

PG DEPARTMENT OF ECONOMICS

B.SC (ECONOMICS)

PROGRAMME OUTCOMES

After successful completion of three year degree program B.Sc (Economics), a student will be capable of:

- Applying economic principles to real world situation conducting research and communicating their findings effectively.
- Get familiar with the techniques of collection as well as analysis of data. They will get acquainted with the various sources of primary data and secondary data collection.
- Get knowledge about the problems of the economy in terms of high rate of population, poverty, unemployment etc. and develop critical thinking of the students.
- Understand the techniques to find solution of various economic issues and make them aware about how the scarce economic resources of the economy can be optimally utilized.
- They may develop skills in data analysis financial modelling and understanding global economic issues.

COURSE OUTCOMES

B.SC (ECONOMICS) - SEM I

1. English

- Linguistic Proficiency
- Vocabulary Enhancement
- Grammatical Correctness
- Appreciation of literature
- Inculcation of moral and social values through literary studies

2. Punjabi

- ਪੁਸਤਕ 'ਦੋ ਰੰਗ' ਵਿਚਲੇ ਕਵਿਤਾ ਭਾਗ ਦੇ ਵਿਭਿੰਨ ਆਧੁਨਿਕ ਕਵੀਆਂ ਦੀਆਂ ਕਵਿਤਾਵਾਂ ਦੇ ਪਾਠ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਵਿੱਚ ਵਧੇਰੇ ਸਾਹਿਤ ਪੜ੍ਹਨ ਅਤੇ ਲਿਖਣ ਦੀ ਚਿਣਗ ਪੈਦਾ ਹੁੰਦੀ ਹੈ। ਇਹਨਾਂ ਕਵਿਤਾਵਾਂ ਦੇ ਅਧਿਐਨ ਰਾਹੀਂ ਮਨੁੱਖੀ ਮਨ ਦੇ ਵਿਭਿੰਨ ਪੱਖਾਂ-ਪਾਸਾਰਾਂ ਨੂੰ ਸਮਝਣ ਦੀ ਯੋਗਤਾ ਪੈਦਾ ਹੁੰਦੀ ਹੈ।
- 'ਸੰਸਾਰ ਦੀਆਂ ਪ੍ਰਸਿੱਧ ਹਸਤੀਆਂ' ਪੁਸਤਕ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਸੰਸਾਰ ਭਰ ਦੀਆਂ ਅਧਿਆਤਮਿਕ, ਧਾਰਮਿਕ, ਰਾਜਨੀਤਿਕ, ਇਤਿਹਾਸਕ ਅਤੇ ਸਮਾਜ ਸੁਧਾਰਕ ਸ਼ਖਸੀਅਤਾਂ ਦੇ ਜੀਵਨ ਅਤੇ ਸਮਾਜ ਪ੍ਰਤੀ ਦੇਣ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਦਾਨ ਕਰਨ ਲਈ ਸਰੋਤ ਮੁਹੱਈਆ ਕਰਵਾਉਂਦੀ ਹੈ। ਇਹਨਾਂ ਉੱਪਰੋਕਤ ਹਸਤੀਆਂ ਸੰਬੰਧੀ ਪ੍ਰਾਪਤ ਜਾਣਕਾਰੀ ਵਿਦਿਆਰਥੀਆਂ ਵਿੱਚ ਸਮਾਜਿਕ ਜ਼ਿੰਮੇਵਾਰੀ ਦੇ ਸਾਹਿਸ ਪੈਦਾ ਕਰਦੀ ਹੈ।
- ਪੈਰਾ ਰਚਨਾ ਅਤੇ ਪੈਰਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਵਿਦਿਆਰਥੀਆਂ ਵਿੱਚ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਪੜ੍ਹਨ ਤੇ ਲਿਖਣ ਦੀ ਯੋਗਤਾ ਪੈਦਾ ਹੋਣ ਦੇ ਨਾਲ ਨਾਲ ਸਾਹਿਤਿਕ ਰੁਚੀਆਂ ਵੀ ਵਿਕਸਿਤ ਹੁੰਦੀਆਂ ਹਨ।

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- ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ ਦੇ ਅਧਿਅਨ ਰਾਹੀਂ ਟਕਸਾਲੀ ਭਾਸ਼ਾ, ਭਾਸ਼ਾ ਤੇ ਉਪ ਭਾਸ਼ਾ ਦਾ ਅੰਤਰ ਅਤੇ ਪੰਜਾਬੀ ਦੀਆਂ ਵਿਭਿੰਨ ਉਪ ਭਾਸ਼ਾਵਾਂ ਦੀ ਪਛਾਣ ਕਰਨ ਦੀ ਸਮਝ ਵਿਕਸਿਤ ਹੁੰਦੀ ਹੈ। ਇਸਤੋਂ ਇਲਾਵਾ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਜਨਮ ਅਤੇ ਵੱਖ-ਵੱਖ ਵਿਕਾਸ ਪੜਾਵਾਂ ਦੀ ਜਾਣਕਾਰੀ ਮਿਲਦੀ ਹੈ।

2A. Basic Punjabi

- ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਪੜ੍ਹਨ ਤੇ ਲਿਖਣ ਦਾ ਗਿਆਨ ਹੁੰਦਾ ਹੈ।
- ਪੰਜਾਬੀ ਸਾਹਿਤ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਦਾਨ ਹੁੰਦੀ ਹੈ।
- ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਮਾਤ੍ਰਾਵਾਂ ਦੀ ਵਰਤੋਂ ਦਾ ਗਿਆਨ ਹੁੰਦਾ ਹੈ।
- ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਭਾਸ਼ਾਈ ਯੋਗਤਾ ਵਿਕਸਿਤ ਹੁੰਦੀ ਹੈ।
- ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਭਾਸ਼ਾ ਦੀ ਮੁੱਢਲੀ ਸ਼ਬਦਾਵਲੀ ਦਾ ਗਿਆਨ ਪ੍ਰਾਪਤ ਹੁੰਦਾ ਹੈ।

2B. Punjab History & Culture

- Understand the region's river, like the Indus, influenced settlement patterns, agricultural practices and trade routes, invasions, migrations and the formation of civilizations can provide insights into the historical development of the Punjab.
- Understand the various historical sources, including archaeological findings, inscriptions and ancient texts to reconstruct the past accurately.
- Understanding urban planning, efficient drainage system, multi-story buildings, artifacts, Agriculture, advanced irrigation system, crafts, including pottery and metal work.
- Understanding the migration patterns and settlements of the Indo-Aryans into the Indian Subcontinent.
- Understanding the dynamic changes in social & economic life during the Rigvedic and Later Rigvedic Periods.
- Both Buddhism & Jainism left a lasting impact on the cultural, moral & artistic landscape of Punjab. The teaching of compassion, non-violence & ethical conduct from these traditions contributed to the broader philosophical and religious diversity of the region.
- The remnants of Buddhism and Jain archaeological sites in Punjab bear witness to the historical presence and influence of these ancient Indian religions.

3. Economics

- Understand consumer decision making and consumer behaviour.
- Learn how the scarce resources of the economy can be used in an optimal way
- Analyze economic decision making at individual level and get a solid understanding of microeconomics concepts like supply and demand.
- Get knowledge about different market structures including perfect competition, monopoly and determination of price and quantities in these markets.

4. Quantitative techniques

- Learn about Sets, its properties and various applications
- Learn about Relations, its properties and various applications

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- Learn about coordinate Geometry, Linear Equations, Quadratic, its properties and various applications
- Learn about AP, GP, its properties and various applications
- Learn about Derivatives, its properties and various applications

5. Maths

a. Paper I (Algebra)

- Understand the concept of rank of a matrix and its application to solve linear equations.
- Understand Eigen values, Eigen vectors, Cayley Hamilton Theorem and its applications to find inverse of matrix
- Understand and apply the concept of Definite, semi-definite and indefinite quadratic form.
- Understand relation between roots and coefficient, transformation of equations and its applications to solve cubic and biquadratic equations.

b. Paper II (Calculus and Trigonometry)

- Understand real number system and its properties.
- Learn about limits of functions & Continuous Functions
- Learn about principles of uniform continuity to analyze the behaviour of functions
- Learn about Differentiation of hyperbolic functions
- Understand and apply successive differentiation to functions
- Understand Leibnitz theorem to compute higher-order derivatives.
- Learn to Utilize Taylor's and Maclaurin's theorems along with their remainders for function approximation.
- Learn to Identify and evaluate functions that result in indeterminate forms
- Learn about De-Moivre's Theorem and its applications
- Learn to Differentiate and integrate functions involving complex variables
- Learn To Expand trigonometric functions using series representations
- Understand and apply Gregory's series and other methods for the summation of series.

6a. Computer Application

- Gain a foundational understanding of computers and their applications.
- Understand the key components of a computer system.
- Develop proficiency in using the Windows 7 operating system.
- Acquire skills in using Microsoft Word for document processing.
- Develop proficiency in creating and delivering presentations using Microsoft PowerPoint.

6b. Computer Science

- Gain a foundational understanding of computers and their applications.
- Understand the key components of a computer system.
- Develop proficiency in using the Windows 7 operating system.

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- Acquire skills in using Microsoft Word for document processing.
- Develop proficiency in creating and delivering presentations using Microsoft PowerPoint.
- Acquire skills in using Microsoft excel for document processing.

B.SC (ECONOMICS) - SEM II

1. English

- Linguistic Proficiency
- Vocabulary Enhancement
- Grammatical Correctness
- Appreciation of literature
- Inculcation of moral and social values through literary studies

2. Punjabi

- ਪੁਸਤਕ 'ਦੇ ਰੰਗ' ਵਿਚਲੇ ਕਹਾਣੀ ਭਾਗ ਦੇ ਵੱਖ-ਵੱਖ ਪੰਜਾਬੀ ਕਹਾਣੀਕਾਰਾਂ ਦੀਆਂ ਕਹਾਣੀਆਂ ਦੇ ਕਹਾਣੀ-ਪਾਠ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਵਿੱਚ ਸਾਹਿਤ ਨੂੰ ਪੜ੍ਹਨ ਅਤੇ ਸਮਝਣ ਦੀ ਸੂਝ ਵਿਕਸਿਤ ਹੁੰਦੀ ਹੈ। ਇਸਤੋਂ ਇਲਾਵਾ ਇਹ ਕਹਾਣੀਆਂ ਵੱਖ-ਵੱਖ ਸਮਾਜਕ ਸਮੱਸਿਆਵਾਂ ਦੇ ਹੱਲ ਤਲਾਸ਼ਣ ਪ੍ਰਤੀ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਜਾਗਰੂਕ ਕਰਦੀਆਂ ਹਨ।
- 'ਸੰਸਾਰ ਦੀਆਂ ਪ੍ਰਸਿੱਧ ਹਸਤੀਆਂ' ਪੁਸਤਕ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਸੰਸਾਰ ਭਰ ਦੀਆਂ ਅਧਿਆਤਮਿਕ, ਧਾਰਮਿਕ, ਰਾਜਨੀਤਿਕ, ਇਤਿਹਾਸਕ ਅਤੇ ਸਮਾਜ ਸੁਧਾਰਕ ਸ਼ਖਸੀਅਤਾਂ ਦੇ ਜੀਵਨ ਅਤੇ ਸਮਾਜ ਪ੍ਰਤੀ ਦੇਣ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਦਾਨ ਕਰਨ ਲਈ ਸਰੋਤ ਮੁਹੱਈਆ ਕਰਵਾਉਂਦੀ ਹੈ। ਇਹਨਾਂ ਉੱਘੀਆਂ ਹਸਤੀਆਂ ਸੰਬੰਧੀ ਪ੍ਰਾਪਤ ਜਾਣਕਾਰੀ ਵਿਦਿਆਰਥੀਆਂ ਵਿੱਚ ਸਮਾਜਿਕ ਜ਼ਿੰਮੇਵਾਰੀ ਦਾ ਅਹਿਸਾਸ ਪੈਦਾ ਕਰਦੀ ਹੈ।
- ਸ਼ਬਦ ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ ਰਚਨਾ ਦੇ ਅਧਿਐਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਭਾਸ਼ਾ ਸਮਰਥਾ ਵਿਚ ਵਾਧਾ ਹੋਣ ਦੇ ਨਾਲ-ਨਾਲ ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾ ਦੇ ਮੁੱਢਲੇ ਸੰਕਲਪਾਂ ਬਾਰੇ ਜਾਣਕਾਰੀ ਹਾਸਲ ਹੁੰਦੀ ਹੈ ਅਤੇ ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ ਦੇ ਅਧਿਐਨ ਰਾ ਹੀਂ ਪੰਜਾਬੀ ਵਿਆਕਰਨ ਦੇ ਮੁੱਢਲੇ ਨਿਯਮਾਂ ਦੀ ਜਾਣਕਾਰੀ ਮਿਲਦੀ ਹੈ।
- ਦਫ਼ਤਰੀ ਚਿੱਠੀ ਪੱਤਰ ਨੂੰ ਸਮਝਣ ਨਾਲ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਦਫ਼ਤਰੀ ਕੰਮਕਾਜ ਕਰਾਉਣ ਲਈ ਲੋੜੀਂਦੇ ਪੱਤਰ ਵਿਹਾਰ ਵਿਚ ਸਹਾਇਤਾ ਮਿਲਦੀ ਹੈ। ਅਖਾਣ ਅਤੇ ਮੁਹਾਵਰਿਆਂ ਦੇ ਅਧਿਐਨ ਅਤੇ ਅਭਿਆਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਭਾਸ਼ਾ ਸਮਰਥਾ ਵਿਚ ਵਾਧਾ ਹੁੰਦਾ ਹੈ।

2A. Basic Punjabi

- ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਭਾਸ਼ਾ ਦੀ ਅੰਦਰੂਨੀ ਬਣਤਰ ਸੰਬੰਧੀ ਗਿਆਨ ਪ੍ਰਾਪਤ ਹੁੰਦਾ ਹੈ।
- ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਸੋਚਣ ਸ਼ਕਤੀ ਵਿਚ ਵਾਧਾ ਹੁੰਦਾ ਹੈ।
- ਵਿਦਿਆਰਥੀ ਕਿਸੇ ਵੀ ਵਿਸ਼ੇ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਕਰਨ ਦੇ ਕਾਬਲ ਹੁੰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀ ਵਿਆਕਰਨਕ ਨੇਮ ਵਿਧਾਨਾਂ ਤੋਂ ਜਾਣੂ ਹੁੰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਸਾਹਿਤ ਪੜ੍ਹਨ ਦੀ ਰੁਚੀ ਵਧਦੀ ਹੈ ਅਤੇ ਉਹ ਸਮਾਜ ਨੂੰ ਚੰਗੀ ਸੋਚ ਦੇਣ ਦੇ ਸਮਰੱਥ ਹੁੰਦੇ ਹਨ।

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2B. Punjab History & Culture

- Understanding the Alexander's conquests led to the creation of the largest empires in history, the spread of Greek culture, art, architecture, philosophy & language.
- Understanding the influence of Mauryan rule, especially during the reign of Ashoka, contributed to the cultural, economic and administrative development of the region.
- Understanding the Kushans, through their interaction and rule, left a lasting imprints on Punjab's cultural, religious and economic landscape.
- Understanding the impact of political stability, economic prosperity, cultural flourishing & a period of relative peace and progress under the Gupta Empire on Punjab.
- Understanding the Vardhana Empire who ruled over the northern regions, figures, social structures and Hindu religion practices.
- Understanding the development and consolidation of distinct socio-cultural identities within the diverse population of Punjab.
- Provide the comprehensive perspective on the development of language and education in Taxila, offering insight into the intellectual vibrancy and academic pursuits of this ancient educational centre.
- Understanding the frame work for comprehensively studying the development of art , architecture, multidimensional nature of these creative endeavors and their impact on societies.

3. Economics

- Get a complete understanding of various macroeconomic variables and Say's Law of market.
- Learn about money and its role in the economy and how credit is created and controlled in the economy.
- Analyze the trade off between unemployment and inflation and role of fiscal policy and monetary policy in controlling inflation.
- Develop analytical thinking regarding the occurrence of trade cycles in the economy.

4. Quantitative techniques

- Learn about statistics, its properties and various applications
- Learn about Central Tendency, its properties and various applications
- Learn about Correlation, Regression, its properties and various applications
- Learn about skewness and kurtosis, its properties and various applications
- Learn about Time Series, its properties and various applications

5. Maths

a. Paper I (Calculus and Differential Equations)

- Understand and test the concavity and convexity of curves
- Gain proficiency and trace various curves

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- Understand and apply Fundamental Theorem of Integral Calculus
- Understand the concept of exact differential equations
- Understand and apply power series method, Bessel method to find series solution of differential equations

b. Paper II (Calculus)

- Understand the concept of limit, continuity and partial derivatives of a function of two variables.
- Apply the concept of Jacobian to find partial derivative of implicit function and functional dependence.
- Apply partial derivatives to find maxima and minima of a function of two or more variables.
- Learn evaluation of double and triple integration and its application to area and volume.

6a. Computer Application

- Comprehend the basics of the C programming language.
- Understand the applications and advantages of C.
- Identify and use different tokens in C, explore basic and derived data types, as well as user-defined data types, learn to declare and initialize variables in C.
- Understand unary, binary, and ternary operators, learn about operator precedence and associativity.
- Understand the concept of Functions, Array, strings and string etc.
- Introduce various storage classes and Pointers.

6b. Computer Science

- Students should gain a solid understanding of fundamental programming concepts, such as variables, data types, operators, control structures (if statements, loops), and functions.
- Develop the ability to approach problems algorithmically and implement solutions using C programming constructs.
- Introduce basic data structures like arrays and strings in C and their manipulation.
- These outcomes aim to provide students with a solid foundation in C programming, preparing them for more advanced courses and real-world application development.

B.SC (ECONOMICS) - SEM III

1. English

- Development of analytical Skills
- Ability to connect ideas and infer information accurately
- Grammar proficiency
- Vocabulary enrichment
- Inculcation of creative writing skills through close readings of Poems

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2. Punjabi

- ‘ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਵਾਰਤਕ’ ਪੁਸਤਕ ਵਿਚ ਸ਼ਾਮਲ ਵੱਖ-ਵੱਖ ਵਾਰਤਕਕਾਰਾਂ ਦੇ ਲੇਖਾਂ ਦੇ ਅਧਿਅਨ ਨਾਲ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਉਸਾਰੂ ਸੋਚ ਅਤੇ ਪਾਰਦਰਸ਼ੀ ਨਜ਼ਰੀਆ ਵਿਕਸਤ ਹੁੰਦਾ ਹੈ। ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਹੁੰਦੀਆਂ ਹਨ ਜਿਸ ਨਾਲ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਵਿਕਾਸ ਹੁੰਦਾ ਹੈ।
- ‘ਚੋਣਵੇਂ ਪੰਜਾਬੀ ਇਕਾਂਗੀ’ ਪੁਸਤਕ ਵਿਚ ਸ਼ਾਮਲ ਇਕਾਂਗੀਆਂ ਦੇ ਅਧਿਅਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਨਿੱਜੀ ਅਤੇ ਸਮਾਜਿਕ ਸਮੱਸਿਆਵਾਂ ਪ੍ਰਤੀ ਸੁਚੇਤ ਹੁੰਦੇ ਹਨ ਅਤੇ ਸਮਾਜ ਨੂੰ ਵੀ ਜਾਗਰੂਕ ਕਰਦੇ ਹਨ। ਇਸਤੋਂ ਇਲਾਵਾ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਨਾਟ ਕਲਾ ਅਤੇ ਰੰਗਮੰਚ ਪ੍ਰਤੀ ਰੁਚੀ ਪੈਦਾ ਹੁੰਦੀ ਹੈ।
- ਸੰਖੇਪ ਰਚਨਾ ਦੇ ਅਭਿਆਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਭਾਸ਼ਾਈ ਸੰਜਮ ਦੀ ਯੋਗਤਾ ਪੈਦਾ ਹੁੰਦੀ ਹੈ। ਬਹੁਤੇ ਸ਼ਬਦਾਂ ਦੀ ਥਾਂ ਇਕ ਸ਼ਬਦ ਦੀ ਵਰਤੋਂ ਦਾ ਅਭਿਆਸ ਹੁੰਦਾ ਹੈ ਅਤੇ ਵਿਸਥਾਰ ਨੂੰ ਸੰਖੇਪਤਾ ਪ੍ਰਦਾਨ ਕਰਨ ਦੀ ਜਾਚ ਆਉਂਦੀ ਹੈ। ਅਸ਼ੁੱਧ ਸ਼ਬਦਾਂ ਨੂੰ ਸ਼ੁੱਧ ਕਰਨ ਦੇ ਅਭਿਆਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਲਿਖਣ ਅਤੇ ਬੋਲਣ ਦੇ ਯੋਗ ਹੁੰਦੇ ਹਨ।
- ਮੂਲ ਵਿਆਕਰਨਕ ਇਕਾਈਆਂ ਦੇ ਅਧਿਅਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਵਿਆਕਰਨ ਦੇ ਨਿਯਮਾਂ ਨੂੰ ਸਮਝਣ ਦੀ ਯੋਗਤਾ ਪੈਦਾ ਹੁੰਦੀ ਹੈ। ਇਸਤੋਂ ਇਲਾਵਾ ਵਿਆਕਰਨ ਦੀਆਂ ਬਾਰੀਕੀਆਂ ਤੋਂ ਵਿਦਿਆਰਥੀ ਜਾਣੂ ਹੁੰਦੇ ਹਨ। ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸੰਚਾਰ ਦਾ ਹੁਨਰ ਵਿਕਸਿਤ ਹੁੰਦਾ ਹੈ।

2A. Basic Punjabi

- ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਵਿਆਕਰਨ ਦੀਆਂ ਬਾਰੀਕੀਆਂ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਾਪਤ ਹੁੰਦੀ ਹੈ।
- ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਪੜ੍ਹਨ ਤੇ ਲਿਖਣ ਦਾ ਗਿਆਨ ਹੁੰਦਾ ਹੈ।
- ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤ ਪੜ੍ਹਨ ਤੇ ਲਿਖਣ ਦੀ ਰੁਚੀ ਵਧਦੀ ਹੈ।
- ਵਿਦਿਆਰਥੀ ਅੰਗਰੇਜ਼ੀ ਭਾਸ਼ਾ ਦਾ ਪੰਜਾਬੀ ਵਿਚ ਅਨੁਵਾਦ ਕਰਨ ਦੇ ਯੋਗ ਹੁੰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਵਿਕਾਸ ਵਿਚ ਆਪਣਾ ਯੋਗਦਾਨ ਪਾਉਂਦੇ ਹਨ।

2B. Punjab History & Culture

- Understanding the Turko –Afghan rule, socio-cultural changes, the dominance of various Muslim dynasties: Ghaznavids, Ghurids.
- Understanding that the Mughals had profound impact on Punjab, cultural fusion, administrative reforms, art and literature.
- Understanding the socio-religious movement that emerged in medieval India, through its influence on Sikhism, led to the establishment of a distinct religious and social identity characterized by devotion, equality, and a commitment to social justice.
- Understanding the impact of Sufism in Punjab has led to a rich tapestry of spirituality, culture, and social values, with special reference to Baba Farid Ji, include spiritual enlightenment, contributions to culture and literature, promotion of social equality, and fostering a legacy of tolerance and interfaith harmony.
- The life and travels of Guru Nanak Dev Ji, the founder of Sikhism, had profound impacts on the spiritual, social, and cultural aspects of Sikhism, across borders and beyond, shaped Sikhism into a distinct spiritual and cultural tradition, emphasizing oneness, equality, community, and service.

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- Understanding the teachings of Guru Nanak Dev Ji, as expressed through the concepts of Sangat, Pangat, and Dharamsala, lead to the formation of a united Sikh community, the promotion of equality and humility, the practice of selfless service, and the preservation of Sikh culture and spirituality.
- The second, third, and fourth Sikh Gurus made significant contributions to the development and consolidation of Sikhism, these Gurus played pivotal roles in shaping Sikhism during its formative years.
- Understanding the compilation of Guru Adi Granth Sahib Ji and the martyrdom of Guru Arjan Dev Ji had enduring impacts on Sikhism, shaped the spiritual and cultural identity of Sikhs, providing them with a sacred scripture for guidance and inspiring them to uphold principles of justice, truth, and religious freedom.

3. Economics

- Learn about the nature of Indian Economy, status of Indian agriculture, green revolution and new agricultural strategy to be adopted to improve the agricultural backwardness of our economy.
- Understand the performance and problems of industrial development, role of small and cottage industries and also study the latest Industrial policy to enhance the productivity of industries in the economy.
- Get knowledge about the direction, composition of exports and imports, foreign capital and multinational corporations in India. They will understand the role of foreign capital in the development of the economy.
- Get knowledge about the major problems of the economy including Inflation, unemployment, poverty and inequalities and develop critical thinking about how these economic problems can be solved.

4. Quantitative techniques

- Learn about differentiation its properties and applications
- Learn about integration its properties and applications
- Learn about matrices and determinants, its properties and various applications
- Learn about Linear programming, its properties and various applications

5. Maths

a. Paper I (Analysis)

- Learn about Sequences, its properties and various applications
- Learn about Series, its properties and various applications
- Learn about Riemann Integrability, its properties and various applications
- Learn about Beta Gamma functions, Improper Integrals, its properties and various applications

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b. Paper II (Analytical Geometry)

- Understand transformation of axes, shifting of origin in two and three dimensions
- Learn about joint equation of straight lines and equations of bisectors
- Learn about Parabola, its properties and various applications
- Learn about Ellipse, its properties and various applications
- Learn about Hyperbola, its properties and various applications
- Learn about Sphere, its properties and various applications

6a. Computer Application

- Understand the historical development from machine language to high-level languages through assembly, compilers, and interpreters.
- Classify operating systems into single-user and multi-user categories and explore examples of single-user systems and multi-user systems, including Unix, Xenix, and Vax/VMS.
- Understand memory management and CPU management techniques.
- Explore the features and benefits of Unix, including multi-programming, time-sharing, and multitasking.
- Understand the components of Unix, such as the Kernel and Shell.
- Understand different types of Unix shells, including Bourne, C-shell, and R-shell.

6b. Computer Science

- Understand the basics of Numerical Methods and Numerical Analysis.
- The course aims to equip students with a strong foundation in numerical methods, providing them with the skills needed to solve a variety of mathematical and engineering problems through computational approaches.
- Students should gain practical experience in implementing these methods using numerical tools and programming languages.

B.SC (ECONOMICS) - SEM IV

1. English

- Development of analytical Skills
- Ability to connect ideas and infer information accurately
- Grammar proficiency
- Vocabulary enrichment
- Inculcation of creative writing skills through close readings of Poems

2. Punjabi

- ‘ਮੇਰੀ ਜੀਵਨ ਗਾਥਾ’ ਪੁਸਤਕ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਸੱਭਿਆਚਾਰ ਦੀ ਸਾਹਿਤ ਨੂੰ ਸਮਝਣ ਅਤੇ ਪੜ੍ਹਣ ਵਿਚ ਰੁਚੀ ਪੈਦਾ ਕਰਦੀ ਹੈ। ਇਸਦੀ ਵਾਰਤਕ ਸ਼ੈਲੀ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਭਾਸ਼ਾ ਦੀ ਅੰਦਰੂਨੀ ਬਣਤਰ ਜਿਵੇਂ ਕਿ ਮੁਹਾਵਰੇਦਾਰ ਭਾਸ਼ਾ ਅਤੇ ਸ਼ਬਦਕੋਸ਼ ਨੂੰ ਸਮਝਣ ਅਤੇ ਵਰਤਣ ਵਿਚ ਮਦਦ ਕਰਦੀ ਹੈ।

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- ‘ਫ਼ਾਸਲੇ’ ਨਾਟਕ ਦੇ ਅਧਿਅਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਰੰਗਮੰਚ ਅਤੇ ਰੰਗਮੰਚੀ ਜੁਗਤਾਂ ਦਾ ਗਿਆਨ ਹੁੰਦਾ ਹੈ। ਨਾਟ ਕਲਾ ਦੇ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਨਿੱਜੀ ਅਤੇ ਸਮਾਜਕ ਮਸਲਿਆਂ ਪ੍ਰਤੀ ਸੁਚੇਤ ਹੋ ਕੇ ਸਮਾਜ ਨੂੰ ਜਾਗਰੂਕ ਕਰਨ ਦੇ ਸਮਰੱਥ ਹੁੰਦੇ ਹਨ। ਇਸਤੋਂ ਇਲਾਵਾ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਨਾਟਕ ਲਿਖਣ ਤੇ ਨਾਟਕ ਖੇਡਣ ਦੀ ਰੁਚੀ ਪ੍ਰਫੁੱਲਿਤ ਹੁੰਦੀ ਹੈ।
- ਵੱਖ-ਵੱਖ ਸਮਾਜਕ, ਸਭਿਆਚਾਰਕ, ਇਤਿਹਾਸਕ, ਅਤੇ ਵਿਦਿਅਕ ਸਰੋਕਾਰਾਂ ਸੰਬੰਧੀ ਲੇਖ ਰਚਨਾ ਵਿਦਿਆਰਥੀਆਂ ਦੇ ਬੌਧਿਕ ਵਿਕਾਸ ਵਿਚ ਵੱਡਾ ਯੋਗਦਾਨ ਪਾਉਂਦਾ ਹੈ। ਉਹਨਾਂ ਅੰਦਰ ਕਿਸੇ ਵੀ ਵਿਸ਼ੇ ’ਤੇ ਲਿਖ ਜਾਂ ਬੋਲ ਸਕਣਾ ਸੁਖਾਲਾ ਹੋ ਜਾਂਦਾ ਹੈ ਜਿਸ ਨਾਲ ਭਾਸ਼ਨ ਕਲਾ ਵਿਚ ਵੀ ਨਿਖਾਰ ਆਉਂਦਾ ਹੈ। ਅਖ਼ਬਾਰ ਦੇ ਨਿੱਜੀ ਅਤੇ ਦਫ਼ਤਰੀ ਇਸ਼ਤਿਹਾਰਾਂ ਦਾ ਅਭਿਆਸ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਆਪਣੇ ਨਿੱਜੀ ਜੀਵਨ ਵਿਚ ਅਜਿਹੀ ਲੋੜ ਦੀ ਪੂਰਤੀ ਲਈ ਯੋਗ ਬਣਾਉਂਦਾ ਹੈ।
- ਸ਼ਬਦ ਜੋੜਾਂ ਦੇ ਨਿਯਮਾਂ ਦਾ ਗਿਆਨ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਵਿਆਕਰਨ ਦੀਆਂ ਬਾਰੀਕੀਆਂ ਪ੍ਰਤੀ ਸੁਚੇਤ ਕਰਦਾ ਹੈ। ਸ਼ੁੱਧ ਭਾਸ਼ਾ ਲਿਖਣ ਅਤੇ ਪੜ੍ਹਨ ਦੀ ਯੋਗਤਾ ਪੈਦਾ ਹੁੰਦੀ ਹੈ। ਗੁਰਮੁਖੀ ਲਿੱਪੀ ਨੂੰ ਸਮਝਣ ਨਾਲ ਭਾਸ਼ਾ ਦੇ ਸ਼ਬਦ ਜੋੜਾਂ ਦੀ ਸਮੱਸਿਆ ਖ਼ਤਮ ਹੁੰਦੀ ਹੈ।

2A. Basic Punjabi

- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਨੂੰ ਪ੍ਰਭਾਵਸ਼ਾਲੀ ਢੰਗ ਨਾਲ ਵਰਤਨ ਦੇ ਯੋਗ ਹੁੰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀ ਭਾਸ਼ਾ ਦੀਆਂ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਦੇ ਸਮਰੱਥ ਹੁੰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਆਤਮ ਵਿਸ਼ਵਾਸ ਪੈਦਾ ਹੁੰਦਾ ਹੈ।
- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਨਵੇਂ ਵਾਕਾਂ ਦਾ ਨਿਰਮਾਣ ਕਰਨ ਦੇ ਯੋਗ ਹੁੰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਵਿਕਾਸ ਵਿਚ ਆਪਣਾ ਯੋਗਦਾਨ ਪਾਉਂਦੇ ਹਨ।

2B. Punjab History & Culture

- Understanding the politicization of Sikhism under Guru Hargobind resulted in a redefined Sikh identity that encompassed both spiritual and military dimensions.
- Understanding the martyrdom of Guru Tegh Bahadur, the ninth Sikh Guru, had profound consequences for Sikhism, influencing the course of Sikh history and shaping the principles of the faith. It is a testament to the commitment of Sikhs to the protection of human rights, religious freedom, and the values enshrined in Sikhism.
- The creation of the Khalsa by Guru Gobind Singh Ji, the tenth Sikh Guru, was a transformative event in Sikh history.
- Understanding the creation of Khalsa impacting sikh identity, principles, and the historical & cultural landscape of Punjab.
- Understanding the rise of Banda Singh Bahadur had far-reaching outcomes, including the establishment of Sikh rule, the promotion of Sikh values, religious freedom, socioeconomic changes, and the inspiration for future Sikh movements.
- Understanding the rise of the Sikh Misls, this era of the Misls played a crucial role in shaping the trajectory of Sikh political and cultural development in Punjab.
- Understanding the Ranjit Singh’s rule, consolidation of his power, civil administration, land revenue, military achievements & modernisation.

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- Understanding the dynamic cultural, social and economic aspects of the medieval Punjab.

3. Economics

- Understand the fundamental theories of international trade including comparative advantage, absolute advantage and terms of trade.
- Analyze the determinants of exchange rate fluctuations and examine the role of international institutions, such as World Trade Organizations and IMF, in regulating and promoting international trade and finance.
- Understand the concepts and principles of public finance, including revenue generation, expenditure allocation and fiscal sustainability
- Get understanding of taxation system of economy by studying principles, incidence and impact of taxation. Students will also learn about the concept of public debt, objectives, importance and burden of debt on the economy.

4. Quantitative techniques

- Learn about Multiple Linear Regression and non linear regression, its properties and various applications
- Learn about Probability its properties and various applications
- Learn about Theoretical probability distribution, its properties and various applications
- Learn about Sampling , its properties and various applications

5. Maths

a. Paper I (Statics and Vector Calculus)

- Understand principles of equilibrium, analyzing forces and moments on rigid bodies and applications
- Understand Laws of Friction and Centre of Gravity & its applications
- Learn about Vector Differentiation and Intrgration
- Learn about Gradient, Divergence and Curl operators and line integrals
- Understand theorems of Gauss, Stokes and Green & various applications

b. Paper II (Solid Geometry)

- Learn about Cylinder, its properties and various applications
- Learn about Cone, its properties and various applications
- Learn about Ellipsoi , Hyperboloid and paraboloid , its properties and various applications
- Learn about Surfaces, Tangent lines and Tangent planes , Normals, its properties and various applications

6a. Computer Application

- Define a Database Management System (DBMS) and its role in information management and identify the components of a DBMS

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- Create Entity-Relationship (ER) diagrams to model database relationships and Understand different data models, including the Hierarchical Model, Network Model, and Relational Model.
- Explain the concept of normalization and Implement normalization up to the Third Normal Form (1NF, 2NF, 3NF).
- Familiarity with Oracle 10 SQL, including Data Definition Language (DDL), Data Manipulation Language (DML), and Data Control Language (DCL) and Utilize built-in functions in Oracle 10, including aggregate, character, and arithmetic functions.
- Apply advanced reporting techniques, such as breaking on multiple columns with different spacing.
- Use SQL Plus commands for page size, line size, pause, etc.

6b. Computer Science

- Understand elementary data organization concepts and common operations.
- Understanding the Array, Link list stack and Queue data structure.
- Understand sorting algorithms, including bubble sort, selection sort, insertion sort, quicksort, merge sort, and heap sort.
- Understanding of Object Oriented Programming concepts and its implementations

B.SC (ECONOMICS) - SEM V

1. English

- Appreciation of Literature
- Inculcation of moral and social values
- Enhancement of Creative Writing Skills
- Enhanced understanding of human nature.

2. Punjabi

- ਸੰਪਾਦਿਤ ਪੁਸਤਕ 'ਚੋਣਵੀਆਂ ਪੰਜਾਬੀ ਕਹਾਣੀਆਂ' ਵਿਚ ਦਰਜ ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਹਾਣੀਆਂ ਦੇ ਪਾਠ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਕਹਾਣੀ ਸਾਹਿਤ ਪੜ੍ਹਨ ਪ੍ਰਤੀ ਰੁਚੀ ਪ੍ਰਬਲ ਹੁੰਦੀ ਹੈ। ਕਹਾਣੀਆਂ ਵਿਚੋਂ ਚੰਗੇ ਇਨਸਾਨ ਬਣਨ ਦੀ ਪ੍ਰੇਰਨਾ ਮਿਲਦੀ ਹੈ ਅਤੇ ਵਿਦਿਆਰਥੀ ਸਮਾਜਕ ਜ਼ਿੰਮੇਵਾਰੀਆਂ ਨੂੰ ਨਿਭਾਉਣ ਅਤੇ ਚੰਗੀ ਜੀਵਨ ਜਾਚ ਸਿੱਖਣ ਦੇ ਕਾਬਲ ਬਣਦੇ ਹਨ। ਉਹ ਸਾਹਿਤ ਲਿਖਣ ਪ੍ਰਤੀ ਵੀ ਰੁਚਿਤ ਹੁੰਦੇ ਹਨ।
- 'ਏਹੁ ਹਮਾਰਾ ਜੀਵਣਾ' ਨਾਵਲ ਦਾ ਪਾਠ ਔਰਤ ਦੀ ਸਮਾਜਕ ਹੈਸੀਅਤ ਨੂੰ ਦਰਸਾਉਂਦਾ ਹੋਇਆ ਸਮਾਜ ਵਿਚ ਉਸਦੇ ਰੁਤਬੇ ਨੂੰ ਬਹਾਲ ਕਰਨ ਲਈ ਸੁਚੇਤ ਕਰਦਾ ਹੈ। ਇਸਤੋਂ ਇਲਾਵਾ ਦਲੀਪ ਕੌਰ ਟਿਵਾਣਾ ਵਰਗੀ ਇਸਤਰੀ ਨਾਵਲਕਾਰ ਦੇ ਜੀਵਨ ਤੋਂ ਮਿਲਨ ਵਾਲੀ ਪ੍ਰੇਰਨਾ ਵੀ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਮਨੁੱਖੀ ਜੀਵਨ ਮੁੱਲਾਂ ਪ੍ਰਤੀ ਸੁਚੇਤ ਕਰਦੀ ਹੈ।
- ਪੈਰਾ ਰਚਨਾ ਦੇ ਅਭਿਆਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਕਿਸੇ ਵਿਸ਼ੇ 'ਤੇ ਸੁਖੇਪ ਪਰ ਮੁੱਲਵਾਨ ਵਿਚਾਰ ਸਾਂਝੇ ਕਰਨ ਦਾ ਮੌਕਾ ਮਿਲਦਾ ਹੈ। ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਆਲੋਚਨਾ ਵਿਸ਼ੇ 'ਤੇ ਪਕੜ ਮਜ਼ਬੂਤ ਕਰਦੀ ਹੈ। ਅੰਗਰੇਜ਼ੀ

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ਪੈਰੋ ਦਾ ਪੰਜਾਬੀ ਵਿਚ ਅਨੁਵਾਦ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ ਤੇ ਭਾਸ਼ਾ ਯੋਗਤਾ ਵਿਚ ਵਾਧਾ ਕਰਦਾ ਹੈ। ਅਨੁਵਾਦ ਦੀ ਯੋਗਤਾ ਇਸ ਖੇਤਰ ਵਿਚ ਵਿਦਿਆਰਥੀਆਂ ਲਈ ਰੋਜ਼ਗਾਰ ਦੇ ਮੌਕੇ ਵੀ ਪੈਦਾ ਕਰਦੀ ਹੈ।

- ਪੰਜਾਬੀ ਧੁਨੀ ਵਿਉਂਤ ਰਾਹੀਂ ਜਿੱਥੇ ਪੰਜਾਬੀ ਧੁਨੀਆਂ ਦਾ ਵਿਗਿਆਨਕ ਅਧਿਐਨ ਭਾਸ਼ਾ ਦੇ ਵਿਗਿਆਨਕ ਪਾਸਾਰਾਂ ਵਿਚ ਵਾਧਾ ਕਰਦਾ ਹੈ ਉੱਥੇ ਵਾਕਾਤਮਕ ਜੁਗਤਾਂ ਦੇ ਅਧਿਐਨ ਨਾਲ ਵਾਕ ਵਿਚਲੇ ਸ਼ਬਦਾਂ ਦੇ ਆਪਸੀ ਸੰਬੰਧਾਂ ਦੇ ਉਜਾਗਰ ਹੋਣ ਨਾਲ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਵਿਆਕਰਨ ਪ੍ਰਤੀ ਸਮਝ ਵਿਚ ਮੁੱਲਵਾਨ ਵਾਧਾ ਹੁੰਦਾ ਹੈ।

2A. Basic Punjabi

- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਸਾਹਿਤ ਅਤੇ ਲੋਕ ਸਾਹਿਤ ਸੰਬੰਧੀ ਜਾਣਕਾਰੀ ਪ੍ਰਾਪਤ ਕਰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀ ਲੋਕ ਕਾਵਿ ਦੀਆਂ ਮਹੱਤਵਪੂਰਨ ਵੰਨਗੀਆਂ ਨੂੰ ਸਮਝਣ ਦੇ ਸਮਰੱਥ ਹੁੰਦੇ ਹਨ।
- ਪੰਜਾਬੀ ਲੋਕਨਾਚਾਂ ਦੀਆਂ ਵਿਭਿੰਨ ਵੰਨਗੀਆਂ ਦੀ ਜਾਣਕਾਰੀ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਪੰਜਾਬੀ ਰਹਿਤਲ ਦਾ ਗਿਆਨ ਵਧਾਉਂਦੀ ਹੈ।
- ਲੋਕ ਖੇਡਾਂ, ਲੋਕ ਤਮਾਸ਼ੇ ਅਤੇ ਲੋਕ ਕਲਾਵਾਂ ਦੇ ਬੁਨਿਆਦੀ ਗਿਆਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਸਮਾਜ ਤੇ ਸਭਿਆਚਾਰ ਨੂੰ ਡੂੰਘੇ ਰੂਪ ਵਿਚ ਸਮਝਣ ਦੇ ਯੋਗ ਹੁੰਦੇ ਹਨ।

2B. Punjab History & Culture

- Understand The First Anglo-Sikh War, the Treaty of Lahore, signed in 1846, which ceded significant territories to the British, established a British Resident at Lahore.
- Understand the trajectory of Punjab's history under British rule, influencing its socio-economic and political development.
- Understand the economic transformations, social changes, and the emergence of a new educated class that played a crucial role in India's struggle for independence.
- Analyse these movements collectively that played a crucial role in shaping the social, cultural, and political landscape of India, contributing to the broader struggle for independence and fostering a spirit of reform and resistance against various forms of oppression.
- Create the ability to understand the power of mass mobilization, civil disobedience, and nonviolent resistance, contributing significantly to India's eventual attainment of independence in 1947.

3. Economics

- Students get overview idea of the concepts and approaches to Economic development and further learn about the economic and non –economic factors of development. They also get the understanding of dualism and problems of unemployment.
- Students get thorough familiarity with the models of growth.
- Students understand the strategies of Economic development
- Students get acquainted with different types of planning and role of planning in underdeveloped countries.

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4. Quantitative techniques

- Attain the deeper understanding of meaning of theoretical probability distributions and their properties. They will also get the knowledge of basic concepts of hypotheses and tests of significance
- Learn about derivation of main properties of t , Z and F distributions
- Solve the numerical problems related to tests of significance based on normal deviate (Z), T , Chi-Square and F statistics.
- Get acquainted with the Analysis of Variance techniques which is highly used in Agronomical data as well as natural, social and physical sciences.

5. Maths

a. Paper I (Dynamics)

- To demonstrate a clear understanding of rectilinear motion with uniform acceleration
- Explain Newton's laws of motion and their applications in solving problems.
- Solve problems involving the motion of interconnected particles.
- Analyze motion along smooth inclined plane and Apply principles of force and acceleration on inclined surfaces.
- Apply calculus concepts to analyze variable acceleration in motion.
- Define and analyse simple harmonic motion and Apply mathematical equations to describe the displacement, velocity, and acceleration of particles in SHM.
- Understand the principles of curvilinear motion.
- Understand the key parameters influencing the trajectory of a projectile.
- Understand the motion of a simple pendulum, a conical pendulum and Apply mathematical principles to describe oscillatory motion.
- Define and calculate work, power, and energy in mechanical systems.
- Apply the principle of conservation of energy to analyze systems with conservative forces.
- Understand the gravitational potential energy and its implications in mechanical systems.

b. Paper II (Number Theory)

- Understand the results involving divisibility and greatest common divisors and its application to solve linear Diophantine equations.
- Analyze and interpret the concepts of prime numbers and prime-factorization and its applications.
- Understand and apply the concept of congruence, linear congruence and Chinese remainder theorem.
- Understand and Apply Euler-Phi function, divisor function, multiplicative function.
- Understand and apply Wilson's theorem, Fermat's theorem and Euler's theorem.

6a. Computer Application

- Gain knowledge of Bulletin Board Systems (BBS) and their historical significance.
- Develop a foundational understanding of computer networks and the Internet.

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- Acquire practical skills in using email services and web browsers.
- Acquire skills in creating and designing web pages using HTML.

6b. Computer Science

- Understand fundamental concepts like data, fields, records, files, and databases.
- Explore the structure of a Database Management System (DBMS), including different keys used in a relational system.
- Demonstrate proficiency in SQL, covering Data Definition Language (DDL), Data Manipulation Language (DML), and Data Control Language (DCL).
- Define Big Data and its challenges and opportunities.
- Introduce the basics of NoSQL databases and their role in handling large-scale data.

B.SC (ECONOMICS) - SEM VI

1. English

- Appreciation of Literature
- Inculcation of moral and social values
- Enhancement of Creative Writing Skills
- Enhanced understanding of human nature.

2. Punjabi

- ਸੰਪਾਦਿਤ ਪੁਸਤਕ ‘ਕਾਵਿ ਗੌਰਵ’ ਵਿਚਲਾ ਸੂਫੀ ਕਾਵਿ, ਗੁਰਮਤਿ ਕਾਵਿ, ਕਿੱਸਾ ਕਾਵਿ ਅਤੇ ਬੀਰ ਕਾਵਿ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਕਲਾਸੀਕਲ ਸਾਹਿਤ ਪੜ੍ਹਨ ਤੇ ਸਮਝਣ ਉਪਰੰਤ ਉਹਨਾਂ ਦੀ ਸੋਚ ਨੂੰ ਵਿਸ਼ਾਲ ਕਰਦਾ ਹੈ। ਜੀਵਨ ਪ੍ਰਤੀ ਉਹਨਾਂ ਦੀ ਸੋਚ ਵਧੇਰੇ ਉਸਾਰੂ ਹੁੰਦੀ ਹੈ।
- ‘ਧਰਤੀਆਂ ਦੇ ਗੀਤ’ ਪੁਸਤਕ ਵੱਖ-ਵੱਖ ਦੱਖਣ ਪੂਰਬੀ ਦੇਸ਼ਾਂ ਦੇ ਲੋਕਾਂ ਦੇ ਜੀਵਨ ’ਤੇ ਇਕ ਪੰਛੀ ਝਾਤ ਪਾਉਂਦਾ ਸਫ਼ਰਨਾਮਾ ਹੈ ਜਿਸਦੇ ਦੂਜੇ ਹਿੱਸੇ ਵਿਚ ਭਾਰਤ ਦੇ ਅੰਡੇਮਾਨ ਅਤੇ ਨਿਕੋਬਾਰ ਟਾਪੂਆਂ ’ਤੇ ਵਸਦੇ ਲੋਕਾਂ ਦੇ ਜੀਵਨ ਬਾਰੇ ਵਿਸਥਾਰ ਪੂਰਵਕ ਜਾਣਕਾਰੀ ਦਿੱਤੀ ਗਈ ਹੈ ਜਿਸ ਤੋਂ ਵੱਖ-ਵੱਖ ਦੇਸ਼ਾਂ ਦੇ ਸਭਿਆਚਾਰ ਦੀ ਝਲਕ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਉਹਨਾਂ ਦੇਸ਼ਾਂ ਵਿਚ ਘੁੰਮਣ ਦੀ ਤਾਂਘ ਪੈਦਾ ਕਰਦੀ ਹੈ ਅਤੇ ਇਸ ਨਾਲ ਉਹ ਸੰਸਾਰਕ ਪੱਧਰ ’ਤੇ ਇਕ ਸਾਂਝ ਸਥਾਪਤ ਕਰਦੇ ਨਜ਼ਰ ਆਉਂਦੇ ਹਨ।
- ਲੇਖ ਰਚਨਾ ਦਾ ਅਭਿਆਸ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਵਿਗਿਆਨ, ਤਕਨਾਲੋਜੀ ਅਤੇ ਚਲੰਤ ਮਸਲਿਆਂ ਸੰਬੰਧੀ ਸੂਝ ਵਧਾਉਂਦਾ ਹੈ। ਇਸਤੋਂ ਇਲਾਵਾ ਆਧੁਨਿਕ ਸਾਹਿਤ ਰੂਪਾਂ ਸੰਬੰਧੀ ਗਿਆਨ ਸਾਹਿਤ ਨੂੰ ਬੌਧਿਕ ਪੱਧਰ ’ਤੇ ਸਮਝਣਯੋਗ ਬਣਾਉਂਦਾ ਹੈ। ਵਿਦਿਆਰਥੀ ਸਾਹਿਤ ਦੀਆਂ ਵੱਖ-ਵੱਖ ਵਿਧਾਵਾਂ ਤੋਂ ਜਾਣੂ ਹੁੰਦੇ ਹਨ।
- ਕਿਸੇ ਵੀ ਭਾਸ਼ਾ ਦੀ ਗਹਿਨ ਸੂਝ ਲਈ ਉਸਦੀ ਵਿਆਕਰਨਕ ਸਮਝ ਹੋਣੀ ਬਹੁਤ ਜ਼ਰੂਰੀ ਹੈ। ਪ੍ਰਮੁੱਖ ਵਿਆਕਰਨਕ ਸ਼੍ਰੇਣੀਆਂ ਅਤੇ ਵਿਆਕਰਨਕ ਇਕਾਈਆਂ ਦਾ ਗਿਆਨ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਵਿਆਕਰਨ ਸੰਬੰਧੀ ਸਮਝ ਨੂੰ ਵਿਸਥਾਰ ਦਿੰਦਾ ਹੈ। ਇਸ ਨਾਲ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਭਾਸ਼ਾਈ ਸੰਚਾਰ ਦੀ ਯੋਗਤਾ ਵਿਚ ਵਾਧਾ ਹੁੰਦਾ ਹੈ।

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2A. Basic Punjabi

- ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੇ ਪਿਛੋਕੜ, ਭੂਗੋਲਿਕ ਸਥਿਤੀ, ਅਤੇ ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੇ ਉੱਘੜਵੇਂ ਲੱਛਣਾਂ ਦੀ ਜਾਣਕਾਰੀ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਭਿਆਚਾਰਕ ਚੇਤਨਾ ਪੈਦਾ ਕਰਦੀ ਹੈ।
- ਪੰਜਾਬ ਦੇ ਪ੍ਰਮੁੱਖ ਮੇਲੇ, ਪ੍ਰਮੁੱਖ ਤਿਉਹਾਰ ਅਤੇ ਪ੍ਰਮੁੱਖ ਧਾਰਮਿਕ ਸਥਾਨਾਂ ਦੇ ਅਧਿਐਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਲੋਕਾਂ ਦੀ ਮਾਨਸਿਕਤਾ ਨੂੰ ਵਧੇਰੇ ਚੰਗੀ ਤਰ੍ਹਾਂ ਸਮਝ ਸਕਦੇ ਹਨ।
- ਪੰਜਾਬੀਆਂ ਦੀਆਂ ਜਨਮ, ਵਿਆਹ ਤੇ ਮੌਤ ਸੰਬੰਧੀ ਰਸਮਾਂ ਰੀਤਾਂ ਦੇ ਗਿਆਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਸਮਾਜ ਦੀ ਸੰਰਚਨਾ ਦੀ ਡੂੰਘੀ ਜਾਣਕਾਰੀ ਹਾਸਲ ਕਰਦੇ ਹਨ।
- ਪੰਜਾਬੀ ਲੋਕਾਂ ਦਾ ਖਾਣ-ਪੀਣ, ਪਹਿਰਾਵਾ ਅਤੇ ਪੰਜਾਬੀਆਂ ਦੇ ਲੋਕ ਵਿਸ਼ਵਾਸਾਂ ਦੇ ਗਿਆਨ ਦੀ ਰੋਸ਼ਨੀ ਵਿਚ ਵਿਦਿਆਰਥੀ ਵਧੇਰੇ ਗੰਭੀਰਤਾ ਨਾਲ ਪੰਜਾਬ ਦੀ ਲੋਕਧਾਰਾ ਅਤੇ ਸਭਿਆਚਾਰ ਸੰਬੰਧੀ ਵਿਚ ਰੁਚੀ ਲੈਂਦੇ ਹਨ।

2B. Punjab History & Culture

- Understand the partition and historical complexities and enduring effects of the partition on Punjab, massive migration, displacement of population and immense human suffering.
- Understand the long-term process of rebuilding lives and communities in Punjab after the traumatic events of partition.
- Understanding the historical context and consequences of the Punjabi Suba movement and the reorganization of states in 1966.
- Create ability to understanding the multifaceted impact of the Green Revolution on Punjab's agriculture, economy, and society.
- Understand the diverse and dynamic impact of the Punjabi diaspora on both the countries they reside in and the cultural changes of Punjab itself.
- Understand the multifaceted development of education and cultural expression in Punjab after independence.
- Understand the comprehensive strategies and interventions to address the complex and interconnected issues of drug addiction and female foeticide in Punjab.

3. Economics

- Students learn the elementary idea of sets and function along with their economic applications.
- Students get acquainted with the knowledge of central tendency and dispersion
- Students get in depth knowledge about the concept of correlation and regression.
- Students learn about about various quantities for describing the price level and cost of living index. They learn about concepts and methods of interpolation.

4. Quantitative techniques

- Understand the key concepts and principles of econometrics, including linear regression model, hypotheses testing, and statistical inference. Learn to apply these techniques to real world economic data.
- Estimate and interpret econometric models using general linear regression model, concepts of R2 and tests of significance.

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- Understand the reasons, testing and solution of econometric problems of heteroscedasticity and Multi collinearity in the regression analysis.
- Analyze the problem and solution of auto correlation in regression analysis.
- Students will also learn about the dummy variable techniques and its uses in real world situation.

5. Maths

a. Paper I (Linear Algebra)

- Define groups, rings, and fields with examples.
- Able to recognize the properties and operations that characterize each algebraic structure.
- Define a vector space and identify its properties. Recognize and understand subspaces, providing examples for illustration.
- Understand the concepts of linear dependence and independence in vector spaces.
- Define the basis of a vector space and understand its significance.
- Understand the existence theorem for the basis of a vector space and recognize the conditions under which a basis exists.
- Explore the dimension of the sum of two subspaces and the dimension of quotient spaces.
- Define linear transformations and explore their properties.
- State and apply the Rank-ToNullity theorem in linear algebra. Understand the relationship between the rank and nullity of a linear transformation.
- Define isomorphism and recognize its importance in linear algebra. and Identify isomorphic spaces and understand their equivalence.
- Understand the matrix representation of a linear transformation. and Learn to compute and interpret the matrix of a linear transformation.
- Define linear operators and their properties. Recognize the role of linear operators in various mathematical contexts.

b. Paper II (Numerical Analysis)

- Apply different methods to solve linear and non- linear equations.
- Apply numerical methods to obtain approximate solutions to mathematical problems.
- Find the missing data points form the given data using interpolation and extrapolation.
- Apply various methods in solving double numerical integration and ordinary differential equations.

6a. Computer Application

- Define data processing and its significance in business operations.
- Recognize the essential role of computers in various aspects of business.
- Analyze the characteristics of business organization and Explore the applications of computers in different business areas, including Payroll Systems, Inventory Control, Online Reservations, Banking, and Education.

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- Define and categorize different types of files (Master, Transaction, Work, Backup, Audit Files).
- Understand and implement iterative controls, including Simple Loops (Loop-end loop), Numeric FOR Loops, and While Loops.
- Understand and utilize utilities like Export/Import and SQL*Loader for data management.

6b. Computer Science

- Understanding of Internet Basics.
- Understand the role of Internet Service Providers (ISPs).
- Understand the concept and workings of the World Wide Web (WWW).
- Demonstrate web browsing skills, including opening, viewing, saving, printing a web page, and bookmarking.
- Introduce websites, distinguishing between static and dynamic websites.
- Understand the basics of CSS, including syntax, Add rules to a style sheet, Manage style sheets by creating, importing, and embedding them.
- Develop a basic HTML website using CSS for layout and styling.

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B.SC (COMPUTER SCIENCE)

PROGRAMME OUTCOMES

After successful completion of three year degree program B.Sc (Computer Science)), a student will be capable of:

- Proficiency in programming languages and software development methodologies.
- Ability to analyze, design, and implement algorithms and data structures.
- Competence in database management systems and software engineering principles and maintaining skills in networking and operating systems.
- Effective communication and teamwork skills in interdisciplinary settings.
- Strong foundational knowledge in chemistry and physics.
- Understanding of advanced topics in non-medical sciences such as computer science, chemistry, and physics.
- Effective communication skills, both oral and written, for presenting scientific findings and collaborating with others.
- Critical thinking abilities to evaluate scientific literature and research.

COURSE OUTCOMES

B.SC (COMPUTER SCIENCE) - SEM I

1. English

- Linguistic Proficiency
- Vocabulary Enhancement
- Grammatical Correctness
- Appreciation of literature
- Inculcation of moral and social values through literary studies

2. Punjabi

- ਪੁਸਤਕ 'ਦੋ ਰੰਗ' ਵਿਚਲੇ ਕਵਿਤਾ ਭਾਗ ਦੇ ਵਿਭਿੰਨ ਆਧੁਨਿਕ ਕਵੀਆਂ ਦੀਆਂ ਕਵਿਤਾਵਾਂ ਦੇ ਪਾਠ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਵਿੱਚ ਵਧੇਰੇ ਸਾਹਿਤ ਪੜ੍ਹਨ ਅਤੇ ਲਿਖਣ ਦੀ ਚਿਣਗ ਪੈਦਾ ਹੁੰਦੀ ਹੈ। ਇਹਨਾਂ ਕਵਿਤਾਵਾਂ ਦੇ ਅਧਿਐਨ ਰਾਹੀਂ ਮਨੁੱਖੀ ਮਨ ਦੇ ਵਿਭਿੰਨ ਪੱਖਾਂ-ਪਾਸਾਰਾਂ ਨੂੰ ਸਮਝਣ ਦੀ ਯੋਗਤਾ ਪੈਦਾ ਹੁੰਦੀ ਹੈ।
- 'ਸੰਸਾਰ ਦੀਆਂ ਪ੍ਰਸਿੱਧ ਹਸਤੀਆਂ' ਪੁਸਤਕ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਸੰਸਾਰ ਭਰ ਦੀਆਂ ਅਧਿਆਤਮਿਕ, ਧਾਰਮਿਕ, ਰਾਜਨੀਤਿਕ, ਇਤਿਹਾਸਕ ਅਤੇ ਸਮਾਜ ਸੁਧਾਰਕ ਸ਼ਖਸੀਅਤਾਂ ਦੇ ਜੀਵਨ ਅਤੇ ਸਮਾਜ ਪ੍ਰਤੀ ਦੇਣ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਦਾਨ ਕਰਨ ਲਈ ਸਰੋਤ ਮੁਹੱਈਆ ਕਰਵਾਉਂਦੀ ਹੈ। ਇਹਨਾਂ ਉੱਘੀਆਂ ਹਸਤੀਆਂ ਸੰਬੰਧੀ ਪ੍ਰਾਪਤ ਜਾਣਕਾਰੀ ਵਿਦਿਆਰਥੀਆਂ ਵਿੱਚ ਸਮਾਜਿਕ ਜ਼ਿੰਮੇਵਾਰੀ ਦਾ ਅਹਿਸਾਸ ਪੈਦਾ ਕਰਦੀ ਹੈ।
- ਪੈਰ੍ਹਾ ਰਚਨਾ ਅਤੇ ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇ ਅਭਿਆਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਵਿੱਚ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਪੜ੍ਹਨ ਤੇ ਲਿਖਣ ਦੀ ਯੋਗਤਾ ਪੈਦਾ ਹੋਣ ਦੇ ਨਤੀਜੇ ਵਜੋਂ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਵਿਕਸਿਤ ਹੁੰਦੀਆਂ ਹਨ।

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- ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ ਦੇ ਅਧਿਅਨ ਰਾਹੀਂ ਟਕਸਾਲੀ ਭਾਸ਼ਾ, ਭਾਸ਼ਾ ਤੇ ਉਪ ਭਾਸ਼ਾ ਦਾ ਅੰਤਰ ਅਤੇ ਪੰਜਾਬੀ ਦੀਆਂ ਵਿਭਿੰਨ ਉਪ ਭਾਸ਼ਾਵਾਂ ਦੀ ਪਛਾਣ ਕਰਨ ਦੀ ਸਮਝ ਵਿਕਸਿਤ ਹੁੰਦੀ ਹੈ। ਇਸਤੋਂ ਇਲਾਵਾ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਜਨਮ ਅਤੇ ਵੱਖ-ਵੱਖ ਵਿਕਾਸ ਪੜਾਵਾਂ ਦੀ ਜਾਣਕਾਰੀ ਮਿਲਦੀ ਹੈ।

2A. Basic Punjabi

- ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਪੜ੍ਹਨ ਤੇ ਲਿਖਣ ਦਾ ਗਿਆਨ ਹੁੰਦਾ ਹੈ।
- ਪੰਜਾਬੀ ਸਾਹਿਤ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਦਾਨ ਹੁੰਦੀ ਹੈ।
- ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਮਾਤ੍ਰਾਵਾਂ ਦੀ ਵਰਤੋਂ ਦਾ ਗਿਆਨ ਹੁੰਦਾ ਹੈ।
- ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਭਾਸ਼ਾਈ ਯੋਗਤਾ ਵਿਕਸਿਤ ਹੁੰਦੀ ਹੈ।
- ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਭਾਸ਼ਾ ਦੀ ਮੁੱਢਲੀ ਸ਼ਬਦਾਵਲੀ ਦਾ ਗਿਆਨ ਪ੍ਰਾਪਤ ਹੁੰਦਾ ਹੈ।

2B. Punjab History & Culture

- Understand the region's river, like the Indus, influenced settlement patterns, agricultural practices and trade routes, invasions, migrations and the formation of civilizations can provide insights into the historical development of the Punjab.
- Understand the various historical sources, including archaeological findings, inscriptions and ancient texts to reconstruct the past accurately.
- Understanding urban planning, efficient drainage system, multi-story buildings, artifacts, Agriculture, advanced irrigation system, crafts, including pottery and metal work.
- Understanding the migration patterns and settlements of the Indo-Aryans into the Indian Subcontinent.
- Understanding the dynamic changes in social & economic life during the Rigvedic and Later Rigvedic Periods.
- Both Buddhism & Jainism left a lasting impact on the cultural, moral & artistic landscape of Punjab. The teaching of compassion, non-violence & ethical conduct from these traditions contributed to the broader philosophical and religious diversity of the region.
- The remnants of Buddhism and Jain archaeological sites in Punjab bear witness to the historical presence and influence of these ancient Indian religions.

3. Computer Science

- Gain a foundational understanding of computers and their applications.
- Understand the key components of a computer system.
- Develop proficiency in using the Windows 7 operating system.
- Acquire skills in using Microsoft Word for document processing.
- Develop proficiency in creating and delivering presentations using Microsoft PowerPoint.
- Acquire skills in using Microsoft excel for document processing.

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4a. Physics

a. Paper I (Mechanics)

- Understand the concept of various co-ordinate systems and their applications, solid angle and the relationship between conservation laws and symmetries of space and time.
- Acquire knowledge of various forces in nature and their characteristics, centre of mass, the equations of motion of an object moving under central force, Kepler's Laws and explain the significance of the Michelson- Morley experiment.
- Acquire the knowledge of inertial frames of reference, Galilean transformations, and invariance.
- Get familiarize with the concept of non-inertial frames and various fictitious forces and their applications.
- Understand the concept of elastic collisions in lab. and centre of mass systems, cross section, Rutherford scattering, rigid body motion, rotational motion, principal moments and principal axes, Euler's equations, precession, and elementary gyroscope.

b. Paper II (Electricity and Magnetism)

- Understand the basic ideas of vector calculus, including gradient, divergence, curl, the application of Laplacian in different coordinate systems, Coulomb's Law, and electric fields due to various charge distributions, Gauss's Law and its applications, Gauss divergence theorem, differential form of Gauss's law and Green's theorem.
- Be able to develop the concept of work and potential difference in electrostatics, the electric potential due to different charge distributions Stoke's theorem and its applications in electrostatic field.
- Gain knowledge to solve Poisson and Laplace's equations in different coordinate- systems, concept of electrical images, and its application, current density, microscopic form of ohm's law and its failure.
- Gain knowledge regarding interaction between moving charges, force between parallel currents, the behaviour of various substances in magnetic fields, concept of M and H, and their relation to free and bound currents, the students with the concept of permeability, susceptibility, orbital motion of electrons, diamagnetism, paramagnetism, and ferromagnetism.

4b. Chemistry

a. Paper I (Inorganic Chemistry I)

- Demonstrate the ability to apply the knowledge gained in predicting and explaining chemical behavior based on periodic trends and bonding principles
- Apply Aufbau and Pauli exclusion principles, along with Hund's multiplicity rule, in determining electronic configurations
- Analyze periodic properties such as effective nuclear charge, atomic/ionic radii, ionization energy, electron affinity, and electronegativity
- Study ionic solids, close packing, ionic structure, lattice defects, semiconductors, and factors influencing solubility.

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- Understand the concept of de Broglie matter waves and Heisenberg uncertainty principle in atomic structure
- Explore covalent bonding using valence bond theory, hybridization, and VSEPR theory for predicting molecular shapes

b. Paper II (Organic Chemistry–I)

- Grasp the concepts of hybridization, bond lengths, bond angles, bond energy, and distinguish between localized and delocalized chemical bonds.
- Understand Vander Waals interactions, resonance, hyperconjugation, hydrogen bonding, and the inductive and electromeric effects.
- Demonstrate the ability to apply the acquired knowledge in predicting and explaining chemical behavior based on organic reaction mechanisms.
- Identify types of reagents such as electrophiles and nucleophiles, and recognize reactive intermediates like carbocations, carbanions, free radicals, carbenes, arenes, and nitrenes.
- Apply curved arrow notation, distinguish between half-headed and double-headed arrows, and comprehend homolytic and heterolytic bond breaking in the mechanism of organic reactions

5. Maths

a. Paper I (Algebra)

- Understand the concept of rank of a matrix and its application to solve linear equations.
- Understand Eigen values, Eigen vectors, Cayley Hamilton Theorem and its applications to find inverse of matrix
- Understand and apply the concept of Definite, semi-definite and indefinite quadratic form.
- Understand relation between roots and coefficient, transformation of equations and its applications to solve cubic and biquadratic equations.

b. Paper II (Calculus and Trigonometry)

- Understand real number system and its properties.
- Learn about limits of functions & Continuous Functions
- Learn about principles of uniform continuity to analyze the behaviour of functions
- Learn about Differentiation of hyperbolic functions
- Understand and apply successive differentiation to functions
- Understand Leibnitz theorem to compute higher-order derivatives.
- Learn to Utilize Taylor's and Maclaurin's theorems along with their remainders for function approximation.
- Learn to Identify and evaluate functions that result in indeterminate forms
- Learn about De-Moivre's Theorem and its applications
- Learn to Differentiate and integrate functions involving complex variables
- Learn To Expand trigonometric functions in powers representations
- Understand and apply Gregory's series and other methods for the summation of series.

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B.SC (COMPUTER SCIENCE) - SEM II

1. English

- Linguistic Proficiency
- Vocabulary Enhancement
- Grammatical Correctness
- Appreciation of literature
- Inculcation of moral and social values through literary studies

2. Punjabi

- ਪੁਸਤਕ 'ਦੇ ਰੰਗ' ਵਿਚਲੇ ਕਹਾਣੀ ਭਾਗ ਦੇ ਵੱਖ-ਵੱਖ ਪੰਜਾਬੀ ਕਹਾਣੀਕਾਰਾਂ ਦੀਆਂ ਕਹਾਣੀਆਂ ਦੇ ਕਹਾਣੀ-ਪਾਠ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਵਿੱਚ ਸਾਹਿਤ ਨੂੰ ਪੜ੍ਹਨ ਅਤੇ ਸਮਝਣ ਦੀ ਸੂਝ ਵਿਕਸਿਤ ਹੁੰਦੀ ਹੈ। ਇਸਤੋਂ ਇਲਾਵਾ ਇਹ ਕਹਾਣੀਆਂ ਵੱਖ-ਵੱਖ ਸਮਾਜਕ ਸਮੱਸਿਆਵਾਂ ਦੇ ਹੱਲ ਤਲਾਸ਼ਣ ਪ੍ਰਤੀ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਜਾਗਰੂਕ ਕਰਦੀਆਂ ਹਨ।
- 'ਸੰਸਾਰ ਦੀਆਂ ਪ੍ਰਸਿੱਧ ਹਸਤੀਆਂ' ਪੁਸਤਕ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਸੰਸਾਰ ਭਰ ਦੀਆਂ ਅਧਿਆਤਮਿਕ, ਧਾਰਮਿਕ, ਰਾਜਨੀਤਿਕ, ਇਤਿਹਾਸਕ ਅਤੇ ਸਮਾਜ ਸੁਧਾਰਕ ਸ਼ਖਸੀਅਤਾਂ ਦੇ ਜੀਵਨ ਅਤੇ ਸਮਾਜ ਪ੍ਰਤੀ ਦੇਣ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਦਾਨ ਕਰਨ ਲਈ ਸਰੋਤ ਮੁਹੱਈਆ ਕਰਵਾਉਂਦੀ ਹੈ। ਇਹਨਾਂ ਉੱਘੀਆਂ ਹਸਤੀਆਂ ਸੰਬੰਧੀ ਪ੍ਰਾਪਤ ਜਾਣਕਾਰੀ ਵਿਦਿਆਰਥੀਆਂ ਵਿੱਚ ਸਮਾਜਿਕ ਜ਼ਿੰਮੇਵਾਰੀ ਦਾ ਅਹਿਸਾਸ ਪੈਦਾ ਕਰਦੀ ਹੈ।
- ਸ਼ਬਦ ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ ਰਚਨਾ ਦੇ ਅਧਿਐਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਭਾਸ਼ਾ ਸਮਰਥਾ ਵਿਚ ਵਾਧਾ ਹੋਣ ਦੇ ਨਾਲ-ਨਾਲ ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾ ਦੇ ਮੁੱਢਲੇ ਸੰਕਲਪਾਂ ਬਾਰੇ ਜਾਣਕਾਰੀ ਹਾਸਲ ਹੁੰਦੀ ਹੈ ਅਤੇ ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ ਦੇ ਅਧਿਐਨ ਰਾ ਹੀਂ ਪੰਜਾਬੀ ਵਿਆਕਰਨ ਦੇ ਮੁੱਢਲੇ ਨਿਯਮਾਂ ਦੀ ਜਾਣਕਾਰੀ ਮਿਲਦੀ ਹੈ।
- ਦਫ਼ਤਰੀ ਚਿੱਠੀ ਪੱਤਰ ਨੂੰ ਸਮਝਣ ਨਾਲ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਦਫ਼ਤਰੀ ਕੰਮਕਾਜ ਕਰਾਉਣ ਲਈ ਲੋੜੀਂਦੇ ਪੱਤਰ ਵਿਹਾਰ ਵਿਚ ਸਹਾਇਤਾ ਮਿਲਦੀ ਹੈ। ਅਖਾਣ ਅਤੇ ਮੁਹਾਵਰਿਆਂ ਦੇ ਅਧਿਐਨ ਅਤੇ ਅਭਿਆਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਭਾਸ਼ਾ ਸਮਰਥਾ ਵਿਚ ਵਾਧਾ ਹੁੰਦਾ ਹੈ।

2A. Basic Punjabi

- ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਭਾਸ਼ਾ ਦੀ ਅੰਦਰੂਨੀ ਬਣਤਰ ਸੰਬੰਧੀ ਗਿਆਨ ਪ੍ਰਾਪਤ ਹੁੰਦਾ ਹੈ।
- ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਸੋਚਣ ਸ਼ਕਤੀ ਵਿਚ ਵਾਧਾ ਹੁੰਦਾ ਹੈ।
- ਵਿਦਿਆਰਥੀ ਕਿਸੇ ਵੀ ਵਿਸ਼ੇ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਕਰਨ ਦੇ ਕਾਬਲ ਹੁੰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀ ਵਿਆਕਰਨਕ ਨੇਮ ਵਿਧਾਨਾਂ ਤੋਂ ਜਾਣੂ ਹੁੰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਸਾਹਿਤ ਪੜ੍ਹਨ ਦੀ ਰੁਚੀ ਵਧਦੀ ਹੈ ਅਤੇ ਉਹ ਸਮਾਜ ਨੂੰ ਚੰਗੀ ਸੋਚ ਦੇਣ ਦੇ ਸਮਰੱਥ ਹੁੰਦੇ ਹਨ।

2B. Punjab History & Culture

- Understanding the Alexander's conquests led to the creation of the largest empires in history, the spread of Greek culture, art, architecture, philosophy & language.
- Understanding the influence of Mauryan and Gupta empires during the reign of Ashoka, contributed to the cultural, economic and administrative development of the region.

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- Understanding the Kushans, through their interaction and rule, left a lasting imprints on Punjab's cultural, religious and economic landscape.
- Understanding the impact of political stability, economic prosperity, cultural flourishing & a period of relative peace and progress under the Gupta Empire on Punjab.
- Understanding the Vardhana Empire who ruled over the northern regions, figures, social structures and Hindu religion practices.
- Understanding the development and consolidation of distinct socio-cultural identities within the diverse population of Punjab.
- Provide the comprehensive perspective on the development of language and education in Taxila, offering insight into the intellectual vibrancy and academic pursuits of this ancient educational centre.
- Understanding the frame work for comprehensively studying the development of art , architecture, multidimensional nature of these creative endeavors and their impact on societies.

3. Computer Science

- Students should gain a solid understanding of fundamental programming concepts, such as variables, data types, operators, control structures (if statements, loops), and functions.
- Develop the ability to approach problems algorithmically and implement solutions using C programming constructs.
- Introduce basic data structures like arrays and strings in C and their manipulation.
- These outcomes aim to provide students with a solid foundation in C programming, preparing them for more advanced courses and real-world application development.

4a. Physics

a. Paper I (Relativity and Electromagnetism)

- Understand the postulates of the special theory of relativity, derivations of Lorentz transformations, relativity of simultaneity, mass, length, time, velocities, the relativistic Doppler effect, and the variation of mass with velocity, mass-energy equivalence, relativistic momentum, energy concepts of Minkowski space and four vector formation.
- Be able to develop the understanding regarding Lorentz force, Biot-Savart's Law and its applications, Ampere's Circuital law and its applications, the concepts of divergence and curl of B, Hall effect, and vector potential, surface current density and its applications and transformations of E and B from one frame to another.
- Understand the concept of Faraday's Law of EM induction, displacement current, mutual inductance reciprocity theorem, self-inductance for solenoid, coupling of electrical circuits, analysis of LCR series and parallel resonant circuits, Q-factor, power consumed, and power factor in resonant circuits.
- Gain knowledge to derive Maxwell's equations, the physical significance, the behaviour of electromagnetic waves in different media including conductors and dielectrics, the

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concept of the reflection, transmission, and absorption of electromagnetic waves at boundaries for two dielectric media for normal and oblique incidence.

b. Paper II (Vibration and Waves)

- Develop the understanding of simple harmonic motion, mechanical oscillator, electrical oscillator, compound pendulum, torsional pendulums, transverse vibrations of mass on string and the composition of two perpendicular SHM of same period and period in ratio 1:2.
- Understand the effects of damping on simple harmonic oscillations, the differential equation for damped harmonic motion and explain different types of damping, determine damping coefficients (logarithmic decrement, relaxation time and Q -factors), electromagnetic damping and its applications in electrical oscillators.
- Be able to develop the concept of forced mechanical and electrical oscillators under external driving forces, the transient and steady-state behaviours of forced oscillators, the variation of displacement, velocity, phase with the frequency of driving force, the concept of resonance phenomena and calculate power supplied to oscillators, stiffness coupled oscillators, normal co-ordinates, and normal modes of vibration, inductive coupling of electrical oscillators.
- Gain knowledge regarding different types of waves, wave equation, and its solution, nature and properties of waves, derive the wave equation, and discuss its, wave propagation in different media and impedance matching, the behaviour of waves at boundaries, reflection, and transmission coefficients of amplitude and energy, standing waves on a string of fixed length, energy of vibrating string and group velocity.

4b. Chemistry

a. Paper I (Inorganic Chemistry–II)

- Understand the comparative study, including the diagonal relationship, of group's 13–17 elements, focusing on hydrides, oxides, oxyacids, and halides.
- Develop a comprehensive understanding of the chemistry of transition elements, integrating knowledge of various properties and behaviors across different series.
- Demonstrate the ability to apply acquired knowledge in predicting the relative stability of oxidation states and coordination characteristics of transition elements and their complexes.
- Analyze the various concepts of acids and bases, including Arrhenius, Bronsted-Lowry, Lux-Flood, solvent system, and Lewis.

b. Paper II (Physical Chemistry–I)

- Comprehend the postulates of the kinetic theory of gases and the deviation from ideal behavior, including van der Waal's equation of state

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- Explore critical phenomena, PV isotherms of real gases, and the isotherms of van der Waal's equation, emphasizing the law of corresponding states and the reduced equation of state.
- Explore liquid crystals, differentiating between nematic and cholesteric phases, and understand thermography and the seven-segment cell.
- Explore liquids-in-liquids (emulsions), including types, preparation, emulsifiers, and general applications of colloids.
- Understand ideal and non-ideal solutions, methods of expressing concentrations, activity, and activity coefficient.
- Investigate intermolecular forces, the structure of liquids, and the structural differences between solids, liquids, and gases

5. Maths

a. Paper I (Calculus and Differential Equations)

- Understand and test the concavity and convexity of curves
- Gain proficiency and trace various curves
- Understand and apply Fundamental Theorem of Integral Calculus
- Understand the concept of exact differential equations
- Understand and apply power series method, bessel method to find series solution of differential equations

b. Paper II (Calculus)

- Understand the concept of limit, continuity and partial derivatives of a function of two variables.
- Apply the concept of Jacobian to find partial derivative of implicit function and functional dependence.
- Apply partial derivatives to find maxima and minima of a function of two or more variables.
- Learn evaluation of double and triple integration and its application to area and volume.

B.SC (COMPUTER SCIENCE) - SEM III

1. English

- Development of analytical Skills
- Ability to connect ideas and infer information accurately
- Grammar proficiency
- Vocabulary enrichment
- Inculcation of creative writing skills through close readings of Poems

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2. Punjabi

- ‘ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਵਾਰਤਕ’ ਪੁਸਤਕ ਵਿਚ ਸ਼ਾਮਲ ਵੱਖ-ਵੱਖ ਵਾਰਤਕਕਾਰਾਂ ਦੇ ਲੇਖਾਂ ਦੇ ਅਧਿਅਨ ਨਾਲ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਉਸਾਰੂ ਸੋਚ ਅਤੇ ਪਾਰਦਰਸ਼ੀ ਨਜ਼ਰੀਆ ਵਿਕਸਤ ਹੁੰਦਾ ਹੈ। ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਹੁੰਦੀਆਂ ਹਨ ਜਿਸ ਨਾਲ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਵਿਕਾਸ ਹੁੰਦਾ ਹੈ।
- ‘ਚੋਣਵੇਂ ਪੰਜਾਬੀ ਇਕਾਂਗੀ’ ਪੁਸਤਕ ਵਿਚ ਸ਼ਾਮਲ ਇਕਾਂਗੀਆਂ ਦੇ ਅਧਿਅਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਨਿੱਜੀ ਅਤੇ ਸਮਾਜਿਕ ਸਮੱਸਿਆਵਾਂ ਪ੍ਰਤੀ ਸੁਚੇਤ ਹੁੰਦੇ ਹਨ ਅਤੇ ਸਮਾਜ ਨੂੰ ਵੀ ਜਾਗਰੂਕ ਕਰਦੇ ਹਨ। ਇਸਤੋਂ ਇਲਾਵਾ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਨਾਟ ਕਲਾ ਅਤੇ ਰੰਗਮੰਚ ਪ੍ਰਤੀ ਰੁਚੀ ਪੈਦਾ ਹੁੰਦੀ ਹੈ।
- ਸੰਖੇਪ ਰਚਨਾ ਦੇ ਅਭਿਆਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਭਾਸ਼ਾਈ ਸੰਜਮ ਦੀ ਯੋਗਤਾ ਪੈਦਾ ਹੁੰਦੀ ਹੈ। ਬਹੁਤੇ ਸ਼ਬਦਾਂ ਦੀ ਥਾਂ ਇਕ ਸ਼ਬਦ ਦੀ ਵਰਤੋਂ ਦਾ ਅਭਿਆਸ ਹੁੰਦਾ ਹੈ ਅਤੇ ਵਿਸਥਾਰ ਨੂੰ ਸੰਖੇਪਤਾ ਪ੍ਰਦਾਨ ਕਰਨ ਦੀ ਜਾਚ ਆਉਂਦੀ ਹੈ। ਅਸ਼ੁੱਧ ਸ਼ਬਦਾਂ ਨੂੰ ਸ਼ੁੱਧ ਕਰਨ ਦੇ ਅਭਿਆਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਲਿਖਣ ਅਤੇ ਬੋਲਣ ਦੇ ਯੋਗ ਹੁੰਦੇ ਹਨ।
- ਮੂਲ ਵਿਆਕਰਨਕ ਇਕਾਈਆਂ ਦੇ ਅਧਿਅਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਵਿਆਕਰਨ ਦੇ ਨਿਯਮਾਂ ਨੂੰ ਸਮਝਣ ਦੀ ਯੋਗਤਾ ਪੈਦਾ ਹੁੰਦੀ ਹੈ। ਇਸਤੋਂ ਇਲਾਵਾ ਵਿਆਕਰਨ ਦੀਆਂ ਬਾਰੀਕੀਆਂ ਤੋਂ ਵਿਦਿਆਰਥੀ ਜਾਣੂ ਹੁੰਦੇ ਹਨ। ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸੰਚਾਰ ਦਾ ਹੁਨਰ ਵਿਕਸਿਤ ਹੁੰਦਾ ਹੈ।

2A. Basic Punjabi

- ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਵਿਆਕਰਨ ਦੀਆਂ ਬਾਰੀਕੀਆਂ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਾਪਤ ਹੁੰਦੀ ਹੈ।
- ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਪੜ੍ਹਨ ਤੇ ਲਿਖਣ ਦਾ ਗਿਆਨ ਹੁੰਦਾ ਹੈ।
- ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤ ਪੜ੍ਹਨ ਤੇ ਲਿਖਣ ਦੀ ਰੁਚੀ ਵਧਦੀ ਹੈ।
- ਵਿਦਿਆਰਥੀ ਅੰਗਰੇਜ਼ੀ ਭਾਸ਼ਾ ਦਾ ਪੰਜਾਬੀ ਵਿਚ ਅਨੁਵਾਦ ਕਰਨ ਦੇ ਯੋਗ ਹੁੰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਵਿਕਾਸ ਵਿਚ ਆਪਣਾ ਯੋਗਦਾਨ ਪਾਉਂਦੇ ਹਨ।

2B. Punjab History & Culture

- Understanding the Turko –Afghan rule, socio-cultural changes, the dominance of various Muslim dynasties: Ghaznavids, Ghurids.
- Understanding that the Mughals had profound impact on Punjab, cultural fusion, administrative reforms, art and literature.
- Understanding the socio-religious movement that emerged in medieval India, through its influence on Sikhism, led to the establishment of a distinct religious and social identity characterized by devotion, equality, and a commitment to social justice.
- Understanding the impact of Sufism in Punjab has led to a rich tapestry of spirituality, culture, and social values, with special reference to Baba Farid Ji, include spiritual enlightenment, contributions to culture and literature, promotion of social equality, and fostering a legacy of tolerance and interfaith harmony.
- The life and travels of Guru Nanak Dev Ji, the founder of Sikhism, had profound impacts on the spiritual, social, and cultural aspects of Sikh followers and beyond, shaped Sikhism into a distinct spiritual and cultural tradition, emphasizing oneness, equality, community, and service.

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- Understanding the teachings of Guru Nanak Dev Ji, as expressed through the concepts of Sangat, Pangat, and Dharamsala, lead to the formation of a united Sikh community, the promotion of equality and humility, the practice of selfless service, and the preservation of Sikh culture and spirituality.
- The second, third, and fourth Sikh Gurus made significant contributions to the development and consolidation of Sikhism, these Gurus played pivotal roles in shaping Sikhism during its formative years.
- Understanding the compilation of Guru Adi Granth Sahib Ji and the martyrdom of Guru Arjan Dev Ji had enduring impacts on Sikhism, shaped the spiritual and cultural identity of Sikhs, providing them with a sacred scripture for guidance and inspiring them to uphold principles of justice, truth, and religious freedom.

3. Computer Science

- Understand the basics of Numerical Methods and Numerical Analysis.
- The course aims to equip students with a strong foundation in numerical methods, providing them with the skills needed to solve a variety of mathematical and engineering problems through computational approaches.
- Students should gain practical experience in implementing these methods using numerical tools and programming languages.

4a. Physics

a. Paper I (Statistical Physics & Thermodynamics)

- Develop the understanding of probability, basic ideas of statistical physics, and its scope, the distribution of four distinguishable particles into two compartments of equal size, the concept of macrostates, microstates, and analysis of thermodynamic probability, the concept of constraints, its effects on the system and study the distribution of n particles in two compartments of equal size and the distribution of n particles in K compartments of unequal sizes.
- Understand the concept of phase space and its division into elementary cells, Maxwell-Boltzmann (MB) statistics to an ideal gas in equilibrium, and to verify experimentally the law of distribution of molecular speeds, explain the concept of Bose-Einstein (BE.) statistics, Planck's law of radiation, Wein's displacement law and Stefan's law, the concept of Fermi-Dirac (FD) statistics and comparison of MB, BE. and FD.
- Understand with the definition of entropy, and its characteristics, differentiate between reversible and irreversible processes with examples and work done in reversible process, the laws of thermodynamics, Carnot cycle and entropy change in Carnot cycle, the applications of thermodynamics to thermoelectric effect, change of entropy along reversible path in P-V diagram and the concept of heat death of the universe.
- Able to derive Maxwell's thermodynamics relations, calculate change in temperature produced by adiabatic stretching and adiabatic compression, calculate the change of internal energy with volume, molar specific heat at constant pressure (C_p), molar specific

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heat at constant volume (C_v) and derivation of expression for C_p-C_v , the concept of latent heat and discuss the Claypron equation.

b. Paper II (Optics and Lasers)

- Develop the understanding of the superposition of light waves, interference phenomena, Young's double-slit experiment and conditions for sustained interference patterns, interference patterns by division of wavefront, and interference by division of amplitude and their applications.
- Understand Huygens-Fresnel's theory of diffraction, half-period zones and distinction between Fresnel and Fraunhofer diffraction, the application of Fraunhofer diffraction at rectangular and circular apertures, the effect of diffraction in optical imaging and resolving power of telescope and the use of diffraction gratings as spectroscopic elements and their resolving power.
- Understand the phenomenon of polarization, the concept of plane-polarized and elliptically polarized light, wire grid polarizer, and sheet polarizer, Mal's Law, Brewster's Law, polarization by reflection, scattering and double refraction, Nicol prism, retardation plates, the production and analysis of polarized light using quarter and half-wave plates.
- Understand the concept of stimulated emission, population inversion, derivation of Einstein's relations, broadening spectral lines, and laser schemes, elementary theory of optical cavity and longitudinal and transverse modes, components of laser devices, different types of lasers (Ruby, Nd: YAG, He-Ne, CO₂), and applications of lasers.

4b. Chemistry

a. Paper I (Organic Chemistry–A)

- Understand the stereochemistry of organic compounds.
- Investigate conformational isomerism, including conformational analysis of ethane and n-butane, conformation of cyclohexane, axial and equatorial bonds, and conformation of mono-substituted cyclohexane derivatives.
- Understand the nomenclature, structure, and bonding of alcohols, and explore the classification of monohydric and dihydric alcohols.
- Explore various reduction reactions, halogenation of enolizable ketones, and other reactions involving aldehydes and ketones.

b. Paper II (Physical Chemistry–B)

- Understand the fundamental thermodynamic terms such as system, surroundings, and types of systems
- Explore thermodynamic processes, the concept of heat and work, and the First Law of Thermodynamics, including internal energy and enthalpy
- Understand the Nernst distribution law, its thermodynamic derivation, and applications in non-ideal systems and immiscible liquids.
- Calculate work, heat, internal energy, and entropy for the expansion of ideal gases under isothermal and adiabatic conditions for reversible processes

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5. Maths

a. Paper I (Analysis)

- Learn about Sequences, its properties and various applications
- Learn about Series, its properties and various applications
- Learn about Riemann Integrability, its properties and various applications
- Learn about Beta Gamma functions, Improper Integrals , its properties and various applications

b. Paper II (Analytical Geometry)

- Understand transformation of axes, shifting of origin in two and three dimensions
- Learn about joint equation of straight lines and equations of bisectors
- Learn about Parabola, its properties and various applications
- Learn about Ellipse, its properties and various applications
- Learn about Hyperbola, its properties and various applications
- Learn about Sphere, its properties and various applications

B.SC (COMPUTER SCIENCE) - SEM IV

1. English

- Development of analytical Skills
- Ability to connect ideas and infer information accurately
- Grammar proficiency
- Vocabulary enrichment
- Inculcation of creative writing skills through close readings of Poems

2. Punjabi

- ‘ਮੇਰੀ ਜੀਵਨ ਗਾਥਾ’ ਪੁਸਤਕ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਸਵੈਜੀਵਨੀ ਸਾਹਿਤ ਨੂੰ ਸਮਝਣ ਅਤੇ ਪੜ੍ਹਣ ਵਿਚ ਰੁਚੀ ਪੈਦਾ ਕਰਦੀ ਹੈ। ਇਸਦੀ ਵਾਰਤਕ ਸ਼ੈਲੀ ਦੇ ਅਧਿਐਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਭਾਸ਼ਾ ਦੀ ਅੰਦਰੂਨੀ ਬਣਤਰ ਜਿਵੇਂ ਕਿ ਮੁਹਾਵਰੇਦਾਰ ਭਾਸ਼ਾ ਅਤੇ ਸ਼ੈਲੀ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਹੁੰਦਾ ਹੈ।
- ‘ਫ਼ਾਸਲੇ’ ਨਾਟਕ ਦੇ ਅਧਿਐਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਰੰਗਮੰਚ ਅਤੇ ਰੰਗਮੰਚੀ ਜੁਗਤਾਂ ਦਾ ਗਿਆਨ ਹੁੰਦਾ ਹੈ। ਨਾਟ ਕਲਾ ਦੇ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਨਿੱਜੀ ਅਤੇ ਸਮਾਜਕ ਮਸਲਿਆਂ ਪ੍ਰਤੀ ਸੁਚੇਤ ਹੋ ਕੇ ਸਮਾਜ ਨੂੰ ਜਾਗਰੂਕ ਕਰਨ ਦੇ ਸਮਰੱਥ ਹੁੰਦੇ ਹਨ। ਇਸਤੋਂ ਇਲਾਵਾ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਨਾਟਕ ਲਿਖਣ ਤੇ ਨਾਟਕ ਖੇਡਣ ਦੀ ਰੁਚੀ ਪ੍ਰਫੁੱਲਿਤ ਹੁੰਦੀ ਹੈ।
- ਵੱਖ-ਵੱਖ ਸਮਾਜਕ, ਸਭਿਆਚਾਰਕ, ਇਤਿਹਾਸਕ, ਅਤੇ ਵਿਦਿਅਕ ਸਰੋਕਾਰਾਂ ਸੰਬੰਧੀ ਲੇਖ ਰਚਨਾ ਵਿਦਿਆਰਥੀਆਂ ਦੇ ਬੌਧਿਕ ਵਿਕਾਸ ਵਿਚ ਵੱਡਾ ਯੋਗਦਾਨ ਪਾਉਂਦਾ ਹੈ। ਉਹਨਾਂ ਅੰਦਰ ਕਿਸੇ ਵੀ ਵਿਸ਼ੇ ’ਤੇ ਲਿਖ ਜਾਂ ਬੋਲ ਸਕਣਾ ਸੁਖਾਲਾ ਹੋ ਜਾਂਦਾ ਹੈ ਜਿਸ ਦੇ ਨਤੀਜੇ ਵਜੋਂ ਆਪਣੇ ਨਿਖਾਰ ਆਉਂਦਾ ਹੈ। ਅਖ਼ਬਾਰ ਦੇ ਨਿੱਜੀ ਅਤੇ ਦਫ਼ਤਰੀ ਇਸ਼ਤਿਹਾਰਾਂ ਦਾ ਅਧਿਐਨ ਰਾਹੀਂ ਆਪਣੇ ਨਿੱਜੀ ਜੀਵਨ ਵਿਚ ਅਜਿਹੀ ਲੋੜ ਦੀ ਪੂਰਤੀ ਲਈ ਯੋਗ ਬਣਾਉਂਦਾ ਹੈ।

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- ਸ਼ਬਦ ਜੋੜਾਂ ਦੇ ਨਿਯਮਾਂ ਦਾ ਗਿਆਨ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਵਿਆਕਰਨ ਦੀਆਂ ਬਾਰੀਕੀਆਂ ਪ੍ਰਤੀ ਸੁਚੇਤ ਕਰਦਾ ਹੈ। ਸ਼ੁੱਧ ਭਾਸ਼ਾ ਲਿਖਣ ਅਤੇ ਪੜ੍ਹਨ ਦੀ ਯੋਗਤਾ ਪੈਦਾ ਹੁੰਦੀ ਹੈ। ਗੁਰਮੁਖੀ ਲਿੱਪੀ ਨੂੰ ਸਮਝਣ ਨਾਲ ਭਾਸ਼ਾ ਦੇ ਸ਼ਬਦ ਜੋੜਾਂ ਦੀ ਸਮੱਸਿਆ ਖਤਮ ਹੁੰਦੀ ਹੈ।

2A. Basic Punjabi

- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਨੂੰ ਪ੍ਰਭਾਵਸ਼ਾਲੀ ਢੰਗ ਨਾਲ ਵਰਤਨ ਦੇ ਯੋਗ ਹੁੰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀ ਭਾਸ਼ਾ ਦੀਆਂ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਦੇ ਸਮਰੱਥ ਹੁੰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਆਤਮ ਵਿਸ਼ਵਾਸ ਪੈਦਾ ਹੁੰਦਾ ਹੈ।
- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਨਵੇਂ ਵਾਕਾਂ ਦਾ ਨਿਰਮਾਣ ਕਰਨ ਦੇ ਯੋਗ ਹੁੰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਵਿਕਾਸ ਵਿਚ ਆਪਣਾ ਯੋਗਦਾਨ ਪਾਉਂਦੇ ਹਨ।

2B. Punjab History & Culture

- Understanding the politicization of Sikhism under Guru Hargobind resulted in a redefined Sikh identity that encompassed both spiritual and military dimensions.
- Understanding the martyrdom of Guru Tegh Bahadur, the ninth Sikh Guru, had profound consequences for Sikhism, influencing the course of Sikh history and shaping the principles of the faith. It is a testament to the commitment of Sikhs to the protection of human rights, religious freedom, and the values enshrined in Sikhism.
- The creation of the Khalsa by Guru Gobind Singh Ji, the tenth Sikh Guru, was a transformative event in Sikh history.
- Understanding the creation of Khalsa impacting sikh identity, principles, and the historical & cultural landscape of Punjab.
- Understanding the rise of Banda Singh Bahadur had far-reaching outcomes, including the establishment of Sikh rule, the promotion of Sikh values, religious freedom, socioeconomic changes, and the inspiration for future Sikh movements.
- Understanding the rise of the Sikh Misls, this era of the Misls played a crucial role in shaping the trajectory of Sikh political and cultural development in Punjab.
- Understanding the Ranjit Singh's rule, consolidation of his power, civil administration, land revenue, military achievements & modernization.
- Understanding the dynamic cultural, social and economic aspects of the medieval Punjab.

3. Computer Science

- Understand elementary data organization concepts and common operations.
- Understanding the Array, Link list stack and Queue data structure.
- Understand sorting algorithms, including bubble sort, selection sort, insertion sort, quicksort, merge sort, and heap sort.
- Understanding of Object Oriented Programming concepts and its implementations

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4a. Physics

a. Paper I (Quantum Mechanics)

- Understand the development of quantum mechanics, explain the difference between classical and quantum mechanics, understand the concept of the uncertainty principle, Gaussian wave packet, and operator correspondence and the normalization of wave functions.
- Be able to understand the concept of expectation values, probability current, admissibility conditions for wave functions, the Ehrenfest theorem, eigenfunctions and eigenvalues, orthogonal functions, Hermitian operators and simultaneous eigenfunctions.
- Understand the fundamental postulates of wave mechanics, derivation of Schrodinger's wave equation (SWE) for a free particle in one dimensional problem and its various applications.
- Acquire knowledge to apply SWE to three-dimensional problems and derive SWE in spherical polar coordinates and its application to the hydrogen atom.

b. Paper II (Atomic and Molecular Spectra)

- Understand different types of spectra and the units in spectroscopy, Bohr's theory of hydrogen atom, Bohr's correspondence principle and Ritz combination rule and the Frank-Hertz experiment.
- Develop knowledge regarding vector model of atom, atom as a magnetic dipole, Lande's splitting factor, the Stern-Gerlach experiment and spin-orbit coupling, fine structure of hydrogen spectrum and the normal Zeeman effect, anomalous Zeeman effect.
- Understand exchange symmetry of wave functions, the Pauli Exclusion Principle, LS coupling, spectroscopic notation, and spectral terms for LS coupling, atomic spectra of helium and alkaline earth atoms, rules, and regularities in atomic spectra.
- Know the concept of X-ray spectra, Mosley law, the Auger effect, molecular bonding, molecular spectra, selection rules, rotational spectra, vibrational spectra, and electronic energy levels, Raman effect, classical and quantum theory of Raman effect.

4b. Chemistry

a. Paper I (Inorganic Chemistry–A)

- Investigate non-aqueous solvents, including physical properties, types, and general characteristics
- Examine the general features and chemistry of lanthanides and actinides
- Understand the biological role of alkali and alkaline earth metal ions, specifically highlighting the significance of Ca^{2+} in biological systems
- Analyze the valence bond theory of transition metal complexes, providing insights into the bonding in coordination compounds
- Understand Werner's coordination theory and its experimental verification, including the effective atomic number concept

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b. Paper II (Organic Chemistry–B)

- Understand the nomenclature, structure, and bonding of carboxylic acids, including their physical properties and acidity.
- Explore the molecular orbital picture and aromatic characteristics of heterocyclic compounds like pyrrole, furan, thiophene, and pyridine.
- Understand the methods of synthesis and chemical reactions of heterocyclic compounds
- Understand the separation of primary, secondary, and tertiary amines and factors affecting the basicity of amines
- Investigate organometallic compounds, focusing on Grignard reagents, organolithium compounds, and organozinc and organocopper compounds, including their formation and chemical reactions.

5. Maths

a. Paper I (Statics and Vector Calculus)

- Understand principles of equilibrium, analyzing forces and moments on rigid bodies and applications
- Understand Laws of Friction and Centre of Gravity & its applications
- Learn about Vector Differentiation and Integration
- Learn about Gradient, Divergence and Curl operators and line integrals
- Understand theorems of Gauss, Stokes and Green & various applications

b. Paper II (Solid Geometry)

- Learn about Cylinder, its properties and various applications
- Learn about Cone, its properties and various applications
- Learn about Ellipsoid, Hyperboloid and paraboloid, its properties and various applications
- Learn about Surfaces, Tangent lines and Tangent planes, Normals, its properties and various applications

B.SC (COMPUTER SCIENCE) - SEM V

1. English

- Appreciation of Literature
- Inculcation of moral and social values
- Enhancement of Creative Writing Skills
- Enhanced understanding of human nature.

2. Punjabi

- ਸੰਪਾਦਿਤ ਪੁਸਤਕ ‘ਚੋਣਵੀਆਂ ਪੰਜਾਬੀ ਕਹਾਣੀਆਂ’ ਵਿਚ ਦਰਜ ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਹਾਣੀਆਂ ਦੇ ਪਾਠ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਕਹਾਣੀ ਸਾਹਿਤ ਪੜ੍ਹਨ ਪ੍ਰਤੀ ਰਚੀ ਪ੍ਰਬਲਤਾ ਵੱਧਦੀ ਹੈ। ਕਹਾਣੀਆਂ ਵਿਚੋਂ ਚੰਗੇ ਇਨਸਾਨ ਬਣਨ ਦੀ ਪ੍ਰੇਰਨਾ ਮਿਲਦੀ ਹੈ ਅਤੇ ਵਿਦਿਆਰਥੀ ਸਮਾਜ ਨੂੰ ਵੱਧਾਰੀਆਂ ਨੂੰ ਨਿਭਾਉਣ ਅਤੇ ਚੰਗੀ ਜੀਵਨ ਜਾਚ ਸਿੱਖਣ ਦੇ ਕਾਬਲ ਬਣਦੇ ਹਨ। ਉਹ ਸਾਹਿਤ 2024-02-28 10:29:29 ਹੁੰਦੇ ਹਨ।

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- ‘ਏਹੁ ਹਮਾਰਾ ਜੀਵਣਾ’ ਨਾਵਲ ਦਾ ਪਾਠ ਔਰਤ ਦੀ ਸਮਾਜਕ ਹੈਸੀਅਤ ਨੂੰ ਦਰਸਾਉਂਦਾ ਹੋਇਆ ਸਮਾਜ ਵਿਚ ਉਸਦੇ ਰੁਤਬੇ ਨੂੰ ਬਹਾਲ ਕਰਨ ਲਈ ਸੁਚੇਤ ਕਰਦਾ ਹੈ। ਇਸਤੋਂ ਇਲਾਵਾ ਦਲੀਪ ਕੌਰ ਟਿਵਾਣਾ ਵਰਗੀ ਇਸਤਰੀ ਨਾਵਲਕਾਰ ਦੇ ਜੀਵਨ ਤੋਂ ਮਿਲਨ ਵਾਲੀ ਪ੍ਰੇਰਨਾ ਵੀ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਮਨੁੱਖੀ ਜੀਵਨ ਮੁੱਲਾਂ ਪ੍ਰਤੀ ਸੁਚੇਤ ਕਰਦੀ ਹੈ।
- ਪੈਰਾ ਰਚਨਾ ਦੇ ਅਭਿਆਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਕਿਸੇ ਵਿਸ਼ੇ 'ਤੇ ਸੰਖੇਪ ਪਰ ਮੁੱਲਵਾਨ ਵਿਚਾਰ ਸਾਂਝੇ ਕਰਨ ਦਾ ਮੌਕਾ ਮਿਲਦਾ ਹੈ। ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਆਪਣੀ ਲਿਖਤ ਵਿਸ਼ੇ 'ਤੇ ਪਕੜ ਮਜ਼ਬੂਤ ਕਰਦੀ ਹੈ। ਅੰਗਰੇਜ਼ੀ ਪੈਰੇ ਦਾ ਪੰਜਾਬੀ ਵਿਚ ਅਨੁਵਾਦ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ ਤੇ ਭਾਸ਼ਾ ਯੋਗਤਾ ਵਿਚ ਵਾਧਾ ਕਰਦਾ ਹੈ। ਅਨੁਵਾਦ ਦੀ ਯੋਗਤਾ ਇਸ ਖੇਤਰ ਵਿਚ ਵਿਦਿਆਰਥੀਆਂ ਲਈ ਰੋਜ਼ਗਾਰ ਦੇ ਮੌਕੇ ਵੀ ਪੈਦਾ ਕਰਦੀ ਹੈ।
- ਪੰਜਾਬੀ ਧੁਨੀ ਵਿਉਂਤ ਰਾਹੀਂ ਜਿੱਥੇ ਪੰਜਾਬੀ ਧੁਨੀਆਂ ਦਾ ਵਿਗਿਆਨਕ ਅਧਿਐਨ ਭਾਸ਼ਾ ਦੇ ਵਿਗਿਆਨਕ ਪਾਸਾਰਾਂ ਵਿਚ ਵਾਧਾ ਕਰਦਾ ਹੈ ਉੱਥੇ ਵਾਕਾਤਮਕ ਜੁਗਤਾਂ ਦੇ ਅਧਿਐਨ ਨਾਲ ਵਾਕ ਵਿਚਲੇ ਸ਼ਬਦਾਂ ਦੇ ਆਪਸੀ ਸੰਬੰਧਾਂ ਦੇ ਉਜਾਗਰ ਹੋਣ ਨਾਲ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਵਿਆਕਰਨ ਪ੍ਰਤੀ ਸਮਝ ਵਿਚ ਮੁੱਲਵਾਨ ਵਾਧਾ ਹੁੰਦਾ ਹੈ।

2A. Basic Punjabi

- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਸਾਹਿਤ ਅਤੇ ਲੋਕ ਸਾਹਿਤ ਸੰਬੰਧੀ ਜਾਣਕਾਰੀ ਪ੍ਰਾਪਤ ਕਰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀ ਲੋਕ ਕਾਵਿ ਦੀਆਂ ਮਹੱਤਵਪੂਰਨ ਵੰਨਗੀਆਂ ਨੂੰ ਸਮਝਣ ਦੇ ਸਮਰੱਥ ਹੁੰਦੇ ਹਨ।
- ਪੰਜਾਬੀ ਲੋਕਨਾਚਾਂ ਦੀਆਂ ਵਿਭਿੰਨ ਵੰਨਗੀਆਂ ਦੀ ਜਾਣਕਾਰੀ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਪੰਜਾਬੀ ਰਹਿਤਲ ਦਾ ਗਿਆਨ ਵਧਾਉਂਦੀ ਹੈ।
- ਲੋਕ ਖੇਡਾਂ, ਲੋਕ ਤਮਾਸ਼ੇ ਅਤੇ ਲੋਕ ਕਲਾਵਾਂ ਦੇ ਬੁਨਿਆਦੀ ਗਿਆਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਸਮਾਜ ਤੇ ਸਭਿਆਚਾਰ ਨੂੰ ਡੂੰਘੇ ਰੂਪ ਵਿਚ ਸਮਝਣ ਦੇ ਯੋਗ ਹੁੰਦੇ ਹਨ।

2B. Punjab History & Culture

- Understand The First Anglo-Sikh War, the Treaty of Lahore, signed in 1846, which ceded significant territories to the British, established a British Resident at Lahore.
- Understand the trajectory of Punjab's history under British rule, influencing its socio-economic and political development.
- Understand the economic transformations, social changes, and the emergence of a new educated class that played a crucial role in India's struggle for independence.
- Analysis these movements collectively that played a crucial role in shaping the social, cultural, and political landscape of India, contributing to the broader struggle for independence and fostering a spirit of reform and resistance against various forms of oppression.
- Create the ability to understand the power of mass mobilization, civil disobedience, and nonviolent resistance, contributing significantly to India's eventual attainment of independence in 1947.

3. Computer Science

- Understand fundamental concepts like digital files, folders, files, and databases.

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- Explore the structure of a Database Management System (DBMS), including different keys used in a relational system.
- Demonstrate proficiency in SQL, covering Data Definition Language (DDL), Data Manipulation Language (DML), and Data Control Language (DCL).
- Define Big Data and its challenges and opportunities.
- Introduce the basics of NoSQL databases and their role in handling large-scale data.

4a. Physics

a. Paper I (Condensed Matter Physics)

- Develop the understanding of crystal structure and symmetry operations for two and three-dimensional crystals, primitive cell, two dimensional Bravais lattices and three-dimensional Bravais lattices, Miller indices and distance between crystal planes, diamond and NaCl structures.
- Acquire knowledge of Bragg's law, experimental methods for crystal structure studies, derivation of Laue equations and reciprocal lattices of SC, BCC, and FCC, Bragg's law in reciprocal lattice, Brillouin zones and its derivation in two dimensions, Geometrical structure factor and atomic form factor.
- Understand the concept of lattice vibrations, phonons and scattering of photons by phonons, vibrations of one-dimensional mono-atomic lattice capacity, Dulong's Petit's law, Einstein theory of specific heat and Debye theory of specific heat.
- Acquire knowledge of free electron model of metals, free electron gas in one dimensional box and in three-dimensional box, the band theory, Kronig-Penney model, metals, and insulators the conductivity and its variation with temperature in semiconductors, Fermi levels in intrinsic and extrinsic semiconductors and the band gap in semiconductors.

b. Paper II (Electronics)

- Understand the concept of current, and voltage sources, P-N junction diode, and its biasing and characteristics, Zener diode and photonic devices, P-N diode as half wave rectifier, full-wave rectifier, rectifiers, filter circuits (LC and π filters), basic concepts of Boolean algebra, AND, OR, NOT and NAND gates.
- Understand the working of junction transistor, and its amplifying action, different configurations of a transistor, and their characteristics (CB and CE), JFET, the concept of stabilization of operating point and voltage divider circuit.
- Understand the working of CE amplifier and amplifier analysis using h-parameters, equivalent circuits of CE amplifier, and its current gain, power gain, and input impedance, FET as an amplifier, and its voltage gain, feedback in amplifiers, different types of feedback, the advantages of negative feedback and the emitter follower as a negative feedback circuit.
- Understand Barkhausen criterion for sustained oscillations, LC oscillators (tuned collector, tuned base Hartley), RC oscillators, phase-shift, and Wein bridge oscillators.

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4b. Chemistry

a. Paper I (Inorganic Chemistry–A)

- Understand the limitations of valence bond theory in explaining metal complexes and gain an elementary idea of crystal-field theory.
- Explore the thermodynamic stability of metal complexes, factors influencing stability, and substitution reactions in square planar complexes.
- Understand the bonding in metal-ethylenic complexes and the mechanism of homogeneous hydrogenation reactions in organometallic chemistry
- Explore crystal field splitting in octahedral, tetrahedral, and square planar complexes, along with factors influencing the crystal-field parameters.

b. Paper II (Physical Chemistry–B)

- Demonstrate understanding of equivalent conductance, its measurement, and the variation of equivalent and specific conductance with dilution.
- Explore the migration of ions and Kohlrausch law, and critically assess the Arrhenius theory of electrolyte dissociation, distinguishing between weak and strong electrolytes.
- Explore spectroscopy, including electromagnetic radiation, rotational spectrum of diatomic molecules, vibrational spectrum (infrared and Raman), and electronic spectrum with an emphasis on potential energy curves and transitions.
- Develop practical skills and theoretical understanding through comprehensive course outcomes.

5. Maths

a. Paper I (Dynamics)

- To demonstrate a clear understanding of rectilinear motion with uniform acceleration
- Explain Newton's laws of motion and their applications in solving problems.
- Solve problems involving the motion of interconnected particles.
- Analyze motion along smooth inclined plane and Apply principles of force and acceleration on inclined surfaces.
- Apply calculus concepts to analyze variable acceleration in motion.
- Define and analyse simple harmonic motion.and Apply mathematical equations to describe the displacement, velocity, and acceleration of particles in SHM.
- Understand the principles of curvilinear motion.
- Understand the key parameters influencing the trajectory of a projectile.
- Understand the motion of a simple pendulum, a conical pendulum.and Apply mathematical principles to describe oscillatory motion.
- Define and calculate work, power, and energy in mechanical systems.
- Apply the principle of conservation of energy to solve problems with conservative forces.
- Understand the gravitational potential energy and its applications in mechanical systems.

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b. Paper II (Number Theory)

- Understand the results involving divisibility and greatest common divisors and its application to solve linear Diophantine equations.
- Analyze and interpret the concepts of prime numbers and prime-factorization and its applications.
- Understand and apply the concept of congruence, linear congruence and Chinese remainder theorem.
- Understand and Apply Euler-Phi function, divisor function, multiplicative function.
- Understand and apply Wilson's theorem, Fermat's theorem and Euler's theorem.

B.SC (COMPUTER SCIENCE) - SEM VI

1. English

- Appreciation of Literature
- Inculcation of moral and social values
- Enhancement of Creative Writing Skills
- Enhanced understanding of human nature.

2. Punjabi

- ਸੰਪਾਦਿਤ ਪੁਸਤਕ 'ਕਾਵਿ ਗੌਰਵ' ਵਿਚਲਾ ਸੂਫੀ ਕਾਵਿ, ਗੁਰਮਤਿ ਕਾਵਿ, ਕਿੱਸਾ ਕਾਵਿ ਅਤੇ ਬੀਰ ਕਾਵਿ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਕਲਾਸੀਕਲ ਸਾਹਿਤ ਪੜ੍ਹਨ ਤੇ ਸਮਝਣ ਉਪਰੰਤ ਉਹਨਾਂ ਦੀ ਸੋਚ ਨੂੰ ਵਿਸ਼ਾਲ ਕਰਦਾ ਹੈ। ਜੀਵਨ ਪ੍ਰਤੀ ਉਹਨਾਂ ਦੀ ਸੋਚ ਵਧੇਰੇ ਉਸਾਰੂ ਹੁੰਦੀ ਹੈ।
- 'ਧਰਤੀਆਂ ਦੇ ਗੀਤ' ਪੁਸਤਕ ਵੱਖ-ਵੱਖ ਦੱਖਣ ਪੂਰਬੀ ਦੇਸ਼ਾਂ ਦੇ ਲੋਕਾਂ ਦੇ ਜੀਵਨ 'ਤੇ ਇਕ ਪੰਛੀ ਝਾਤ ਪਾਉਂਦਾ ਸਫ਼ਰਨਾਮਾ ਹੈ ਜਿਸਦੇ ਦੂਜੇ ਹਿੱਸੇ ਵਿਚ ਭਾਰਤ ਦੇ ਅੰਡੇਮਾਨ ਅਤੇ ਨਿਕੋਬਾਰ ਟਾਪੂਆਂ 'ਤੇ ਵਸਦੇ ਲੋਕਾਂ ਦੇ ਜੀਵਨ ਬਾਰੇ ਵਿਸਥਾਰ ਪੂਰਵਕ ਜਾਣਕਾਰੀ ਦਿੱਤੀ ਗਈ ਹੈ ਜਿਸ ਤੋਂ ਵੱਖ-ਵੱਖ ਦੇਸ਼ਾਂ ਦੇ ਸਭਿਆਚਾਰ ਦੀ ਝਲਕ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਉਹਨਾਂ ਦੇਸ਼ਾਂ ਵਿਚ ਘੁੰਮਣ ਦੀ ਤਾਂਘ ਪੈਦਾ ਕਰਦੀ ਹੈ ਅਤੇ ਇਸ ਨਾਲ ਉਹ ਸੰਸਾਰਕ ਪੱਧਰ 'ਤੇ ਇਕ ਸਾਂਝ ਸਥਾਪਤ ਕਰਦੇ ਨਜ਼ਰ ਆਉਂਦੇ ਹਨ।
- ਲੇਖ ਰਚਨਾ ਦਾ ਅਭਿਆਸ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਵਿਗਿਆਨ, ਤਕਨਾਲੋਜੀ ਅਤੇ ਚਲੰਤ ਮਸਲਿਆਂ ਸੰਬੰਧੀ ਸੂਝ ਵਧਾਉਂਦਾ ਹੈ। ਇਸ ਤੋਂ ਇਲਾਵਾ ਆਧੁਨਿਕ ਸਾਹਿਤ ਰੂਪਾਂ ਸੰਬੰਧੀ ਗਿਆਨ ਸਾਹਿਤ ਨੂੰ ਬੌਧਿਕ ਪੱਧਰ 'ਤੇ ਸਮਝਣਯੋਗ ਬਣਾਉਂਦਾ ਹੈ। ਵਿਦਿਆਰਥੀ ਸਾਹਿਤ ਦੀਆਂ ਵੱਖ-ਵੱਖ ਵਿਧਾਵਾਂ ਤੋਂ ਜਾਣੂ ਹੁੰਦੇ ਹਨ।
- ਕਿਸੇ ਵੀ ਭਾਸ਼ਾ ਦੀ ਗਹਿਨ ਸੂਝ ਲਈ ਉਸਦੀ ਵਿਆਕਰਨਕ ਸਮਝ ਹੋਣੀ ਬਹੁਤ ਜ਼ਰੂਰੀ ਹੈ। ਪ੍ਰਮੁੱਖ ਵਿਆਕਰਨਕ ਸ਼੍ਰੇਣੀਆਂ ਅਤੇ ਵਿਆਕਰਨਕ ਇਕਾਈਆਂ ਦਾ ਗਿਆਨ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਵਿਆਕਰਨ ਸੰਬੰਧੀ ਸਮਝ ਨੂੰ ਵਿਸਥਾਰ ਦਿੰਦਾ ਹੈ। ਇਸ ਨਾਲ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਭਾਸ਼ਾਈ ਸੰਚਾਰ ਦੀ ਯੋਗਤਾ ਵਿਚ ਵਾਧਾ ਹੁੰਦਾ ਹੈ।

2A. Basic Punjabi

- ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੇ ਪਿਛੋਕੜ, ਭੂਗੋਲਿਕ ਅਤੇ ਸੱਭਿਆਚਾਰਕ ਸਭਿਆਚਾਰ ਦੇ ਉੱਘੜਵੇਂ ਲੱਛਣਾਂ ਦੀ ਜਾਣਕਾਰੀ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਭਿਆਚਾਰਕ ਚੇਤਨਾ ਪੈਦਾ ਕਰਦੀ ਹੈ।
- ਪੰਜਾਬ ਦੇ ਪ੍ਰਮੁੱਖ ਮੇਲੇ, ਪ੍ਰਮੁੱਖ ਤਿਉਹਾਰ ਅਤੇ ਸਭਿਆਚਾਰਕ ਸਥਾਨਾਂ ਦੇ ਅਧਿਐਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਲੋਕਾਂ ਦੀ ਮਾਨਸਿਕਤਾ ਨੂੰ ਵਧੇਰੇ ਚੰਗੇ ਢੰਗ ਨਾਲ ਸਮਝ ਸਕਦੇ ਹਨ।

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- ਪੰਜਾਬੀਆਂ ਦੀਆਂ ਜਨਮ, ਵਿਆਹ ਤੇ ਮੌਤ ਸੰਬੰਧੀ ਰਸਮਾਂ ਰੀਤਾਂ ਦੇ ਗਿਆਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਸਮਾਜ ਦੀ ਸੰਰਚਨਾ ਦੀ ਡੂੰਘੀ ਜਾਣਕਾਰੀ ਹਾਸਲ ਕਰਦੇ ਹਨ।
- ਪੰਜਾਬੀ ਲੋਕਾਂ ਦਾ ਖਾਣ-ਪੀਣ, ਪਹਿਰਾਵਾ ਅਤੇ ਪੰਜਾਬੀਆਂ ਦੇ ਲੋਕ ਵਿਸ਼ਵਾਸਾਂ ਦੇ ਗਿਆਨ ਦੀ ਰੋਸ਼ਨੀ ਵਿਚ ਵਿਦਿਆਰਥੀ ਵਧੇਰੇ ਗੰਭੀਰਤਾ ਨਾਲ ਪੰਜਾਬ ਦੀ ਲੋਕਧਾਰਾ ਅਤੇ ਸਭਿਆਚਾਰ ਸੰਬੰਧੀ ਵਿਚ ਰੁਚੀ ਲੈਂਦੇ ਹਨ।

2B. Punjab History & Culture

- Understand the partition and historical complexities and enduring effects of the partition on Punjab, massive migration, displacement of population and immense human suffering.
- Understand the long-term process of rebuilding lives and communities in Punjab after the traumatic events of partition.
- Understanding the historical context and consequences of the Punjabi Suba movement and the reorganization of states in 1966.
- Create ability to understanding the multifaceted impact of the Green Revolution on Punjab's agriculture, economy, and society.
- Understand the diverse and dynamic impact of the Punjabi diaspora on both the countries they reside in and the cultural changes of Punjab itself.
- Understand the multifaceted development of education and cultural expression in Punjab after independence.
- Understand the comprehensive strategies and interventions to address the complex and interconnected issues of drug addiction and female foeticide in Punjab.

3. Computer Science

- Understanding of Internet Basics.
- Understand the role of Internet Service Providers (ISPs).
- Understand the concept and workings of the World Wide Web (WWW).
- Demonstrate web browsing skills, including opening, viewing, saving, printing a web page, and bookmarking.
- Introduce websites, distinguishing between static and dynamic websites.
- Understand the basics of CSS, including syntax, Add rules to a style sheet, Manage style sheets by creating, importing, and embedding them.
- Develop a basic HTML website using CSS for layout and styling.

4a. Physics

a. Ppaer I (Radiation and Particle Physics)

- Acquire knowledge regarding interaction of heavy charged particle with matter and derive Bethe-Bloch formula, stopping power and range of heavier charged particles, the concept of the energy loss of electrons, positrons, and photons, and their annihilation in condensed media and the interaction of gamma rays with matter.
- Acquire the knowledge of gas-filled detectors, proportional and Geiger-Muller counters, scintillation detectors, semiconductor detectors, Cherenkov effect, Cherenkov counter

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and solid-state nuclear track detectors, principle, working of bubble chambers, and nuclear emulsions.

- Understand the principle and working of linear accelerators, cyclotron, betatron, synchrocyclotron, betatron, electron and proton synchrotrons, phase stability, colliding beam machines: Large Hadron collider and Fermilab Tevatron.
- Acquire knowledge regarding elementary particles, fermions and bosons particles, and antiparticles, different types of interactions, quantum numbers, conservation laws, isospin, charge conjugation, and the quark model and high-energy physics units.

b. Paper II (Nuclear Physics)

- Understand nuclear structure, nuclear mass, nucleus radius, angular momentum, and parity, binding energy, and variation of the binding energy versus mass number, nuclear moments: magnetic dipole moment and electric quadrupole moment, nuclear force, and Yukawa theory.
- Acquire knowledge regarding modes of decay, decay laws, radioactive series, radioactive dating, alpha decay, Gamow's theory, barrier penetration, Geiger-Nuttall law, beta decays (β^- , β^+ , electron capture), neutrino hypothesis, and parity violation in β decay, gamma transitions, excited levels, isomeric levels, and internal conversion.
- Understand different types of nuclear reactions, and their examples, reaction cross-section, conservation laws, kinematics of nuclear reactions, Q-value, and its physical significance, compound nucleus and level width.
- Understand postulates of the liquid drop model, derivation of semi-empirical mass formula, evidence for nuclear magic numbers, theory of shell model, and energy level scheme, angular momenta, magnetic moment, and parity of nuclear ground states.

4b. Chemistry

a. Paper I (Organic Chemistry–A)

- Acquire a comprehensive understanding of Nuclear Magnetic Resonance (NMR) spectroscopy, including proton magnetic resonance (^1H NMR) spectroscopy
- Solve problems related to structure elucidation of organic compounds using UV, IR, and PMR spectroscopic techniques.
- Develop comprehensive course outcomes reflecting theoretical knowledge and practical skills in spectroscopy, organosulphur compounds, synthetic polymers, organic synthesis via enolates, carbohydrates, and biomolecules.
- Understand organic synthesis via enolates

b. Paper II (Physical Chemistry–B)

- Mastery of quantum mechanics, solid-state physics, and photochemistry principles, enabling advanced analysis and application in diverse scenarios
- Proficient understanding of spectroscopy techniques, electrochemistry, nuclear chemistry, and organic compounds, fostering problem-solving skills and critical thinking in complex scientific contexts.

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- Understands the first, second, and third laws, entropy, free energy, equilibrium, and chemical kinetics

5. Maths

a. Paper I (Linear Algebra)

- Define groups, rings, and fields with examples.
- Able to recognize the properties and operations that characterize each algebraic structure.
- Define a vector space and identify its properties. Recognize and understand subspaces, providing examples for illustration.
- Understand the concepts of linear dependence and independence in vector spaces.
- Define the basis of a vector space and understand its significance.
- Understand the existence theorem for the basis of a vector space and recognize the conditions under which a basis exists.
- Explore the dimension of the sum of two subspaces and the dimension of quotient spaces.
- Define linear transformations and explore their properties.
- State and apply the Rank-ToNullity theorem in linear algebra. Understand the relationship between the rank and nullity of a linear transformation.
- Define isomorphism and recognize its importance in linear algebra. and Identify isomorphic spaces and understand their equivalence.
- Understand the matrix representation of a linear transformation. and Learn to compute and interpret the matrix of a linear transformation.
- Define linear operators and their properties. Recognize the role of linear operators in various mathematical contexts.

b. Paper II (Numerical Analysis)

- Apply different methods to solve linear and non- linear equations.
- Apply numerical methods to obtain approximate solutions to mathematical problems.
- Find the missing data points form the given data using interpolation and extrapolation.
- Apply various methods in solving double numerical integration and ordinary differential equations.

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B.SC (MEDICAL)

PROGRAMME OUTCOMES

After successful completion of three year degree program B.Sc (Computer Science)), a student will be capable of:

- Proficiency in basic medical sciences including anatomy, physiology, and biochemistry.
- Ability to understand and apply principles of medical ethics and professionalism.
- Knowledge of common diseases, their etiology, pathophysiology, and treatment modalities.
- Proficiency in medical research methods and evidence-based practice.
- Effective communication skills for interacting with patients, colleagues, and other healthcare professionals.
- Ability to integrate interdisciplinary knowledge for comprehensive patient care.
- Continuous learning and professional development to stay updated with advancements in the field of medicine.
- Commitment to lifelong ethical practice and patient-centered care.

COURSE OUTCOMES

B.SC (MEDICAL) - SEM I

1. English

- Linguistic Proficiency
- Vocabulary Enhancement
- Grammatical Correctness
- Appreciation of literature
- Inculcation of moral and social values through literary studies

2. Punjabi

- ਪੁਸਤਕ 'ਦੋ ਰੰਗ' ਵਿਚਲੇ ਕਵਿਤਾ ਭਾਗ ਦੇ ਵਿਭਿੰਨ ਆਧੁਨਿਕ ਕਵੀਆਂ ਦੀਆਂ ਕਵਿਤਾਵਾਂ ਦੇ ਪਾਠ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਵਿੱਚ ਵਧੇਰੇ ਸਾਹਿਤ ਪੜ੍ਹਨ ਅਤੇ ਲਿਖਣ ਦੀ ਚਿਣਗ ਪੈਦਾ ਹੁੰਦੀ ਹੈ। ਇਹਨਾਂ ਕਵਿਤਾਵਾਂ ਦੇ ਅਧਿਐਨ ਰਾਹੀਂ ਮਨੁੱਖੀ ਮਨ ਦੇ ਵਿਭਿੰਨ ਪੱਖਾਂ-ਪਾਸਾਰਾਂ ਨੂੰ ਸਮਝਣ ਦੀ ਯੋਗਤਾ ਪੈਦਾ ਹੁੰਦੀ ਹੈ।
- 'ਸੰਸਾਰ ਦੀਆਂ ਪ੍ਰਸਿੱਧ ਹਸਤੀਆਂ' ਪੁਸਤਕ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਸੰਸਾਰ ਭਰ ਦੀਆਂ ਅਧਿਆਤਮਿਕ, ਧਾਰਮਿਕ, ਰਾਜਨੀਤਿਕ, ਇਤਿਹਾਸਕ ਅਤੇ ਸਮਾਜ ਸੁਧਾਰਕ ਸ਼ਖਸੀਅਤਾਂ ਦੇ ਜੀਵਨ ਅਤੇ ਸਮਾਜ ਪ੍ਰਤੀ ਦੇਣ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਦਾਨ ਕਰਨ ਲਈ ਸਰੋਤ ਮੁਹੱਈਆ ਕਰਵਾਉਂਦੀ ਹੈ। ਇਹਨਾਂ ਉੱਘੀਆਂ ਹਸਤੀਆਂ ਸੰਬੰਧੀ ਪ੍ਰਾਪਤ ਜਾਣਕਾਰੀ ਵਿਦਿਆਰਥੀਆਂ ਵਿੱਚ ਸਮਾਜਿਕ ਜ਼ਿੰਮੇਵਾਰੀ ਦਾ ਅਹਿਸਾਸ ਪੈਦਾ ਕਰਦੀ ਹੈ।
- ਪੈਰਾ ਰਚਨਾ ਅਤੇ ਪੈਰਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇ ਅਭਿਆਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਵਿੱਚ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਪੜ੍ਹਨ ਤੇ ਲਿਖਣ ਦੀ ਯੋਗਤਾ ਪੈਦਾ ਹੋਣ ਦੇ ਨਾਲ ਨਾਲ ਆਪਣੇ ਆਪ ਦੀਆਂ ਵੀ ਵਿਕਸਿਤ ਹੁੰਦੀਆਂ ਹਨ।

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- ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ ਦੇ ਅਧਿਅਨ ਰਾਹੀਂ ਟਕਸਾਲੀ ਭਾਸ਼ਾ, ਭਾਸ਼ਾ ਤੇ ਉਪ ਭਾਸ਼ਾ ਦਾ ਅੰਤਰ ਅਤੇ ਪੰਜਾਬੀ ਦੀਆਂ ਵਿਭਿੰਨ ਉਪ ਭਾਸ਼ਾਵਾਂ ਦੀ ਪਛਾਣ ਕਰਨ ਦੀ ਸਮਝ ਵਿਕਸਿਤ ਹੁੰਦੀ ਹੈ। ਇਸਤੋਂ ਇਲਾਵਾ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਜਨਮ ਅਤੇ ਵੱਖ-ਵੱਖ ਵਿਕਾਸ ਪੜਾਵਾਂ ਦੀ ਜਾਣਕਾਰੀ ਮਿਲਦੀ ਹੈ।

2A. Basic Punjabi

- ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਪੜ੍ਹਨ ਤੇ ਲਿਖਣ ਦਾ ਗਿਆਨ ਹੁੰਦਾ ਹੈ।
- ਪੰਜਾਬੀ ਸਾਹਿਤ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਦਾਨ ਹੁੰਦੀ ਹੈ।
- ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਮਾਤ੍ਰਾਵਾਂ ਦੀ ਵਰਤੋਂ ਦਾ ਗਿਆਨ ਹੁੰਦਾ ਹੈ।
- ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਭਾਸ਼ਾਈ ਯੋਗਤਾ ਵਿਕਸਿਤ ਹੁੰਦੀ ਹੈ।
- ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਭਾਸ਼ਾ ਦੀ ਮੁੱਢਲੀ ਸ਼ਬਦਾਵਲੀ ਦਾ ਗਿਆਨ ਪ੍ਰਾਪਤ ਹੁੰਦਾ ਹੈ।

2B. Punjab History & Culture

- Understand the region's river, like the Indus, influenced settlement patterns, agricultural practices and trade routes, invasions, migrations and the formation of civilizations can provide insights into the historical development of the Punjab.
- Understand the various historical sources, including archaeological findings, inscriptions and ancient texts to reconstruct the past accurately.
- Understanding urban planning, efficient drainage system, multi-story buildings, artifacts, Agriculture, advanced irrigation system, crafts, including pottery and metal work.
- Understanding the migration patterns and settlements of the Indo-Aryans into the Indian Subcontinent.
- Understanding the dynamic changes in social & economic life during the Rigvedic and Later Rigvedic Periods.
- Both Buddhism & Jainism left a lasting impact on the cultural, moral & artistic landscape of Punjab. The teaching of compassion, non-violence & ethical conduct from these traditions contributed to the broader philosophical and religious diversity of the region.
- The remnants of Buddhism and Jain archaeological sites in Punjab bear witness to the historical presence and influence of these ancient Indian religions.

3. Botany

a. Paper I (Diversity of Microbes)

- To provide comprehensive understanding of the general characteristics, classification, and economic importance of algae.
- Students will gain the knowledge of the biology of viruses, bacteria, and cyanobacteria, covering their structures, functions, reproductive processes, nutritional aspects, and economic relevance.
- The course outcome likely encompasses a deep understanding of fungal biology, classification, economic roles and their life history.
- It aims for students to acquire in-depth knowledge of these specific fungal groups within Basidiomycotina and Deuteromycotina.

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- Broad understanding of the biology and significance of lichens.

b. Paper II (Diversity of Cryptogams)

- Understanding the alternation of generations in Bryophyta.
- Classifying and identifying examples of liverworts, hornworts, and mosses.
- Grasping the significance and characteristics of the first vascular plants (Pteridophyta) and their subdivisions.
- Detailed knowledge about specific plants within Pteridophyta.

4. Zoology

a. Paper I (Cell Biology)

- Describe the structure and function of various cellular organelles.
- Understand how cells respond to external stimuli and regulate their activities.
- Explain the principles of cell cycle regulation.
- Describe various cell types and their specific functions.

b. Paper II (Biodiversity)

- Explore sustainable practices and conservation strategies to mitigate human-induced threats.
- Understand the ecological processes that influence biodiversity, including nutrient cycling, energy flow, and succession.
- Recognize the importance of biodiversity in ecological stability and resilience.
- Explain the structure and function of ecosystems.
- Learn methods for measuring and assessing biodiversity, including species richness, abundance, and diversity indices.

5. Chemistry

a. Paper I (Inorganic Chemistry I)

- Demonstrate the ability to apply the knowledge gained in predicting and explaining chemical behavior based on periodic trends and bonding principles
- Apply Aufbau and Pauli exclusion principles, along with Hund's multiplicity rule, in determining electronic configurations
- Analyze periodic properties such as effective nuclear charge, atomic/ionic radii, ionization energy, electron affinity, and electronegativity
- Study ionic solids, close packing, ionic structures, lattice defects, semiconductors, and factors influencing solubility.
- Understand the concept of de Broglie matter waves and Heisenberg uncertainty principle in atomic structure
- Explore covalent bonding using valence bond theory, hybridization, and VSEPR theory for predicting molecular shapes

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b. Paper II (Organic Chemistry–I)

- Grasp the concepts of hybridization, bond lengths, bond angles, bond energy, and distinguish between localized and delocalized chemical bonds.
- Understand Vander Waals interactions, resonance, hyperconjugation, hydrogen bonding, and the inductive and electromeric effects.
- Demonstrate the ability to apply the acquired knowledge in predicting and explaining chemical behavior based on organic reaction mechanisms.
- Identify types of reagents such as electrophiles and nucleophiles, and recognize reactive intermediates like carbocations, carbanions, free radicals, carbenes, arenes, and nitrenes.
- Apply curved arrow notation, distinguish between half-headed and double-headed arrows, and comprehend homolytic and heterolytic bond breaking in the mechanism of organic reactions

B.SC (MEDICAL) - SEM II

1. English

- Linguistic Proficiency
- Vocabulary Enhancement
- Grammatical Correctness
- Appreciation of literature
- Inculcation of moral and social values through literary studies

2. Punjabi

- ਪੁਸਤਕ 'ਦੇ ਰੰਗ' ਵਿਚਲੇ ਕਹਾਣੀ ਭਾਗ ਦੇ ਵੱਖ-ਵੱਖ ਪੰਜਾਬੀ ਕਹਾਣੀਕਾਰਾਂ ਦੀਆਂ ਕਹਾਣੀਆਂ ਦੇ ਕਹਾਣੀ-ਪਾਠ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਵਿੱਚ ਸਾਹਿਤ ਨੂੰ ਪੜ੍ਹਨ ਅਤੇ ਸਮਝਣ ਦੀ ਸੂਝ ਵਿਕਸਿਤ ਹੁੰਦੀ ਹੈ। ਇਸਤੋਂ ਇਲਾਵਾ ਇਹ ਕਹਾਣੀਆਂ ਵੱਖ-ਵੱਖ ਸਮਾਜਕ ਸਮੱਸਿਆਵਾਂ ਦੇ ਹੱਲ ਤਲਾਸ਼ਣ ਪ੍ਰਤੀ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਜਾਗਰੂਕ ਕਰਦੀਆਂ ਹਨ।
- 'ਸੰਸਾਰ ਦੀਆਂ ਪ੍ਰਸਿੱਧ ਹਸਤੀਆਂ' ਪੁਸਤਕ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਸੰਸਾਰ ਭਰ ਦੀਆਂ ਅਧਿਆਤਮਿਕ, ਪਾਰਮਿਕ, ਰਾਜਨੀਤਿਕ, ਇਤਿਹਾਸਕ ਅਤੇ ਸਮਾਜ ਸੁਧਾਰਕ ਸ਼ਖਸੀਅਤਾਂ ਦੇ ਜੀਵਨ ਅਤੇ ਸਮਾਜ ਪ੍ਰਤੀ ਦੇਣ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਦਾਨ ਕਰਨ ਲਈ ਸਰੋਤ ਮੁਹੱਈਆ ਕਰਵਾਉਂਦੀ ਹੈ। ਇਹਨਾਂ ਉੱਘੀਆਂ ਹਸਤੀਆਂ ਸੰਬੰਧੀ ਪ੍ਰਾਪਤ ਜਾਣਕਾਰੀ ਵਿਦਿਆਰਥੀਆਂ ਵਿੱਚ ਸਮਾਜਿਕ ਜ਼ਿੰਮੇਵਾਰੀ ਦਾ ਅਹਿਸਾਸ ਪੈਦਾ ਕਰਦੀ ਹੈ।
- ਸ਼ਬਦ ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ ਰਚਨਾ ਦੇ ਅਧਿਐਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਭਾਸ਼ਾ ਸਮਰਥਾ ਵਿਚ ਵਾਧਾ ਹੋਣ ਦੇ ਨਾਲ-ਨਾਲ ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾ ਦੇ ਮੁੱਢਲੇ ਸੰਕਲਪਾਂ ਬਾਰੇ ਜਾਣਕਾਰੀ ਹਾਸਲ ਹੁੰਦੀ ਹੈ ਅਤੇ ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ ਦੇ ਅਧਿਐਨ ਰਾ ਹੀਂ ਪੰਜਾਬੀ ਵਿਆਕਰਨ ਦੇ ਮੁੱਢਲੇ ਨਿਯਮਾਂ ਦੀ ਜਾਣਕਾਰੀ ਮਿਲਦੀ ਹੈ।
- ਦਫ਼ਤਰੀ ਚਿੱਠੀ ਪੱਤਰ ਨੂੰ ਸਮਝਣ ਨਾਲ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਦਫ਼ਤਰੀ ਕੰਮਕਾਜ ਕਰਾਉਣ ਲਈ ਲੋੜੀਂਦੇ ਪੱਤਰ ਵਿਹਾਰ ਵਿਚ ਸਹਾਇਤਾ ਮਿਲਦੀ ਹੈ। ਆਪਣੇ ਅਤੇ ਪੁਰਾਵਰਿਆਂ ਦੇ ਅਧਿਐਨ ਅਤੇ ਅਭਿਆਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਭਾਸ਼ਾ ਸਮਰਥਾ ਵਿਚ ਵਾਧਾ ਹੁੰਦਾ ਹੈ।

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2A. Basic Punjabi

- ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਭਾਸ਼ਾ ਦੀ ਅੰਦਰੂਨੀ ਬਣਤਰ ਸੰਬੰਧੀ ਗਿਆਨ ਪ੍ਰਾਪਤ ਹੁੰਦਾ ਹੈ।
- ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਸੋਚਣ ਸ਼ਕਤੀ ਵਿਚ ਵਾਧਾ ਹੁੰਦਾ ਹੈ।
- ਵਿਦਿਆਰਥੀ ਕਿਸੇ ਵੀ ਵਿਸ਼ੇ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਕਰਨ ਦੇ ਕਾਬਲ ਹੁੰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀ ਵਿਆਕਰਨਕ ਨੇਮ ਵਿਧਾਨਾਂ ਤੋਂ ਜਾਣੂ ਹੁੰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਸਾਹਿਤ ਪੜ੍ਹਨ ਦੀ ਰੁਚੀ ਵਧਦੀ ਹੈ ਅਤੇ ਉਹ ਸਮਾਜ ਨੂੰ ਚੰਗੀ ਸੋਚ ਦੇਣ ਦੇ ਸਮਰੱਥ ਹੁੰਦੇ ਹਨ।

2B. Punjab History & Culture

- Understanding the Alexander's conquests led to the creation of the largest empires in history, the spread of Greek culture, art, architecture, philosophy & language.
- Understanding the influence of Mauryan rule, especially during the reign of Ashoka, contributed to the cultural, economic and administrative development of the region.
- Understanding the Kushans, through their interaction and rule, left a lasting imprints on Punjab's cultural, religious and economic landscape.
- Understanding the impact of political stability, economic prosperity, cultural flourishing & a period of relative peace and progress under the Gupta Empire on Punjab.
- Understanding the Vardhana Empire who ruled over the northern regions, figures, social structures and Hindu religion practices.
- Understanding the development and consolidation of distinct socio-cultural identities within the diverse population of Punjab.
- Provide the comprehensive perspective on the development of language and education in Taxila, offering insight into the intellectual vibrancy and academic pursuits of this ancient educational centre.
- Understanding the frame work for comprehensively studying the development of art , architecture, multidimensional nature of these creative endeavors and their impact on societies.

3. Botany

a. Paper I (Cell biology)

- Understanding the structure and function of the nucleus aids in comprehending cellular processes and contributing to a broader grasp of biology and molecular biology principles.
- Enhances knowledge of cellular biology
- Emphasizing the significance of various cell organelles.
- Studying chromosome organization provides insights into genetic variations abnormalities, and alterations
- Comprehensive understanding of genetics, chromosomal disorders, and their impact on organisms.
- To deepens understanding of cell structure and its components and the role they play in regulating cellular processes

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b. Paper II (Genetics)

- Understanding the molecular basis of genetics.
- To analyze and interpret genetic information, and applying this knowledge to Explain various biological processes and phenomena.
- Students may gain skills in experimental techniques and critical thinking related to genetics.

4. Zoology

a. Paper I (Ecology)

- Apply ecological principles to address real-world environmental issues.
- Define and understand key ecological concepts, such as ecosystems, populations, communities, and the biosphere.
- Explore principles of population dynamics, including birth rates, death rates, population growth, and regulation.
- Explain the major biogeochemical cycles (carbon, nitrogen, phosphorus, etc.) and their significance in ecosystem functioning.
- Understand the threats to biodiversity and the role of conservation in maintaining ecological balance.

b. Paper II (Biodiversity)

- Define and comprehend the concept of biodiversity, including genetic, species, and ecosystem diversity.
- Understand and evaluate the various ecosystem services provided by biodiversity, including pollination, water purification, and climate regulation.
- Identify and analyze the major threats to biodiversity, including habitat loss, pollution, invasive species, and climate change.
- Explore the distribution patterns of species and ecosystems across geographic regions.
- Understand the processes of speciation, adaptation, and the development of biodiversity over geological time.

5. Chemistry

a. Paper I (Inorganic Chemistry–II)

- Understand the comparative study, including the diagonal relationship, of group's 13–17 elements, focusing on hydrides, oxides, oxyacids, and halides.
- Develop a comprehensive understanding of the chemistry of transition elements, integrating knowledge of various properties and behaviors across different series.
- Demonstrate the ability to apply acquired knowledge in predicting the relative stability of oxidation states and coordination characteristics of transition elements and their complexes.
- Analyze the various concepts of acids and bases, including Arrhenius, Bronsted-Lowry, Lux-Flood, solvent system, and Lewis.

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b. Paper II (Physical Chemistry–I)

- Comprehend the postulates of the kinetic theory of gases and the deviation from ideal behavior, including van der Waal's equation of state.
- Explore critical phenomena, PV isotherms of real gases, and the isotherms of van der Waal's equation, emphasizing the law of corresponding states and the reduced equation of state.
- Explore liquid crystals, differentiating between nematic and cholestric phases, and understand thermography and the seven-segment cell.
- Explore liquids-in-liquids (emulsions), including types, preparation, emulsifiers, and general applications of colloids.
- Understand ideal and non-ideal solutions, methods of expressing concentrations, activity, and activity coefficient.
- Investigate intermolecular forces, the structure of liquids, and the structural differences between solids, liquids, and gases

B.SC (MEDICAL) - SEM III

1. English

- Development of analytical Skills
- Ability to connect ideas and infer information accurately
- Grammar proficiency
- Vocabulary enrichment
- Inculcation of creative writing skills through close readings of Poems

2. Punjabi

- 'ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਵਾਰਤਕ' ਪੁਸਤਕ ਵਿਚ ਸ਼ਾਮਲ ਵੱਖ-ਵੱਖ ਵਾਰਤਕਕਾਰਾਂ ਦੇ ਲੇਖਾਂ ਦੇ ਅਧਿਐਨ ਨਾਲ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਉਸਾਰੂ ਸੋਚ ਅਤੇ ਪਾਰਦਰਸ਼ੀ ਨਜ਼ਰੀਆ ਵਿਕਸਤ ਹੁੰਦਾ ਹੈ। ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਹੁੰਦੀਆਂ ਹਨ ਜਿਸ ਨਾਲ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਵਿਕਾਸ ਹੁੰਦਾ ਹੈ।
- 'ਚੋਣਵੇਂ ਪੰਜਾਬੀ ਇਕਾਂਗੀ' ਪੁਸਤਕ ਵਿਚ ਸ਼ਾਮਲ ਇਕਾਂਗੀਆਂ ਦੇ ਅਧਿਐਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਨਿੱਜੀ ਅਤੇ ਸਮਾਜਿਕ ਸਮੱਸਿਆਵਾਂ ਪ੍ਰਤੀ ਸੁਚੇਤ ਹੁੰਦੇ ਹਨ ਅਤੇ ਸਮਾਜ ਨੂੰ ਵੀ ਜਾਗਰੂਕ ਕਰਦੇ ਹਨ। ਇਸਤੋਂ ਇਲਾਵਾ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਨਾਟ ਕਲਾ ਅਤੇ ਰੰਗਮੰਚ ਪ੍ਰਤੀ ਰੁਚੀ ਪੈਦਾ ਹੁੰਦੀ ਹੈ।
- ਸੰਖੇਪ ਰਚਨਾ ਦੇ ਅਭਿਆਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਭਾਸ਼ਾਈ ਸੰਜਮ ਦੀ ਯੋਗਤਾ ਪੈਦਾ ਹੁੰਦੀ ਹੈ। ਬਹੁਤੇ ਸ਼ਬਦਾਂ ਦੀ ਥਾਂ ਇਕ ਸ਼ਬਦ ਦੀ ਵਰਤੋਂ ਦਾ ਅਭਿਆਸ ਹੁੰਦਾ ਹੈ ਅਤੇ ਵਿਸਥਾਰ ਨੂੰ ਸੰਖੇਪਤਾ ਪ੍ਰਦਾਨ ਕਰਨ ਦੀ ਜਾਚ ਆਉਂਦੀ ਹੈ। ਅਸ਼ੁੱਧ ਸ਼ਬਦਾਂ ਨੂੰ ਸ਼ੁੱਧ ਕਰਨ ਦੇ ਅਭਿਆਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਲਿਖਣ ਅਤੇ ਬੋਲਣ ਦੇ ਯੋਗ ਹੁੰਦੇ ਹਨ।
- ਮੂਲ ਵਿਆਕਰਨਕ ਇਕਾਈਆਂ ਦੇ ਅਧਿਐਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਵਿਆਕਰਨ ਦੇ ਨਿਯਮਾਂ ਨੂੰ ਸਮਝਣ ਦੀ ਯੋਗਤਾ ਪੈਦਾ ਹੁੰਦੀ ਹੈ। ਇਸਤੋਂ ਇਲਾਵਾ ਵਿਆਕਰਨ ਦੀਆਂ ਯੁਕਤੀਆਂ ਤੋਂ ਵਿਦਿਆਰਥੀ ਜਾਣੂ ਹੁੰਦੇ ਹਨ। ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸੰਚਾਰ ਦਾ ਹੁਨਰ ਵਿਕਸਤ ਹੁੰਦਾ ਹੈ।

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2A. Basic Punjabi

- ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਵਿਆਕਰਨ ਦੀਆਂ ਬਾਰੀਕੀਆਂ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਾਪਤ ਹੁੰਦੀ ਹੈ।
- ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਪੜ੍ਹਨ ਤੇ ਲਿਖਣ ਦਾ ਗਿਆਨ ਹੁੰਦਾ ਹੈ।
- ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤ ਪੜ੍ਹਨ ਤੇ ਲਿਖਣ ਦੀ ਰੁਚੀ ਵਧਦੀ ਹੈ।
- ਵਿਦਿਆਰਥੀ ਅੰਗਰੇਜ਼ੀ ਭਾਸ਼ਾ ਦਾ ਪੰਜਾਬੀ ਵਿਚ ਅਨੁਵਾਦ ਕਰਨ ਦੇ ਯੋਗ ਹੁੰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਵਿਕਾਸ ਵਿਚ ਆਪਣਾ ਯੋਗਦਾਨ ਪਾਉਂਦੇ ਹਨ।

2B. Punjab History & Culture

- Understanding the Turko –Afghan rule, socio-cultural changes, the dominance of various Muslim dynasties: Ghaznavids, Ghurids.
- Understanding that the Mughals had profound impact on Punjab, cultural fusion, administrative reforms, art and literature.
- Understanding the socio-religious movement that emerged in medieval India, through its influence on Sikhism, led to the establishment of a distinct religious and social identity characterized by devotion, equality, and a commitment to social justice.
- Understanding the impact of Sufism in Punjab has led to a rich tapestry of spirituality, culture, and social values, with special reference to Baba Farid Ji, include spiritual enlightenment, contributions to culture and literature, promotion of social equality, and fostering a legacy of tolerance and interfaith harmony.
- The life and travels of Guru Nanak Dev Ji, the founder of Sikhism, had profound impacts on the spiritual, social, and cultural aspects of Sikh followers and beyond, shaped Sikhism into a distinct spiritual and cultural tradition with a focus on oneness, equality, community, and service.
- Understanding the teachings of Guru Nanak Dev Ji, as expressed through the concepts of Sangat, Pangat, and Dharamsala, lead to the formation of a united Sikh community, the promotion of equality and humility, the practice of selfless service, and the preservation of Sikh culture and spirituality.
- The second, third, and fourth Sikh Gurus made significant contributions to the development and consolidation of Sikhism, these Gurus played pivotal roles in shaping Sikhism during its formative years.
- Understanding the compilation of Guru Adi Granth Sahib Ji and the martyrdom of Guru Arjan Dev Ji had enduring impacts on Sikhism, shaped the spiritual and cultural identity of Sikhs, providing them with a sacred scripture for guidance and inspiring them to uphold principles of justice, truth, and religious freedom.

3. Botany

a. Paper I (Structure, development and reproduction in flowering plants)

- To understand the modular growth of flowering plants and recognizing diversity in plant forms (annuals, biennials, perennials, trees).

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- Comprehending branching patterns, and differentiating between monopodial and sympodial growth, along with grasping canopy architecture concepts.
- It involve gaining knowledge about the shoot system and understanding meristematic and permanent tissues
- Student learn about the formation of internodes, functions of cambium, and understanding the process of secondary xylem formation.
- General understanding of wood structure, recognizing characteristics of growth rings, sapwood, and heartwood.
- Comprehending the role of the woody skeleton, understanding the structure-function relationships of secondary phloem, and gaining knowledge about periderm.
- It include understanding the origin, development, and arrangement of leaves, their diversity in shape and size.
- Learning about adaptations to water stress, and gaining knowledge about senescence and abscission processes in leaves.

b. Paper II (Structure, Development and Reproduction in Flowering Plants–II)

- Students will gain a thorough understanding of plant structure, growth, and reproduction.
- Development of practical skills related to vegetative propagation, grafting, and budding.
- Expertise in flower structure, pollination mechanisms, and seed development.
- Awareness of the ecological significance of seeds, their adaptation, and dispersal strategies.
- Critical Thinking:
- Encouraging critical thinking through the application of knowledge in various aspects of plant biology

4. Zoology

a. Paper I (Evolution)

- Define and understand the fundamental concepts of evolution, including natural selection, adaptation, and common ancestry.
- Explore the mechanisms that drive evolution, including genetic variation, mutation, gene flow, genetic drift, and natural selection.
- Understand the evidence for human evolution and the relationships between different hominin species.
- Discuss ethical considerations related to the teaching and application of evolutionary biology.
- Apply the scientific method to formulate and test hypotheses related to evolutionary processes.

b. Paper II (Biodiversity)

- Define and comprehend the concept of biodiversity including genetic, species, and ecosystem diversity.
- Understand the ecological processes of biodiversity, including nutrient cycling, energy flow, and succession.

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- Identify and analyze the major threats to biodiversity, including habitat loss, pollution, invasive species, and climate change.
- Learn methods for measuring and assessing biodiversity, including species richness, abundance, and diversity indices.

5. Chemistry

a. Paper I (Organic Chemistry–A)

- Understand the stereochemistry of organic compounds.
- Investigate conformational isomerism, including conformational analysis of ethane and n-butane, conformation of cyclohexane, axial and equatorial bonds, and conformation of mono-substituted cyclohexane derivatives.
- Understand the nomenclature, structure, and bonding of alcohols, and explore the classification of monohydric and dihydric alcohols.
- Explore various reduction reactions, halogenation of enolizable ketones, and other reactions involving aldehydes and ketones.

b. Paper II (Physical Chemistry–B)

- Understand the fundamental thermodynamic terms such as system, surroundings, and types of systems
- Explore thermodynamic processes, the concept of heat and work, and the First Law of Thermodynamics, including internal energy and enthalpy
- Understand the Nernst distribution law, its thermodynamic derivation, and applications in non-ideal systems and immiscible liquids.
- Calculate work, heat, internal energy, and enthalpy for the expansion of ideal gases under isothermal and adiabatic conditions for reversible processes

B.SC (MEDICAL) - SEM IV

1. English

- Development of analytical Skills
- Ability to connect ideas and infer information accurately
- Grammar proficiency
- Vocabulary enrichment
- Inculcation of creative writing skills through close readings of Poems

2. Punjabi

- ‘ਮੇਰੀ ਜੀਵਨ ਗਾਥਾ’ ਪੁਸਤਕ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਸਵੈਜੀਵਨੀ ਸਾਹਿਤ ਨੂੰ ਸਮਝਣ ਅਤੇ ਪੜ੍ਹਣ ਵਿਚ ਰੁਚੀ ਪੈਦਾ ਕਰਦੀ ਹੈ। ਇਸਦੀ ਵਾਰਤਕ ਸ਼ੈਲੀ ਦੇ ਅਧਿਐਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਭਾਸ਼ਾ ਦੀ ਅੰਦਰੂਨੀ ਬਣਤਰ ਜਿਵੇਂ ਕਿ ਮੁਹਾਵਰੇਦਾਰ ਭਾਸ਼ਾ ਅਤੇ ਸ਼ੈਲੀ ਦਾ ਗਹਿਨ ਅਤੇ ਅਨੁ ਹੁੰਦਾ ਹੈ।
- ‘ਫ਼ਾਸਲੇ’ ਨਾਟਕ ਦੇ ਅਧਿਐਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਨਾਟਕ ਅਤੇ ਰੰਗਮੰਚੀ ਜੁਗਤਾਂ ਦਾ ਗਿਆਨ ਹੁੰਦਾ ਹੈ। ਨਾਟ ਕਲਾ ਦੇ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਨਿੱਜੀ ਅਤੇ ਸਮਾਜਿਕ ਮਸਲਿਆਂ ਪ੍ਰਤੀ ਸੁਚੇਤ ਹੋ ਕੇ ਸਮਾਜ ਨੂੰ ਜਾਗਰੂਕ

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ਕਰਨ ਦੇ ਸਮਰੱਥ ਹੁੰਦੇ ਹਨ। ਇਸਤੋਂ ਇਲਾਵਾ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਨਾਟਕ ਲਿਖਣ ਤੇ ਨਾਟਕ ਖੇਡਣ ਦੀ ਰੁਚੀ ਪ੍ਰਫੁੱਲਿਤ ਹੁੰਦੀ ਹੈ।

- ਵੱਖ-ਵੱਖ ਸਮਾਜਕ, ਸਭਿਆਚਾਰਕ, ਇਤਿਹਾਸਕ, ਅਤੇ ਵਿਦਿਅਕ ਸਰੋਕਾਰਾਂ ਸੰਬੰਧੀ ਲੇਖ ਰਚਨਾ ਵਿਦਿਆਰਥੀਆਂ ਦੇ ਬੌਧਿਕ ਵਿਕਾਸ ਵਿਚ ਵੱਡਾ ਯੋਗਦਾਨ ਪਾਉਂਦਾ ਹੈ। ਉਹਨਾਂ ਅੰਦਰ ਕਿਸੇ ਵੀ ਵਿਸ਼ੇ 'ਤੇ ਲਿਖ ਜਾਂ ਬੋਲ ਸਕਣਾ ਸੁਖਾਲਾ ਹੋ ਜਾਂਦਾ ਹੈ ਜਿਸ ਨਾਲ ਭਾਸ਼ਨ ਕਲਾ ਵਿਚ ਵੀ ਨਿਖਾਰ ਆਉਂਦਾ ਹੈ। ਅਖ਼ਬਾਰ ਦੇ ਨਿੱਜੀ ਅਤੇ ਦਫ਼ਤਰੀ ਇਸ਼ਤਿਹਾਰਾਂ ਦਾ ਅਭਿਆਸ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਆਪਣੇ ਨਿੱਜੀ ਜੀਵਨ ਵਿਚ ਅਜਿਹੀ ਲੋੜ ਦੀ ਪੂਰਤੀ ਲਈ ਯੋਗ ਬਣਾਉਂਦਾ ਹੈ।
- ਸ਼ਬਦ ਜੋੜਾਂ ਦੇ ਨਿਯਮਾਂ ਦਾ ਗਿਆਨ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਵਿਆਕਰਨ ਦੀਆਂ ਬਾਰੀਕੀਆਂ ਪ੍ਰਤੀ ਸੁਚੇਤ ਕਰਦਾ ਹੈ। ਸ਼ੁੱਧ ਭਾਸ਼ਾ ਲਿਖਣ ਅਤੇ ਪੜ੍ਹਨ ਦੀ ਯੋਗਤਾ ਪੈਦਾ ਹੁੰਦੀ ਹੈ। ਗੁਰਮੁਖੀ ਲਿੱਪੀ ਨੂੰ ਸਮਝਣ ਨਾਲ ਭਾਸ਼ਾ ਦੇ ਸ਼ਬਦ ਜੋੜਾਂ ਦੀ ਸਮੱਸਿਆ ਖ਼ਤਮ ਹੁੰਦੀ ਹੈ।

2A. Basic Punjabi

- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਨੂੰ ਪ੍ਰਭਾਵਸ਼ਾਲੀ ਢੰਗ ਨਾਲ ਵਰਤਨ ਦੇ ਯੋਗ ਹੁੰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀ ਭਾਸ਼ਾ ਦੀਆਂ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਦੇ ਸਮਰੱਥ ਹੁੰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਆਤਮ ਵਿਸ਼ਵਾਸ ਪੈਦਾ ਹੁੰਦਾ ਹੈ।
- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਨਵੇਂ ਵਾਕਾਂ ਦਾ ਨਿਰਮਾਣ ਕਰਨ ਦੇ ਯੋਗ ਹੁੰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਵਿਕਾਸ ਵਿਚ ਆਪਣਾ ਯੋਗਦਾਨ ਪਾਉਂਦੇ ਹਨ।

2B. Punjab History & Culture

- Understanding the politicization of Sikhism under Guru Hargobind resulted in a redefined Sikh identity that encompassed both spiritual and military dimensions.
- Understanding the martyrdom of Guru Tegh Bahadur, the ninth Sikh Guru, had profound consequences for Sikhism, influencing the course of Sikh history and shaping the principles of the faith. It is a testament to the commitment of Sikhs to the protection of human rights, religious freedom, and the values enshrined in Sikhism.
- The creation of the Khalsa by Guru Gobind Singh Ji, the tenth Sikh Guru, was a transformative event in Sikh history.
- Understanding the creation of Khalsa impacting sikh identity, principles, and the historical & cultural landscape of Punjab.
- Understanding the rise of Banda Singh Bahadur had far-reaching outcomes, including the establishment of Sikh rule, the promotion of Sikh values, religious freedom, socioeconomic changes, and the inspiration for future Sikh movements.
- Understanding the rise of the Sikh Misls, this era of the Misls played a crucial role in shaping the trajectory of Sikh political and cultural development in Punjab.
- Understanding the Ranjit Singh's rule, consolidation of his power, civil administration, land revenue, military achievements
- Understanding the dynamic cultural, political and socio-economic aspects of the medieval Punjab.

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3. Botany

a. Paper I (Diversity of seed plants and their systematic)

- Studying the characteristics, evolution, and distinctions of seed plants, particularly angiosperms and gymnosperms
- This knowledge contributes to a broader understanding of botanical principles and ecosystems.
- Students will delve into the diverse realm of gymnosperms, exploring both living species and their fossilized counterparts.
- The curriculum places particular emphasis on connecting this botanical knowledge with the geological time scale along with the trajectories of gymnosperms
- The course endeavors to equip students with a detailed understanding of plant morphology and anatomy, focusing on both vegetative and reproductive structures.
- Additionally, the reproductive processes and life cycles of key plant species, such as Pinus and Cycas, will be studied to provide a comprehensive overview of plant reproduction.
- The study of the reproduction and life cycles of Ephedra and Ginkgo will provide valuable insights into diverse plant reproductive strategies.
- The course outcome is to cultivate a thorough appreciation for the complexities of plant morphology, anatomy, and reproduction, fostering a well-rounded understanding of these aspects within the context of specific plant species.

b. Paper II (Diversity of Seed Plants and Their Systematics–II)

- Understanding the historical development of angiosperm taxonomy.
- Mastery of alpha-taxonomy, omega-taxonomy, and holotaxonomy principles.
- Proficiency in using identification keys and taxonomic literature.
- Knowledge of botanical nomenclature, including taxonomic ranks, type concept, and the principle of priority.
- Recognition of the contributions of cytology, phytochemistry, and taxometrics to taxonomy.
- Familiarity with the classification systems proposed by Bentham and Hooker, Engler and Prantl.
- Comprehensive knowledge of the diversity of flowering plants through the study of specific plant families.
- Ability to apply taxonomic principles to identify and classify plants.
- Appreciation of the ecological and economic importance of different plant families.

4. Zoology

a. Paper I (Biochemistry)

- Demonstrate a solid understanding of the fundamental principles of biochemistry, including the structure and function of biomolecules such as proteins, nucleic acids, lipids, and carbohydrates.

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- Explore the regulation of metabolic pathways and the integration of different metabolic processes.
- Describe the structure of DNA and RNA and understand their roles in genetic information storage and expression.
- Gain proficiency in common biochemical techniques such as gel electrophoresis, chromatography, and spectrophotometry.
- Understand the principles of bioenergetics, including the thermodynamics of biological reactions.

b. Paper II (Animal Physiology)

- Understand the mechanisms of muscle contraction and relaxation.
- Explore the principles of blood circulation, blood pressure regulation, and cardiac function.
- Understand the regulation of breathing and the transport of respiratory gases in the blood.
- Explore the role of digestive enzymes and hormones in the regulation of metabolism.
- Understand the reproductive anatomy and physiology in both males and females.

5. Chemistry

a. Paper I (Inorganic Chemistry–A)

- Investigate non-aqueous solvents, including physical properties, types, and general characteristics
- Examine the general features and chemistry of lanthanides and actinides
- Understand the biological role of alkali and alkaline earth metal ions, specifically highlighting the significance of Ca^{2+} in biological systems
- Analyze the valence bond theory of transition metal complexes, providing insights into the bonding in coordination compounds
- Understand Werner's coordination theory and its experimental verification, including the effective atomic number concept

b. Paper II (Organic Chemistry–B)

- Understand the nomenclature, structure, and bonding of carboxylic acids, including their physical properties and acidity.
- Explore the molecular orbital picture and aromatic characteristics of heterocyclic compounds like pyrrole, furan, thiophene, and pyridine.
- Understand the methods of synthesis and chemical reactions of heterocyclic compounds
- Understand the separation of primary, secondary, and tertiary amines and factors affecting the basicity of amines
- Investigate organometallic compounds, focusing on Grignard reagents, organolithium compounds, and organozinc and organocopper compounds, including their formation and chemical reactions.

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B.SC (MEDICAL) - SEM V

1. English

- Appreciation of Literature
- Inculcation of moral and social values
- Enhancement of Creative Writing Skills
- Enhanced understanding of human nature.

2. Punjabi

- ਸੰਪਾਦਿਤ ਪੁਸਤਕ 'ਚੋਣਵੀਆਂ ਪੰਜਾਬੀ ਕਹਾਣੀਆਂ' ਵਿਚ ਦਰਜ ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਹਾਣੀਆਂ ਦੇ ਪਾਠ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਕਹਾਣੀ ਸਾਹਿਤ ਪੜ੍ਹਨ ਪ੍ਰਤੀ ਰੁਚੀ ਪ੍ਰਬਲ ਹੁੰਦੀ ਹੈ। ਕਹਾਣੀਆਂ ਵਿਚੋਂ ਚੰਗੇ ਇਨਸਾਨ ਬਣਨ ਦੀ ਪ੍ਰੇਰਨਾ ਮਿਲਦੀ ਹੈ ਅਤੇ ਵਿਦਿਆਰਥੀ ਸਮਾਜਕ ਜ਼ਿੰਮੇਵਾਰੀਆਂ ਨੂੰ ਨਿਭਾਉਣ ਅਤੇ ਚੰਗੀ ਜੀਵਨ ਜਾਚ ਸਿੱਖਣ ਦੇ ਕਾਬਲ ਬਣਦੇ ਹਨ। ਉਹ ਸਾਹਿਤ ਲਿਖਣ ਪ੍ਰਤੀ ਵੀ ਰੁਚਿਤ ਹੁੰਦੇ ਹਨ।
- 'ਏਹੁ ਹਮਾਰਾ ਜੀਵਣਾ' ਨਾਵਲ ਦਾ ਪਾਠ ਔਰਤ ਦੀ ਸਮਾਜਕ ਹੈਸੀਅਤ ਨੂੰ ਦਰਸਾਉਂਦਾ ਹੋਇਆ ਸਮਾਜ ਵਿਚ ਉਸਦੇ ਰੁਤਬੇ ਨੂੰ ਬਹਾਲ ਕਰਨ ਲਈ ਸੁਚੇਤ ਕਰਦਾ ਹੈ। ਇਸਤੋਂ ਇਲਾਵਾ ਦਲੀਪ ਕੌਰ ਟਿਵਾਣਾ ਵਰਗੀ ਇਸਤਰੀ ਨਾਵਲਕਾਰ ਦੇ ਜੀਵਨ ਤੋਂ ਮਿਲਨ ਵਾਲੀ ਪ੍ਰੇਰਨਾ ਵੀ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਮਨੁੱਖੀ ਜੀਵਨ ਮੁੱਲਾਂ ਪ੍ਰਤੀ ਸੁਚੇਤ ਕਰਦੀ ਹੈ।
- ਪੈਰੂਾ ਰਚਨਾ ਦੇ ਅਭਿਆਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਕਿਸੇ ਵਿਸ਼ੇ 'ਤੇ ਸੰਖੇਪ ਪਰ ਮੁੱਲਵਾਨ ਵਿਚਾਰ ਸਾਂਝੇ ਕਰਨ ਦਾ ਮੌਕਾ ਮਿਲਦਾ ਹੈ। ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਆਪਣੀ ਲਿਖਤ ਵਿਸ਼ੇ 'ਤੇ ਪਕੜ ਮਜ਼ਬੂਤ ਕਰਦੀ ਹੈ। ਅੰਗਰੇਜ਼ੀ ਪੈਰੂੇ ਦਾ ਪੰਜਾਬੀ ਵਿਚ ਅਨੁਵਾਦ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ ਤੇ ਭਾਸ਼ਾ ਯੋਗਤਾ ਵਿਚ ਵਾਧਾ ਕਰਦਾ ਹੈ। ਅਨੁਵਾਦ ਦੀ ਯੋਗਤਾ ਇਸ ਖੇਤਰ ਵਿਚ ਵਿਦਿਆਰਥੀਆਂ ਲਈ ਰੋਜ਼ਗਾਰ ਦੇ ਮੌਕੇ ਵੀ ਪੈਦਾ ਕਰਦੀ ਹੈ।
- ਪੰਜਾਬੀ ਧੁਨੀ ਵਿਉਂਤ ਰਾਹੀਂ ਜਿੱਥੇ ਪੰਜਾਬੀ ਧੁਨੀਆਂ ਦਾ ਵਿਗਿਆਨਕ ਅਧਿਐਨ ਭਾਸ਼ਾ ਦੇ ਵਿਗਿਆਨਕ ਪਾਸਾਰਾਂ ਵਿਚ ਵਾਧਾ ਕਰਦਾ ਹੈ ਉੱਥੇ ਵਾਕਾਤਮਕ ਜੁਗਤਾਂ ਦੇ ਅਧਿਐਨ ਨਾਲ ਵਾਕ ਵਿਚਲੇ ਸ਼ਬਦਾਂ ਦੇ ਆਪਸੀ ਸੰਬੰਧਾਂ ਦੇ ਉਜਾਗਰ ਹੋਣ ਨਾਲ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਵਿਆਕਰਨ ਪ੍ਰਤੀ ਸਮਝ ਵਿਚ ਮੁੱਲਵਾਨ ਵਾਧਾ ਹੁੰਦਾ ਹੈ।

2A. Basic Punjabi

- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਸਾਹਿਤ ਅਤੇ ਲੋਕ ਸਾਹਿਤ ਸੰਬੰਧੀ ਜਾਣਕਾਰੀ ਪ੍ਰਾਪਤ ਕਰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀ ਲੋਕ ਕਾਵਿ ਦੀਆਂ ਮਹੱਤਵਪੂਰਨ ਵੰਨਗੀਆਂ ਨੂੰ ਸਮਝਣ ਦੇ ਸਮਰੱਥ ਹੁੰਦੇ ਹਨ।
- ਪੰਜਾਬੀ ਲੋਕਨਾਚਾਂ ਦੀਆਂ ਵਿਭਿੰਨ ਵੰਨਗੀਆਂ ਦੀ ਜਾਣਕਾਰੀ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਪੰਜਾਬੀ ਰਹਿਤਲ ਦਾ ਗਿਆਨ ਵਧਾਉਂਦੀ ਹੈ।
- ਲੋਕ ਖੇਡਾਂ, ਲੋਕ ਤਮਾਸ਼ੇ ਅਤੇ ਲੋਕ ਕਲਾਵਾਂ ਦੇ ਬੁਨਿਆਦੀ ਗਿਆਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਸਮਾਜ ਤੇ ਸਭਿਆਚਾਰ ਨੂੰ ਡੂੰਘੇ ਰੂਪ ਵਿਚ ਸਮਝਣ ਦੇ ਯੋਗ ਹੁੰਦੇ ਹਨ।

2B. Punjab History & Culture

- Understand The First Anglo-Sikh War, the Treaty of Lahore, signed in 1846, which ceded significant territories to the British, established a British Resident at Lahore.
- Understand the trajectory of Punjab's history under British rule, influencing its socio-economic and political development.

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- Understand the economic transformations, social changes, and the emergence of a new educated class that played a crucial role in India's struggle for independence.
- Analyse these movements collectively that played a crucial role in shaping the social, cultural, and political landscape of India, contributing to the broader struggle for independence and fostering a spirit of reform and resistance against various forms of oppression.
- Create the ability to understand the power of mass mobilization, civil disobedience, and nonviolent resistance, contributing significantly to India's eventual attainment of independence in 1947.

3. Botany

a. Paper I (Plant Physiology)

- Students should integrate knowledge from different units to understand the holistic functioning of plants.
- Develop critical thinking skills to analyze and apply physiological concepts in various plant-related scenarios.
- Gain hands-on experience through experiments related to hydroponics, transpiration, and mineral uptake.
- Effectively communicate complex physiological concepts and experimental findings.

b. Paper II (Biochemistry and Biotechnology)

- It include students gaining a comprehensive understanding of enzyme-related topics.
- To ensure that students have a solid foundation in the fundamental principles of enzymology.
- Students will gain a comprehensive understanding of various aspects related to cellular respiration.
- To ensure that students have a thorough understanding of the biochemical processes involved in cellular respiration and energy production.
- Students will be able to know about the basics of enzymes.
- This aim to ensure that students have a solid foundation in the biochemical aspects of nitrogen metabolism and lipid-related processes.
- It include students gaining a comprehensive understanding of genetic manipulation and biotechnological processes.
- To ensure that students have a comprehensive understanding of genetic engineering techniques and their applications in biotechnology.

4. Zoology

a. Paper I (Genetics)

- Demonstrate a thorough understanding of the fundamental principles of genetics, including Mendelian inheritance, molecular genetics, and population genetics.
- Apply Mendelian principles to predict and analyse inheritance patterns.

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- Explore the sources and mechanisms of genetic variation, including mutation and recombination.
- Understand the genetic basis of inherited disorders and the use of genetic counselling.
- Communicate genetic concepts effectively through written reports, oral presentations, and scientific discussions.
- Apply genetic principles to solve real-world challenges.

b. Paper II (Developmental Biology)

- Demonstrate a solid understanding of the fundamental principles of developmental biology, including the processes of embryogenesis, organogenesis, and tissue differentiation.
- Understand the molecular mechanisms involved in cell fate determination and differentiation during development.
- Explore the stages of embryonic development from fertilization to the formation of the basic body plan.
- Explore the potential applications of stem cell research in medicine.
- Understand how changes in developmental processes contribute to evolutionary divergence.
- Explore the genetic and environmental factors contributing to developmental abnormalities.

5. Chemistry

a. Paper I (Inorganic Chemistry–A)

- Understand the limitations of valence bond theory in explaining metal complexes and gain an elementary idea of crystal-field theory.
- Explore the thermodynamic stability of metal complexes, factors influencing stability, and substitution reactions in square planar complexes.
- Understand the bonding in metal-ethylenic complexes and the mechanism of homogeneous hydrogenation reactions in organometallic chemistry
- Explore crystal field splitting in octahedral, tetrahedral, and square planar complexes, along with factors influencing the crystal-field parameters.

b. Paper II (Physical Chemistry–B)

- Demonstrate understanding of equivalent conductance, its measurement, and the variation of equivalent and specific conductance with dilution.
- Explore the migration of ions and Kohlrausch law, and critically assess the Arrhenius theory of electrolyte dissociation, distinguishing between weak and strong electrolytes.
- Explore spectroscopy, including electromagnetic radiation, rotational spectrum of diatomic molecules, vibrational spectrum (infrared) and electronic spectrum with an emphasis on potential energy curves and transitions.
- Develop practical skills and theoretical understanding through comprehensive course outcomes.

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B.SC (MEDICAL) - SEM VI

1. English

- Appreciation of Literature
- Inculcation of moral and social values
- Enhancement of Creative Writing Skills
- Enhanced understanding of human nature.

2. Punjabi

- ਸੰਪਾਦਿਤ ਪੁਸਤਕ 'ਕਾਵਿ ਗੌਰਵ' ਵਿਚਲਾ ਸੂਫੀ ਕਾਵਿ, ਗੁਰਮਤਿ ਕਾਵਿ, ਕਿੱਸਾ ਕਾਵਿ ਅਤੇ ਬੀਰ ਕਾਵਿ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਕਲਾਸੀਕਲ ਸਾਹਿਤ ਪੜ੍ਹਨ ਤੇ ਸਮਝਣ ਉਪਰੰਤ ਉਹਨਾਂ ਦੀ ਸੋਚ ਨੂੰ ਵਿਸ਼ਾਲ ਕਰਦਾ ਹੈ। ਜੀਵਨ ਪ੍ਰਤੀ ਉਹਨਾਂ ਦੀ ਸੋਚ ਵਧੇਰੇ ਉਸਾਰੂ ਹੁੰਦੀ ਹੈ।
- 'ਧਰਤੀਆਂ ਦੇ ਗੀਤ' ਪੁਸਤਕ ਵੱਖ-ਵੱਖ ਦੱਖਣ ਪੂਰਬੀ ਦੇਸ਼ਾਂ ਦੇ ਲੋਕਾਂ ਦੇ ਜੀਵਨ 'ਤੇ ਇਕ ਪੰਛੀ ਝਾਤ ਪਾਉਂਦਾ ਸਫ਼ਰਨਾਮਾ ਹੈ ਜਿਸਦੇ ਦੂਜੇ ਹਿੱਸੇ ਵਿਚ ਭਾਰਤ ਦੇ ਅੰਡੇਮਾਨ ਅਤੇ ਨਿਕੋਬਾਰ ਟਾਪੂਆਂ 'ਤੇ ਵਸਦੇ ਲੋਕਾਂ ਦੇ ਜੀਵਨ ਬਾਰੇ ਵਿਸਥਾਰ ਪੂਰਵਕ ਜਾਣਕਾਰੀ ਦਿੱਤੀ ਗਈ ਹੈ ਜਿਸ ਤੋਂ ਵੱਖ-ਵੱਖ ਦੇਸ਼ਾਂ ਦੇ ਸਭਿਆਚਾਰ ਦੀ ਝਲਕ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਉਹਨਾਂ ਦੇਸ਼ਾਂ ਵਿਚ ਘੁੰਮਣ ਦੀ ਤਾਂਘ ਪੈਦਾ ਕਰਦੀ ਹੈ ਅਤੇ ਇਸ ਨਾਲ ਉਹ ਸੰਸਾਰਕ ਪੱਧਰ 'ਤੇ ਇਕ ਸਾਂਝ ਸਥਾਪਤ ਕਰਦੇ ਨਜ਼ਰ ਆਉਂਦੇ ਹਨ।
- ਲੇਖ ਰਚਨਾ ਦਾ ਅਭਿਆਸ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਵਿਗਿਆਨ, ਤਕਨਾਲੋਜੀ ਅਤੇ ਚਲੰਤ ਮਸਲਿਆਂ ਸੰਬੰਧੀ ਸੂਝ ਵਧਾਉਂਦਾ ਹੈ। ਇਸਤੋਂ ਇਲਾਵਾ ਆਧੁਨਿਕ ਸਾਹਿਤ ਰੂਪਾਂ ਸੰਬੰਧੀ ਗਿਆਨ ਸਾਹਿਤ ਨੂੰ ਬੌਧਿਕ ਪੱਧਰ 'ਤੇ ਸਮਝਣਯੋਗ ਬਣਾਉਂਦਾ ਹੈ। ਵਿਦਿਆਰਥੀ ਸਾਹਿਤ ਦੀਆਂ ਵੱਖ-ਵੱਖ ਵਿਧਾਵਾਂ ਤੋਂ ਜਾਣੂ ਹੁੰਦੇ ਹਨ।
- ਕਿਸੇ ਵੀ ਭਾਸ਼ਾ ਦੀ ਗਹਿਨ ਸੂਝ ਲਈ ਉਸਦੀ ਵਿਆਕਰਨਕ ਸਮਝ ਹੋਣੀ ਬਹੁਤ ਜ਼ਰੂਰੀ ਹੈ। ਪ੍ਰਮੁੱਖ ਵਿਆਕਰਨਕ ਸ਼੍ਰੇਣੀਆਂ ਅਤੇ ਵਿਆਕਰਨਕ ਇਕਾਈਆਂ ਦਾ ਗਿਆਨ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਵਿਆਕਰਨ ਸੰਬੰਧੀ ਸਮਝ ਨੂੰ ਵਿਸਥਾਰ ਦਿੰਦਾ ਹੈ। ਇਸ ਨਾਲ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਭਾਸ਼ਾਈ ਸੰਚਾਰ ਦੀ ਯੋਗਤਾ ਵਿਚ ਵਾਧਾ ਹੁੰਦਾ ਹੈ।

2A. Basic Punjabi

- ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੇ ਪਿਛੋਕੜ, ਭੂਗੋਲਿਕ ਸਥਿਤੀ, ਅਤੇ ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੇ ਉੱਘੜਵੇਂ ਲੱਛਣਾਂ ਦੀ ਜਾਣਕਾਰੀ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਭਿਆਚਾਰਕ ਚੇਤਨਾ ਪੈਦਾ ਕਰਦੀ ਹੈ।
- ਪੰਜਾਬ ਦੇ ਪ੍ਰਮੁੱਖ ਮੇਲੇ, ਪ੍ਰਮੁੱਖ ਤਿਉਹਾਰ ਅਤੇ ਪ੍ਰਮੁੱਖ ਧਾਰਮਿਕ ਸਥਾਨਾਂ ਦੇ ਅਧਿਐਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਲੋਕਾਂ ਦੀ ਮਾਨਸਿਕਤਾ ਨੂੰ ਵਧੇਰੇ ਚੰਗੀ ਤਰ੍ਹਾਂ ਸਮਝ ਸਕਦੇ ਹਨ।
- ਪੰਜਾਬੀਆਂ ਦੀਆਂ ਜਨਮ, ਵਿਆਹ ਤੇ ਮੌਤ ਸੰਬੰਧੀ ਰਸਮਾਂ ਰੀਤਾਂ ਦੇ ਗਿਆਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਸਮਾਜ ਦੀ ਸੰਰਚਨਾ ਦੀ ਡੂੰਘੀ ਜਾਣਕਾਰੀ ਹਾਸਲ ਕਰਦੇ ਹਨ।
- ਪੰਜਾਬੀ ਲੋਕਾਂ ਦਾ ਖਾਣ-ਪੀਣ, ਪਹਿਰਾਵਾ ਅਤੇ ਪੰਜਾਬੀਆਂ ਦੇ ਲੋਕ ਵਿਸ਼ਵਾਸਾਂ ਦੇ ਗਿਆਨ ਦੀ ਰੋਸ਼ਨੀ ਵਿਚ ਵਿਦਿਆਰਥੀ ਵਧੇਰੇ ਗੰਭੀਰਤਾ ਨਾਲ ਪੰਜਾਬ ਦੀ ਲੋਕਧਾਰਾ ਅਤੇ ਸਭਿਆਚਾਰ ਸੰਬੰਧੀ ਵਿਚ ਰੁਚੀ ਲੈਂਦੇ ਹਨ।

2B. Punjab History & Culture

- Understand the partition and historical complexities and enduring effects of the partition on Punjab, massive migration, displacement and immense human suffering.
- Understand the long-term process of rebuilding lives and communities in Punjab after the traumatic events of partition.

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- Understanding the historical context and consequences of the Punjabi Suba movement and the reorganization of states in 1966.
- Create ability to understanding the multifaceted impact of the Green Revolution on Punjab's agriculture, economy, and society.
- Understand the diverse and dynamic impact of the Punjabi diaspora on both the countries they reside in and the cultural changes of Punjab itself.
- Understand the multifaceted development of education and cultural expression in Punjab after independence.
- Understand the comprehensive strategies and interventions to address the complex and interconnected issues of drug addiction and female foeticide in Punjab.

3. Botany

a. Paper I (Ecology)

- Understanding the key components of the environment that influence plant growth and their relationship.
- Enabling them to analyze and interpret the impact of environmental factors on plant life.
- Grasping the fundamental characteristics of ecological communities.
- Recognition and analysis of life forms and biological spectra within ecological communities and comprehension of ecological succession.
- Understanding population growth curves and various biogeochemical cycles.
- Comprehending the structure of ecosystems, interaction of abiotic and biotic components and knowledge of food chain, food web and ecological pyramids
- To equip students with the knowledge and skills necessary to analyze and interpret population dynamics.
- To get knowledge and understanding of the biogeographical regions of India.
- To understand the characteristics of different vegetation types, and apply landscape ecology principles to evaluate the relationship between landscape structure and biodiversity.
- Students should gain insights into the dynamic nature of land use and its effects on ecosystems.

b. Paper II (Economic Botany)

- Practical understanding, and the application of plant-related concepts in various industries.
- The course aims to provide students with a comprehensive understanding of the diverse uses of plants in agriculture, industry, medicine, and daily life.

4. Zoology

- Understand the morphology and physiological adaptations of economically significant insects.
- Explore the mechanisms of host selection, feeding, and oviposition by economically important insects.

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- Explore the integration of biological, chemical, cultural, and mechanical control methods.
- Understand the principles of biological control as a sustainable method for managing insect pests.
- Understand the ecological interactions between insect pests, beneficial organisms, and the environment.

5. Chemistry

a. Paper I (Organic Chemistry–A)

- Acquire a comprehensive understanding of Nuclear Magnetic Resonance (NMR) spectroscopy, including proton magnetic resonance (^1H NMR) spectroscopy
- Solve problems related to structure elucidation of organic compounds using UV, IR, and PMR spectroscopic techniques.
- Develop comprehensive course outcomes reflecting theoretical knowledge and practical skills in spectroscopy, organosulphur compounds, synthetic polymers, organic synthesis via enolates, carbohydrates, and biomolecules.
- Understand organic synthesis via enolates

b. Paper II (Physical Chemistry–B)

- Mastery of quantum mechanics, solid-state physics, and photochemistry principles, enabling advanced analysis and application in diverse scenarios
- Proficient understanding of spectroscopy techniques, electrochemistry, nuclear chemistry, and organic compounds, fostering problem-solving skills and critical thinking in complex scientific contexts.
- Understands the first, second, and third laws, entropy, free energy, equilibrium, and chemical kinetics

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B.SC NON- (MEDICAL)

PROGRAMME OUTCOMES

After successful completion of three year degree program B.Sc (Computer Science)), a student will be capable of:

- Strong foundational knowledge in mathematics and physics.
- Proficiency in analytical and problem-solving skills.
- Ability to apply mathematical concepts to real-world situations.
- Competence in laboratory techniques and experimental methods.
- Understanding of advanced topics in non-medical sciences such as computer science, chemistry, and statistics.
- Effective communication skills, both oral and written, for presenting scientific findings and collaborating with others.
- Critical thinking abilities to evaluate scientific literature and research.
- Preparation for further studies or careers in fields such as engineering, technology, research, education, or applied sciences.

COURSE OUTCOMES

B.SC (NON- MEDICAL) - SEM I

1. English

- Linguistic Proficiency
- Vocabulary Enhancement
- Grammatical Correctness
- Appreciation of literature
- Inculcation of moral and social values through literary studies

2. Punjabi

- ਪੁਸਤਕ 'ਦੋ ਰੰਗ' ਵਿਚਲੇ ਕਵਿਤਾ ਭਾਗ ਦੇ ਵਿਭਿੰਨ ਆਧੁਨਿਕ ਕਵੀਆਂ ਦੀਆਂ ਕਵਿਤਾਵਾਂ ਦੇ ਪਾਠ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਵਿੱਚ ਵਧੇਰੇ ਸਾਹਿਤ ਪੜ੍ਹਨ ਅਤੇ ਲਿਖਣ ਦੀ ਚਿਣਗ ਪੈਦਾ ਹੁੰਦੀ ਹੈ। ਇਹਨਾਂ ਕਵਿਤਾਵਾਂ ਦੇ ਅਧਿਐਨ ਰਾਹੀਂ ਮਨੁੱਖੀ ਮਨ ਦੇ ਵਿਭਿੰਨ ਪੱਖਾਂ-ਪਾਸਾਰਾਂ ਨੂੰ ਸਮਝਣ ਦੀ ਯੋਗਤਾ ਪੈਦਾ ਹੁੰਦੀ ਹੈ।
- 'ਸੰਸਾਰ ਦੀਆਂ ਪ੍ਰਸਿੱਧ ਹਸਤੀਆਂ' ਪੁਸਤਕ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਸੰਸਾਰ ਭਰ ਦੀਆਂ ਅਧਿਆਤਮਿਕ, ਧਾਰਮਿਕ, ਰਾਜਨੀਤਿਕ, ਇਤਿਹਾਸਕ ਅਤੇ ਸਮਾਜ ਸੁਧਾਰਕ ਸ਼ਖਸੀਅਤਾਂ ਦੇ ਜੀਵਨ ਅਤੇ ਸਮਾਜ ਪ੍ਰਤੀ ਦੇਣ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਦਾਨ ਕਰਨ ਲਈ ਸਰੋਤ ਮੁਹੱਈਆ ਕਰਵਾਉਂਦੀ ਹੈ। ਇਹਨਾਂ ਉੱਘੀਆਂ ਹਸਤੀਆਂ ਸੰਬੰਧੀ ਪ੍ਰਾਪਤ ਜਾਣਕਾਰੀ ਵਿਦਿਆਰਥੀਆਂ ਵਿੱਚ ਸਮਾਜਿਕ ਜ਼ਿੰਮੇਵਾਰੀ ਦਾ ਅਹਿਸਾਸ ਪੈਦਾ ਕਰਦੀ ਹੈ।
- ਪੈਰੂਾ ਰਚਨਾ ਅਤੇ ਪੈਰੂਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇ ਅਭਿਆਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਵਿੱਚ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਪੜ੍ਹਨ ਤੇ ਲਿਖਣ ਦੀ ਯੋਗਤਾ ਪੈਦਾ ਹੋਣ ਦੇ ਨਾਲ-ਨਾਲ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਵਿਕਸਿਤ ਹੁੰਦੀਆਂ ਹਨ।

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- ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ ਦੇ ਅਧਿਅਨ ਰਾਹੀਂ ਟਕਸਾਲੀ ਭਾਸ਼ਾ, ਭਾਸ਼ਾ ਤੇ ਉਪ ਭਾਸ਼ਾ ਦਾ ਅੰਤਰ ਅਤੇ ਪੰਜਾਬੀ ਦੀਆਂ ਵਿਭਿੰਨ ਉਪ ਭਾਸ਼ਾਵਾਂ ਦੀ ਪਛਾਣ ਕਰਨ ਦੀ ਸਮਝ ਵਿਕਸਿਤ ਹੁੰਦੀ ਹੈ। ਇਸਤੋਂ ਇਲਾਵਾ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਜਨਮ ਅਤੇ ਵੱਖ-ਵੱਖ ਵਿਕਾਸ ਪੜਾਵਾਂ ਦੀ ਜਾਣਕਾਰੀ ਮਿਲਦੀ ਹੈ।

2A. Basic Punjabi

- ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਪੜ੍ਹਨ ਤੇ ਲਿਖਣ ਦਾ ਗਿਆਨ ਹੁੰਦਾ ਹੈ।
- ਪੰਜਾਬੀ ਸਾਹਿਤ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਦਾਨ ਹੁੰਦੀ ਹੈ।
- ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਮਾਤ੍ਰਾਵਾਂ ਦੀ ਵਰਤੋਂ ਦਾ ਗਿਆਨ ਹੁੰਦਾ ਹੈ।
- ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਭਾਸ਼ਾਈ ਯੋਗਤਾ ਵਿਕਸਿਤ ਹੁੰਦੀ ਹੈ।
- ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਭਾਸ਼ਾ ਦੀ ਮੁੱਢਲੀ ਸ਼ਬਦਾਵਲੀ ਦਾ ਗਿਆਨ ਪ੍ਰਾਪਤ ਹੁੰਦਾ ਹੈ।

2B. Punjab History & Culture

- Understand the region's river, like the Indus, influenced settlement patterns, agricultural practices and trade routes, invasions, migrations and the formation of civilizations can provide insights into the historical development of the Punjab.
- Understand the various historical sources, including archaeological findings, inscriptions and ancient texts to reconstruct the past accurately.
- Understanding urban planning, efficient drainage system, multi-story buildings, artifacts, Agriculture, advanced irrigation system, crafts, including pottery and metal work.
- Understanding the migration patterns and settlements of the Indo-Aryans into the Indian Subcontinent.
- Understanding the dynamic changes in social & economic life during the Rigvedic and Later Rigvedic Periods.
- Both Buddhism & Jainism left a lasting impact on the cultural, moral & artistic landscape of Punjab. The teaching of compassion, non-violence & ethical conduct from these traditions contributed to the broader philosophical and religious diversity of the region.
- The remnants of Buddhism and Jain archaeological sites in Punjab bear witness to the historical presence and influence of these ancient Indian religions.

3. Physics

a. Paper I (Mechanics)

- Understand the concept of various co-ordinate systems and their applications, solid angle and the relationship between conservation laws and symmetries of space and time.
- Acquire knowledge of various forces in nature and their characteristics, centre of mass, the equations of motion of an object moving under central force, Kepler's Laws and explain the significance of the Michelson- Morley experiment.
- Acquire the knowledge of inertial frames of reference, Galilean transformations, and invariance.
- Get familiarize with the concept of non-inertial frames and various fictitious forces and their applications.

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- Understand the concept of elastic collisions in lab. and centre of mass systems, cross section, Rutherford scattering, rigid body motion, rotational motion, principal moments and principal axes, Euler's equations, precession, and elementary gyroscope.

b. Paper II (Electricity and Magnetism)

- Understand the basic ideas of vector calculus, including gradient, divergence, curl, the application of Laplacian in different coordinate systems, Coulomb's Law, and electric fields due to various charge distributions, Gauss's Law and its applications, Gauss divergence theorem, differential form of Gauss's law and Green's theorem.
- Be able to develop the concept of work and potential difference in electrostatics, the electric potential due to different charge distributions Stoke's theorem and its applications in electrostatic field.
- Gain knowledge to solve Poisson and Laplace's equations in different coordinate- systems, concept of electrical images, and its application, current density, microscopic form of ohm's law and its failure.
- Gain knowledge regarding interaction between moving charges, force between parallel currents, the behaviour of various substances in magnetic fields, concept of M and H, and their relation to free and bound currents, the students with the concept of permeability, susceptibility, orbital motion of electrons, diamagnetism, paramagnetism, and ferromagnetism.

4. Chemistry

a. Paper I (Inorganic Chemistry I)

- Demonstrate the ability to apply the knowledge gained in predicting and explaining chemical behavior based on periodic trends and bonding principles
- Apply Aufbau and Pauli exclusion principles, along with Hund's multiplicity rule, in determining electronic configurations
- Analyze periodic properties such as effective nuclear charge, atomic/ionic radii, ionization energy, electron affinity, and electronegativity
- Study ionic solids, close packing, ionic structures, lattice defects, semiconductors, and factors influencing solubility.
- Understand the concept of de Broglie matter waves and Heisenberg uncertainty principle in atomic structure
- Explore covalent bonding using valence bond theory, hybridization, and VSEPR theory for predicting molecular shapes

b. Paper II (Organic Chemistry-I)

- Grasp the concepts of hybridization, bond lengths, bond angles, bond energy, and distinguish between localized and delocalized chemical bonds.
- Understand Vander Waals interactions, resonance, hyperconjugation, hydrogen bonding, and the inductive and electromeric effects.

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- Demonstrate the ability to apply the acquired knowledge in predicting and explaining chemical behavior based on organic reaction mechanisms.
- Identify types of reagents such as electrophiles and nucleophiles, and recognize reactive intermediates like carbocations, carbanions, free radicals, carbenes, arenes, and nitrenes.
- Apply curved arrow notation, distinguish between half-headed and double-headed arrows, and comprehend homolytic and heterolytic bond breaking in the mechanism of organic reactions

5. Mathematics

a. Paper I (Algebra)

- Understand the concept of rank of a matrix and its application to solve linear equations.
- Understand Eigen values, Eigen vectors, Cayley Hamilton Theorem and its applications to find inverse of matrix
- Understand and apply the concept of Definite, semi-definite and indefinite quadratic form.
- Understand relation between roots and coefficient, transformation of equations and its applications to solve cubic and biquadratic equations.

b. Paper II (Calculus and Trigonometry)

- Understand real number system and its properties.
- Learn about limits of functions & Continuous Functions
- Learn about principles of uniform continuity to analyze the behaviour of functions
- Learn about Differentiation of hyperbolic functions
- Understand and apply successive differentiation to functions
- Understand Leibnitz theorem to compute higher-order derivatives.
- Learn to Utilize Taylor's and Maclaurin's theorems along with their remainders for function approximation.
- Learn to Identify and evaluate functions that result in indeterminate forms
- Learn about De-Moivre's Theorem and its applications
- Learn to Differentiate and integrate functions involving complex variables
- Learn To Expand trigonometric functions using series representations
- Understand and apply Gregory's series and other methods for the summation of series.

B.SC (NON- MEDICAL) - SEM II

1. English

- Linguistic Proficiency
- Vocabulary Enhancement
- Grammatical Correctness
- Appreciation of literature
- Inculcation of moral and social values through literary studies

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2. Punjabi

- ਪੁਸਤਕ 'ਦੋ ਰੰਗ' ਵਿਚਲੇ ਕਹਾਣੀ ਭਾਗ ਦੇ ਵੱਖ-ਵੱਖ ਪੰਜਾਬੀ ਕਹਾਣੀਕਾਰਾਂ ਦੀਆਂ ਕਹਾਣੀਆਂ ਦੇ ਕਹਾਣੀ-ਪਾਠ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਵਿੱਚ ਸਾਹਿਤ ਨੂੰ ਪੜ੍ਹਨ ਅਤੇ ਸਮਝਣ ਦੀ ਸੂਝ ਵਿਕਸਿਤ ਹੁੰਦੀ ਹੈ। ਇਸਤੋਂ ਇਲਾਵਾ ਇਹ ਕਹਾਣੀਆਂ ਵੱਖ-ਵੱਖ ਸਮਾਜਕ ਸਮੱਸਿਆਵਾਂ ਦੇ ਹੱਲ ਤਲਾਸ਼ਣ ਪ੍ਰਤੀ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਜਾਗਰੂਕ ਕਰਦੀਆਂ ਹਨ।
- 'ਸੰਸਾਰ ਦੀਆਂ ਪ੍ਰਸਿੱਧ ਹਸਤੀਆਂ' ਪੁਸਤਕ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਸੰਸਾਰ ਭਰ ਦੀਆਂ ਅਧਿਆਤਮਿਕ, ਧਾਰਮਿਕ, ਰਾਜਨੀਤਿਕ, ਇਤਿਹਾਸਕ ਅਤੇ ਸਮਾਜ ਸੁਧਾਰਕ ਸ਼ਖ਼ਸੀਅਤਾਂ ਦੇ ਜੀਵਨ ਅਤੇ ਸਮਾਜ ਪ੍ਰਤੀ ਦੇਣ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਦਾਨ ਕਰਨ ਲਈ ਸਰੋਤ ਮੁਹੱਈਆ ਕਰਵਾਉਂਦੀ ਹੈ। ਇਹਨਾਂ ਉੱਘੀਆਂ ਹਸਤੀਆਂ ਸੰਬੰਧੀ ਪ੍ਰਾਪਤ ਜਾਣਕਾਰੀ ਵਿਦਿਆਰਥੀਆਂ ਵਿੱਚ ਸਮਾਜਿਕ ਜ਼ਿੰਮੇਵਾਰੀ ਦਾ ਅਹਿਸਾਸ ਪੈਦਾ ਕਰਦੀ ਹੈ।
- ਸ਼ਬਦ ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ ਰਚਨਾ ਦੇ ਅਧਿਐਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਭਾਸ਼ਾ ਸਮਰਥਾ ਵਿਚ ਵਾਧਾ ਹੋਣ ਦੇ ਨਾਲ-ਨਾਲ ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾ ਦੇ ਮੁੱਢਲੇ ਸੰਕਲਪਾਂ ਬਾਰੇ ਜਾਣਕਾਰੀ ਹਾਸਲ ਹੁੰਦੀ ਹੈ ਅਤੇ ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ ਦੇ ਅਧਿਐਨ ਰਾ ਹੀਂ ਪੰਜਾਬੀ ਵਿਆਕਰਨ ਦੇ ਮੁੱਢਲੇ ਨਿਯਮਾਂ ਦੀ ਜਾਣਕਾਰੀ ਮਿਲਦੀ ਹੈ।
- ਦਫ਼ਤਰੀ ਚਿੱਠੀ ਪੱਤਰ ਨੂੰ ਸਮਝਣ ਨਾਲ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਦਫ਼ਤਰੀ ਕੰਮਕਾਜ ਕਰਾਉਣ ਲਈ ਲੋੜੀਂਦੇ ਪੱਤਰ ਵਿਹਾਰ ਵਿਚ ਸਹਾਇਤਾ ਮਿਲਦੀ ਹੈ। ਅਖਾਣ ਅਤੇ ਮੁਹਾਵਰਿਆਂ ਦੇ ਅਧਿਐਨ ਅਤੇ ਅਭਿਆਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਭਾਸ਼ਾ ਸਮਰਥਾ ਵਿਚ ਵਾਧਾ ਹੁੰਦਾ ਹੈ।

2A. Basic Punjabi

- ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਭਾਸ਼ਾ ਦੀ ਅੰਦਰੂਨੀ ਬਣਤਰ ਸੰਬੰਧੀ ਗਿਆਨ ਪ੍ਰਾਪਤ ਹੁੰਦਾ ਹੈ।
- ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਸੋਚਣ ਸ਼ਕਤੀ ਵਿਚ ਵਾਧਾ ਹੁੰਦਾ ਹੈ।
- ਵਿਦਿਆਰਥੀ ਕਿਸੇ ਵੀ ਵਿਸ਼ੇ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਕਰਨ ਦੇ ਕਾਬਲ ਹੁੰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀ ਵਿਆਕਰਨਕ ਨੇਮ ਵਿਧਾਨਾਂ ਤੋਂ ਜਾਣੂ ਹੁੰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਸਾਹਿਤ ਪੜ੍ਹਨ ਦੀ ਰੁਚੀ ਵਧਦੀ ਹੈ ਅਤੇ ਉਹ ਸਮਾਜ ਨੂੰ ਚੰਗੀ ਸੋਚ ਦੇਣ ਦੇ ਸਮਰੱਥ ਹੁੰਦੇ ਹਨ।

2B. Punjab History & Culture

- Understanding the Alexander's conquests led to the creation of the largest empires in history, the spread of Greek culture, art, architecture, philosophy & language.
- Understanding the influence of Mauryan rule, especially during the reign of Ashoka, contributed to the cultural, economic and administrative development of the region.
- Understanding the Kushans, through their interaction and rule, left a lasting imprints on Punjab's cultural, religious and economic landscape.
- Understanding the impact of political stability, economic prosperity, cultural flourishing & a period of relative peace and progress under the Gupta Empire on Punjab.
- Understanding the Vardhana Empire who ruled over the northern regions, figures, social structures and Hindu religion practices.
- Understanding the development and consolidation of distinct socio-cultural identities within the diverse population of Punjab.

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- Provide the comprehensive perspective on the development of language and education in Taxila, offering insight into the intellectual vibrancy and academic pursuits of this ancient educational centre.
- Understanding the frame work for comprehensively studying the development of art , architecture, multidimensional nature of these creative endeavors and their impact on societies.

3. Physics

a. Paper I (Relativity and Electromagnetism)

- Understand the postulates of the special theory of relativity, derivations of Lorentz transformations, relativity of simultaneity, mass, length, time, velocities, the relativistic Doppler effect, and the variation of mass with velocity, mass-energy equivalence, relativistic momentum, energy concepts of Minkowski space and four vector formation.
- Be able to develop the understanding regarding Lorentz force, Biot-Savart's Law and its applications, Ampere's Circuital law and its applications, the concepts of divergence and curl of B, Hall effect, and vector potential, surface current density and its applications and transformations of E and B from one frame to another.
- Understand the concept of Faraday's Law of EM induction, displacement current, mutual inductance reciprocity theorem, self-inductance for solenoid, coupling of electrical circuits, analysis of LCR series and parallel resonant circuits, Q-factor, power consumed, and power factor in resonant circuits.
- Gain knowledge to derive Maxwell's equations, their physical significance, the behaviour of electromagnetic waves in different media, including conductors and dielectrics, the concept of the reflection, transmission, and absorption of electromagnetic waves at boundaries for two dielectric media for normal and oblique incidence.

b. Paper II (Vibration and Waves)

- Develop the understanding of simple harmonic motion, mechanical oscillator, electrical oscillator, compound pendulum, torsional pendulums, transverse vibrations of mass on string and the composition of two perpendicular SHM of same period and period in ratio 1:2.
- Understand the effects of damping on simple harmonic oscillations, the differential equation for damped harmonic motion and explain different types of damping, determine damping coefficients (logarithmic decrement, relaxation time and Q -factors), electromagnetic damping and its applications in electrical oscillators.
- Be able to develop the concept of forced mechanical and electrical oscillators under external driving forces, the transient and steady-state behaviours of forced oscillators, the variation of displacement, velocity, phase with the frequency of driving force, the concept of resonance phenomena and calculate power supplied to oscillators, stiffness coupled oscillators, normal co-ordinates, and normal modes of vibration, inductive coupling of electrical oscillators.

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- Gain knowledge regarding different types of waves, wave equation, and its solution, nature and properties of waves, derive the wave equation, and discuss its, wave propagation in different media and impedance matching, the behaviour of waves at boundaries, reflection, and transmission coefficients of amplitude and energy, standing waves on a string of fixed length, energy of vibrating string and group velocity.

4. Chemistry

a. Paper I (Inorganic Chemistry–II)

- Understand the comparative study, including the diagonal relationship, of group's 13–17 elements, focusing on hydrides, oxides, oxyacids, and halides.
- Develop a comprehensive understanding of the chemistry of transition elements, integrating knowledge of various properties and behaviors across different series.
- Demonstrate the ability to apply acquired knowledge in predicting the relative stability of oxidation states and coordination characteristics of transition elements and their complexes.
- Analyze the various concepts of acids and bases, including Arrhenius, Bronsted-Lowry, Lux-Flood, solvent system, and Lewis.

b. Paper II (Physical Chemistry–I)

- Comprehend the postulates of the kinetic theory of gases and the deviation from ideal behavior, including van der Waal's equation of state.
- Explore critical phenomena, PV isotherms of real gases, and the isotherms of van der Waal's equation, emphasizing the law of corresponding states and the reduced equation of state.
- Explore liquid crystals, differentiating between nematic and cholestric phases, and understand thermography and the seven-segment cell.
- Explore liquids-in-liquids (emulsions), including types, preparation, emulsifiers, and general applications of colloids.
- Understand ideal and non-ideal solutions, methods of expressing concentrations, activity, and activity coefficient.
- Investigate intermolecular forces, the structure of liquids, and the structural differences between solids, liquids, and gases

5. Mathematics

a. Paper I (Calculus and Differential Equations)

- Understand and test the concavity and convexity of curves
- Gain proficiency and trace various curves
- Understand and apply Fundamental Theorem of Integral Calculus
- Understand the concept of exact differential equation
- Understand and apply power series method to find series solution of differential equations

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- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਵਿਕਾਸ ਵਿਚ ਆਪਣਾ ਯੋਗਦਾਨ ਪਾਉਂਦੇ ਹਨ।

2B. Punjab History & Culture

- Understanding the Turko –Afghan rule, socio-cultural changes, the dominance of various Muslim dynasties: Ghaznavids, Ghurids.
- Understanding that the Mughals had profound impact on Punjab, cultural fusion, administrative reforms, art and literature.
- Understanding the socio-religious movement that emerged in medieval India, through its influence on Sikhism, led to the establishment of a distinct religious and social identity characterized by devotion, equality, and a commitment to social justice.
- Understanding the impact of Sufism in Punjab has led to a rich tapestry of spirituality, culture, and social values, with special reference to Baba Farid Ji, include spiritual enlightenment, contributions to culture and literature, promotion of social equality, and fostering a legacy of tolerance and interfaith harmony.
- The life and travels of Guru Nanak Dev Ji, the founder of Sikhism, had profound impacts on the spiritual, social, and cultural aspects of Sikh followers and beyond, shaped Sikhism into a distinct spiritual and cultural tradition with a focus on oneness, equality, community, and service.
- Understanding the teachings of Guru Nanak Dev Ji, as expressed through the concepts of Sangat, Pangat, and Dharamsala, lead to the formation of a united Sikh community, the promotion of equality and humility, the practice of selfless service, and the preservation of Sikh culture and spirituality.
- The second, third, and fourth Sikh Gurus made significant contributions to the development and consolidation of Sikhism, these Gurus played pivotal roles in shaping Sikhism during its formative years.
- Understanding the compilation of Guru Adi Granth Sahib Ji and the martyrdom of Guru Arjan Dev Ji had enduring impacts on Sikhism, shaped the spiritual and cultural identity of Sikhs, providing them with a sacred scripture for guidance and inspiring them to uphold principles of justice, truth, and religious freedom.

3. Physics

a. Paper I (Statistical Physics & Thermodynamics)

- Develop the understanding of probability, basic ideas of statistical physics, and its scope, the distribution of four distinguishable particles into two compartments of equal size, the concept of macrostates, microstates, and analysis of thermodynamic probability, the concept of constraints, its effects on the system and study the distribution of n particles in two compartments of equal size and the distribution of n particles in K compartments of unequal sizes.
- Understand the concept of phase space, partition function into elementary cells, Maxwell-Boltzmann (MB) statistics to an ideal gas in equilibrium, and to verify experimentally the law of distribution of molecular speeds, explain the concept of Bose-Einstein (BE.)

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statistics, Planck's law of radiation, Wein's displacement law and Stefan's law, the concept of Fermi-Dirac (FD) statistics and comparison of MB, BE. and FD.

- Understand with the definition of entropy, and its characteristics, differentiate between reversible and irreversible processes with examples and work done in reversible process, the laws of thermodynamics, Carnot cycle and entropy change in Carnot cycle, the applications of thermodynamics to thermoelectric effect, change of entropy along reversible path in P-V diagram and the concept of heat death of the universe.
- Able to derive Maxwell's thermodynamics relations, calculate change in temperature produced by adiabatic stretching and adiabatic compression, calculate the change of internal energy with volume, molar specific heat at constant pressure (C_p), molar specific heat at constant volume (C_v) and derivation of expression for $C_p - C_v$, the concept of latent heat and discuss the Claypron equation.

b. Paper II (Optics and Lasers)

- Develop the understanding of the superposition of light waves, interference phenomena, Young's double-slit experiment and conditions for sustained interference patterns, interference patterns by division of wavefront, and interference by division of amplitude and their applications.
- Understand Huygens-Fresnel's theory of diffraction, half-period zones and distinction between Fresnel and Fraunhofer diffraction, the application of Fraunhofer diffraction at rectangular and circular apertures, the effect of diffraction in optical imaging and resolving power of telescope and the use of diffraction gratings as spectroscopic elements and their resolving power.
- Understand the phenomenon of polarization, the concept of plane-polarized and elliptically polarized light, wire grid polarizer, and sheet polarizer, Malus's Law, Brewster's Law, polarization by reflection, scattering and double refraction, Nicol prism, retardation plates, the production and analysis of polarized light using quarter and half-wave plates.
- Understand the concept of stimulated emission, population inversion, derivation of Einstein's relations, broadening spectral lines, and laser schemes, elementary theory of optical cavity and longitudinal and transverse modes, components of laser devices, different types of lasers (Ruby, Nd: YAG, He-Ne, CO₂), and applications of lasers.

4. Chemistry

a. Paper I (Organic Chemistry–A)

- Understand the stereochemistry of organic compounds.
- Investigate conformational isomerism, including conformational analysis of ethane and n-butane, conformation of cyclohexane, axial and equatorial bonds, and conformation of mono-substituted cyclohexane derivatives.
- Understand the nomenclature, structure, and bonding of alcohols, and explore the classification of monohydric and dihydric alcohols.
- Explore various reduction reactions, particularly of reducible ketones, and other reactions involving aldehydes and ketones.

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b. Paper II (Physical Chemistry–B)

- Understand the fundamental thermodynamic terms such as system, surroundings, and types of systems
- Explore thermodynamic processes, the concept of heat and work, and the First Law of Thermodynamics, including internal energy and enthalpy
- Understand the Nernst distribution law, its thermodynamic derivation, and applications in non-ideal systems and immiscible liquids.
- Calculate work, heat, internal energy, and enthalpy for the expansion of ideal gases under isothermal and adiabatic conditions for reversible processes

5. Mathematics

a. Paper I (Analysis)

- Learn about Sequences, its properties and various applications
- Learn about Series, its properties and various applications
- Learn about Riemann Integrability, its properties and various applications
- Learn about Beta Gamma functions, Improper Integrals , its properties and various applications

b. Paper II (Analytical Geometry)

- Understand transformation of axes, shifting of origin in two and three dimensions
- Learn about joint equation of straight lines and equations of bisectors
- Learn about Parabola, its properties and various applications
- Learn about Ellipse, its properties and various applications
- Learn about Hyperbola, its properties and various applications
- Learn about Sphere, its properties and various applications

B.SC (NON- MEDICAL) - SEM IV

1. English

- Development of analytical Skills
- Ability to connect ideas and infer information accurately
- Grammar proficiency
- Vocabulary enrichment
- Inculcation of creative writing skills through close readings of Poems

2. Punjabi

- ‘ਮੇਰੀ ਜੀਵਨ ਗਾਥਾ’ ਪੁਸਤਕ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਸਾਹਿਤ ਨੂੰ ਸਮਝਣ ਅਤੇ ਪੜ੍ਹਣ ਵਿਚ ਰੁਚੀ ਪੈਦਾ ਕਰਦੀ ਹੈ। ਇਸਦੀ ਵਾਰਤਕ ਸ਼ੈਲੀ ਦੇ ਅਧਿਐਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਭਾਸ਼ਾ ਦੀ ਅੰਦਰੂਨੀ ਬਣਤਰ ਜਿਵੇਂ ਕਿ ਮੁਹਾਵਰੇਦਾਰ ਭਾਸ਼ਾ ਅਤੇ ਇਸਦੀ ਵਰਤੋਂ ਸਮਝਾਇਆ ਜਾਂਦਾ ਹੈ।

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- ‘ਫ਼ਾਸਲੇ’ ਨਾਟਕ ਦੇ ਅਧਿਅਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਰੰਗਮੰਚ ਅਤੇ ਰੰਗਮੰਚੀ ਜੁਗਤਾਂ ਦਾ ਗਿਆਨ ਹੁੰਦਾ ਹੈ। ਨਾਟ ਕਲਾ ਦੇ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਨਿੱਜੀ ਅਤੇ ਸਮਾਜਕ ਮਸਲਿਆਂ ਪ੍ਰਤੀ ਸੁਚੇਤ ਹੋ ਕੇ ਸਮਾਜ ਨੂੰ ਜਾਗਰੂਕ ਕਰਨ ਦੇ ਸਮਰੱਥ ਹੁੰਦੇ ਹਨ। ਇਸਤੋਂ ਇਲਾਵਾ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਨਾਟਕ ਲਿਖਣ ਤੇ ਨਾਟਕ ਖੇਡਣ ਦੀ ਰੁਚੀ ਪ੍ਰਫੁੱਲਿਤ ਹੁੰਦੀ ਹੈ।
- ਵੱਖ-ਵੱਖ ਸਮਾਜਕ, ਸਭਿਆਚਾਰਕ, ਇਤਿਹਾਸਕ, ਅਤੇ ਵਿਦਿਅਕ ਸਰੋਕਾਰਾਂ ਸੰਬੰਧੀ ਲੇਖ ਰਚਨਾ ਵਿਦਿਆਰਥੀਆਂ ਦੇ ਬੌਧਿਕ ਵਿਕਾਸ ਵਿਚ ਵੱਡਾ ਯੋਗਦਾਨ ਪਾਉਂਦਾ ਹੈ। ਉਹਨਾਂ ਅੰਦਰ ਕਿਸੇ ਵੀ ਵਿਸ਼ੇ ’ਤੇ ਲਿਖ ਜਾਂ ਬੋਲ ਸਕਣਾ ਸੁਖਾਲਾ ਹੋ ਜਾਂਦਾ ਹੈ ਜਿਸ ਨਾਲ ਭਾਸ਼ਨ ਕਲਾ ਵਿਚ ਵੀ ਨਿਖਾਰ ਆਉਂਦਾ ਹੈ। ਅਖ਼ਬਾਰ ਦੇ ਨਿੱਜੀ ਅਤੇ ਦਫ਼ਤਰੀ ਇਸ਼ਤਿਹਾਰਾਂ ਦਾ ਅਭਿਆਸ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਆਪਣੇ ਨਿੱਜੀ ਜੀਵਨ ਵਿਚ ਅਜਿਹੀ ਲੋੜ ਦੀ ਪੂਰਤੀ ਲਈ ਯੋਗ ਬਣਾਉਂਦਾ ਹੈ।
- ਸ਼ਬਦ ਜੋੜਾਂ ਦੇ ਨਿਯਮਾਂ ਦਾ ਗਿਆਨ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਵਿਆਕਰਨ ਦੀਆਂ ਬਾਰੀਕੀਆਂ ਪ੍ਰਤੀ ਸੁਚੇਤ ਕਰਦਾ ਹੈ। ਸ਼ੁੱਧ ਭਾਸ਼ਾ ਲਿਖਣ ਅਤੇ ਪੜ੍ਹਨ ਦੀ ਯੋਗਤਾ ਪੈਦਾ ਹੁੰਦੀ ਹੈ। ਗੁਰਮੁਖੀ ਲਿੱਪੀ ਨੂੰ ਸਮਝਣ ਨਾਲ ਭਾਸ਼ਾ ਦੇ ਸ਼ਬਦ ਜੋੜਾਂ ਦੀ ਸਮੱਸਿਆ ਖ਼ਤਮ ਹੁੰਦੀ ਹੈ।

2A. Basic Punjabi

- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਨੂੰ ਪ੍ਰਭਾਵਸ਼ਾਲੀ ਢੰਗ ਨਾਲ ਵਰਤਨ ਦੇ ਯੋਗ ਹੁੰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀ ਭਾਸ਼ਾ ਦੀਆਂ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਦੇ ਸਮਰੱਥ ਹੁੰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਆਤਮ ਵਿਸ਼ਵਾਸ ਪੈਦਾ ਹੁੰਦਾ ਹੈ।
- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਨਵੇਂ ਵਾਕਾਂ ਦਾ ਨਿਰਮਾਣ ਕਰਨ ਦੇ ਯੋਗ ਹੁੰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਵਿਕਾਸ ਵਿਚ ਆਪਣਾ ਯੋਗਦਾਨ ਪਾਉਂਦੇ ਹਨ।

2B. Punjab History & Culture

- Understanding the politicization of Sikhism under Guru Hargobind resulted in a redefined Sikh identity that encompassed both spiritual and military dimensions.
- Understanding the martyrdom of Guru Tegh Bahadur, the ninth Sikh Guru, had profound consequences for Sikhism, influencing the course of Sikh history and shaping the principles of the faith. It is a testament to the commitment of Sikhs to the protection of human rights, religious freedom, and the values enshrined in Sikhism.
- The creation of the Khalsa by Guru Gobind Singh Ji, the tenth Sikh Guru, was a transformative event in Sikh history.
- Understanding the creation of Khalsa impacting sikh identity, principles, and the historical & cultural landscape of Punjab.
- Understanding the rise of Banda Singh Bahadur had far-reaching outcomes, including the establishment of Sikh rule, the promotion of Sikh values, religious freedom, socioeconomic changes, and the inspiration for future Sikh movements.
- Understanding the rise of the Sikh Misls, this era of the Misls played a crucial role in shaping the trajectory of Sikh political and cultural development in Punjab.
- Understanding the Ranjit Singh’s rule, his power, civil administration, land revenue, military achievements & modernisation.

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- Understanding the dynamic cultural, social and economic aspects of the medieval Punjab.

3. Physics

a. Paper I (Quantum Mechanics)

- Understand the development of quantum mechanics, explain the difference between classical and quantum mechanics, understand the concept of the uncertainty principle, Gaussian wave packet, and operator correspondence and the normalization of wave functions.
- Be able to understand the concept of expectation values, probability current, admissibility conditions for wave functions, the Ehrenfest theorem, eigenfunctions and eigenvalues, orthogonal functions, Hermitian operators and simultaneous eigenfunctions.
- Understand the fundamental postulates of wave mechanics, derivation of Schrodinger's wave equation (SWE) for a free particle in one dimensional problem and its various applications.
- Acquire knowledge to apply SWE to three-dimensional problems and derive SWE in spherical polar coordinates and its application to the hydrogen atom.

b. Paper II (Atomic and Molecular Spectra)

- Understand different types of spectra and the units in spectroscopy, Bohrs theory of hydrogen atom, Bohr's correspondence principle and Ritz combination rule and the Frank-Hertz experiment.
- Develop knowledge regarding vector model of atom, atom as a magnetic dipole, Lande's splitting factor, the Stern-Gerlach experiment and spin-orbit coupling, fine structure of hydrogen spectrum and the normal Zeeman effect, anomalous Zeeman effect.
- Understand exchange symmetry of wave functions, the Pauli Exclusion Principle, LS coupling, spectroscopic notation, and spectral terms for LS coupling, atomic spectra of helium and alkaline earth atoms, rules, and regularities in atomic spectra.
- Know the concept of X-ray spectra, Mosley law, the Auger effect, molecular bonding, molecular spectra, selection rules, rotational spectra, vibrational spectra, and electronic energy levels, Raman effect, classical and quantum theory of Raman effect.

4. Chemistry

a. Paper I (Inorganic Chemistry–A)

- Investigate non-aqueous solvents, including physical properties, types, and general characteristics
- Examine the general features and chemistry of lanthanides and actinides
- Understand the biological role of alkali and alkaline earth metal ions, specifically highlighting the significance of Ca^{2+} in biological systems
- Analyze the valence bond theory of transition metal complexes, providing insights into the bonding in coordination compounds
- Understand Werner's coordination theory and its experimental verification, including the effective atomic number concept

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b. Paper II (Organic Chemistry–B)

- Understand the nomenclature, structure, and bonding of carboxylic acids, including their physical properties and acidity.
- Explore the molecular orbital picture and aromatic characteristics of heterocyclic compounds like pyrrole, furan, thiophene, and pyridine.
- Understand the methods of synthesis and chemical reactions of heterocyclic compounds
- Understand the separation of primary, secondary, and tertiary amines and factors affecting the basicity of amines
- Investigate organometallic compounds, focusing on Grignard reagents, organolithium compounds, and organozinc and organocopper compounds, including their formation and chemical reactions.

5. Mathematics

a. Paper I (Statics and Vector Calculus)

- Understand principles of equilibrium, analyzing forces and moments on rigid bodies and applications
- Understand Laws of Friction and Centre of Gravity & its applications
- Learn about Vector Differentiation and Integration
- Learn about Gradient, Divergence and Curl operators and line integrals
- Understand theorems of Gauss, Stokes and Green & various applications

b. Paper II (Solid Geometry)

- Learn about Cylinder, its properties and various applications
- Learn about Cone, its properties and various applications
- Learn about Ellipsoid, Hyperboloid and paraboloid, its properties and various applications
- Learn about Surfaces, Tangent lines and Tangent planes, Normals, its properties and various applications

B.SC (NON- MEDICAL) - SEM V

1. English

- Appreciation of Literature
- Inculcation of moral and social values
- Enhancement of Creative Writing Skills
- Enhanced understanding of human nature.

2. Punjabi

- ਸੰਪਾਦਿਤ ਪੁਸਤਕ ‘ਚੋਣਵੀਆਂ ਪੰਜਾਬੀ ਕਹਾਣੀਆਂ’ ਵਿਚ ਦਰਜ ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਹਾਣੀਆਂ ਦੇ ਪਾਠ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਕਹਾਣੀ ਸਾਹਿਤ ਪੜ੍ਹਨ ਪੜ੍ਹੀ ਰਚੀ ਪ੍ਰਬਲਤਾ ਦੀ ਹੈ। ਕਹਾਣੀਆਂ ਵਿਚੋਂ ਚੰਗੇ ਇਨਸਾਨ ਬਣਨ ਦੀ ਪ੍ਰੇਰਨਾ ਮਿਲਦੀ ਹੈ ਅਤੇ ਵਿਦਿਆਰਥੀ ਸਮਾਜ ਨੂੰ ਵੱਧੀ ਵੱਧੀ ਨੂੰ ਨਿਭਾਉਣ ਅਤੇ ਚੰਗੀ ਜੀਵਨ ਜਾਚ ਸਿੱਖਣ ਦੇ ਕਾਬਲ ਬਣਦੇ ਹਨ। ਉਹ ਸਾਹਿਤ 2024-02-28 10:29 ਹੁੰਦੇ ਹਨ।

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- ‘ਏਹੁ ਹਮਾਰਾ ਜੀਵਣਾ’ ਨਾਵਲ ਦਾ ਪਾਠ ਔਰਤ ਦੀ ਸਮਾਜਕ ਹੈਸੀਅਤ ਨੂੰ ਦਰਸਾਉਂਦਾ ਹੋਇਆ ਸਮਾਜ ਵਿਚ ਉਸਦੇ ਰੁਤਬੇ ਨੂੰ ਬਹਾਲ ਕਰਨ ਲਈ ਸੁਚੇਤ ਕਰਦਾ ਹੈ। ਇਸਤੋਂ ਇਲਾਵਾ ਦਲੀਪ ਕੌਰ ਟਿਵਾਣਾ ਵਰਗੀ ਇਸਤਰੀ ਨਾਵਲਕਾਰ ਦੇ ਜੀਵਨ ਤੋਂ ਮਿਲਨ ਵਾਲੀ ਪ੍ਰੇਰਨਾ ਵੀ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਮਨੁੱਖੀ ਜੀਵਨ ਮੁੱਲਾਂ ਪ੍ਰਤੀ ਸੁਚੇਤ ਕਰਦੀ ਹੈ।
- ਪੈਰਾ ਰਚਨਾ ਦੇ ਅਭਿਆਸ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਕਿਸੇ ਵਿਸ਼ੇ 'ਤੇ ਸੰਖੇਪ ਪਰ ਮੁੱਲਵਾਨ ਵਿਚਾਰ ਸਾਂਝੇ ਕਰਨ ਦਾ ਮੌਕਾ ਮਿਲਦਾ ਹੈ। ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਆਪਣੀ ਲਿਖਤ ਵਿਸ਼ੇ 'ਤੇ ਪਕੜ ਮਜ਼ਬੂਤ ਕਰਦੀ ਹੈ। ਅੰਗਰੇਜ਼ੀ ਪੈਰੇ ਦਾ ਪੰਜਾਬੀ ਵਿਚ ਅਨੁਵਾਦ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ ਤੇ ਭਾਸ਼ਾ ਯੋਗਤਾ ਵਿਚ ਵਾਧਾ ਕਰਦਾ ਹੈ। ਅਨੁਵਾਦ ਦੀ ਯੋਗਤਾ ਇਸ ਖੇਤਰ ਵਿਚ ਵਿਦਿਆਰਥੀਆਂ ਲਈ ਰੋਜ਼ਗਾਰ ਦੇ ਮੌਕੇ ਵੀ ਪੈਦਾ ਕਰਦੀ ਹੈ।
- ਪੰਜਾਬੀ ਧੁਨੀ ਵਿਉਂਤ ਰਾਹੀਂ ਜਿੱਥੇ ਪੰਜਾਬੀ ਧੁਨੀਆਂ ਦਾ ਵਿਗਿਆਨਕ ਅਧਿਐਨ ਭਾਸ਼ਾ ਦੇ ਵਿਗਿਆਨਕ ਪਾਸਾਰਾਂ ਵਿਚ ਵਾਧਾ ਕਰਦਾ ਹੈ ਉੱਥੇ ਵਾਕਾਤਮਕ ਜੁਗਤਾਂ ਦੇ ਅਧਿਐਨ ਨਾਲ ਵਾਕ ਵਿਚਲੇ ਸ਼ਬਦਾਂ ਦੇ ਆਪਸੀ ਸੰਬੰਧਾਂ ਦੇ ਉਜਾਗਰ ਹੋਣ ਨਾਲ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਵਿਆਕਰਨ ਪ੍ਰਤੀ ਸਮਝ ਵਿਚ ਮੁੱਲਵਾਨ ਵਾਧਾ ਹੁੰਦਾ ਹੈ।

2A. Basic Punjabi

- ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਸਾਹਿਤ ਅਤੇ ਲੋਕ ਸਾਹਿਤ ਸੰਬੰਧੀ ਜਾਣਕਾਰੀ ਪ੍ਰਾਪਤ ਕਰਦੇ ਹਨ।
- ਵਿਦਿਆਰਥੀ ਲੋਕ ਕਾਵਿ ਦੀਆਂ ਮਹੱਤਵਪੂਰਨ ਵੰਨਗੀਆਂ ਨੂੰ ਸਮਝਣ ਦੇ ਸਮਰੱਥ ਹੁੰਦੇ ਹਨ।
- ਪੰਜਾਬੀ ਲੋਕਨਾਚਾਂ ਦੀਆਂ ਵਿਭਿੰਨ ਵੰਨਗੀਆਂ ਦੀ ਜਾਣਕਾਰੀ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਪੰਜਾਬੀ ਰਹਿਤਲ ਦਾ ਗਿਆਨ ਵਧਾਉਂਦੀ ਹੈ।
- ਲੋਕ ਖੇਡਾਂ, ਲੋਕ ਤਮਾਸ਼ੇ ਅਤੇ ਲੋਕ ਕਲਾਵਾਂ ਦੇ ਬੁਨਿਆਦੀ ਗਿਆਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਸਮਾਜ ਤੇ ਸਭਿਆਚਾਰ ਨੂੰ ਡੂੰਘੇ ਰੂਪ ਵਿਚ ਸਮਝਣ ਦੇ ਯੋਗ ਹੁੰਦੇ ਹਨ।

2B. Punjab History & Culture

- Understand The First Anglo-Sikh War, the Treaty of Lahore, signed in 1846, which ceded significant territories to the British, established a British Resident at Lahore.
- Understand the trajectory of Punjab's history under British rule, influencing its socio-economic and political development.
- Understand the economic transformations, social changes, and the emergence of a new educated class that played a crucial role in India's struggle for independence.
- Analysis these movements collectively that played a crucial role in shaping the social, cultural, and political landscape of India, contributing to the broader struggle for independence and fostering a spirit of reform and resistance against various forms of oppression.
- Create the ability to understand the power of mass mobilization, civil disobedience, and nonviolent resistance, contributing significantly to India's eventual attainment of independence in 1947.

3. Physics

a. Ppaer I (Condensed Matter Physics)

- Develop the understanding of crystal structures, symmetry operations for two and three-dimensional crystals, primitive cell, two-dimensional Bravais lattices and three-

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dimensional Bravais lattices, Miller indices and distance between crystal planes, diamond and NaCl structures.

- Acquire knowledge of Bragg's law, experimental methods for crystal structure studies, derivation of Laue equations and reciprocal lattices of SC, BCC, and FCC, Bragg's law in reciprocal lattice, Brillouin zones and its derivation in two dimensions, Geometrical structure factor and atomic form factor.
- Understand the concept of lattice vibrations, phonons and scattering of photons by phonons, vibrations of one-dimensional mono-atomic lattice capacity, Dulong's Petit's law, Einstein theory of specific heat and Debye theory of specific heat.
- Acquire knowledge of free electron model of metals, free electron gas in one dimensional box and in three-dimensional box, the band theory, Kronig-Penney model, metals, and insulators the conductivity and its variation with temperature in semiconductors, Fermi levels in intrinsic and extrinsic semiconductors and the band gap in semiconductors.

b. Paper II (Electronics)

- Understand the concept of current, and voltage sources, P-N junction diode, and its biasing and characteristics, Zener diode and photonic devices, P-N diode as half wave rectifier, full-wave rectifier, rectifiers, filter circuits (LC and π filters), basic concepts of Boolean algebra, AND, OR, NOT and NAND gates.
- Understand the working of junction transistor, and its amplifying action, different configurations of a transistor, and their characteristics (CB and CE), JFET, the concept of stabilization of operating point and voltage divider circuit.
- Understand the working of CE amplifier and amplifier analysis using h-parameters, equivalent circuits of CE amplifier, and its current gain, power gain, and input impedance, FET as an amplifier, and its voltage gain, feedback in amplifiers, different types of feedback, the advantages of negative feedback and the emitter follower as a negative feedback circuit.
- Understand Barkhausen criterion for sustained oscillations, LC oscillators (tuned collector, tuned base Hartley), RC oscillators, phase-shift, and Wein bridge oscillators.

4. Chemistry

a. Paper I (Inorganic Chemistry–A)

- Understand the limitations of valence bond theory in explaining metal complexes and gain an elementary idea of crystal-field theory.
- Explore the thermodynamic stability of metal complexes, factors influencing stability, and substitution reactions in square planar complexes.
- Understand the bonding in metal-ethylenic complexes and the mechanism of homogeneous hydrogenation reactions in organometallic chemistry
- Explore crystal field splitting in octahedral, tetrahedral and square planar complexes, along with factors influencing the crystal-field parameters.

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b. Paper II (Physical Chemistry–B)

- Demonstrate understanding of equivalent conductance, its measurement, and the variation of equivalent and specific conductance with dilution.
- Explore the migration of ions and Kohlrausch law, and critically assess the Arrhenius theory of electrolyte dissociation, distinguishing between weak and strong electrolytes.
- Explore spectroscopy, including electromagnetic radiation, rotational spectrum of diatomic molecules, vibrational spectrum (infrared and Raman), and electronic spectrum with an emphasis on potential energy curves and transitions.
- Develop practical skills and theoretical understanding through comprehensive course outcomes.

5. Mathematics

a. Paper I (Dynamics)

- To demonstrate a clear understanding of rectilinear motion with uniform acceleration
- Explain Newton's laws of motion and their applications in solving problems.
- Solve problems involving the motion of interconnected particles.
- Analyze motion along smooth inclined plane and Apply principles of force and acceleration on inclined surfaces.
- Apply calculus concepts to analyze variable acceleration in motion.
- Define and analyse simple harmonic motion and Apply mathematical equations to describe the displacement, velocity, and acceleration of particles in SHM.
- Understand the principles of curvilinear motion.
- Understand the key parameters influencing the trajectory of a projectile.
- Understand the motion of a simple pendulum, a conical pendulum and Apply mathematical principles to describe oscillatory motion.
- Define and calculate work, power, and energy in mechanical systems.
- Apply the principle of conservation of energy to analyze systems with conservative forces.
- Understand the gravitational potential energy and its implications in mechanical systems.

b. Paper II (Number Theory)

- Understand the results involving divisibility and greatest common divisors and its application to solve linear Diophantine equations.
- Analyze and interpret the concepts of prime numbers and prime-factorization and its applications.
- Understand and apply the concept of congruence, linear congruence and Chinese remainder theorem.
- Understand and Apply Euler-Phi function, divisor function, multiplicative function.
- Understand and apply Wilson's theorem, Fermat's little theorem and Euler's theorem.

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B.SC (NON- MEDICAL) - SEM VI

1. English

- Appreciation of Literature
- Inculcation of moral and social values
- Enhancement of Creative Writing Skills
- Enhanced understanding of human nature.

2. Punjabi

- ਸੰਪਾਦਿਤ ਪੁਸਤਕ 'ਕਾਵਿ ਗੌਰਵ' ਵਿਚਲਾ ਸੂਫੀ ਕਾਵਿ, ਗੁਰਮਤਿ ਕਾਵਿ, ਕਿੱਸਾ ਕਾਵਿ ਅਤੇ ਬੀਰ ਕਾਵਿ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਕਲਾਸੀਕਲ ਸਾਹਿਤ ਪੜ੍ਹਨ ਤੇ ਸਮਝਣ ਉਪਰੰਤ ਉਹਨਾਂ ਦੀ ਸੋਚ ਨੂੰ ਵਿਸ਼ਾਲ ਕਰਦਾ ਹੈ। ਜੀਵਨ ਪ੍ਰਤੀ ਉਹਨਾਂ ਦੀ ਸੋਚ ਵਧੇਰੇ ਉਸਾਰੂ ਹੁੰਦੀ ਹੈ।
- 'ਧਰਤੀਆਂ ਦੇ ਗੀਤ' ਪੁਸਤਕ ਵੱਖ-ਵੱਖ ਦੱਖਣ ਪੂਰਬੀ ਦੇਸ਼ਾਂ ਦੇ ਲੋਕਾਂ ਦੇ ਜੀਵਨ 'ਤੇ ਇਕ ਪੰਛੀ ਝਾਤ ਪਾਉਂਦਾ ਸਫ਼ਰਨਾਮਾ ਹੈ ਜਿਸਦੇ ਦੂਜੇ ਹਿੱਸੇ ਵਿਚ ਭਾਰਤ ਦੇ ਅੰਡੇਮਾਨ ਅਤੇ ਨਿਕੋਬਾਰ ਟਾਪੂਆਂ 'ਤੇ ਵਸਦੇ ਲੋਕਾਂ ਦੇ ਜੀਵਨ ਬਾਰੇ ਵਿਸਥਾਰ ਪੂਰਵਕ ਜਾਣਕਾਰੀ ਦਿੱਤੀ ਗਈ ਹੈ ਜਿਸ ਤੋਂ ਵੱਖ-ਵੱਖ ਦੇਸ਼ਾਂ ਦੇ ਸਭਿਆਚਾਰ ਦੀ ਝਲਕ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਉਹਨਾਂ ਦੇਸ਼ਾਂ ਵਿਚ ਘੁੰਮਣ ਦੀ ਤਾਂਘ ਪੈਦਾ ਕਰਦੀ ਹੈ ਅਤੇ ਇਸ ਨਾਲ ਉਹ ਸੰਸਾਰਕ ਪੱਧਰ 'ਤੇ ਇਕ ਸਾਂਝ ਸਥਾਪਤ ਕਰਦੇ ਨਜ਼ਰ ਆਉਂਦੇ ਹਨ।
- ਲੇਖ ਰਚਨਾ ਦਾ ਅਭਿਆਸ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਵਿਗਿਆਨ, ਤਕਨਾਲੋਜੀ ਅਤੇ ਚਲੰਤ ਮਸਲਿਆਂ ਸੰਬੰਧੀ ਸੂਝ ਵਧਾਉਂਦਾ ਹੈ। ਇਸਤੋਂ ਇਲਾਵਾ ਆਧੁਨਿਕ ਸਾਹਿਤ ਰੂਪਾਂ ਸੰਬੰਧੀ ਗਿਆਨ ਸਾਹਿਤ ਨੂੰ ਬੌਧਿਕ ਪੱਧਰ 'ਤੇ ਸਮਝਣਯੋਗ ਬਣਾਉਂਦਾ ਹੈ। ਵਿਦਿਆਰਥੀ ਸਾਹਿਤ ਦੀਆਂ ਵੱਖ-ਵੱਖ ਵਿਧਾਵਾਂ ਤੋਂ ਜਾਣੂ ਹੁੰਦੇ ਹਨ।
- ਕਿਸੇ ਵੀ ਭਾਸ਼ਾ ਦੀ ਗਹਿਨ ਸੂਝ ਲਈ ਉਸਦੀ ਵਿਆਕਰਨਕ ਸਮਝ ਹੋਣੀ ਬਹੁਤ ਜ਼ਰੂਰੀ ਹੈ। ਪ੍ਰਮੁੱਖ ਵਿਆਕਰਨਕ ਸ਼੍ਰੇਣੀਆਂ ਅਤੇ ਵਿਆਕਰਨਕ ਇਕਾਈਆਂ ਦਾ ਗਿਆਨ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਵਿਆਕਰਨ ਸੰਬੰਧੀ ਸਮਝ ਨੂੰ ਵਿਸਥਾਰ ਦਿੰਦਾ ਹੈ। ਇਸ ਨਾਲ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਭਾਸ਼ਾਈ ਸੰਚਾਰ ਦੀ ਯੋਗਤਾ ਵਿਚ ਵਾਧਾ ਹੁੰਦਾ ਹੈ।

2A. Basic Punjabi

- ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੇ ਪਿਛੋਕੜ, ਭੂਗੋਲਿਕ ਸਥਿਤੀ, ਅਤੇ ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੇ ਉੱਘੜਵੇਂ ਲੱਛਣਾਂ ਦੀ ਜਾਣਕਾਰੀ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਭਿਆਚਾਰਕ ਚੇਤਨਾ ਪੈਦਾ ਕਰਦੀ ਹੈ।
- ਪੰਜਾਬ ਦੇ ਪ੍ਰਮੁੱਖ ਮੇਲੇ, ਪ੍ਰਮੁੱਖ ਤਿਉਹਾਰ ਅਤੇ ਪ੍ਰਮੁੱਖ ਧਾਰਮਿਕ ਸਥਾਨਾਂ ਦੇ ਅਧਿਅਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਲੋਕਾਂ ਦੀ ਮਾਨਸਿਕਤਾ ਨੂੰ ਵਧੇਰੇ ਚੰਗੀ ਤਰ੍ਹਾਂ ਸਮਝ ਸਕਦੇ ਹਨ।
- ਪੰਜਾਬੀਆਂ ਦੀਆਂ ਜਨਮ, ਵਿਆਹ ਤੇ ਮੌਤ ਸੰਬੰਧੀ ਰਸਮਾਂ ਰੀਤਾਂ ਦੇ ਗਿਆਨ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਸਮਾਜ ਦੀ ਸੰਰਚਨਾ ਦੀ ਡੂੰਘੀ ਜਾਣਕਾਰੀ ਹਾਸਲ ਕਰਦੇ ਹਨ।
- ਪੰਜਾਬੀ ਲੋਕਾਂ ਦਾ ਖਾਣ-ਪੀਣ, ਪਹਿਰਾਵਾ ਅਤੇ ਪੰਜਾਬੀਆਂ ਦੇ ਲੋਕ ਵਿਸ਼ਵਾਸਾਂ ਦੇ ਗਿਆਨ ਦੀ ਰੋਸ਼ਨੀ ਵਿਚ ਵਿਦਿਆਰਥੀ ਵਧੇਰੇ ਗੰਭੀਰਤਾ ਨਾਲ ਪੰਜਾਬ ਦੀ ਲੋਕਧਾਰਾ ਅਤੇ ਸਭਿਆਚਾਰ ਸੰਬੰਧੀ ਵਿਚ ਰੁਚੀ ਲੈਂਦੇ ਹਨ।

2B. Punjab History & Culture

- Understand the partition and historical complexities and enduring effects of the partition on Punjab, massive migration, displacement, population and immense human suffering.

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- Understand the long-term process of rebuilding lives and communities in Punjab after the traumatic events of partition.
- Understanding the historical context and consequences of the Punjabi Suba movement and the reorganization of states in 1966.
- Create ability to understanding the multifaceted impact of the Green Revolution on Punjab's agriculture, economy, and society.
- Understand the diverse and dynamic impact of the Punjabi diaspora on both the countries they reside in and the cultural changes of Punjab itself.
- Understand the multifaceted development of education and cultural expression in Punjab after independence.
- Understand the comprehensive strategies and interventions to address the complex and interconnected issues of drug addiction and female foeticide in Punjab.

3. Physics

a. Paper I (Radiation and Particle Physics)

- Acquire knowledge regarding interaction of heavy charged particle with matter and derive Bethe-Bloch formula, stopping power and range of heavier charged particles, the concept of the energy loss of electrons, positrons, and positrons annihilation in condensed media and the interaction of gamma rays with matter.
- Acquire the knowledge of gas-filled detectors: proportional and Geiger-Muller counters, scintillation detectors, semiconductor detectors, the Cherenkov effect, Cherenkov counter and solid-state nuclear track detectors, principle, working of bubble chambers, and nuclear emulsions.
- Understand the principle and working of linear accelerators, cyclotron, betatron, synchrocyclotron, betatron, electron and proton synchrotrons, phase stability, colliding beam machines: Large Hadron collider and Fermilab Tevatron.
- Acquire knowledge regarding elementary particles, fermions and bosons particles, and antiparticles, different types of interactions, quantum numbers, conservation laws, isospin, charge conjugation, and the quark model and high-energy physics units.

b. Paper II (Nuclear Physics)

- Understand nuclear structure, nuclear mass, nucleus radius, angular momentum, and parity, binding energy, and variation of the binding energy versus mass number, nuclear moments: magnetic dipole moment and electric quadrupole moment, nuclear force, and Yukawa theory.
- Acquire knowledge regarding modes of decay, decay laws, radioactive series, radioactive dating, alpha decay, Gamow's theory, barrier penetration, Geiger-Nuttal law, beta decays (β^- , β^+ , electron capture), neutrino hypothesis, and parity violation in β decay, gamma transitions, excited levels, isomeric levels, and interlevel conversion.
- Understand different types of nuclear reactions, examples, reaction cross-section, conservation laws, kinematics of nuclear reaction, Q -value, and its physical significance, compound nucleus and level width.

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- Understand postulates of the liquid drop model, derivation of semi-empirical mass formula, evidence for nuclear magic numbers, theory of shell model, and energy level scheme, angular momenta, magnetic moment, and parity of nuclear ground states.

4. Chemistry

a. Paper I (Organic Chemistry–A)

- Acquire a comprehensive understanding of Nuclear Magnetic Resonance (NMR) spectroscopy, including proton magnetic resonance (^1H NMR) spectroscopy
- Solve problems related to structure elucidation of organic compounds using UV, IR, and PMR spectroscopic techniques.
- Develop comprehensive course outcomes reflecting theoretical knowledge and practical skills in spectroscopy, organosulphur compounds, synthetic polymers, organic synthesis via enolates, carbohydrates, and biomolecules.
- Understand organic synthesis via enolates

b. Paper II (Physical Chemistry–B)

- Mastery of quantum mechanics, solid-state physics, and photochemistry principles, enabling advanced analysis and application in diverse scenarios
- Proficient understanding of spectroscopy techniques, electrochemistry, nuclear chemistry, and organic compounds, fostering problem-solving skills and critical thinking in complex scientific contexts.
- Understands the first, second, and third laws, entropy, free energy, equilibrium, and chemical kinetics

5. Mathematics

a. Paper I (Linear Algebra)

- Define groups, rings, and fields with examples.
- Able to recognize the properties and operations that characterize each algebraic structure.
- Define a vector space and identify its properties. Recognize and understand subspaces, providing examples for illustration.
- Understand the concepts of linear dependence and independence in vector spaces.
- Define the basis of a vector space and understand its significance.
- Understand the existence theorem for the basis of a vector space and recognize the conditions under which a basis exists.
- Explore the dimension of the sum of two subspaces and the dimension of quotient spaces.
- Define linear transformations and explore their properties.
- State and apply the Rank-Nullity theorem in linear algebra. Understand the relationship between the rank and nullity of a linear transformation.
- Define isomorphism and recognize its importance in linear algebra. and Identify isomorphic spaces and understand their equivalence.

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- Understand the matrix representation of a linear transformation. and Learn to compute and interpret the matrix of a linear transformation.
- Define linear operators and their properties. Recognize the role of linear operators in various mathematical contexts.

b. Paper II (Numerical Analysis)

- Apply different methods to solve linear and non-linear equations.
- Apply numerical methods to obtain approximate solutions to mathematical problems.
- Find the missing data points from the given data using interpolation and extrapolation.
- Apply various methods in solving double numerical integration and ordinary differential equations.

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M.SC (MATHEMATICS)

PROGRAMME OUTCOMES

This program consists of various branches of mathematics that will help students;

- To get deep understanding of advanced mathematical concepts & theories
- To make a solid foundation for research in mathematics
- To get specialized knowledge in chosen areas such as pure mathematics , applied mathematics and statistics
- To communicate complex mathematical ideas or theories through clear , easy to understand & effective language or presentations
- Gaining skills and knowledge in analytical reasoning , critical understanding & analysis to solve theoretical & practical problems
- To apply knowledge or techniques in other fields such as data science, astronomy , economy etc
- Will give career opportunities in schools and colleges or in various government & non government sectors or can become self employed
- A career in UPSC or state PSC's where advanced knowledge of subject is valued
- Develop efficient work habits to handle complex tasks or theories in given period of time
- Prepare for various national level competitive exams like NET , Gate , CMI, NBHM etc

COURSE OUTCOMES

M.Sc (Maths) - Sem I

1. Real Analysis I

- Understand set theory and apply it in real life
- Understand and apply Cantor's Intersection Theorem
- Gain proficiency in concept of continuity, compactness and connectedness
- Understand and apply Fundamental Theorem of Calculus
- Understand and apply 1st and 2nd Mean Value Theorems of Fundamental Calculus

2. Complex Analysis

- Learn about algebra and geometry of Complex Numbers
- Have ability to check differentiability and analyticity of complex functions
- Learn about Cauchy Riemann relations and harmonic functions
- Understand complex Integration, Cauchy Integral theorems and applications
- Understand concept of Maximum Modulus Theorem and applications
- Learn about Residues, Contour Integration and its various applications
- Learn concepts of Analytic Continuation & Bilinear transformation and applications

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3. Algebra- I

- Define and provide examples of groups, subgroups, and normal subgroups, apply Lagrange's theorem to analyze groups and subgroups.
- Demonstrate knowledge of cyclic groups and their properties
- Comprehend the concepts of homomorphisms, isomorphisms, automorphisms and its applications to analyze Group Structure.
- Analyze the concept of permutation groups, alternating groups and commutator groups.
- Understand Sylow's Theorems and their applications.
- Analyze composition series and apply Jordan Holder Theorem.
- Comprehend external and internal direct products

4. Mechanics I

- Understand the definitions of velocity and accelerations
- Able to break down motion into components often used in polar or cylindrical coordinate system
- Able to describe rigid body motion involves understanding of translation and rotation
- Understand and apply newton's three laws of motion to describe the relationship between an objects motion and forces acting on it
- Apply the work energy theorem and understand the concept of conservation of energy
- Define and understand SHM and its equation of motion, Understand the horizontal and vertical components of projectile motion
- Understand the concept of central force and its influence on the motion of particles, grasp the concept of pedal coordinates often used in the study of conics and certain curves,
- Understand keplers three laws, describing the motion of planets around sun, understand newto's law of gravitation, describing the attractive force between two masses, understand elliptic harmonic motion as a specialized form of oscillatory motion
- Understand the concept of moment of inertia and learn how to calculate moment of inertia for different shapes, understand and apply the theorem of parallel and perpendicular axis ,understand the concept of principal axes ,
- Apply the concept of equimomental system to solve problems related to equivalent rotational motion
- Understand coplanar distribution of mass and apply the concepts of moment of inertia and product of interia to anayze coplanar distributions

5. Differential Equations

- Learn about Succesive Approximation, its properties and various applications
- Learn about Total differential Equations, its property and various applications
- Learn about Laplace, Fourier Transformation, its properties and various applications
- Learn about Special Functions, its properties and various applications

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M.Sc (Maths)- Sem II

1. Real Analysis II

- Understand and apply Arzela's Theorem
- Understand and apply Weierstrass Approximation Theorem
- Grasp fundamental concept of outer measure and its properties
- Understand the concept of characteristic functions and step functions
- Understand and apply Littlewood's Three Principles
- Understand differentiation of monotone functions and integral functions

2. Tensors and Differential Geometry

- Understand Theory of Curves and types , various properties and applications
- Learn about Edge of Regression , Developable Surfaces and applications
- Understand two Fundamental Forms, Principle Directions , Lines of Curvatures , Asymptotes and applications
- Learn concept of Geodesics and applications
- Understand Tensors Its algebra ,types and applications

3. Algebra II

- Gain a comprehensive understanding of algebraic structures such as rings, subrings, and ideals, including the study of factor rings and homomorphisms.
- Explore the properties of integral domains, focusing on maximal and prime ideals, and the field of
- quotients associated with an integral domain.
- Study specialized rings, including principal ideal domains and unique factorization domain.
- Explore polynomial rings and their applications, including Gauss's theorem and the concept of irreducibility of polynomials.
- Understand the concepts of extension fields, both finite and infinite, and their categorization as simple and algebraic extensions.
- Explore the group of automorphisms of a field, normal extensions, and the Fundamental Theorem of Galois theory.
- Investigate symmetric rational functions and their relevance in determining solvability by radicals.

4. Mechanics II

- Analyze the general motion of a rigid body using translation and rotation concepts
- Solve problems related to angular displacement, velocity and acceleration in rigid body

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- Understand the nature and effects of impulsive forces, understand the principle of conservation of energy
- Understand and derive Euler's dynamical equations for the rotational motion of a rigid body
- Solve problems involving the motion of a rigid body in three dimensional space, understand the concepts of angular velocity and angular acceleration in 3-D
- Understand the concept of generalized coordinates as a set of independent parameters to describe the configuration of a system
- Derive and apply Lagrange's equation of motion for holonomic systems using generalized coordinates
- Understand the significance of expressing kinetic energy as a quadratic function of velocities
- Apply principles of equilibrium to solve problems involving forces and potentials
- Understand the concept of linear functional as mapping from a vector space to real numbers
- Grasp the variational principles related to extremals which seeks to optimize functional
- Apply the Euler-Lagrange equation to find the functions that minimize or maximize a given functional
- Understand the Rayleigh-Ritz method and apply it to find approximate solutions for problems with constraints or boundary conditions

5. Partial Differential Equations and Integral Equations

- Learn about Volterra equations, its properties and various applications
- Learn about Fredholm equations, its properties and various applications
- Learn about Separation of variables, Monge's, Laplace, its properties and various applications
- Learn about Partial Differential equations, its properties and various applications

M.Sc (Maths) - Sem III

1. Functional Analysis I

- Grasp fundamental concepts of normed linear spaces and its related concepts
- Understand and apply Holder's inequality and Minkowski's inequality
- Understand and apply Riesz-Fischer Theorem
- Understand and apply Hahn-Banach Theorem and its consequences
- Understand and apply Open Mapping Theorem
- Understand and apply Closed Graph Theorem
- Develop understanding of the concept of inner product space and orthonormal sets

2. Topology I

- Understanding the concept of a topological space and its importance in analysis

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- Ability to define and analyze open sets ,closed sets ,mastery in defining and calculating closure of a set
- Understanding the closure operator and its properties,Recognizing the connection between local bases and continuity
- Grasping the concept of separable spaces and their relevance in functional analysis, Recognising how certain topological properties are inherited by subsets
- Understand the definition of the product topology on the Cartesian product of two or more topological spaces
- Understand the construction of a base for the product topology from the bases of component spaces
- Grasp the concept of a quotient space and its construction
- Understand the different separation axioms and their implications on topological spaces
- Understand the applications and significance of tychonoff's lemma in topology
- Understand how uryson's lemma is used to construct continuous functions with specific properties

3. Stastics I

- Learn Measures of Central Tendency, Measures of Dispersion and applications
- Understand Probability theory and applications
- Understand Shapes and Peakness of frequency curves and learn various methods of measurements
- Learn concept of Discrete and Continuous Random Variables, Joint distributions and Stochastic Independence
- Learn concept of Expectations& m.g.f and various applications
- Learn Chebychev's Inequality, Law of large numbers and applications
- Learn about various Discrete and Continuous Probability Distributions
- Understand difference between Correlation and Regression between one or more variables
- Learn about Association of Attributes

4. Operations Research I

- Ability to convert standard business problems into linear programming problems and can solve using various simplex methods
- Proficiency in applying Linear programming, Integer programming techniques to solve optimization problems
- Knowledge of various methods for solving Assignment and Transportation Problems
- Knowledge to apply Dynamic Programming, Branch and Bound Techniques
- Ability to formulate and solve decision making problems using game theory

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5. Number Theory

- Learn about the existence and uniqueness of primitive root modulo a prime, develop problem solving skills by working on exercises and problem related to primitive roots
- Student will be able to understand the logic of the Quadratic Reciprocity Law
- Student will be able to understand the applications of farey sequences in Diophantine approximation, which involve finding rational approximation to irrational numbers
- Explore connection between Farey Sequences and continued fractions
- Solve system of simultaneous linear congruences
- Understand the conditions under which CRT can be used
- Explore applications of Wilson's theorem in number theory
- Learn techniques for solving equations involving indices, Define quadratic residue and non residue, understand the Legendre symbol and its applications

M.Sc (Maths) - Sem IV

1. Functional Analysis II

- Gain proficiency in strong and weak convergence in finite and infinite dimensional space
- Understand and apply Spectral Theorem for normed operators
- Understand and apply Spectral Properties of Compact Linear Operators
- Grasp knowledge of Banach Algebra and its applications
- Understand and apply formula for spectral radius

2. Topology II

- Understand and apply separation axioms beyond the regular and normal spaces, such as tychonoff spaces and completely normal spaces
- Explore the tychonoff theorem and understand its implications
- Understand how the product topology interacts with the metric properties of the individual spaces
- Understand the implications of compactness on continuity, convergence and the interplay with other topological concepts
- Understand theorems such as Heine –Borel theorem , characterization of compactness in metric spaces and connections to sequential and countable compactness
- Understanding the construction of the Stone –Cech compactification denoted as βX , for a given topological space X
- Understand how the evacuation mapping embeds X densely into βX and exploring conditions under which the embedding is continuous and preserve certain topological properties
- Learn how nets are generalized sequentiality and directed sets
- Understanding the relationship between nets and continuity in topological spaces

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- Exploring how ultrafilters can be used to define a limit point in a topological spaces, Understanding the connection between filters, ultrafilters and compactness in topological spaces

3. Stastics II

- Understand concept of testing of Hypothesis & compute probabilities of two types of errors
- Learn Statistical tests for Means and Proportions of Large Populations
- Learn Chi square, t , F distributions and their applications
- Learn MP, UMP tests and applications
- Learn Estimation theory, various methods of estimation and applications
- Understand Linear Estimation
- Learn concept of ANOVA and its applications

4. Operation Research II

- Familiarity with Queueing theory and its applications
- Knowledge about Inventory and its applications
- Knowledge about Replacement theory and its applications
- Knowledge about various Simulations Models and its applications

5. Discrete Mathematics

- Understand the concept of a rooted tree and its components, Differentiate between directed and undirected trees
- Master different tree traversal techniques such as in order, pre-order and post –order
- Identify the significance of spanning trees in network design and optimization
- Apply Krusgkal’s algorithm to solve real world problem involving network connectivity
- Apply Euler;s theorem to determine the existence of Eulerian paths and circuits in a given graph
- Define and calculate the in-degree and out-degree of vertices in a directed graph
- Apply fundamental cut sets to analyze the connectivity of a graph
- Define graps, vertices, edges and explore different types of graphs(directed, undirected, weighted)
- Learn various methods to represent graphs, including adjacency matrix, adjacency list and incidence matrix
- Analyze conditions under which a graph ha Hamiltonian paths or cycles
- Understand the fundamental concepts of lattices, including partially ordered sete and relations
- Define lattice homeomorphisms and understand their role in preserving lattice structure

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