ਼ਬਦ, ਦੋਹਰੇ/ਦੁਹਰਕਤੀ ਸ਼ਬਦ ਅਤੇ ਮਿਸ਼ਰਤ ਸ਼ਬਦ

(ਅ) ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ

**ਭਾਗ-ਤੀਜਾ**

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਰਚਨਾ:

ਇਕ-ਵਚਨ/ਬਹੁ-ਵਚਨ, ਲਿੰਗ-ਪੁਲਿੰਗ, ਬਹੁਅਰਥਕ ਸ਼ਬਦ, ਸਮਾਨਅਰਥਕ ਸ਼ਬਦ, ਬਹੁਤੇ ਸ਼ਬਦਾਂ ਲਈ ਇਕ ਸ਼ਬਦ, ਸ਼ਬਦ ਜੁੱਟ, ਵਿਰੋਧਅਰਥਕ ਸ਼ਬਦ, ਸਮਨਾਮੀ ਸ਼ਬਦ

**ਭਾਗ-ਚੌਥਾ**

ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ

ਖਾਣ-ਪੀਣ, ਸਾਕਾਦਾਰੀ, ਰੁੱਤਾਂ, ਮਹੀਨਿਆਂ, ਗਿਣਤੀ, ਮੌਸਮ, ਬਜ਼ਾਰ, ਵਪਾਰ, ਧੰਦਿਆਂ ਨਾਲ ਸੰਬੰਧਿਤ



**B.Sc. (HONS.) PHYSICS SEMESTER-II  
BPHC-1204**

**PUNJAB HISTORY & CULTURE (C 321 TO 1000 A.D.)**

**(Special Paper in lieu of Punjabi compulsory)**

**(For those students who are not domicile of Punjab)**

**B. A.; B.A. (SS); B. A. (Hons. – English); B. Com. (Hons., R, Ac. & Finance); B. Sc. Bio-Tech./Comp. Sc./Eco./FD/Food Sc./IT/Med./N.Med.; B.Sc. (Hons. –Botany, Chemistry, Mathematics, Physics, Zoology); B. of Mult.; B. in Int. & Mob. Tech.; BBA; BCA;BJMC; B. Voc. (Software Development, Theatre and Stage Craft, Food Processing, Textile Design & Apparel Technology)**

**SEMESTER-II**

**PUNJAB HISTORY & CULTURE (C 321 BC TO 1000 A.D.)**

**(Special Paper in lieu of Punjabi compulsory)**

**(For those students who are not domicile of Punjab)**

**Teaching Hours (per week): 4**

**Total Credits: 4**

**Credits:LTP:400**

**Total Hours: 60**

**Maximum Marks: 100**

**(Theory Marks: 75+Internal Assessment: 25)**

**Pass Marks: 35%**

**Time: 3 Hours**

**Instructions for the Paper Setters:**

**Question paper should consist of two sections—Section A and Section B.** The paper setter must ensure that questions in Section–A do not cover more than one point, and questions in Section–B should cover at least 50 per cent of the theme.

**Section–A:** The examiner will set 15 objective type questions out of which the candidate shall attempt any 10 questions, each carrying 1½ marks. The total weightage of this section will be 15 marks. Answer to each question should be in approximately one to two sentences.

**Section–B:** The examiner will set 8 questions, two from each Unit. The candidate will attempt 4 questions selecting one from each Unit in about 1000 words. Each question will carry 15 marks. The total weightage of this section will be 60 marks.

**Note: The examiner is to set the question paper in two languages: English & Hindi.**

**Course Objectives:** The main objective of this course is to educate the students who are not domicile of the Punjab about the history and culture of the Ancient Punjab. It is to provide them knowledge about the social, economic, religious, cultural and political life of the people of the Punjab during the rule of various dynasties such as The Mauryans, The Khushans, The Guptas, The Vardhanas and other ancient ruling dynasties of the period under study.

**Unit-I**

1. The Punjab under Chandragupta Maurya and Ashoka.
2. The Kushans and their Contribution to the Punjab.

### **Unit-II**

3. The Punjab under the Gupta Emperors.
4. The Punjab under the Vardhana Emperors

### **Unit-III**

5. Political Developments 7th Century to 1000 A.D.
6. Socio-cultural History of Punjab from 7th Century to 1000 A.D.

### **Unit-IV**

7. Development of languages and Literature.
8. Development of art & Architecture.

### **Suggested Readings:-**

L. Joshi (ed.), *History and Culture of the Punjab*, Part-I, Patiala, 1989 (3rd edition).

L.M. Joshi and Fauja Singh (ed), *History of Punjab*, Vol.I, Patiala 1977.

Budha Parkash, *Glimpses of Ancient Punjab*, Patiala, 1983.

B.N. Sharma, *Life in Northern India*, Delhi. 1966.

### **Course Outcomes:**

#### **On completing the course, the students will be able to:**

- CO-1** Understand the history and culture of the Punjab in Ancient Period.
- CO-2** Analyse social, economic, religious, cultural and political life of Ancient Indian dynasties.
- CO-3** Study about the political developments from 7<sup>th</sup> century to 1000AD.
- CO-4** Understand socio-cultural history of the Punjab from 7<sup>th</sup> century to 1000 AD.
- CO-5** Analyse language, literature, art and architecture of Ancient Punjab.

**B.Sc. (HONS.) PHYSICS SEM-II**  
**BHP-123**  
**PHYSICS LAB-III**

**Teaching Hours (per week): 4**

**Total Credits: 2**

**Credits:LTP:002**

**Total Hours: 60**

**Maximum Marks: 50**

**(Theory Marks: 37+Internal Assessment: 13)**

**Pass Marks: 35%**

**Time: 3 Hours**

**General Guidelines for Practical Examination**

I. The distribution of marks is as follows:

- i) One experiment **15 Marks**
- ii) Brief Theory **5 Marks**
- iii) Viva–Voce **10Marks**
- iv) Record (Practical file) **7 Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session and will consist of 8 experiments out of which an examinee will mark 6 experiments and one of these is to be allotted by the external examiner.

III. Number of candidates in a group for practical examination should not exceed 12.

IV. In a single group no experiment be allotted to more than three examinee in any group.

**Course Objectives:** The purpose of the course is to understand the concept of resonance in series and parallel LCR circuits, study of induced e.m.f. as a function of velocity of a magnet, acceleration due to gravity by compound pendulum and by Kater's reversible pendulum. It includes measurement of logarithmic decrement, coefficient of damping, relaxation time and quality factor of a damped simple pendulum, laws of vibrating string by using Melde's apparatus and to show that  $\lambda/2$  is constant.

**LIST OF EXPERIMENTS**

1. To study the magnetic field produced by a current carrying solenoid using a search coil and calculate permeability of air.
2. To study the induced e.m.f. as a function of the velocity of the magnet.
3. To study the phase relationships using impedance triangle for LCR circuit and calculate impedance.
4. Resonance in a series and parallel LCR circuits for different R–value and calculate Q– value.
5. To measure the charge sensitivity of a moving coil Ballistic galvanometer using a known capacitor.
6. To measure the self-inductance L of a given coil by Anderson Bridge method.
7. To find the value of  $B_H$ , the horizontal component of ear using a deflection & vibration magnetometer.
8. To study the variation of magnetic field with distance along the axis of coil carrying current by plotting a graph.

**Books Prescribed**

1. Practical Physics Vol. I, T.S. Bhatia, Gursharan Kaur, Iqbal Singh, Vishal Publications.
2. Practical Physics, C.L. Arora, S. Chand & Co.

**Course Outcomes:**

<b>Sr. No.</b>	<b>On completing the course, the students will be able to:</b>
CO1	Understand the concept of resonance in series and parallel LCR circuits.
CO2	Study the induced e.m.f. as a function of velocity of a magnet.
CO3	Find out acceleration due to gravity by compound pendulum and by Kater's reversible pendulum.
CO4	Measure logarithmic decrement, coefficient of damping, relaxation time and quality factor of a damped simple pendulum.
CO5	Verify the laws of vibrating string by using Melde's apparatus and to show that $\lambda/2$ is constant.

**B.Sc. (HONS.) PHYSICS SEM-II**  
**BHP-124**  
**PHYSICS LAB-IV**

**Teaching Hours (per week): 4**

**Total Credits: 2**

**Credits:LTP:002**

**Total Hours: 60**

**Maximum Marks: 50**

**(Theory Marks: 37+Internal Assessment: 13)**

**Pass Marks: 35%**

**Time: 3 Hours**

**General Guidelines for Practical Examination**

I. The distribution of marks is as follows:

v)One experiment **15 Marks**

vi)Brief Theory **5 Marks**

vii)Viva–Voce **10Marks**

viii) Record (Practical file) **7 Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session and will consist of 8 experiments out of which an examinee will mark 6 experiments and one of these is to be allotted by the external examiner.

III. Number of candidates in a group for practical examination should not exceed 12.

IV. In a single group no experiment be allotted to more than three examinee in any group.

**Course Objectives:** The purpose of the course is to understand the concept of resonance in series and parallel LCR circuits, study of induced e.m.f. as a function of velocity of a magnet, acceleration due to gravity by compound pendulum and by Kater's reversible pendulum. It includes measurement of logarithmic decrement, coefficient of damping, relaxation time and quality factor of a damped simple pendulum, laws of vibrating string by using Melde's apparatus and to show that  $\lambda/2$  is constant.

**LIST OF EXPERIMENTS**

1. To plot a graph between the distance of the knife edge from the centre of gravity and the time period of a compound pendulum from graph find (a) acceleration due to gravity, (b) the radius of gyration and moment of inertia about an axis passing through centre of gravity.
2. To determine the acceleration due to gravity by Kater's reversible pendulum.
3. To verify the laws of vibrating string by using Melde's apparatus and to show that  $\lambda/2$  is constant.
4. To compare the mass of two vibrating strings by using Melde's apparatus.
5. To measure logarithmic decrement, coefficient of damping, relaxation time and quality factor of a damped simple pendulum.
6. Study of the electrical vibrator.
7. Study the formation of waves on the computer in excel spreadsheet.
8. Study the superposition of waves on the computer in excel spreadsheet.

**Books Prescribed**

3. Practical Physics Vol. I, T.S. Bhatia, Gursharan Kaur, Iqbal Singh, Vishal Publications.
4. Practical Physics, C.L. Arora, S. Chand & Co.

**Course Outcomes:**

Sr. No.	<b>On completing the course, the students will be able to:</b>
CO1	Understand the concept of resonance in series and parallel LCR circuits.
CO2	Study the induced e.m.f. as a function of velocity of a magnet.
CO3	Find out acceleration due to gravity by compound pendulum and by Kater's reversible pendulum.
CO4	Measure logarithmic decrement, coefficient of damping, relaxation time and quality factor of a damped simple pendulum.
CO5	Verify the laws of vibrating string by using Melde's apparatus and to show that $\lambda/2$ is constant.

**B.Sc. (HONS.) PHYSICS SEMESTER-II**

**CHP 122**

**Inorganic Chemistry Lab-II**

**Teaching Hours (per week): 2**

**Total Credits: 1**

**Credits:LTP:001**

**Total Hours: 30**

**Maximum Marks: 25**

**(Theory Marks: 19+Internal Assessment: 06)**

**Pass Marks: 35%**

**Time: 3 Hours**

**INSTRUCTIONS FOR PAPER SETTERS AND CANDIDATES:**

- I. Examiner will give one organic salt to the students.
- II. Each student will get different salt and analyse it for elements, functional group and prepare its derivatives.
- III. The question paper will be 19 marks with split as under:

(Write up = 6, Performance = 6, Viva-voce = 5, Practical note book = 2)

**COURSE OBJECTIVE:**

*Students learn to identify and separate different cations in the inorganic mixtures through different methods. Students will be able to perform special tests for anions.*

**COURSE CONTENTS:**

**Section-A**

Identification of cations and anions in a mixture which may contain combinations of acid ions.

**a) Special Tests for Mixture of Anions**

- (i) Carbonate in the presence of sulphate.
- (ii) Nitrate in the presence of nitrite
- (iii) Nitrate in the presence of bromide and iodide.
- (iv) Nitrate in the presence of chlorate.
- (v) Chloride in the presence of bromide and iodide.
- (vi) Chloride in the presence of iodide.
- (vii) Bromide and iodide in the presence of each other and of chloride.
- (viii) Phosphate, arsenate and arsenite in the presence of each other.
- (ix) Sulphide, sulphite, thiosulphate and sulphate in the presence of each other.

(x) Borate in the presence of copper and barium salts.

(xi) Oxalate in the presence of fluoride.

### Section-B

#### Identification of Cations in Mixtures

Identification of Group I, Group II (Group IIA and IIB), Group III,

Group IV, Group V and Group VI cations.

#### BOOKS PRESCRIBED:

Vogel's book on Inorganic Qualitative Analysis

#### COURSE OUTCOMES:

Sr. No.	On completing the course,
CO1	Students will be able to identify the anions present in the mixture.
CO2	Students will be able to identify the cations present in the mixture.
CO3	Gain hands-on practice of handling different Chemicals in the lab
CO4	Learn to prepare basic solution required to identify cations and anions in the mixture
CO5	learn about determination of boiling points of various compounds.



**B.Sc. (HONS.) PHYSICS SEMESTER-II**

**Course Code: ZDA121**

**Course Title-DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION**

**DRUG ABUSE: MANAGEMENT AND PREVENTION**

**(Compulsory for all Under Graduate Classes)**

**Teaching Hours (per week): 2**

**Total Hours: 30**

**Time: 3 Hours**

**Maximum Marks: 50**

**Instructions for the Paper Setters:**

- 1) There will be a total of 9 questions of which 5 are to be attempted.
- 2) Question 1 is compulsory and having 10 short answer type questions (1 mark each).
- 3) The remaining 8 questions (10 marks each) shall include 2 questions from each unit. Candidates shall be required to attempt 4 questions, one from each unit. Preferably, the question should not be split into more than two sub-parts.

**Course Objectives:**

The course aim is to

CO-1.	Describe the role of family in the prevention of drug abuse.
CO-2.	Describe the role of school and teachers in the prevention of drug abuse.
CO-3.	Emphasize the role of media and educational and awareness program.
CO-4.	Provide knowhow about various legislation and Acts against drug abuse.

**UNIT-I**

• **Prevention of Drug abuse**

Role of family: Parent child relationship, Family support, Supervision, Shaping values, Active Scrutiny.

**UNIT-II**

- School: Counseling, Teacher as role-model.
- Parent-teacher-Health Professional Coordination, Random testing on students.

**UNIT-III**

• **Controlling Drug Abuse**

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

**UNIT-IV**

- Legislation: NDPS act, Statutory warnings, Policing of Borders, Checking Supply/Smuggling of Drugs, Strict enforcement of laws, Time bound trials.

**References:**

1. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
2. Gandotra, R. and Randhawa, J.K. 2018. *voZrI d[otos'A (BPky'oh) gqpzXB ns o'eEkw.* Kasturi Lal & Sons, Educational Publishers, Amritsar- Jalandhar.
3. Inciardi, J.A. 1981. *The Drug Crime Connection.* Beverly Hills: Sage Publications.
4. Modi, Ishwar and Modi, Shalini (1997) *Drugs: Addiction and Prevention,* Jaipur: Rawat Publication.
5. Randhawa, J.K. and Randhawa, Samreet 2018. *Drug Abuse-Management and Prevention.* Kasturi Lal & Sons, Educational Publishers, Amritsar- Jalandhar.
6. Sain, Bhim 1991, *Drug Addiction Alcoholism, Smoking obscenity* New Delhi: Mittal Publications.
7. Sandhu, Ranvinder Singh, 2009, *Drug Addiction in Punjab: A Sociological Study.* Amritsar: Guru Nanak Dev University.
8. Singh, C. P. 2000. *Alcohol and Dependence among Industrial Workers:* Delhi: Shipra.
9. *World Drug Report 2011,* United Nations office of Drug and Crime.
10. *World Drug Report 2010,* United Nations office of Drug and Crime

**Course Outcomes:**

The students will be able to:

CO-1.	Understand the importance of family and its role in drug abuse prevention.
CO-2.	Understand the role of support system especially in schools and inter-relationships between students, parents and teachers.
CO-3.	Understand impact of media on substance abuse prevention.
CO-4.	Understand the role of awareness drives, campaigns etc. in drug abuse management.
CO-5	Learn about the Legislations and Acts governing drug trafficking and Abuse in India.