

FACULTY OF SCIENCES

SYLLABUS FOR
THE BATCH FROM THE YEAR 2023 TO YEAR 2026

Programme Code: *BSHC*

Programme Name: B.Sc. (Hons.) Chemistry

(Semester I-II)
Examinations: 2023-2026



Department of Chemistry
Khalsa College, Amritsar

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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.	This programme was designed for the students of students aspiring for the carrier in the field of chemistry.
2.	It is aimed to develop critical thinking of students so that they can carry out problem solving tasks more objectively.
3.	Programme is aimed to develop deep knowledge in the various branches of chemistry through various theory and practical courses and to analyse problems, formulate a hypothesis, evaluate and validate results, and draw reasonable conclusions.
4.	The practical work is designed attain the precision and accuracy in task provided to students, learn various practical techniques and their application in the research and industry.
5.	Ability to evaluate and identify logical flaws in the arguments of others; analyse and synthesise data from a variety of sources; draw valid conclusions and support them with evidences and examples, and addressing opposing viewpoints is the basic target of the programme.
6.	Create awareness to become an enlightened citizen with commitment to deliver one's responsibilities within the scope of bestowed rights and privileges.
7.	Ability to think, acquire knowledge and skills through logical reasoning and to inculcate the habit of self-learning throughout life, through self- paced and self- directed learning aimed at personal development, and adapting to changing academic demands of work place through knowledge/ skill development.

S.No.	PROGRAMME SPECIFIC OUTCOMES (PSOs)
1	To acquire knowledge and develop understanding of the basic concepts, scientific theories and principles of different fields of chemistry.
2	To apply the knowledge acquired to write IUPAC names of compounds, interpret data, analyze mathematical derivations and solve qualitative as well as quantitative chemistry problems.
3	To study different types of organic reactions and apply the knowledge to identify reactive intermediates as well as mechanisms of organic reaction..

4	To apply the knowledge of spectroscopic techniques for predicting the structure of the unknown compounds.
5	To synthesize, separate (purify), characterize and study the properties of organic or inorganic compounds and learn the application of chemical reagents used in organic or inorganic synthesis.
6	To learn various laboratory techniques and will be able to handle various instruments used in chemical analysis.
7	To learn the synthesis, chemical properties and applications of organic as well as inorganic compounds containing elements such as Si, P and S in everyday life.

Eligibility:- Candidates having passed 10+2 Examination (Medical and Non-Medical) from a recognized board.

COURSE SCHEME						
SEMESTER - I						
Course	Course Name	Hours	Credits	Total	Max Marks	Page No.

Code		/Week	L	T	P	Credits	Th	P	I A	Total	
BHC 111	Physical Chemistry-I	3	2	1	0	3	56		19	75	99-101
BHC 112	Inorganic Chemistry-I	3	2	1	0	3	56		19	75	102-104
BHC 113	Organic Chemistry-I	3	2	1	0	3	56		19	75	105-107
BHC 114	Organic Chemistry Lab-I	6	0	0	3	3		56	19	75	108-109
Minor Courses (If Any)											
MAC 111	Mathematics-I	4	3	1	0	4	75		25	100	110-111
PHX 111	Physics-I (Optics)	3	2	1	0	3	56		19	75	112-114
PHC 112	Physics Lab-I (Optics Lab)	2	0	0	1	1		19	06	25	115-116
Ability Enhancement Compulsory Courses											
BCEN-1123	Communicative English-I	4	3	1	0	4	75		25	100	117-119
BHPB-1101 /BPBI-1102	Punjabi Compulsory /Basic Punjabi	4	3	1	0	4	75		25	100	120/121- 122
Value Addition Courses											
ZDA-111	Drug Abuse-I	2	2	0	0	2	50			50 (Ex)	123-124
	TOTAL	34				30				700	

COURSE SCHEME											
SEMESTER - II											
Course Code	Course Name	Hours /Week	Credits			Total Credits	Max Marks				Page No.
			L	T	P		Th	P	I	Total	

									A		
BHC 121	Physical Chemistry-II	3	2	1	0	3	56		19	75	126-128
BHC 122	Inorganic Chemistry-II	3	2	1	0	3	56		19	75	129-130
BHC 123	Organic Chemistry-II	3	2	1	0	3	56		19	75	131-133
BHC 124	Inorganic Chemistry Lab-I	6	0	0	3	3		56	19	75	134-135
Minor Courses (If Any)											
MAC 121	Mathematics-II	4	3	1	0	4	75		25	100	136-137
PHX 121	Physics-II (Modern Physics)	3	2	1	0	3	56		19	75	138-139
PHC 122	Physics Lab-II	2	0	0	1	1		19	06	25	140-141
Ability Enhancement Compulsory Courses											
BCEN 1223	Communicative English-II	4	3	1	0	4	75		25	100	142-143
BHPB 1201 /BPBI 1202	Punjabi Compulsory /Basic Punjabi	4	3	1	0	4	75		25	100	144/145 -146
Value Addition Courses											
ZDA-121	Drug Abuse-II	2	2	0	0	2	50			50 (Ex)	147-148
	TOTAL	34				30				700	

YEAR

2023-24

Semester-I

B.Sc. (Hons) Chemistry Semester-I

BHC-111

Physical Chemistry-I

Total Hours: 45

Total Hours/week: 3

Total Credits: 3

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2 1 0

Maximum Marks: 75

Theory: 56

Internal Assessment: 19

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 EIGHT questions and students are required to attempt any SIX short questions carrying 2 marks each. The answer should not exceed 50 words.
- 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 aim of this course is to provide detailed knowledge to students on the most essential fields of chemistry like Gases, Liquids and their properties, Thermodynamics and its applications from chemical view point, interpreting thermochemical data, Carnot's Cycle and its utility alongwith the significance of Free Energy.

COURSE CONTENTS:

UNIT- I

1. Equation of State: (11Hrs.)

Kinetic molecular theory of gases, derivation of kinetic gas equation, deduction of gas laws from kinetic gas equation, imperfection in real gases, the compressibility of real gases, isotherms of real gases, equations of state, vander Waal's equation, effect of attractive forces, Liquification of gases, critical phenomenon, P-V isotherms of carbon dioxide, principle of continuity of state, vander Waal's equation and critical constants, principle of corresponding states.

Root mean square, average and most probable velocities, Qualitative discussion of the Maxwell's distribution of molecular velocities, Collision number, mean free path and collision diameter.

UNIT-II

2. Properties of Liquids: (11Hrs.)

The Kinetic molecular description, Intermolecular forces in liquids, Density and methods for its measurements, Vapour pressure and its determination, surface tension and determination of surface tension using capillary rise method and drop formation method, viscosity and

measurement of viscosity – Ostwald method, refractivity, molar refractivity, parachor and its measurement, Optical activity and its measurement using polarimeter. Structural differences between solids, liquids and gases. Liquid crystals, Difference between liquid crystal, solid and liquid. Classification, structure of nematic and cholestric phases. Thermography.

UNIT- III

3. The First Law of Thermodynamics: (8 Hrs.)
Thermodynamic terms and basic concepts, Intensive and extensive properties, State functions and differentials, thermodynamic processes, reversibility, irreversibility, Nature of heat and work, Conservation of energy, Zeroth law of thermodynamics, various statements of first law, internal energy (U) and enthalpy (H). Reversible isothermal expansion of ideal and real gases, Molar heat capacity at constant pressure C_p and at constant volume C_v , relation between C_p and C_v , Reversible adiabatic expansion of ideal and real gases, The T-V, P-V and P-T relationships, Joule Thomson effect.

4. Thermochemistry : (4 Hrs.)
The reaction enthalpy, standard enthalpies, Hess's law and reaction enthalpies, Kirchoff's equation. Relation between H and U for reactions, calorimetric measurements, varieties of enthalpy changes. Bond energy and bond dissociation energy.

UNIT-IV

5. The Second Law of Thermodynamics: (11 Hrs.)
Spontaneous change, Carnot Cycle, conclusions from Carnot cycle, efficiency of heat engines, second law of thermodynamics, entropy, entropy as a state function, Clausius inequality, entropy as criterion of spontaneity, natural processes, different types of entropy changes under isothermal and non-isothermal conditions, entropy change in irreversible processes.

Helmholtz function (A), Gibbs function (G), standard molar free energy changes, Maxwell relations, dependence of free energy functions on temperature and pressure, total differential equations. Gibbs Helmholtz equations, thermodynamic criteria for spontaneity. Heat capacity at low temperature, Nernst heat theorem, third law of thermodynamics and its application

BOOKS PRESCRIBED:

ESSENTIAL:

1. Physical Chemistry by P.W. Atkins, 8th Ed., Oxford University Press, 2006 (Indian Print).
2. Physical Chemistry by T. Engel & P. Reid, 1st ed., Pearson Education, 2006.

FURTHER READING:

1. Physical Chemistry by Castellan, 3rd Ed., Addison Wesley/Narosa, 1985 (Indian Print)
2. Physical Chemistry by G. M. Barrow, 6th Ed., New York, McGraw Hill, 1996.
3. Physical Chemistry by R. J. Silbey, R. A. Albert & Mounji G. Bawendi, 4th Ed., New York: John Wiley, 2005.

COURSE OUTCOMES:

S. No.	On completing the course, the student will be able to
CO1	Visualize the properties of gases, their behavior under different circumstances, Liquification of gases and critical phenomenon. Related laws, velocities, Maxwell distribution and collision properties of gases.
CO2	Understand molecular forces in liquids, surface tension, refraction and its correlation with molecular structure. Liquid crystal, their types and uses
CO3	Enhance the knowledge of thermodynamics through its Zeroth and First Law. Understanding the thermodynamics parameters like U, H, Cp, Cv and along with T-V, T-P and P-T relations for adiabatic processes
CO4	Enhance the evaluating skills through interpreting of thermochemical data in terms of U, H and bond energies
CO5	Know the next stage of thermodynamics through the second and third law. Carnot cycle and its use for deriving the concept of entropy. Understanding the Gibb's and Helmholtz free energies

B.Sc. (Hons) Chemistry Semester-I
BHC 112
Inorganic Chemistry-I

Total Hours: 45

Total Hours/week: 3

Total Credits: 3

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Maximum Marks: 75

Theory: 56

Internal Assessment: 19

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 EIGHT questions and students are required to attempt any SIX short questions carrying 2 marks each. The answer should not exceed 50 words.
- 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 course is intended to provide the students an in-depth understanding of the basic concepts of Inorganic chemistry including chemical bonding, Valence bond theory and Molecular orbital theory. The course imparts knowledge about the atomic structure, arrangement of elements in the periodic table and the periodic properties.

COURSE CONTENTS:

UNIT- I

1. Atomic Structure: (6 Hrs)

Schrodinger's Wave equation, Significance of Ψ and Ψ^2 , The four quantum numbers and their significance, Radial and angular probability, The shapes of s, p, d and f orbitals, Recall of relative energies of atomic orbitals as a function of atomic number, effective nuclear charge and shielding effect, Slater rules, Calculation of screening constant, Recapitulation of fundamental properties of atoms such as atomic volume, the sizes of atoms, ionization energy, electron affinity and their periodic trends, Factors effecting periodic properties.

2. Chemical Bonding-I (5 Hrs)

Electronegativity and Polarity of bond: Electronegativity, different scales and methods of determination, Recent advances in electronegativity theory, variation of electronegativity, Group electronegativity, Polarities of bonds and molecules, Dipole moments, Percentage of ionic character from dipole moment and electronegativity difference.

UNIT-II

3. Chemical Bonding-I I (Valence Bond theory and Molecular Orbital Theory) (11 Hrs)

Valence bond (VB) approach, Resonance structures, Bond angles and shapes of molecules and ions (containing bond pairs and lone pairs), Criterion of bond strength and bond length, Molecular orbitals (MO) approach of bonding (LCAO Method), Symmetry and overlap, symmetry of molecular orbitals, Bonding in Homonuclear molecules (H_2 to Ne_2) and NO , CO , CN^+ , CO^+ , CN^- , HF , HCl , BeH_2 , CO_2 , Comparison of VB and MO theories.

UNIT- III

4. The Periodic Table and Chemical Periodicity (12 Hrs)

The relationship between chemical periodicity and electronic structure of the atom, The long form of the periodic Table – Classification of elements in s, p, d and f-block of elements, Periodicity in oxidation state of valence, metallic/non-metallic character, oxidizing or reducing behavior, acidic and basic character of oxides, trends in bond type with position of element and with oxidation state for a given element, trends in the stability of compounds and regularities in methods used for extraction of elements from their compounds, Trends in the stability of coordination complexes; Anomalous behavior of elements of 2nd short period (Li to F) compared to other members in the same groups of s & p block elements; The diagonal behavior between elements, the inert pair effect, variability of oxidation states of transition elements, color, magnetic properties and other characteristics of transition elements.

UNIT- IV

5. Hydrogen (4 Hrs)

Its unique position in the periodic table, isotopes, ortho and para hydrogen, Industrial production, Hydrides and their chemistry; Heavy water, Hydrogen bonding, Hydrates.

6. Acids-bases: (7 Hrs)

Various definitions of acids and bases, A generalized acid-base concept, Measurement of acid-base strength, Lewis interactions in non-polar solvents, Systematics of Lewis acid-base interactions, Bond energies, steric effects, solvation effects and acid-base anomalies, Classification of acids and bases as hard and soft, Pearson's HSAB concept, acid-base strength and hardness and softness, Symbiosis, theoretical basis of hardness and softness, electronegativity and hardness and softness.

BOOKS PRESCRIBED:

ESSENTIAL:

1. Cotton F.A., Wilkinson G.W. and Gaus P.L., Basic Inorganic Chemistry, Pubs: John Wiley & Sons, 1987.
2. Lee J.D., Concise Inorganic Chemistry, 4th edition, Pubs: ELBS, 1991.
3. Huheey J.E., Keiter E.A., Keiter R.L., Inorganic Chemistry : Principles of Structures and Reactivity; 4th Edition, Pubs: Harper Collins, 1993.
4. Greenwood N.N. and Earnshaw A., Chemistry of the Elements, 2nd edition., Pubs: Butterworth/Heinemann, 1997.

FURTHER READING:

1. Cotton F.A. and Wilkinson G., Murillo C.A., Bochmann M., Advanced Inorg.

- Chemistry, 6th Edition, Pubs: John Wiley & Sons. Inc., 1999.
2. Shriver D.F., Atkins F.W. and Langford C.M., Inorganic Chemistry; 3rd Edition, Pubs: Oxford University Press, 1999.
 3. Douglas B., Daniel D. Mc and Alexander J., Concepts of Models of Inorganic Chemistry, Pubs: John Wiley, 1987.
 4. Gray H.B., Electrons and Chemical Bonding, Pubs: W.A., J Benjamin Inc., 1965.

COURSE OUTCOMES:

S. No.	On completing the course, the student will be able to
CO1	Understand quantum mechanical model of atom, quantum numbers, electronic configuration, radial and angular distribution curves, shapes of s, p, and d orbitals, and periodicity in atomic radii, ionic radii, ionization energy and electron affinity of elements.
CO2	Acquire knowledge on the bonding theories (VBT, MOT & Band theory) used to explain various types of bonds (ionic, covalent and metallic). Deduce the shape (geometry) of molecules using VSEPR theory. MO diagrams for a few homo- & hetero-nuclear diatomic molecules and to calculate the bond order
CO3	Understand the concept of periodicity, trends regarding stability of TMC, Diagonal relationship, inert pair effect and properties of Transition metal complexes
CO4	Understand position and properties of hydrogen
CO5	Gain the knowledge regarding classification of acids and bases according to different concepts. HSAB Concept and relationship of hardness and softness with electronegativity

B.Sc. (Hons) Chemistry Semester-I
BHC 113 : Organic Chemistry-I

Total Hours: 45

Total Hours/week: 3

Total Credits: 3

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Maximum Marks: 75

Theory: 56

Internal Assessment: 19

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 EIGHT questions and students are required to attempt any SIX short questions carrying 2 marks each. The answer should not exceed 50 words.
- 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 this course is to introduce students to the foundations of organic chemistry by focusing on the structures, properties and chemical reactivity of the various hybridization states carbon atoms can adopt in alkanes (including cycloalkanes), alkenes and alkynes. This course will also cover different aspects of aromaticity.

COURSE CONTENTS:

UNIT-I

1. Structure and Bonding (4 Hrs)
Hybridization, bond lengths and bond angles, bond energy, localized and delocalized chemical bonds, vander Waals interactions, inclusion compounds, clathrates, charge transfer complexes, resonance, hyperconjugation, aromaticity, inductive, field effects and hydrogen bonding.
2. Mechanism of Organic Reactions (7 Hrs)
Curved arrow notation, drawing electron movements with arrows, half-headed and double-headed arrows, homolytic and heterolytic bond breaking. Types of reagents – electrophiles and nucleophiles. Types of organic reactions. Energy considerations.
Reactive intermediates – carbocations, carbanions, free radicals, carbenes, arynes and nitrenes (with examples). Assigning formal charges on intermediates and other ionic species.
Methods of determination of reaction mechanism (product analysis, intermediates, isotope effects, kinetic and stereochemical studies).

UNIT-II

3. Stereochemistry of Organic Compounds (11 Hrs)
Concept of isomerism. Types of isomerism.

Optical isomerism – elements of symmetry, molecular chirality, enantiomers, stereogenic center, optical activity, properties of enantiomers, chiral and achiral molecules with two stereogenic centers, diastereomers, threo and erythrodiastereomers, meso compounds, resolution of enantiomers, inversion, retention and racemization.

Relative and absolute configuration, sequence rules, D & L and R & S systems of nomenclature.

Geometric isomerism – determination of configuration of geometric isomers. E & Z system of nomenclature, geometric isomerism in oximes and alicyclic compounds.

Conformational isomerism – conformational analysis of ethane and n-butane; conformational analysis of cyclohexane, axial and equatorial bonds, conformation of mono substituted cyclohexane derivative. Newman projection and Sawhorse formulae, Fischer and flying wedge formulae. Difference between configuration and conformation.

UNIT-III

4. Alkanes and Cycloalkanes (6 Hrs)

IUPAC nomenclature of branched and unbranched alkanes, the alkyl group, classification of carbon atoms in alkanes. Isomerism in alkanes, sources and methods of formation (with special reference to Wurtz reaction, Kolbe reaction, Corey-House reaction and decarboxylation of carboxylic acids). Physical properties and chemical reactions of alkanes.

Mechanism of free radical halogenation of alkanes : orientation, reactivity and selectivity.

Cycloalkanes – nomenclature, methods of formation, chemical reactions, Baeyer's strain theory and its limitations. Ring strain in small rings (cyclopropane and cyclobutane), theory of strainless rings. The case of cyclopropanering ; banana bonds.

5. Alkenes, Cycloalkenes (5 Hrs)

Nomenclature of alkenes, methods of formation, mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides, regioselectivity in alcohol dehydration. The Saytzeff rule, Hofmann elimination, physical properties and relative stabilities of alkenes.

Chemical reactions of alkenes – mechanisms involved in hydrogenation, electrophilic and free radical additions, Markownikoff's rule, hydroboration-oxidation, oxymercuration-reduction. Epoxidation, ozonolysis, hydration, hydroxylation and oxidation with KMnO_4 Polymerization of alkenes. Substitution at the allylic and vinylic positions of alkenes. Industrial applications of ethylene and propene.

Methods of formation, conformation and Chemical reactions of cycloalkenes.

UNIT-IV

6. Dienes and Alkynes (6 Hrs)

Nomenclature and classification of dienes : isolated, conjugated and cumulated dienes. Structure of allenes and butadiene, methods of formation, polymerization. Chemical reactions – 1, 2 and 1,4 addition, Diels-Alder reaction.

Nomenclature, structure and bonding in alkynes. Methods of formation. Chemical reactions of alkynes, acidity of alkynes. Mechanism of electrophilic and nucleophilic addition reactions, hydroboration-oxidation, metal-ammonia reductions, oxidation and polymerization.

7. Arenes and Aromaticity (5 Hrs)

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 rule, aromatic ions, Aromatic electrophilic substitution -general pattern

of 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 derivations. Birch reduction. Methods of formation and chemical reactions of alkylbenzenes, alkynylbenzenes and biphenyls.

BOOKS PRESCRIBED:

ESSENTIAL :

1. Morrison R.T. and Boyd P.S., Organic Chemistry, 7thEdn., Pubs: Allyn and Bacon Inc., Boston, 2006
2. Mukerji S. M., Singh S. P. and Kapoor R. P., Organic Chemistry Second Edition Vol. I/II, Pubs: Wiley Eastern Ltd., New Delhi, 2010

FURTHER READING :

1. Wade L.G.Jr., Organic Chemistry, Pubs:Prentice-Hall,1990.
2. Solomons G., Fundamentals of Organic Chemistry, Pubs: John Wiley,2002.
3. Carey F.A., Organic Chemistry, Pubs: McGraw-Hill, Inc, 2003.
4. Streitwieser A., Jr. and Heathcock C.H., Introduction to Organic Chemistry, 3rdEdn., Pubs: MacMillan Pub. Co., N.Y,1992.

COURSE OUTCOMES:

S. No.	On completing the course, the student will be able to
CO1	Evaluate the hybridization and nature of bonding.
CO2	Write the IUPAC naming of alkanes, alkenes, dienes, alkynes and arenes.
CO3	Solve and infer the final products when alkanes, alkenes and alkynes undergo halogenation, hydrogenation, hydration and halohydrogenation reactions.
CO4	Draw electron movements with arrows and analyze the reactive intermediates involved in reaction.
CO5	Analyze the type of isomerisms and can draw conformations or configurations of organic compounds.
CO6	Understand the Mechanism of electrophilic addition, aromatic electrophilic substitution and nucleophilic addition reactions.

B.Sc. (Hons) Chemistry Semester-I
BHC 114: Organic Chemistry Lab-I

Total Hours: 90

Total Hours/week: 6

Total Credits: 3

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Maximum Marks: 75

Practical: 56

Internal Assessment: 19

INSTRUCTIONS FOR PAPER SETTERS AND CANDIDATES:

- I. Examiner will set two questions
- II. Students will be asked to complete write up of both practical within first 20 minutes on the first sheet provided.
- III. On the second sheet provided after 20 minutes, students will perform and note the record on second sheet during the conduct of practical exam
- IV. The split of marks will be as under:
(Exp-1 = 20, Exp-2 = 20, Viva-voce = 12, Practical note book = 6
)

COURSE OBJECTIVES:

The main aim of the course is to develop the practical skills in students on the organic chemistry techniques like M. Pt., B. Pt. Distillation, Crystallization, Decolorisation, Sublimation, Extraction and Steam distillation

COURSE CONTENTS:

- 1. Calibration of Thermometer**
80-82°C (Naphthalene), 113-114°C (acetanilide). 132-133 °C (Urea), 100°C (distilled Water)
- 2. Determination of melting point**
Naphthalene 80-82°C, Benzoic acid 121.5-122°C Urea, 132.5-133°C, Succinic acid 184-185 °C, Cinnamic acid 133°C, Salicylic acid 157-5-158°C, Acetanilide 113-5-114°C, m-Dinitrobenzene 90°C, p-Dichlorobenzene 52°C, Aspirin 135°C.
- 3. Determination of boiling points**
Ethanol 78°C, Cyclohexane 81.4°C, Toluene 110.6°C, Benzene 80°C.
- 4. Mixed melting point determination**
Urea-Cinnamic acid mixture of various compositions (1:4,1:1,4:1)
- 5. Distillation**
Simple distillation of ethanol-water mixture using water condenser

Distillation of nitrobenzene and Aniline using air condenser.

6. Crystallization

Concept of induction of crystallization

Phthalic acid from hot water (using fluted filter paper and stemless funnel)

Acetanilide from boiling water

Naphthalene from ethanol

Benzoic acid from water.

7. Decolorisation and crystallization using charcoal

Decolorisation of brown sugar (sucrose) with animal charcoal using gravity filtration.

Crystallization and decolorisation of impure naphthalene (100g of naphthalene mixed with 0.3g of Congo Red using 1g decolorising carbon) from ethanol.

8. Sublimation (Simple and Vacuum)

Camphor, Naphthalene, Phthalic acid and Succinic acid.

9. Extraction: The separatory funnel, drying agent:

Isolation of caffeine from tea leaves

10. Steam distillation

Purification of aniline/nitrobenzene by steam distillation.

BOOKS PRESCRIBED:

1. Vogel A. I., Tatchell A.R., Furnis B.S., Hannaford A.J., Smith P.W.G., Vogel's Text Book of Practical Organic Chemistry, 5th Edn., Pubs: ELBS, 1989.

2. Pavia D.L., Lampanana G.M., Kriz G.S. Jr., Introduction to Organic Laboratory Techniques, 3rd Edn., Pubs: Thomson Brooks/Cole, 2005.

3. Mann F.G., Saunders. P.C., Practical Organic Chemistry, Pubs: Green & Co. Ltd., London, 1978.

4. Svehla, G., Vogel's Qualitative Inorganic Analysis (revised); 7th edition, Pubs: Orient Longman, 1996.

5. Basset, J., Denney, R.C., Jeffery, G.H., Mendham, J., Vogel's Textbook of Quantitative Inorganic Analysis (revised); 4th edition, Pubs: Orient Longman, 1978.

COURSE OUTCOMES:

S. No.	On completing the course, the student will be able to
CO1	Learn to do calibration of thermometers.
CO2	Have developed skill in the method of determination of melting as well as boiling point
CO3	Skilfully handle the techniques such as distillation, crystallization, sublimation, extraction, and steam distillation for purification of compounds and use these techniques in the purification and purity determination of the organic compounds.

B.Sc. (Hons) Chemistry Semester-I
MAC 111
Mathematics-I

Total Hours: 60

Total Hours/week: 4

Total Credits: 4

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Maximum Marks: 100

Theory: 75

Internal Assessment: 25

INSTRUCTIONS FOR PAPER SETTERS AND CANDIDATES:

1. The question paper will consist of five 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. Section-A will consist of eight short answer type questions, each of 2.5 marks. Students are to attempt any six.
3. Sections-B, C, D & E will consist of two questions each (**each question should be sub divided into at most 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

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.

BOOKS PRESCRIBED:

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.

COURSE OUTCOMES:

Sr. No.	On completing the course, the students will be able to:
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.) Chemistry Semester-I
PHX-111
Physics-I (Optics)

Total Hours: 45

Total Hours/week: 3

Total Credits: 3

L T P

2 1 0

Maximum Marks: 75

Theory: 56

Internal Assessment: 19

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 EIGHT questions and students are required to attempt any SIX short questions carrying 2 marks each. The answer should not exceed 50 words.
- 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:

To gain theoretical knowledge and an in depth understanding of properties of light like reflection, refraction, interference, diffraction and polarization and their subsequent applications in the design and working of different optical instruments used in various fields of science.

COURSE CONTENTS:

UNIT-I

1. Light

15 Hrs

Sources of light, Properties of light, Reflection, Refraction, Refractive index, Optical path, dispersion. Dual nature of Light, concept of photons and waves. Travelling waves, characteristics of wave, mathematical representation of waves, Complex representation of waves. Electromagnetic nature of light. Light from a source. Real light waves. Concept of Coherence, spatial and temporal coherence, coherent sources of light. Superposition of light waves and interference.

UNIT-II

2. Interference by Division of wave front

15 Hrs

Interference pattern by division of wave front, Young's double slit experiment, Distribution of intensity in young's double slit experiment, Conditions for sustained interference pattern, Fresnel Biprism, Fresnel's double mirror, Llyod's single mirror, Displacement of fringes.

UNIT-III

3. Interference by Division of Amplitude

15 Hrs

Change of phase on reflection, **Stokes treatment**. Interference in thin films due to reflected and transmitted light, Need for extended source for interference by division of amplitude, Fringes of equal inclination and equal thickness, non reflecting films, Newton's Rings, Michelson Interferometer, Fabry Perot interferometer, Distribution of intensity in Fabry Perot fringes.

UNIT-IV

4. Diffraction and Polarisation

15 Hrs

Huygen'sfresnel theory, half-period zones, Zone plate, Distinction between fresnel and fraunhoffer diffraction. Fraunhoffer diffraction at single slit, Effect of diffraction in optical imaging, Resolving power of telescope and diffraction grating. Polarization of light, plane, circularly and elliptically polarized light,wire grid polarizer, Sheet polarizer, Malus Law, Double refraction, Retardation plates, Production of polarized light.

Reference Books:

1. A Text Book of Optics: N. Subramanayam, B. Lal and M. N. Avadhanulu.
2. Optics: AjoyGhatak. Tata McGraw Hill Publishing Company Limited.
3. Fundamentals of Optics: Jenkins and White.
4. A Text Book of Optics: T. S. Bhatia, V. K. Sharma, S. Vikas& Company

BOOKS PRESCRIBED:

1. Fundamentals of Optics, F.A. Jenkins and Harvey E White,(Mcgraw Hill) 4th edition,
2. Optics; V.K. Sharma and T.S. Bhatia, S.Vikas and Co.
3. Optics, AjoyGhatak,(McMillan Indian) 2nd edition, 7th reprint, 1997
4. Introduction to Atomic Spectra, H.E. White (Mcgraw Hill, Book Co., Inc., New York)
5. Laser Fundamentals, W.T. Silfvast (Foundation Books), New Delhi, 1996
6. Laser and Non-Linear Optics, B.B. Laud (New Age Pub.) 2002
7. Optics, Born and Wolf, (Pergamon Press) 3rd edition, 1965
8. Laser, Svelto, (Plenum Pres) 3rd edition, New York

COURSE OUTCOMES:

S. No.	On completing the course, the students will be able to:
CO1	Gain knowledge about wave theory of light.

CO2	Acquire an in depth understanding of properties of light like reflection, refraction, interference, diffraction and polarization
CO3	Understand the applications of interference in design and working of interferometers.
CO4	Comprehend the concept of Polarization through thorough understanding of Electromagnetic waves and their transverse nature.
CO5	Understand the applications of diffraction and polarization in various optical instruments.

B.Sc. (Hons) Chemistry Semester-I

PHC-112

Physics Lab-I

Optics Lab

Total Hours/week: 2

Total Credits: 1

L T P

0 0 1

Maximum Marks: 25

Practical: 19

Internal Assessment: 06

GENERAL GUIDELINES FOR PRACTICAL EXAMINATION:

I. The distribution of marks is as follows: **Max. Marks: 19+06 (Internal Assessment)**

i) One experiment **8 Marks**

ii) Brief Theory **4 Marks**

iii) Viva–Voce **4 Marks**

iv) Record (Practical file) **3 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: To acquaint and make the students understand the working principles of different optical instruments and relate them to the theoretical concepts of Interference, diffraction and polarization. Gain precision in handling of optical instruments and in making accurate physical measurements using experimental uncertainty and limits.

COURSE CONTENTS:

1. To find the angle of prism by rotating telescope.
2. To find the refractive index of the glass prism using a spectrometer.
3. To find the refractive index of a transparent liquid using a hollow glass prism and spectrometer for given wavelength.
4. To study the variation of refractive index with wavelength of spectral line of mercury source and hence find the values of Cauchy's constant.
5. To measure the wavelength of sodium light by using Newton's rings apparatus.
6. To determine the wavelength of spectral line of mercury using diffraction grating.
7. To determine the wavelength of sodium light using plane diffraction grating.
8. To determine the resolving power of plane diffraction grating.
9. To measure an accessible distance between two points using a sextant.
10. To measure an inaccessible distance between two points using a sextant.
11. To determine the wavelength of He-Ne laser using plane diffraction grating.
12. To find the specific rotation of sugar solution by Laurentz half shade polarimeter.

BOOKS PRESCRIBED :

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

Sr. No.	On completing the course, the students will be able to:
CO1	Understand the working of basic optical instruments.
CO2	Understand and differentiate between the different phenomenon related to light such as Interference, diffraction and polarization.
CO3	Gain precision in handling of optical instruments.
CO4	Understand the operating principle of certain optical instruments
CO5	Understand the applications of Interference, diffraction and polarization.

B.Sc. (Hons) Chemistry Semester-I

COMMUNICATIVE ENGLISH -I

**B.Sc.(Hons.) Physics, Chemistry, Botany, Zoology, Maths and Computational Statistics and
Data Analytics
Code: BCEN-1123**

L	T	P	Credits
3	0	1	4

Time: 3 Hours

Max. Marks: 100

Theory: 60

Practical: 15

Internal Assessment: 25

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= 12 marks)

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 3rd 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)

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Intelligence and Data Science, Bachelor of Vocational (B.Voc.) (Software Development,
Theatre and Stage Craft, Food Processing, Textile Design & Apparel Technology, Renewable
Energy Technology)**

**Semester-I
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	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"> ▪ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕਰਨਾ। ▪ ਆਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਵਿਕਸਤ ਕਰਨਾ। ▪ ਮਾਤਭਾਸ਼ਾ ਦੀ ਸਮਝ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ। 	<ul style="list-style-type: none"> ▪ ਉਸ ਵਿਚ ਸਾਹਿਤ ਰੁਚੀਆਂ ਵਿਕਸਤ ਹੋਣਗੀਆਂ। ▪ ਉਸ ਵਿਚ ਸਾਹਿਤ ਸਿਰਜਣਾ ਦੀ ਸੰਭਾਵਨਾ ਵਧੇਗੀ। ▪ ਉਸ ਵਿਚ ਕਿਸੇ ਵੀ ਵਿਸ਼ੇ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਕਰਨ ਦਾ ਬੋਧ ਹੋਵੇਗਾ। ▪ ਉਹ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਨਿਕਾਸ ਤੇ ਵਿਕਾਸ ਬਾਰੇ ਗਿਆਨ ਹਾਸਲ ਕਰਨਗੇ

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 ਲੇਖਨੁਮਾ 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 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) ਪੈਰਾਰਚਨਾ (ਤਿੰਨਾਂ ਵਿਚੋਂ ਇਕ)

(ਅ) ਪੈਰੁਪੜ੍ਹਕੇ 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।

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Energy Techology)**

**Semester-I
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	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

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

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, ਅੱਖਰਕ੍ਰਮ, ਸਵਰਵਾਹਕ (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, ਮੁਹਾਰਤ, ਲਗਾਂ-ਮਾਤਰਾਂ ਦੀ ਪਛਾਣ

ਭਾਗ-ਤੀਜਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਜੋੜ:ਮੁਕਤਾ (ਦੋ ਅੱਖਰਾਂਵਾਲੇਸ਼ਬਦ, ਤਿੰਨਅੱਖਰਾਂਵਾਲੇਸ਼ਬਦ), ਸਿਹਾਰੀਵਾਲੇਸ਼ਬਦ, ਬਿਹਾਰੀਵਾਲੇਸ਼ਬਦ, ਔਕੜਵਾਲੇਸ਼ਬਦ, ਦੁਲੈਂਕੜਵਾਲੇਸ਼ਬਦ, ਲਾਂਵਾਲੇਸ਼ਬਦ, ਦੁਲਾਵਾਂਵਾਲੇਸ਼ਬਦ, ਹੋੜੇਵਾਲੇਸ਼ਬਦ, ਕਨੌੜੇਵਾਲੇਸ਼ਬਦ, ਲਗਾਖਰ (ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ) ਵਾਲੇਸ਼ਬਦ

ਭਾਗ-ਚੌਥਾ

ਸ਼ੁੱਧ-ਅਸ਼ੁੱਧਸ਼ਬਦ

Course Code: ZDA111
Course Title-Drug Abuse: Problem, Management and Prevention
PROBLEM OF DRUG ABUSE
(Compulsory for all Under Graduate Classes)

Credit hrs./wk.:2

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Max. Marks: 50

Time: 3 Hours

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 –

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 beat 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, “Drug Abuse-Problem, Management & Prevention”, 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, “Drug Abuse-Problem, Management & Prevention”, 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:

On completing the course, the student will be able to

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

B.Sc. (Hons)
Chemistry

Semester-II

B.Sc. (Hons) Chemistry Semester-II

BHC-121

Physical Chemistry-II

Total Hours/week: 3

Total Credits: 3

L T P

2 1 0

Maximum Marks: 75

Theory: 56

Internal Assessment: 19

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 EIGHT questions and students are required to attempt any SIX short questions carrying 2 marks each. The answer should not exceed 50 words.
- 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 aim of this course is to provide detailed knowledge to students on the basic topics of chemistry like Chemical Equilibrium, Phase equilibria and its utility at industrial level, Solid state and XRD for the crystal structure determination, Colloids and their application in the field of Pharmaceutical, cosmetics and other industries, Electrochemistry and its application in the purification of metals, corrosion prevention and electroplating.

COURSE CONTENTS:

UNIT-I

1. Chemical Equilibrium (6 Hrs)
Equilibrium constant and free energy, Thermodynamic derivation of law of mass action. Determination of K_p , K_c , K_a and their relationship, Clausius-Clapeyron equation, applications.
2. Introduction to Phase Equilibrium (9 Hrs)
Statement and meaning of the terms-phase, component and degree of freedom, derivation of Gibbs phase rule, phase equilibria of one component system-water, CO_2 and S systems, Phase equilibria of two component systems-solid-liquid equilibria, simple eutectic; Bi-Cd, Pb-Ag systems, desilverisation of lead, Solid solutions-compound formation with congruent melting point (Mg-Zn) and incongruent melting point, ($\text{NaCl-H}_2\text{O}$), ($\text{FeCl}_3\text{-H}_2\text{O}$) and ($\text{CuSO}_4\text{-H}_2\text{O}$) system, Freezing mixtures: acetone-dry ice, Liquid-liquid mixtures: Ideal liquid mixtures, Raoult's and Henry's law, Non-ideal system: azeotropes-HCl- H_2O and ethanol-water system. Partially miscible liquids Phenol-water, trines-thylamin-water, Nicotine-water System. Lower and upper consolute temperature.

UNIT-II

3. Solid State: (15 Hrs)

Definition of space lattice, unit cell.

Laws of crystallography - (i) Law of constancy of interfacial angles (ii) Law of rationality of indices (iii) Law of symmetry. Symmetry elements in crystals X-ray diffraction by crystals. Derivation of Bragg equation, Determination of crystal structure of NaCl, KCl and CsCl (Laue's method and powder method). Defects in Solids-Point defects, Line defects, screw defects Properties of Solids- Electrical, magnetic and dielectric properties.

UNIT-III

4. Colloidal State: (8Hrs)

Definition of colloids, classification of colloids.

Solids in liquids (sols): properties - kinetic, optical and electrical; stability of colloids, protective action, Hardy-Schulze law, Gold Number.

Liquids in liquids (emulsions): types of emulsions, preparation, Emulsifier.

Liquids in solids (gels): classification, preparation and properties, inhibition, general applications of colloids.

5. Physical Properties and Molecular Structure: (7Hrs)

Optical activity, polarization - (Clausius - Mossotti equation), orientation of dipoles in anelectricfield, dipole moment, induced dipole moment, measurement of dipole moment temperature method, dipole moment and structure of molecules

UNIT-IV

6. Electrochemistry-I (15 Hrs)

Electrical transport-conduction in metals and in electrolyte solutions, specific conductance and equivalent conductance, measurement of equivalent conductance, variation of equivalent and specific conductance with dilution, Migration of ions and Kohlrausch law, Arrhenius theory of electrolyte dissociation and its limitations, weak and strong electrolytes, Ostwald's dilution law, its uses and limitations. Debye-Huckel-Onsager's equation for strong electrolytes (elementary treatment only), Transport number, definition and determination by Hittorf's method and moving boundary method, Applications of conductivity measurements: determination of degree of dissociation, determination of K_a of acids, determination of solubility product of a sparingly soluble salt, conductometric titrations.

BOOKS PRESCRIBED:

1. Principles of physical chemistry, S. H. Maron & C. F. Prutton.
2. Physical Chemistry, K. J. Laidler.
3. Physical Chemistry Vol-1, K. L. Kapoor.
4. Physical chemistry, W. J. Moore.

COURSE OUTCOMES:

S. No.	On completing the course, the student will be able to
CO1	Understand the concept of equilibrium, phase equilibria, Phase Rule and its

	Application on a One-component system as well as on binary systems of solid-liquid and liquid-liquid.
C02	Understand the crystal morphology, laws related to crystal structure, X-Ray diffraction studies of crystals, crystal structure determination and study of crystal defects/imperfections.
C03	Learn colloidal systems of various types, their preparation, stabilization, purification and mechanical, electrical, optical properties.
C04	Enhance the knowledge about electrical dipole moment, factors affecting it and its measurement.
C05	Enhance the concepts related to electrochemistry which involves the laws for strong electrolytes, weak electrolytes, migration of ions under influence of electrical field measurement of electrical conductivity and its applications

B.Sc. (Hons) Chemistry Semester-II
BHC 122: Inorganic Chemistry-II
(Chemistry of representative elements)

Total Hours/week: 3

Total Credits: 3

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2 1 0

Maximum Marks: 75

Theory: 56

Internal Assessment: 19

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 EIGHT questions and students are required to attempt any SIX short questions carrying 2 marks each. The answer should not exceed 50 words.
- 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:

This course is aimed to provide the basis of the representative elements ie s-block and p-block elements in term of their preparation, chemical properties, physical properties and periodic trends. It also aim to understand the terms like ligands, denticity of ligands, chelate, coordination number and use standard rules to name coordination compounds, various types of isomerism possible in such compounds and understand the types of isomerism possible in a metal complex.

COURSE CONTENTS:

UNIT-I

1. General properties of representative elements 10 Hrs.
General remarks about each group, trends in electronic configuration, structure of elements, atomic and ionic radii, ionization potential, electron affinity, electronegativity, oxidation states, inert pair effect, catenation and heterocatenation, first and second row anomalies, the use of d orbitals by non-metals, the use of p-orbitals in bonding . Important classes of compounds of s and p block elements.
2. Alkali Metals 5 Hrs.
Oxides, hydroxides, peroxides and super oxides, halides, hydrides, solutions of metals in liquid ammonia, complexes crowns and cryptands and podands.

UNIT-II

3. Alkaline Earth Metals 5 Hrs.
Solutions of the metals in liquid ammonia, hydroxides, oxides, sulfates, hydrides, halides, carbides, structures of calcium carbide, structures of basic berylliumacetate $\text{Be}_4\text{O}(\text{CH}_3\text{COO})_6$, beryllium oxalate complexes $\text{Be}(\text{ox})_2$, Structure of chlorophyll 'a'.
4. Group III (Boron Group) 5 Hrs.
Oxides, halides and hydrides of group III elements, boron sesquioxide and borates structure of borates, trihalides and lower halides of boron, preparation of boron hydrides reactions and structures of boranes.
5. Group IV (Carbon Group) 5 Hrs.
Structure and allotropy of the elements, types and structure of carbides, oxides of carbon and silicon, types and structures of silicates, Organo-silicon compounds and the silicones, halides of IV group elements.

UNIT-III

6. Group V (Nitrogen Group) 5 Hrs.
Hydrides, properties and structure of ammonia, hydrazine, hydroxylamine, trihalides and Pentahalides of V groups elements, oxides of nitrogen, structure of N_2O , NO , N_2O_3 , N_2O_4 and N_2O_5 , oxo acids of nitrogen and phosphorous, phosphazenes and cyclophosphazenes.

7. Group VI (Oxygen Group) 5 Hrs.
Structure and allotropy of the elements. Oxides of sulfur (structure of SO_2 and SO_3) oxoacids of sulfur halides of sulfur, selenium and tellurium, compounds of Sulfur and nitrogen (S_4N_4).

8. Group VII (Halogen Group) 5 Hrs.
Oxides of halogens (OF_2 , O_2F_2 , Cl_2O , ClO_2 , Cl_2O_6 , BrO_2 , I_2O_5) (structures), Preparation, reaction and structure inter-halogen compounds. (ClF_3 , BrF_3 , ICl_5 , IF_5 , IF_7) Polyhalides, basic properties of halogens.

UNIT-IV

9. Zero Group (Noble Gases) 5 Hrs.
Clathrate compounds, preparation, structure and bonding of noble gas compounds (XeF_2 , XeF_4 , XeF_6 , XeO_3 , XeO_2F_2 , XeO_4).

10. Elementary Coordination Chemistry 10 Hrs.
Werner's theory, nomenclature of coordination complexes, isomerism in coordination complexes, stereochemistry of coordination numbers 2-12, Valence Bond Theory of co-ordination compounds and its application.

BOOKS PRESCRIBED:

1. J.D. Lee, Concise Inorganic Chemistry, 4th Ed.
2. J.E. Huheey, Inorganic Chemistry, Harper & Row.
3. F.A. Cotton and G. Wilinson, Advanced Inorganic Chemistry, Interscience Publishers.
4. N.N. Greenwood and A. Earnshaw, Chemistry of Elements, Pergamon Press.

COURSE OUTCOMES:

S. No.	On completing the course, the student will be able to
CO1	Acquire the knowledge regarding General properties of representative elements and alkali metals
CO2	Understand oxidation states with reference to elements in unusual and rare oxidation states like carbides and nitrides
CO3	Gain the knowledge about Nitrogen, Oxygen and Halogen family
CO4	Learn about Clathrate compounds, and preparation, structure and bonding of noble gas compounds
CO5	Understand the terms, ligand, denticity of ligands, chelate, coordination number and use standard rules to name coordination compounds. Discuss the various types of isomerism possible in such compounds and understand the types of isomerism possible in a metal complex.

B.Sc. (Hons) Chemistry Semester-II
BHC 123
Organic Chemistry-II

Total Hours/week: 3

Total Credits: 3

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Maximum Marks: 75

Theory: 56

Internal Assessment: 19

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 EIGHT questions and students are required to attempt any SIX short questions carrying 2 marks each. The answer should not exceed 50 words.
- 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 this course is to familiarize the students with the basic chemistry of alcohols, phenols, ethers and epoxides, alkyl and aryl halides, aldehydes and ketones, acids and their derivatives. The course content will also provide basic knowledge of organic reaction mechanisms.

COURSE CONTENTS:

UNIT-I

1. Alcohols 8Hrs
Classification and nomenclature.
Monohydric alcohol - nomenclature, methods of formation by reduction of aldehydes, ketones, carboxylic acids and esters. Hydrogen bonding, Acidic nature. Reactions of alcohols.
Dihydric alcohols - nomenclature, methods of formation, chemical reactions of vicinal glycols, oxidative cleavage [$\text{Pb}(\text{OAc})_4$ and HIO_4] and pinacol-pinacolone rearrangement.
Trihydric alcohols - nomenclature and methods of formation, chemical reactions of glycerol.
2. Phenols 7 Hrs
Nomenclature, structure and bonding. Preparation of phenols, physical properties and acidic character. Comparative acidic strengths of alcohols and phenols, resonance stabilization of phenoxide ion. Reactions of phenols - electrophilic aromatic substitution, acylation and carboxylation. Mechanisms of Fries rearrangement, Claisen rearrangement, Gatterman synthesis, Hauben-Hoesch reaction, Laderer-Manasse reaction and Reimen-Tiemann reaction.

UNIT-II

3. Ethers and Epoxides 6 Hrs
Nomenclature of ethers and methods of their formation, physical properties. Chemical reactions – cleavage and autoxidation, Ziesel's method.

Synthesis of epoxides. Acid and base-catalyzed ring opening of epoxides, orientation of epoxide ring opening, reactions of Grignard and organolithium reagents with epoxides.

4. Alkyl and Aryl Halides

9 Hrs

Nomenclature and classes of alkyl halides, methods of formation, chemical reactions. Mechanisms of nucleophilic substitution reactions of alkyl halides, SN_2 and SN_1 reactions with energy profile diagrams.

Polyhalogen compounds: chloroform, carbon tetrachloride.

Methods of formation of aryl halides, nuclear and side chain reactions. The addition-elimination and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions.

Relative reactivities of alkyl halides allyl, vinyl and aryl halides. Synthesis and uses of DDT and BHC.

UNIT-III

5. Aldehydes and Ketones

15Hrs

Nomenclature and structure of the carbonyl group. Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides, synthesis of aldehydes and ketones using 1,3-dithianes, synthesis of ketones from nitriles and from carboxylic acids. Physical properties, of aldehydes and ketones

Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin, aldol, Perkin and Knoevenagel condensations. Condensation with ammonia and its derivatives. Wittig reaction. Mannich reaction.

Use of acetals as protecting group. Oxidation of aldehydes, Baeyer-Villiger oxidation of ketones, Cannizzaro reaction. MPV, Clemmensen, Wolff-Kishner, $LiAlH_4$ and $NaBH_4$ reductions. Halogenation of enolizable ketones.

An introduction to α , β -unsaturated aldehydes and ketones.

UNIT-IV

5. Carboxylic Acids

8 Hrs

Nomenclature, structure and bonding, physical properties, acidity of carboxylic acids, effects of substituents on acid strength. Preparation of carboxylic acids. Reactions of carboxylic acids. Hell-Volhard-Zelinsky reaction. Synthesis of acid chlorides, esters and amides. Reduction of carboxylic acids. Mechanism of decarboxylation.

Methods of formation and chemical reactions of halo acids. Hydroxy acids: maleic, tartaric and citric acids.

Methods of formation and chemical reactions of unsaturated monocarboxylic acids.

Dicarboxylic acids: methods of formation and effect of heat and dehydrating agents.

6. Carboxylic Acid Derivatives

7 Hrs

Structure and nomenclature of acid chlorides, esters, amides (urea) and acid anhydrides. Relative stability of acyl derivatives. Physical properties, Preparation and interconversion of carboxylic acid derivatives, chemical reactions. Mechanisms of esterification and hydrolysis (acidic and basic).

BOOKS PRESCRIBED:

1. Organic Chemistry, Morrison and Boyd, Prentice-Hall.
2. Fundamentals of Organic Chemistry, Solomons, John Wiley.
3. Organic Chemistry. F.A. Carey, McGraw Hill, Inc.
4. Organic Chemistry, L.G. Wade Jr. Prentice Hall.
5. Organic Chemistry Vol. I, II & III, S.M. Mukherji, S.P. Singh and R.P. Kapoor, Wiley Eastern Ltd (New Age International).
6. Introduction to organic chemistry, Stritwieser, Heathcock and Kosover, Macmillan.

COURSE OUTCOMES:

S. No.	On completing the course, the student will be able to
CO1	Acquire knowledge about the nomenclature, general physical properties, synthesis and chemistry of Alcohols, phenols.
CO2	Gain knowledge about the nomenclature, general physical properties, synthesis and chemistry of ethers, epoxides, alkyl/arylhalides,
CO3	Gain knowledge about the nomenclature, general physical properties, synthesis and chemistry of aldehydes and ketones
CO4	Gain knowledge about the nomenclature, general physical properties, synthesis and chemistry of carboxylic acids, and carboxylic acid derivatives

B.Sc. (Hons) Chemistry Semester-II
BHC 124
Inorganic Chemistry Lab-I

Total Hours/week: 6
Total Credits: 3
L T P
0 0 3

Maximum Marks: 75
Practical: 56
Internal Assessment: 19

INSTRUCTIONS FOR PAPER SETTERS AND CANDIDATES:

- I. Examiner will set two questions
- II. Students will be asked to complete write up of both practical within first 20 minutes on the first sheet provided.
- III. On the second sheet provided after 20 minutes, students will perform and note the record on second sheet during the conduct of practical exam
- IV. The split of marks will be as under:
(Exp-1 = 20, Exp-2 = 20, Viva-voce = 10, Practical note book = 6)

COURSE OBJECTIVES:

*To provide good laboratory practice and develop technical skills relevant to qualitative analysis
To Identify cations and anions in a mixture.*

COURSE CONTENTS:

Identification of cations and anions in a mixture which may contain combinations of acid ions.
These must contain interfering acid anions and one, the insoluble.

1. Special Tests for Mixture of Anions

- (i) Carbonate in the presence of sulphite.
- (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 bromide.
- (vii) Chloride in the presence of iodide.
- (viii) Bromide and iodide in the presence of each other and of chloride.
- (ix) Iodate and iodide in the presence of each other.
- (x) Phosphate, arsenate and arsenite in the presence of each other.
- (xi) Sulphide, sulphite, thiosulphate and sulphate in the presence of each other.
- (xii) Borate in the presence of copper and barium salts.
- (xiii) Oxalate in the presence of fluoride.
- (xiv) Oxalate, tartrate, acetate, citrate in the presence of each other.

2. Separation and Identification of Cations in Mixtures

- a. Separation of cations in groups.

- b. Separation and identification of Group I, Group II (Group IIA and IIB), Group III, Group IV, Group V and Group VI cations.
3. **Identification of Cations Including Less Familiar Elements by Spot Tests Assisted by Group Analysis (3 cations).**

BOOKS PRESCRIBED:

Vogel's book on Inorganic Qualitative Analysis

COURSE OUTCOMES:

Sr. No.	On completing the course, the student will be able to
CO1	Identify the cations present in the mixture.
CO2	Identify the anions 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

B.Sc. (Hons) Chemistry Semester-II

**MAC 121
MATHEMATICS - II**

Total Hours/week: 4

Total Credits: 4

L T P

3 1 0

Maximum Marks: 100

Theory: 75

Internal Assessment: 25

INSTRUCTIONS FOR PAPER SETTERS AND CANDIDATES

1.The question paper will consist of five 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.Section–A will consists of eight short answer type questions, each of 2.5 marks. Students are to attempt any six.

3.Sections–B, C, D & E will consist of two questions each (**each question should be sub divided into at most 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 two dimensional geometry.
- To have an idea about the Solid geometry and its applications.
- To perceive knowledge about Polynomial equations.

COURSE CONTENTS:

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

BOOKS PRESCRIBED:

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:

Sr. No.	On completing the course, the students will be able to:
CO1	Solve problems based on differentiation.
CO2	Use of mean value theorems in solving problems of calculus.
CO3	Solve the integrals using various numerical methods such as Trapezoidal rule, Simpsons rule etc.

B.Sc. (Hons) Chemistry Semester-II

PHX-121

Physics-II (Modern Physics)

Total Hours/week: 3

Total Credits: 3

L T P

2 1 0

Maximum Marks: 75

Theory: 56

Internal Assessment: 19

NOTE FOR PAPER SETTER AND STUDENTS:

- 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 EIGHT questions and students are required to attempt any SIX short questions carrying 2 marks each. The answer should not exceed 50 words.
- 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:

To attain a comprehensive understanding of the fundamental aspects of modern physics. Understand the basic ideas of quantum Physics through concepts and theories of 20th century such as of Blackbody radiation, Photoelectric effect, Compton effect, uncertainty principle. The discovery of radioactivity, its applications and detailed knowledge and classification of elementary and composite matter particles that exist in universe.

COURSE CONTENTS:

UNIT-I

1. Dual Nature of Matter and Radiation

15 Hrs

De Broglie's hypothesis, photoelectric effect, Compton effect, electron diffraction experiments of Davission and Germer, Wave group and particle velocities, Heisenberg's uncertainty principle, principle of the electron microscope, X-rays, Diffraction of X-rays from crystals, Planck's quantum hypothesis, Bragg's law of determination of structure of simple crystals.

UNIT-II

2. Radioisotopes and their Application

15 Hrs

Radioactive decay laws, Uranium and Carbon dating, introduction to α , β and γ decays, Radioisotopes and their production, uses of radioisotopes in medicine, agriculture and geology Radiation doses and their units, Biological effects of radiation.

UNIT-III

3. Particle detectors

15 Hrs

Uses of ionization chamber, Proportional counter, GM Counter, Scintillation counter and photographic emulsions as detectors.

UNIT-IV

4.Lasers

15 Hrs

Properties of Laser, concept of stimulated emission, population inversion, components of Laser devices, elementary theory of optical cavity, conditions for laser action, Ruby laser and Nd:YAG laser, applications of lasers.

BOOKS PRESCRIBED:

1. Concepts of Modern Physics: A. Beiser.
2. Essentials of Modern Physics: V. Acota and C. L. Grown
3. Fundamentals of Modern Physics: B. D. Duggal and C. L. Chhabra
4. Laser Fundamentals, W.T. Silfvast (Foundation Books), New Delhi, 1996
5. Laser and Non-Linear Optics, B.B. Laud (New Age Pub.) 2002

COURSE OUTCOMES:

Sr. No.	On completing the course, the students will be able to:
CO1	Attain comprehensive knowledge and understanding of the main Physical concepts and theories of the 20 th century.
CO2	Understand the basics of crystallography and X-ray diffraction.
CO3	Understand the basic ideas of Quantum Physics through concepts of radiation, photoelectric effect, compton effect, uncertainty principle and concept of wave packet.
CO4	Gain an in depth understanding about the process of Radioactivity and its biological effects and applications.
CO5	Understand the concepts related to working of Lasers

B.Sc. (Hons) Chemistry Semester-II

PHC-122

Physics Lab-II

Total Hours/week: 2

Total Credits: 1

L T P

0 0 1

Maximum Marks: 25

Practical: 19

Internal Assessment: 06

GENERAL GUIDELINES FOR PRACTICAL EXAMINATION

I. The distribution of marks is as follows: **Max. Marks: 19+06 (Internal Assessment)**

i) One experiment **8 Marks**

ii) Brief Theory **4 Marks**

iii) Viva-Voce **4 Marks**

iv) Record (Practical file) **3 Marks**

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:

To understand the basic concepts of Modern Physics such as particle nature of light, decay of atomic nucleus, atomic and molecular spectra of elements and molecules and knowledge of semiconductor devices through experiments on Photoelectric effect, Geiger Muller counter, analysis of molecular spectrum of iodine and PN junction.

COURSE CONTENTS:

1. To study the gas discharge spectrum of hydrogen.
2. To study the absorption spectra of iodine vapours.
3. To determine the ionization potential of mercury.
4. To study the photoelectric effect and determine the value of Planck's constant.
5. Study of variation of light intensity with distance using photovoltaic cell (Inverse Square Law).
6. To draw the plateau of a GM counter and find the operating voltage of GM tube.
7. To find the dead time of GM counter.
8. To study the absorption coefficient beta particles in aluminium using GM counter and find the absorption coefficients.
9. To study the statistical fluctuations and end point energy of beta particles using GM counter.
10. Measurement of reverse saturation current in pn junction diode at various temperatures and find the approximate value of the band gap.

BOOKS PRESCRIBED:

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

COURSE OUTCOMES:

Sr. No.	On completing the course, the students will be able to:
CO1	Understand the basic experiments of Modern Physics.
CO2	Understand and verify the particle nature of light through experiments on Photoelectric

	effect.
CO3	Gain knowledge about the construction and working of gas filled radiation detectors.
CO4	Understand the concept of molecular spectra.
CO5	Learn the working of a PN junction and comprehend the concept of band gap.

B.Sc. (Hons) Chemistry (Semester-II)

COMMUNICATIVE ENGLISH-II

**B.Sc.(Hons.) Physics, Chemistry, Botany, Zoology, Maths and Computational Statistics and
Data Analytics
Code: BCEN-1223**

L	T	P	Credits
3	0	1	4

Time: 3 Hours

Max. Marks: 100

Theory: 60

Practical: 15

Internal Assessment: 25

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= 12 marks)

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 3rd 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, Chemistry, Maths), B. Sc. Bio Tech./ IT/ Fashion Designing/ Food Sc., B. A. JMC, BCA, B.Sc. in Computational Statistics and Data Analytics, B.Sc. Artificial Intelligence and Data Science, Bachelor of Vocational (B.Voc.) (Software Development, Theatre and Stage Craft, Food Processing, Textile Design & Apparel Technology, Renewable Energy Technology)
Semester-II
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

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

(ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ/ਨਾਇਕ ਬਿੰਬ)

ਭਾਗ-ਤੀਜਾ

(ੳ) ਦਫਤਰੀ 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, Chemistry, Maths), B. Sc. Bio Tech./ IT/ Fashion Designing/ Food Sc., B.

A. JMC,BCA, B.Sc. in Computational Statistics and Data Analytics, B.Sc. Artificial Intelligence and Data Science, Bachelor of Vocational (B.Voc.) (Software Development, Theatre and Stage Craft, Food Processing, Textile Design & Apparel Technology, Renewable Energy Techology)
Semester-II
 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

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

ਭਾਗ-ਚੌਥਾ

ਨਿੱਤਵਰਤੋਂਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ

ਖਾਣ-ਪੀਣ, ਸਾਕਾਦਾਰੀ, ਰੁੱਤਾਂ, ਮਹੀਨਿਆਂ, ਗਿਣਤੀ, ਮੌਸਮ, ਬਜ਼ਾਰ, ਵਪਾਰ, ਪੰਦਿਆਂਨਾਲਸੰਬੰਧਿਤ

Course Code: ZDA121

Course Title-DRUGABUSE: PROBLEM, MANAGEMENT AND PREVENTION
DRUG ABUSE: MANAGEMENT AND PREVENTION
(Compulsory for all Under Graduate Classes)

Credit hrs./wk.:2
L T P
2 0 0
Max. Marks: 50

Time: 3 Hours

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.	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 know how 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 dJotos'A (BPky'oh) gqzXB ns o'eEkw.* KasturiLal & 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:

On completing the course, the student 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.