# FACULTY OF SCIENCES

## SYLLABUS FOR THE SESSION 2023 -24

**Programme Code: BSMH**

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

**(Semester I-II)**

**Examinations: 2023-2024**

## P. G. Department of Mathematics

# 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.** | To analyze the problem, identify the computing requirements and to find the appropriate solution. |
| **2.** | To equip the students with mathematical abilities and problem solving skills. |
| **3.** | Acquire good knowledge and understanding in advanced areas of mathematics. |

| S.No. | PROGRAMME SPECIFIC OUTCOMES (PSOS) |
|---|---|
| PSO-1 | To make students understand the concepts of different branches of sciences and it's applications to other disciplines. |
| PSO-2 | To train students in communicating mathematical ideas in lucid and effective manner. |
| PSO-3 | To expertise students to apply their theoretical knowledge and understanding to solve theoretical and applied problems in mathematics. |
| PSO-4 | The practical work using software/labs in mathematics and inter-disciplinary subjects will enable the students to analyze problems in a systematic and analytical way. |
| PSO-5 | Students will develop proficiency in inter-disciplinary subjects(Physics, Chemistry etc.) which will motivates students to pursue new knowledge in different subject areas. |

| COURSE SCHEME | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SEMESTER - I | | | | | | | | | | | |
| Course Code | Course Name | Hours/Week | Credits | | | Total Credits | Max Marks | | | | Page No. |
| | | | L | T | P | | Th | P | IA | Total | |
| **Major Courses** | | | | | | | | | | | |
| BHM- 111 | Calculus-I | 4 | 3 | 1 | 0 | 4 | 75 | - | 25 | 100 | 5-6 |
| BHM- 112 | Algebra-I | 4 | 3 | 1 | 0 | 4 | 75 | - | 25 | 100 | 7-8 |
| BHM- 113 | Math Lab-I | 4 | 2 | 0 | 2 | 4 | 75 | - | 25 | 100 | 29 |
| **Minor Courses (Choose one of the following groups)** | | | | | | | | | | | |
| **Group-I** | | | | | | | | | | | |
| PHX- 111 | Physics-I Optics | 3 | 2 | 1 | 0 | 3 | 56 | - | 19 | 75 | 9-10 |
| CHX- 111 | Organic Chemistry-I | 3 | 2 | 1 | 0 | 3 | 56 | - | 19 | 75 | 11-13 |
| PHX-112 | Physics Lab-I (Optics Lab) | 2 | 0 | 0 | 1 | 1 | 19 | - | 06 | 25 | 24-25 |
| CHX-112 | Organic Chemistry Practical-I | 2 | 0 | 0 | 1 | 1 | 19 | - | 06 | 25 | 26-27 |
| **Group-II** | | | | | | | | | | | |
| BHM-114 | Statistical Methods-I | 3 | 2 | 1 | 0 | 3 | 56 | - | 19 | 75 | 14-15 |
| BHM- 115 | Probability theory | 3 | 2 | 1 | 0 | 3 | 56 | - | 19 | 75 | 16-17 |
| BHM-116 | Practical based on Paper: Statistical Methods-I | 4 | 0 | 0 | 2 | 2 | 38 | - | 12 | 50 | 28 |
| **Ability Enhancement Courses** | | | | | | | | | | | |
| BCEN-1123 | Communicative English-I | 4 | 3 | 0 | 1 | 4 | 60 | 15 | 25 | 100 | 18-19 |
| BHPB-1101 or BPBI-1102 | Punjabi Compulsory OR Basic Punjabi | 4 | 4 | 0 | 0 | 4 | 75 | - | 25 | 100 | 20-21 22-23 |
| **Value Added Courses** | | | | | | | | | | | |
| *ZDA111 | DrugAbuse:Problem, Management and Prevention Problem of Drug Abuse (Mandatory Course) | 2 | 2 | 0 | 0 | 2 | 50 | - | - | 50 | 30-31 |
| Total | | 30 | 20 | 05 | 05 | 30 | | | | 700 | |

*Pass Course 4

| COURSE SCHEME | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SEMESTER - II** | | | | | | | | | | | |
| **Course Code** | **Course Name** | **Hours/Week** | **Credits** | | | **Total Credits** | **Max Marks** | | | | **Page No.** |
| | | | **L** | **T** | **P** | | **Th** | **P** | **IA** | **Total** | |
| **Major Courses** | | | | | | | | | | | |
| BHM- 121 | Calculus-II | 4 | 3 | 1 | 0 | 4 | 75 | - | 25 | 100 | 32-33 |
| BHM- 122 | Algebra-II | 4 | 3 | 1 | 0 | 4 | 75 | - | 25 | 100 | 34-35 |
| BHM- 123 | Math Lab-II | 4 | 2 | 0 | 2 | 4 | 75 | - | 25 | 100 | **55** |
| **Minor Courses (Choose one of the following groups)** | | | | | | | | | | | |
| **Group-I** | | | | | | | | | | | |
| PHX- 121 | Physics-II Modern Physics | 3 | 2 | 1 | 0 | 3 | 56 | - | 19 | 75 | 36-37 |
| CHX- 121 | Inorganic Chemistry-II | 3 | 2 | 1 | 0 | 3 | 56 | - | 19 | 75 | 38-39 |
| PHX-122 | Physics Lab-II | 2 | 0 | 0 | 1 | 1 | 19 | - | 06 | 25 | 50-51 |
| CHX-122 | Inorganic Chemistry Practical-II | 2 | 0 | 0 | 1 | 1 | 19 | - | 06 | 25 | 52-53 |
| **Group-II** | | | | | | | | | | | |
| BHM-124 | Statistical Methods-II | 3 | 2 | 1 | 0 | 3 | 56 | - | 19 | 75 | 40-41 |
| BHM- 125 | Probability Distributions | 3 | 2 | 1 | 0 | 3 | 56 | - | 19 | 75 | 42-43 |
| BHM-126 | Practical based on Papers: Statistical Methods-II and Probability Distributions | 4 | 0 | 0 | 2 | 2 | 38 | - | 12 | 50 | 54 |
| **Ability Enhancement Courses** | | | | | | | | | | | |
| BCEN-1223 | Communicative English-II | 4 | 3 | 0 | 1 | 4 | 60 | 15 | 25 | 100 | 44-45 |
| BHPB- 1201 or BPBI-1202 | Punjabi Compulsory OR Basic Punjabi | 4 | 4 | 0 | 0 | 4 | 75 | - | 25 | 100 | 46-47 48-49 |
| **Value Added Courses** | | | | | | | | | | | |
| *ZDA121 | DrugAbuse:Problem, Management and Prevention Problem of Drug Abuse (Mandatory Course) | 2 | 2 | 0 | 0 | 2 | 50 | - | - | 50 | 56-57 |
| Total | | 30 | 20 | 05 | 05 | 30 | | | | 700 | |

*Pass Course

**Khalsa College Amritsar**
**(An Autonomous College)**

**Syllabus for**
**PROGRAMME: B.Sc. Hons. (Mathematics) Sem-I**
**COURSE CODE: BHM-111**
**COURSE TITLE:Calculus-I**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 1 | 0 | 4 |

**TOTAL HOURS: 60 hrs**

**Time: 3 hrs.** **MAXIMUM MARKS: 100**

**Medium: English** **(THEORY : 75**

**INTERNAL ASSESSMENT: 25)**

## INSTRUCTIONS FOR THE PAPER SETTERS:

1. The question paper will consists 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 sudivided 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:

- The content of this course is designed to make the students understand the concepts of limits and continuity of functions, the methods of differentiation of various types of functions, the points to have an idea about the shape of the graph of a function.
- To understand the concept of hyperbolic functions.
- To make students familiar with the concept of concavity and convexity.

## COURSE CONTENTS:

**Unit-I**

Real number & its properties, Limit of a function, Basic properties of limits, Continuous functions and classifications of discontinuities.

**Unit II**

Differentiation of Hyperbolic functions, Successive Differentiation, Leibnitz's Theorem. Indeterminate forms.

**Unit III**

Cauchy's Mean Value Theorem, Taylor's and Maclaurin's theorem, Asymptotes, Concavity-Convexity, points of inflexion, multiple points, Curvature.

**Unit IV**

Limit and Continuity of functions of two variables, Partial differentiation, Change of variables, Partial derivatives and differentiability of real–valued functions of two variables, Schwartz's and Young's Theorem.

**BOOKS PRESCRIBED:**

1. Shanti Narayan and P.K. Mittal: Differential Calculus, S. Chand and Co.
2. S.P. Arya : Differential Calculus, Rastogi and Co.
3. S.C. Arora and Ramesh Kumar: A text Book of Calculus ,Pitamber Publication Co.

**COURSE OUTCOMES: After the completion of the course, student will be able to:**

- understand the theory and applications of derivatives.
- acquire the knowledge of determining stationary points of functions in order to sketch their graphs.
- make the students understand the concepts of limits and continuity of functions.
- understand the applications of methods of differentiation of functions in predicting the shape of the graph of a function.

**Syllabus for Examinations: 2023-2024**

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# Khalsa College Amritsar

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**Syllabus for**

**PROGRAMME: B.Sc. Hons. (Mathematics) Sem-I**

**COURSE CODE: BHM-112**

**COURSE TITLE:Algebra-I**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 1 | 0 | 4 |

**TOTAL HOURS: 60 Hours**

**Time: 3 hrs** **MAXIMUM MARKS: 100**

**Medium: English**

**(THEORY : 75**

**INTERNAL ASSESSMENT: 25)**

## INSTRUCTIONS FOR THE PAPER SETTERS:

1. The question paper will consists 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 sudivided into atmost two parts)**. Students are to attempt any four questions in total by selecting one question from each section. Each question carries 15marks.
4. Teaching time for this paper would be six periods per week.

## COURSE OBJECTIVES:

- Algebra will help the students in expression of abstract ideas.
- Students will learn matrix algebra, vector spaces, eigen values and eigen vectors.
- Students will be able to recognize technical terms and appreciate some of the uses of tools of algebra.

## COURSE CONTENTS:

**Unit-I**

Rank of a matrix. Concept of equivalent matrices and to compute the rank of a matrix using equivalent matrix, normal form of a matrix, elementary operations on matrices and to determine the rank of a matrix by elementary transformations, Echelon form of a matrix and to determine row and column rank of a matrix by reducing it in echelon form.

**Unit-II**

Linear independence of row and column vectors. Row rank and Column rank of a matrix, Equivalence of column and row ranks., nullity of a matrix, Applications of matrices to solve a system of linear (both homogeneous and non–homogeneous) equations. Theorems on consistency of a system of linear equations.

**Unit-III**

Eigen values and Eigen vectors of a matrix, minimal and characteristic equation of a matrix. Cayley-Hamilton Theorem and its use in finding inverse of a matrix.

**Unit-IV**

Quadratic forms, Congruence of quadratic forms and matrices. Congruent transformtations of matrices. Elementary congruent transformations. Congruent reduction of a symmetric matrix. Classification of real quadratic forms in n- variables. Definite, semi definite and indefinite real quadratic forms. Characterstic properties of definite, semi definite and indefinite forms.

**BOOKS PRESCRIBED:**

1. H.S. Hall and S.R. Knight: Higher Algebra, H.M. Publications, 1994.
2. Shanti Narayan & P.K. Mittal : A Text Book of Matrices, S.Chand & Co.
3. M.K. Singal and Asha Rani Singal: Algebra, R. Chand and Co.

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

- acquire the details of abstractness of mathematics.
- learn matrix algebra, vector spaces, eigen values and eigen vectors and basic concepts of number theory.
- understand the fundamental properties of real numbers that lead to the formal development of Real Analysis.
- recognize technical terms and appreciate some of the uses of tools of algebra.

# Khalsa College Amritsar

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**Syllabus for**

**PROGRAMME: B.Sc. Hons. (Mathematics)**

## Semester-I

**PHX-111**

**Physics-I (Optics)**

**Credit Hours (per week): 3**
**Credits:L T P: 2 1 0**
**Total Hours: 60**

**Time: 3 Hours** **Maximum Marks: 75**
**(Theory Marks: 56+Internal Assessment: 19)**
**Pass Marks: 35%**

**Instructions for paper setters and students:**

1. There will be five sections.
2. Section A is compulsory and will be of 12 marks consisting of 8 short type questions carrying 2 mark each covering the whole syllabus. The answer should not exceed 50 words. The candidate will have to attempt 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 11 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:** 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 wavefront**

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-III**

**4. Diffraction and Polarisation** **15 Hrs**

Huygen's fresnel 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: Ajoy Ghatak. Tata Mc Graw 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

| Sr. No. | On completing the course, the students will be able to: |
|---|---|
| CO1 | Gain knowledge about wave theory of light. |
| CO2 | Acquire in depth understanding on the 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 understanding of electro- magnetic waves and their transverse nature. |
| CO5 | Understand the applications of diffraction and polarization in various optical instruments. |

# Khalsa College Amritsar

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**Syllabus for**

**PROGRAMME: B.Sc. Hons. (Mathematics) Sem-I**

**COURSE CODE: CHX-111**

**COURSE TITLE:Organic Chemistry-I**

**CREDIT HOURS(PER WEEK): 3**

| L | T | P | Credits |
|---|---|---|---|
| 2 | 1 | 0 | 3 |

**TOTAL HOURS: 60 HRS**

**Time: 3 hrs.** **MAXIMUM MARKS: 75**

**Medium: English** **(THEORY : 56**

**INTERNAL ASSESSMENT: 19)**

**INSTRUCTIONS FOR THE PAPER SETTERS:**

**(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 consists of eight short questions carrying 2 Mark each. Students are to attempt any six questions.

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 CONTENT:**

UNIT-I 15Hrs

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

UNIT-II 15Hrs

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 15Hrs

Nucleophilic substitution and addition reaction:

**(a)**Functional group transformation by nucleophilicsubstituion, mechanismof 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 nucleophillic addition to carbonyl groups : Hydration acetal formation, cyanohydrin formation ; reactions with primary and secondary amines, Wittig reaction, steroselective addition to carbonyl groups mechanism of halogenation, aldol condensation

UNIT-IV 15Hrs

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 bondlengths of benzene, resonance structure, MO picture. Aromaticity : the Huckel's rule, aromatic ions.Aromatic electrophilic substitution–general pattern of the mechanism, role of σ and π complexes.Mechanism of nitration, halogenation, sulphonation, mercuration and Friedel Crafts reaction.Energy profile diagrams. Activating and deactivating substituents, orientation and ortho/pararatio. Side chain reactions of benzene derivatives.

**BOOKS PRESCRIBED**

1. R.T. Morison 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 Meislickand Jacob Sharefkin
5. Problems and their solution in Organic chemistry by I.L. Finar, Modern Organic Chemistryby J.D. Robbert 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:

| S. No. | On completing the course, the outcomes will be as under: |
|---|---|
| **CO1** | Learned about SN1, SN2 and SNi 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** | Solved the elimination reaction problems |
| **CO4** | Distinguish between type of addition, elimination and substitution reaction. |
| **CO5** | Learn E and Z nomenclature ,Stereo chemical principal, enantiomeric relationship R and S |

# Khalsa College Amritsar

**(An Autonomous College)**

**Syllabus for**

**PROGRAMME: B.Sc. Hons. (Mathematics) SEM-I**

**Semester-I**

**COURSECODE: BHM-114**

**COURSE TITLE: PAPER–I: Statistical Methods–I**

| L | T | P | Credits |
|---|---|---|---|
| 2 | 1 | 0 | 3 |

**TOTAL HOURS: 60 hrs**

**Medium: English**

**MAXIMUM MARKS: 75**

**Time: 3 Hours** **( Theory Marks: 56**

**Theory Internal Assessment: 19)**

**INSTRUCTIONS FOR THE PAPER SETTERS:**

1. The question paper will consists 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 marks. Students are to attempt any six.
3. Sections–B, C, D & E will consist of two questions each **(each question should be sudivided into atmost two parts)**. Students are to attempt any four questions in total by selecting one question from each section. Each question carries 11 marks.
4. Teaching time for this paper would be six periods per week.
5. Simple calculator is allowed.

**COURSE OBJECTIVES:**

- Students will be able to solve Statistical problems using various measure of central tendency.
- It enables the students to collect the data and present it diagrammatically.
- Students will learn the meaning and scope of Statistics.

**COURSE CONTENTS:**

**Unit-I**

Meaning and scope of statistics, Collection of data, presentation of data, diagrammatic representation of data. Attributes and variables, discrete and continuous frequency distribution of a variable, graphical representation of frequency distribution of a variable.

**Unit-II**

Central tendency: Measures of central tendency, namely, Arithmetic mean, median, mode, Geometric mean, Harmonic mean and their comparisons with an ideal measure of central tendency.

**Unit-III**

Dispersion and its measures, range, mean deviation, quartile deviation and standard deviation. Advantages of standard deviation as measure of dispersion over the other measures, Relative measures of dispersion, coefficient of variation.

**Unit-IV**

Central and non–central moments, central–moments expressed in terms of moments about an arbitrary origin and vice-versa. Sheppard's correction for moments. Skewness and its measures, Kurtosis and its measures.

**BOOKS PRESCRIBED:-**

1. Gupta, S.C. and Kapoor, V.K.: Fundamentals of Mathematical Statistics, Sultan Chand and Company, 2007.
2. Croxton F.E., Cowden, D.J. and Kelin, S. (1973): Applied General Statistics, Prentice Hall of India.
3. Goon, A.M. Gupta, M.K. and Dasgupta B.: Fundamentals of Statistics, Vol. I, World Press, 2005.

**BOOKS SUGGESTED FOR SUPPLEMENTARY READING:-**

1. Goon, A.M. Gupta, M.K. and Dasgupta B.: Basic Statistics, World Press, 2005.
2. Gupta, S.C.: Statistical Methods, Himalayan Publishing House, 2003.
3. Nagar, A.L. and Das, R.K., Basic Statistics, Oxford University Press, 2005.

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

- learn to solve Statistical problems using various measure of central tendency.
- collect the data and present it diagrammatically.
- Use Statistics in research for proper characterization, summarization, presentation and interpretation of the result of research.
- apply the statistical methods in various fields such as finance, marketing, accounting and business.

# Khalsa College Amritsar

**(An Autonomous College)**

**Syllabus for**

**PROGRAMMEB.Sc. Hons. (Mathematics) SEM-I**

**Semester-I**

**COURSE CODE: BHM-115**

**COURSE TITLE: PAPER–II: Probability theory**

| L | T | P | Credits |
|---|---|---|---|
| 2 | 1 | 0 | 3 |

**TOTAL HOURS: 60 hrs**

**Medium: English**

**MAXIMUM MARKS: 75**

**Time: 3 Hours**

**( Theory Marks: 56**

**Theory Internal Assessment: 19)**

**INSTRUCTIONS FOR THE PAPER SETTERS:**

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 marks. Students are to attempt any six.
3. Sections–B, C, D & E will consist of two questions each**(each question should be sudivided into atmost two parts)**. Students are to attempt any four questions in total by selecting one question from each section. Each question carries 11 marks.
4. Teaching time for this paper would be six periods per week.

**COURSE OBJECTIVES:**

- Students will acquaint themselves with the foundation of probabilistic analysis.
- It will enable the students to quantify the uncertainty and assess the accuracy of our inference about the population.
- Students will have good understanding of exploratory data analysis

**COURSE CONTENTS:**

**Unit-I**

Random experiments, sample space, events, mutually exclusive and exhaustive events, algebra of events, various definitions of the probability, axiomatic probability function and its properties.

**Unit-II**

Finite sample spaces; equally likely outcomes, additive law of probability, conditional probability, multiplicative law of probability, independent events. Baye's Theorem and its applications.

**Unit-III**

Random variable, examples of random variables, Discrete and continuous random variables, probability mass function and density function, cumulative distribution function, Properties of distribution function of discrete and continuous random variables. Real valued functions of one dimensional random variables and the procedures of finding the Probability Distributionsfunctions of such functions illustrated by examples.

**Unit-IV**

Expected value of a random variable and of functions of one dimensional random variable. Properties of expected values. variance of random variable and its properties. Moment generating function and its properties.

**BOOKS PRESCRIBED:-**

1. Meyer, P.L. Introductory Probability and Statistical Applications, Addison—Wesley, (1970).
2. Ross, S.A. First Course in Probability, Sixth Edition, Pearson Education, 2007.

**Books Suggested for Supplementary Reading:-**

1. Biswal, P.C., Probability and Statistics, Prentice Hall, India, 2007.
2. Miller, I, and Miller, M. Mathematical Statistics with Applications, Seventh Edition, Pearson Education, 2007
3. Hogg. R.V., Mcken, J.W. and Craig. A.T., Introduction to Mathematical Statistics, Pearson Education, 2007.

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

- Use statistics in engineering and science like disease modeling, climate prediction networks etc.
- to quantify the uncertainty and assess the accuracy of our inference about the population.
- have good understanding of exploratory data analysis.
- learn the concept of random variable, expected value and moment generating function of random variable.

# Khalsa College Amritsar

**(An Autonomous College)**

**Syllabus for**

**PROGRAMME: B.Sc. Hons. (Mathematics)**

**SEMESTER – I**

**COMMUNICATIVE ENGLISH -I**

**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)

# Khalsa College Amritsar

(An Autonomous College)

**Syllabus for**

**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-I**

Compulsory Course

**ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ**

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

| Course title & Code | Credits | Credit distribution | | | Total Marks 100 | | Time Allowed in Exam | Eligibility criteria | Pre-requisite of the course (if any) |
|---|---|---|---|---|---|---|---|---|---|
| | | Lecture | Tutorial | Practical | Theory | Internal Assessment | | | |
| **ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ**<br>**BHPB-1101** | 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)** |
|---|---|
| ▪ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕਰਨਾ।<br>▪ ਆਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਵਿਕਸਤ ਕਰਨਾ।<br>▪ ਮਾਤ ਭਾਸ਼ਾ ਦੀ ਸਮਝ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ। | ▪ ਉਸ ਵਿਚ ਸਾਹਿਤ ਰੁਚੀਆਂ ਵਿਕਸਤ ਹੋਣਗੀਆਂ।<br>▪ ਉਸ ਵਿਚ ਸਾਹਿਤ ਸਿਰਜਣਾ ਦੀ ਸੰਭਾਵਨਾ ਵਧੇਗੀ।<br>▪ ਉਸ ਵਿਚ ਕਿਸੇ ਵੀ ਵਿਸ਼ੇ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਕਰਨ ਦਾ ਬੋਧ ਹੋਵੇਗਾ।<br>▪ 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। 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 ਅਸੈੱਸਮੈਂਟ 25 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। 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) ਪੈਰ੍ਹਾ ਰਚਨਾ (ਤਿੰਨਾਂ ਵਿਚੋਂ ਇਕ)
(ਅ) ਪੈਰ੍ਹਾ 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।

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# Khalsa College Amritsar

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**Syllabus for**

**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-I**

Compulsory Course

**ਮੁਢਲੀ ਪੰਜਾਬੀ**

(In Lieu of Compulsory Punjabi)

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

| Course title &Code | Credits | Credit distribution | | | Total Marks 100 | | Time Allowed in Exam | Eligibility criteria | Pre- requisite of the course (if any) |
|---|---|---|---|---|---|---|---|---|---|
| | | Lecture | Tutorial | Practical | Theory | Internal Assessment | | | |
| **ਮੁਢਲੀ ਪੰਜਾਬੀ**<br><br>**BPBI-1102** | 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)** |
|---|---|
| • ਵਿਦਿਆਰਥੀ ਨੂੰ ਗੁਰਮੁਖੀ ਲਿਪੀ ਤੋਂ ਜਾਣੂ ਕਰਾਉਣਾ।<br>• ਵਿਦਿਆਰਥੀ ਨੂੰ ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਪੜ੍ਹਨਾ-ਲਿਖਣਾ ਸਿਖਾਉਣਾ।<br>• ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀਆਂ ਵਿਆਕਰਨਕ ਬਾਰੀਕੀਆਂ ਤੋਂ ਜਾਣੂ ਕਰਾਉਣਾ।<br>• ਸ਼ੁੱਧ ਸੰਚਾਰ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ। | • ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ ਦੀ ਸਿਖਲਾਈ ਵਿਚ ਮੁਹਾਰਤ ਹਾਸਲ ਕਰਨਗੇ।<br>• ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਵਿਚ ਮੁਹਾਰਨੀ, ਲਗਾਂ-ਮਾਤਰਾਂ, ਸਵਰ ਅਤੇ ਵਿਅੰਜਨ ਅੱਖਰਾਂ ਦੀ ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ ਸੰਬੰਧੀ ਸਮਝ ਵਿਕਸਿਤ ਹੋਵੇਗੀ।<br>• ਪੰਜਾਬੀ ਸ਼ਬਦ-ਜੋੜਾਂ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਲ ਕਰਕੇ ਉਹ ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਲਿਖਣ-ਪੜ੍ਹਨ ਦੇ ਸਮਰੱਥ ਹੋਣਗੇ।<br>• 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। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਦੂਸਰੇ ਭਾਗ ਵਿਚ, ਸਿਲੇਬਸ ਦੇ ਪਹਿਲੇ ਭਾਗ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨਾਂ 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 ਜਿੰਨਾਂ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ 8-8 ਅੰਕ ਹੋਣਗੇ। ਭਾਗ ਚੌਥੇ ਵਿਚ ਪੰਜ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨਾਂ ਵਿਚੋਂ ਚਾਰ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ 4-4 ਅੰਕ ਹੋਣਗੇ। ਭਾਗ ਪੰਜਵੇਂ ਵਿਚ ਦਸ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨਾਂ ਵਿਚੋਂ 8 ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ। ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ 2-2 ਅੰਕ ਹੋਣਗੇ।

**ਨੋਟ:** ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 25 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। 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, ੲ), 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, ਔਂਕੜ 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**

ਸ਼ੁੱਧ-ਅਸ਼ੁੱਧ ਸ਼ਬਦ

# Khalsa College Amritsar

**(An Autonomous College)**
**Syllabus for**
**PROGRAMME: B.Sc. Hons. (Mathematics)**

## Semester-I

**PHX-112**
**Physics Lab-I**
**(OPTICS LAB)**

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

| L | T | P | Credits |
|---|---|---|---|
| 0 | 0 | 1 | 1 |

**Total Hours: 30**

**Time: 3 Hours** **Maximum Marks:25**

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

**Pass Marks: 35%**

### 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. |

# Khalsa College Amritsar

**(An Autonomous College)**
**Syllabus for**
**PROGRAMME: B.Sc. Hons. (Mathematics) SEM-I**
**COURSE CODE: CHX-112**
**COURSE TITLE:Organic Chemistry Practical-I**

**Total Hours/week: 2** **Maximum Marks: 25**
**Total Credits: 1** **Practical: 19**
**L T P** **Internal Assessment: 06**
**0 0 1**

**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 |

# Khalsa College Amritsar

**(An Autonomous College)**

**Syllabus for**

**PROGRAMME: B.Sc. Hons. (Mathematics)**

**Semester-I**

**COURSE CODE: BHM-116**

**COURSE TITLE: Practical based on PAPER: STATISTICAL METHODS–I**

| L | T | P | Credits |
|---|---|---|---|
| 0 | 0 | 2 | 2 |

**TOTAL HOURS: 45 hrs.**

**Time: 2 Hours** **MAXIMUM MARKS: 50**

**(Practical Marks: 38**

**Internal Assesment Practical: 12)**

## INSTRUCTION FOR PAPER SETTER AND STUDENTS:

Students are required to prepare a practical note book with at least 30 exercises based upon the above list. At the end of semester, there is a practical examination jointly conducted by two examiners (one is internal and another one is external). This practical examination will cover a written test followed by a viva-voce to test the practical knowledge of students about the contents. The candidates are allowed to use Non–Programmable calculators.

## COURSE OBJECTIVES:

- Students will be able to solve Statistical problems using various measure of central tendency.
- It enables the students to collect the data and present it diagrammatically.
- Students will solve problems related to measure of dispersion.

## COURSE CONTENT:

Teaching time for practical paper would be two period per week.

## List of practical exercises:

1. Exercises on presentation of Data
2. Exercises on measurers of central tendency
3. Exercises on measures of dispersion
4. Exercises on calculation of moments
5. Exercises on measures of Skewness
6. Exercises on measures of Kurtosis

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

- learn to solve Statistical problems using various measure of central tendency.
- collect the data and present it diagrammatically.
- Use Statistics in research for proper characterization, summarization, presentation and interpretation of the result of research.
- apply the statistical methods in various fields such as finance, marketing, accounting and business.

# Khalsa College Amritsar

**(An Autonomous College)**

**Syllabus for**

**PROGRAMME: B.Sc. Hons. (Mathematics) SEM-I**

**COURSE CODE: BHM-113**

**COURSE TITLE:Math Lab-I**

| L | T | P | Credits |
|---|---|---|---|
| 2 | 0 | 2 | 4 |

**TOTAL LAB HOURS: 60 HRS**

**MAXIMUM MARKS: 100**

**(Theory: 75**

**Internal Assessment: 25)**

**COURSE OBJECTIVES:**

- To acquire the knowledge of MATLAB technical computing environment.
- To develop a basic understanding of MATLAB for its usage in higher learning.
- To solve mathematical concepts and sketching of graphs in fraction of seconds. convert the theoretical concepts in matrices to algorithms in MATLAB for their applications in real

**COURSE CONTENT:**

**List of Practical's (using any software):-**

(a) Operations on matrices using Matlab:

1. Addition of matrices
2. Subtraction of matrices
3. Multiplication of matrices
4. Inverse of matrices
5. Determinants of matrices
6. Eigen values and Eigen vectors of matrices
7. Rank of matrices

(b) Plotting of graphs of function $e^{ax+b}$, log (ax + b), 1/(ax + b), sin(ax + b), cos(ax + b), |ax + b| and to illustrate the effect of a and b on the graph.

(c) Plotting the graphs of polynomial of degree 4 and 5, the derivative graph, the second derivative graph and comparing them.

(d) Sketching parametric curves (e.g. Parabola, ellipse, hyperbola).

**BOOKS PRESCRIBED:**

1. Thomas, George B., and Finney Ross L. Calculus. Pearson Education, 9th Ed, 2010.
2. Strauss, M.J., and G.L. Bradley and K. J. Smith. Calculus. Delhi: Dorling Kindersley (India) P. Ltd. (Pearson Education), 3rd Ed, 2007.
3. Anton, H., and I. Bivens, and S. Davis. Calculus. Singapore: John Wiley and Sons (Asia) P. Ltd., 7th Ed. 2002.
4. Courant, R., and F. John. Introduction to Calculus and Analysis. New York: Springer-Verlag (Volumes I & II), 1989.

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

- develop a basic understanding of MATLAB for its usage in higher learning.
- have a precise direction from theoretical learning to computational techniques.
- solve mathematical concepts and sketching of graphs in fraction of seconds.

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# Khalsa College Amritsar

**(An Autonomous College)**
**Syllabus for**
**PROGRAMME: B.Sc. Hons. (Mathematics) SEM-I**
**SEMESTER–I**

# 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

Time: 3 Hours Max. 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 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, gqpzXB 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) gqpzXB 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. |

# Khalsa College Amritsar

**(An Autonomous College)**

**Syllabus for**

**PROGRAMME: B.Sc. Hons. (Mathematics) Sem-II**

**COURSE CODE: BHM-121**

**COURSE TITLE: Calculus-II**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 1 | 0 | 4 |

**TOTAL HOURS: 60 hrs**

**Time: 3hrs.** **MAXIMUM MARKS: 100**

**Medium: English** **( Theory: 75**

**Internal Assessment: 25)**

**INSTRUCTIONS FOR THE PAPER SETTERS:**

1. The question paper will consists 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 sudivided 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.

## COURSEOBJECTIVES:

- This course introduces the concept of integration of hyperbolic functions.
- Students will evaluate double and triple integrals of functions of several variables.
- Students will apply double and triple integrals in evaluating area and volume of solids.
- To aquaint with the concepts of jacobians, maxima and minima of functions of two variables, envelopes and evolutes.

## COURSE CONTENT:

**Unit-I**

Definite integrals and their properties, Integration of Hyperbolic functions, Reduction Formulae, Quadrature, Rectification.

**Unit-II**

Euler's theorem on homogeneous functions, Taylor's theorem for functions of two variables, Statements of Inverse and implicit function theorems and applications, Jacobians.

**Unit-III**

Envelopes, Evolutes, Maxima, Minima and Saddle points of functions of two Variables, Lagrange's undetermined multiplier method.

**Unit-IV**

Double and Triple integrals, Change of variables, Change of order of integration, applications in finding Areas and volumes.

**BOOKS PRESCRIBED:**

1. G.B. Thomas and R.L. Finey, Calculus, 9th Ed, Pearson Education, Delhi, 2005.
2. Erwin Kreyszig: Advanced Engineering Mathematics, John Wiley and Sons, 1999.
3. Shanti Narayan and P.K. Mittal: Integral Calculus, S. Chand and Co.
4. M.J. Strauss, G.L. Bradley and K.J. Smith, Calculus, 3rd Ed, Dorling Kindersley(India) P. Ltd. (Pearson Education), Delhi, 2007.

5. A text Book of Calculus: S.C.Arora and Ramesh Kumar, Pitamber Publishing Co.

**COURSE OUTCOMES:**

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

- understand the concept of theory and applications of integrals.
- finding the area of a region, volume of solids with known cross section, centre of gravity, mass and momentum of bodies.
- get familiar with the properties and geometric interpretation of definite integrals.

# Khalsa College Amritsar

**(An Autonomous College)**
**Syllabus for**
**PROGRAMME: B.Sc. Hons. (Mathematics) Sem-II**
**COURSE CODE: BHM- 122**
**COURSE TITLE: Algebra-II**

| L | T | P | Credits |
|---|---|---|---|
| 3 | 1 | 0 | 4 |

**TOTAL HOURS: 60 hrs**
**Time: 3hrs.** **MAXIMUM MARKS: 100**
**Medium: English** **( Theory: 75**
**Internal Assessment: 25)**

## INSTRUCTIONS FOR THE PAPER SETTERS:

1. The question paper will consists 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 sudivided into atmost two parts)**. Students are to attempt any four questions in total by selecting one question from each section. Each question carries 15marks.
4. Teaching time for this paper would be six periods per week.

## COURSE OBJECTIVES:

- This course will help the students to understand the relation of roots and coefficients of polynomials.
- Students will learn the methods of solving cubic and biquadratic equations and Descarte's rule of signs.
- Students will be able to solve the problems based on consistency and inconsistency of linear equations.

## COURSE CONTENT:

**Unit-I**

Introduction to Demoivre's theorem and its applications, Exponential and Logarithmic function of complex numbers.

**Unit-II**

Expansion of trigonometric functions, Circular and hyperbolic functions and their inverses, Gregory's series, Summation of series.

**Unit-III**

Relation between the roots and coefficients of general polynomial equation in one variable. Transformation of equations and symmetric function of roots.

**Unit-IV**

Descarte's rule of signs, Newton's Method of divisors, Solution of cubic equations by Cardon's method, solution of biquadratic equations by Descarte's and Ferrari's Methods.

## BOOKS PRESCRIBED

1. K.B. Dutta: Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd., New Delhi (2002).
2. H.S. Hall and S.R. Knight: Higher Algebra, H.M. Publications, 1994.
3. Shanti Narayan and P.K. Mittal: A Text Book of Matrices, S.Chand and Co.

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

- understand the abstract ideas and they can easily learn matrix algebra, vector spaces, eigen values and eigen vectors.
- recognize consistency and inconsistency of linear equations.

- understand the fundamental properties of real numbers that lead to the formal development of Real Analysis.
- apply the abstractness of Algebra that will help the brain to think in totally new pattern.

# Khalsa College Amritsar

**(An Autonomous College)**

**Syllabus for**

**PROGRAMME: B.Sc. Hons. (Mathematics)**

## Semester-II

**PHX-121**

**Physics-II (Modern Physics)**

**Credit Hours (per week): 3**
**Credits:L T P: 2 1 0**
**Total Hours: 60**

**Time: 3 Hours** **Maximum Marks: 75**
**(Theory Marks: 56+Internal Assessment: 19)**
**Pass Marks: 35%**

**Instructions for paper setters and students:**

1. **There will be five sections.**
2. **Section A is compulsory and will be of 12 marks consisting of 8 short type questions carrying 2 mark each covering the whole syllabus. The answer should not exceed 50 words. The candidate will have to attempt 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 11 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:** To attain a comprehensive understanding of the fundamental aspects of modern physics. Understand the basic ideas of quantum Physics through concepts and theories of $20^{th}$ 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 Brogile'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 $\alpha$, $\beta$ and $\gamma$ 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-Liner Optics, B.B. Laud (New Age Pub.) 2002

| 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 |

# Khalsa College Amritsar

**(An Autonomous College)**
**Syllabus for**
**PROGRAMME: B.Sc. Hons. (Mathematics) Sem-II**

CHX 121

Inorganic 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 to attempt six short questions carrying 2 marks each.
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 homoneuclear diatomic molecules and heteronuclear Diatomic molecules.charge transfer transitions, π-Acid Ligands, and Alkali metal and alkaline earth metal chelators*

## COURSE CONTENTS:

UNIT-I 15Hrs

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 15Hrs

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 15Hrs

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

UNIT-IV 15Hrs

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

## 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 |

# Khalsa College Amritsar

**(An Autonomous College)**

**Syllabus for**

**PROGRAMME: B.Sc. Hons. (Mathematics)**

**Semester-II**

**COURSE CODE: BHM-124**

**COURSE TITLE: STATISTICAL METHODS – II**

| L | T | P | Credits |
|---|---|---|---|
| 2 | 1 | 0 | 3 |

**TOTAL HOURS: 60 hrs**

**Medium: English**

**MAXIMUM MARKS: 75**

**Time: 3 Hours** **( Theory Marks: 56**

**Theory Internal Assessment: 19)**

## INSTRUCTIONS FOR THE PAPER SETTERS:

1. The question paper will consists 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 marks. Students are to attempt any six.
3. Sections–B, C, D & E will consist of two questions each**(each question should be sudivided into atmost two parts)**. Students are to attempt any four questions in total by selecting one question from each section. Each question carries 11 marks.
4. Teaching time for this paper would be six periods per week.
5. Non-programmable scientific calculator is allowed.

## COURSE OBJECTIVES:

- Students wil understand to find the best fit for a set of data points with the help of method of least square.
- It enables the students to use correlation and regression to predict the behavior of dependent variable.
- Students will use Method of association and contingency table to find the independence of the attributes.

## COURSE CONTENT:

### UNIT-I

Bivariate data, scatter diagram, covariance, Karl–Pearson's correlation coefficient and its properties, calculation of correlation coefficient from grouped data, bounds of the correlation coefficient, interpretation of the value of the correlation coefficient.

### UNIT-II

Spearman’s rank correlation coefficient, The principle of least squares, fitting of straight line, polynomials, exponential, logarithmic curve.

### UNIT-III

Regression lines, relation between correlation coefficient and regression coefficients.

### UNIT-IV

Independence and association of attributes, measures of association,contingency table.

## BOOKS PRESCRIBED:-

1. Goon, A.M. Gupta, M.K. and Dasgupta B., Fundamentals of Statistics, Vol. I, World Press, 2005.
2. Gupta, S.C. and Kapoor, V.K., Fundamentals of Mathematical Statistics, Sultan Chand and Company, 2007.

## Books Suggested for Supplementary Reading:-

1. Goon, A.M. Gupta, M.K. and Dasgupta B., Basic Statistics, World Press, 2005.
2. Gupta, S.C., Statistical Methods, Himalayan Publishing House, 2003.
3. Nagar, A.L. and Das, R.K., Basic Statistics, Oxford University Press, 2005.

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

- learn to establish linear association between two variables by using Correlation.
- find the best fit for a set of data points with the help of method of least square.
- use regression to predict the behavior of dependent variable.
- Use Method of association and contingency table to find the independence of the attributes.
- use statistical methods in the future prediction for various observations in different fields like Business Analysis, Artificial Intelligence, Financial Analysis, Fraud Detection, Share Market and Pharmaceutical Sector and other industries.

# Khalsa College Amritsar

**(An Autonomous College)**
**Syllabus for**
**PROGRAMME: B.Sc. Hons. (Mathematics) Sem-II**
**COURSE CODE: BHM-125**

**COURSE TITLE: Probability Distributions**

| L | T | P | Credits |
|---|---|---|---|
| 2 | 1 | 0 | 3 |

**TOTAL HOURS: 60 hrs**

**Medium: English** **MAXIMUM MARKS: 75**
**Time: 3 Hours** **( Theory Marks: 56**
**Theory Internal Assessment: 19)**

**INSTRUCTIONS FOR THE PAPER SETTERS:**

1. The question paper will consists 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 marks. Students are to attempt any six.
3. Sections–B, C, D & E will consist of two questions each**(each question should be sudivided into atmost two parts)**. Students are to attempt any four questions in total by selecting one question from each section. Each question carries 11marks.
4. Teaching time for this paper would be six periods per week.
5. Non-programmable scientific calculator is allowed.
6. Teaching time for theory paper would be six periods per week and two periods per week for practical.

**COURSE OBJECTIVES:**

- Students will apply the Probability Distributionsin real life situations such as Business Analysis, Artificial Intelligence, Financial Analysis, Fraud Detection etc.
- Students will realize difference between discrete and continuous distributions.
- Students will know about distributions to study the behavior of two random variables

**COURSE CONTENT:**

**Unit–I**

Discrete Distributions: Uniform distribution, Bernoulli distribution, Binomial distribution, Poisson distribution, Poisson distribution as limiting form of Binomial distribution, Fittings of Binomial and Poisson distributions,

**Unit–II**

Geometric distribution, Pascal distribution and Hyper geometric distribution. Properties, expected value, variance and moment generating functions of these distributions.

**Unit–III**

Continuous Distributions: Normal distribution, Fitting of normal distribution, Exponential distribution, Uniform distribution.

**Unit–IV**

Gamma distribution, Beta distribution. The properties of these distribution including their expected values, variances and moment generating functions

**BOOKS PRESCRIBED:-**

1. Meyer, P.L. Introductory Probability and Statistical Applications, Addison—Wesley, (1970).
2. Hogg. R.V., Mcken, J.W. and Craig. A.T., Introduction to Mathematical Statistics, Pearson Education, 2007.

**Books Suggested for Supplementary Reading:-**

1. Biswal, P.C., Probability and Statistics, Prentice Hall, India, 2007.
2. Ross, S.A. First Course in Probability, Sixth Edition, Pearson Education, 2007.
3. Miller, I, and Miller, M. Mathematical Statistics with Applications, Seventh Edition, Pearson Education, 2007.

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

- to differentiate discrete and continuous distributions.
- know about distributions to study the behavior of two random variables.
- study the discrete distributions such as Bernoulii, Binomial, Poisson etc.
- Learn about Continuous distributions such as Exponential, Normal, uniform etc. will be studied in this course.

# Khalsa College Amritsar

**(An Autonomous College)**
**Syllabus for**
**PROGRAMME: B.Sc. (Hons.) Maths**
**SEMESTER – II**
**COMMUNICATIVE ENGLISH-II**
**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)

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**Semester-II**

Compulsory Course

**ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ**

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

| Course title & Code | Credits | Credit distribution | | | Total Marks 100 | | Time Allowed in Exam | Eligibility criteria | Pre- requisite of the course (if any) |
|---|---|---|---|---|---|---|---|---|---|
| | | Lecture | Tutorial | Practical | Theory | Internal Assessment | | | |
| **ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ**<br>**BHPB-1201** | 4 | 3 | 1 | 0 | 75 | 25 | 3 Hours | Class 12th pass in any stream | -- |

| **ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective** | **ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)** |
|---|---|
| ▪ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕਰਨਾ।<br>▪ ਆਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ।<br>▪ ਵਿਦਿਆਰਥੀ ਨੂੰ ਦਫ਼ਤਰੀ ਅਤੇ ਘਰੇਲੂ ਚਿੱਠੀ ਪੱਤਰ ਤੋਂ ਜਾਣੂ ਕਰਵਾਉਣਾ।<br>▪ ਭਾਸ਼ਾਈ ਗਿਆਨ ਵਿਚ ਵਾਧਾ ਕਰਨਾ। | ▪ ਉਸ ਅੰਦਰ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪ੍ਰਫੁਲਿੱਤ ਹੋਣਗੀਆਂ।<br>▪ ਉਸ ਅੰਦਰ ਸਾਹਿਤ ਸਿਰਜਣਾ ਦੀ ਸੰਭਾਵਨਾ ਵਧੇਗੀ।<br>▪ ਵਿਦਿਆਰਥੀ ਚਿੱਠੀ-ਪੱਤਰ ਦੀ ਲਿਖਣ ਸ਼ੈਲੀ ਤੋਂ ਜਾਣੂ ਹੋਵੇਗਾ।<br>▪ ਉਹ ਭਾਸ਼ਾਈ ਬਣਤਰ ਤੋਂ ਜਾਣੂ ਹੋਵੇਗਾ। |

## 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। 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 ਅਸੈੱਸਮੈਂਟ 25 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। 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 ਮੁੱਢਲੇ ਸੰਕਲਪ
(ਅ) ਸ਼ਬਦ-ਸ਼੍ਰੇਣੀਆਂ

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**Semester-II**

Compulsory Course

**ਮੁਢਲੀ ਪੰਜਾਬੀ**

(In Lieu of Compulsory Punjabi)

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

| Course title & Code | Credits | Credit distribution | | | Total Marks 100 | | Time Allowed in Exam | Eligibility criteria | Pre-requisite of the course (if any) |
|---|---|---|---|---|---|---|---|---|---|
| | | Lecture | Tutorial | Practical | Theory | Internal Assessment | | | |
| **ਮੁਢਲੀ ਪੰਜਾਬੀ**<br><br>**BPBI-1202** | 4 | 3 | 1 | 0 | 75 | 25 | 3 Hours | Class 12th pass in any stream | |

**ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective**

- 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।

**ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)**

- ਉਹ ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਲ ਕਰਕੇ ਭਾਸ਼ਾਈ ਗਿਆਨ ਨੂੰ ਵਿਕਸਿਤ ਕਰਨਗੇ।
- ਪੰਜਾਬੀ ਸ਼ਬਦ-ਰਚਨਾ ਸੰਬੰਧੀ ਮੁਹਾਰਤ ਹਾਸਲ ਕਰਨਗੇ।
- ਵਿਦਿਆਰਥੀ ਸ਼ਬਦਾਂ ਦੀਆਂ ਭਿੰਨ-ਭਿੰਨ ਕਿਸਮਾਂ ਤੋਂ ਜਾਣੂ ਹੋਵੇਗਾ।
- ਵਿਦਿਆਰਥੀਆਂ 'ਚ ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ ਭੰਡਾਰ 'ਚ ਵਾਧਾ ਹੋਵੇਗਾ।

**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। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਦੂਸਰੇ ਭਾਗ ਵਿਚ, ਸਿਲੇਬਸ ਦੇ ਪਹਿਲੇ ਭਾਗ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨਾਂ 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 ਜਿੰਨਾਂ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ 8-8 ਅੰਕ ਹੋਣਗੇ। ਭਾਗ ਚੌਥੇ ਵਿਚ ਪੰਜ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨਾਂ ਵਿਚੋਂ ਚਾਰ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ 4-4 ਅੰਕ ਹੋਣਗੇ। ਭਾਗ ਪੰਜਵੇਂ ਵਿਚ ਤਿੰਨ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨਾਂ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ 8-8 ਅੰਕ ਹੋਣਗੇ।

**ਨੋਟ:** ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ 25 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। 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/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, 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**

# Khalsa College Amritsar

**(An Autonomous College)**

**Syllabus for**

**PROGRAMME: B.Sc. Hons. (Mathematics) SEM-II**

## Semester-II

**PHX-122**

**Physics Lab-II**

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

| L | T | P | Credits |
|---|---|---|---|
| 0 | 0 | 1 | 1 |

**Total Hours: 30**

**Time: 3 Hours** **Maximum Marks:25**

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

**Pass Marks: 35%**

**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.



| 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. |

# Khalsa College Amritsar

**(An Autonomous College)**

**Syllabus for**

**PROGRAMME: B.Sc. Hons. (Mathematics) SEM-II**

CHX 122

Inorganic Chemistry Lab-II

**Total Hours/week: 2** **Maximum Marks: 25**
**Total Credits: 1** **Practical: 19**
**L T P** **Internal Assessment: 06**
**0 0 1**

**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. |

# Khalsa College Amritsar

**(An Autonomous College)**

**Syllabus for**

**PROGRAMME: B.Sc. Hons. (Mathematics) Sem-II**

**COURSE CODE: BHM-126**

**COURSE TITLE: Practical based on Paper Statistical Methods–II And Probability Distributions**

| L | T | P | Credits |
|---|---|---|---|
| 0 | 0 | 2 | 2 |

**Medium: English** **TOTAL HOURS: 45 hrs**

**Time: 2 Hours** **MAXIMUM MARKS: 50**

**(Practical Marks: 38**

**Internal Assesment Practical: 12)**

## INSTRUCTION FOR PAPER SETTER:

Students are required to prepare a practical note book with at least 30 exercises based upon the above list. At the end of semester, there is a practical examination jointly conducted by two examiners (one is internal and other one is external). External examiner is appointed by the principal of the college. This practical examination will cover a written test followed by a viva-voce to test the practical knowledge of students about the contents. The candidates are allowed to use Non–Programmable calculators.

Teaching time for practical paper would be two period per week per paper.

## COURSE OBJECTIVES:

- Students wil understand to find the best fit for a set of data points with the help of method of least square.
- It enables the students to use correlation and regression to predict the behavior of dependent variable.
- Students will realize difference between discrete and continuous distributions.

## COURSECONTENT:

**List of practical exercises**

1. Exercises on calculation of Karl Pearsons correlation coefficient
2. Exercises on calculation of Spearman's rank correlation coefficient
3. Exercises on fittings of regression lines, polynomials, exponential and logarithmic curves.
4. Exercises on fittings of Binomial, Poisson and Normal Distributions
5. Exercises on calculation of probabilities for Binomial, Poisson and Normal Distributions

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

- find the best fit for a set of data points with the help of method of least square.
- use regression to predict the behavior of dependent variable
- to differentiate discrete and continuous distributions.
- know about distributions to study the behavior of two random variables.
- study the discrete distributions such as Bernoulii, Binomial, Poisson etc.

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# Khalsa College Amritsar

**(An Autonomous College)**

**Syllabus for**

**PROGRAMME: B.Sc. Hons. (Mathematics) SEM-II**

**COURSE CODE: BHM-123**

**COURSE TITLE:Math Lab-II**

**L T P: 2 0 2**

**CREDIT HOURS(PER WEEK):4**

**TOTAL HOURS: 60 hrs**

**MAXIMUM MARKS**: 100

**(Theory: 75+Internal Assesment**: 25**)**

## COURSE OBJECTIVES:

- To acquire the knowledge of MATLAB technical computing environment.
- To enable the students to use MATLAB in sketching of 3-dimensional graphs in fraction of seconds
- To help the students to convert the theoretical concepts of integrals to algorithms in MATLAB for their applications in real life.

## COURSE CONTENT:

## List of Practical's (using any software):-

(a) Trape (a) Trapezoidal rule.

(b) Simpson's 1/3rd and 3/8th rule.

(c) Prismoidal rule.

(d) Sketching ellipsoid, hyperboloid of one and two sheets, elliptic cone, elliptic, parabolic,
hyperbolic paraboloid using Cartesian coordinates.

(e) Area enclosed by curves.

**BOOKS PRESCRIBED:**

1. Shastry, S.S. Introductory Methods of Numerical Analysis. New Delhi: PHI Learning
Private Limited, 2005. Print.

2. Mathews, John H., and D. Fink Kurtis. Numerical Methods using Matlab, 4th Ed.
New Delhi: PHI Learning Private Limited, 2012. Print.

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

- develop a basic understanding of MATLAB for its usage in higher learning.
- have a precise direction from theoretical learning to computational techniques.
- use MATLAB in sketching of 3-dimensional graphs in fraction of seconds
- convert the theoretical concepts of integrals to algorithms in MATLAB for their applications in real life.

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# Khalsa College Amritsar

**(An Autonomous College)**
**Syllabus for**
**PROGRAMME: B.Sc. Hons. (Mathematics) SEM-II**
**SEMESTER–II**

# Course Code: ZDA121

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

Credit hrs/wk.: 2
Time: 3 Hours Max. 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. |