

FACULTY OF SCIENCES

SYLLABUS FOR THE BATCH FROM THE YEAR 2024 TO YEAR 2028

Programme Code: BSBT

**Programme Name: B.Sc. Biotechnology/B.Sc. (Hons.) Biotechnology
(Semester I-II)**

Examinations: 2024-2028



Department of PG Department of Biotechnology

Khalsa College, Amritsar

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(b) Subject to change in the syllabi at any time.

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S.No.	PROGRAMME OBJECTIVES
1.	To improve, broaden, and deepen the knowledge of the students in order to provide students with an adaptable, research-intensive curriculum that meet the needs of both academia and industry.
2.	Enhancing career opportunities in industry, research locally and internationally, or serving as a foundation for further higher education through, cutting-edge laboratory exposures and dissertation-related activities that develop students' global competencies.
3.	Fostering a value system among students in order to promote critical thinking and a thorough understanding of key bioethical concepts.
4.	To inculcate the ability to work as entrepreneurs and technologists with strong ethics and communication abilities.

S.No.	PROGRAMME SPECIFIC OUTCOMES (PSOS)
PSO-1	To gain knowledge through theory and practical.
PSO-2	To establish a solid foundation at the cellular, molecular, genetic, and metabolic levels.
PSO-3	To make agricultural practices more efficient through the use of plant tissue culture and recombinant DNA technology.
PSO-4	To gain understanding of biomolecules, including their formation and interaction.
PSO-5	To do research on microorganisms and strain improvement for industrial applications.
PSO-6	To instill safe laboratory practices and procedures.
PSO-7	To get knowledge on different techniques and the usage of laboratory instruments.

**B.Sc. Biotechnology/ B.Sc. (Hons.) Biotechnology (Under NEP 2020) (Semester-I-VIII) (CBGS)
(Batch 2024-2028)**

COURSE SCHEME											
SEMESTER – I											
Course Code	Course Name	Hours/ Week	Credits			Total Credits	Max Marks				Page No.
			L	T	P		Th	P	IA	Total	
Discipline Specific Courses											
BT-BTL111	Biochemistry-I (Biomolecules)	4	4	-	-	4	75	-	25	100	6-7
BT-BTP111	Biochemistry-I (Biomolecules) Lab	2	-	-	1	1	-	19	6	25	8-9
BT-BTL112	General Microbiology-I	4	4	-	-	4	75	-	25	100	10-11
BT-BTP112	General Microbiology-I Lab	2	-	-	1	1	-	19	6	25	12-13
BO-BTL113	Botany-I	3	3	-	-	3	56	-	19	75	14-15
BO-BTP113	Botany-I Lab	2	-	-	1	1	-	19	6	25	16
Ability Enhancement Courses (Compulsory Courses)											
BCSE-1122	Communication skills in English-I	4	3	1	-	4	60	15	25	100	18-19
Skill Enhancement Courses-1											
SEC-116	Basics of Computers	2	2	-	-	2	37	-	13	50	21-22
Value-Added courses											
ZDA-111	***Drug Abuse: Problem, Management and Prevention	1	1	0	0	1	-	-	-	25	24-25
Core Courses											
BHPB-1101 BPBI-1102 BPHC-1104	Punjabi Compulsory OR *Basic Punjabi OR **Punjab History & Culture	4	4	-	-	4	75	-	25	100	27-32
Total		28	21	1	3	25	378	72	150	600	

Note:

1. *Special Paper in lieu of Punjabi Compulsory.
2. **For those students who are not domicile of Punjab
3. ***This paper marks will not be included in the total marks.
4. For theory one credit is equal to 1 hours and for practical one credit is equal to 2 hours

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SEMESTER – II											
Course Code	Course Name	Hours/Week	Credits			Total Credits	Max Marks				Page No.
			L	T	P		Th	P	IA	Total	
Discipline Specific Courses											
BT-BTL121	Genetics	4	4	-	-	4	75	-	25	100	34-35
BT-BTP121	Genetics Lab	2	-	-	1	1	-	19	6	25	36-37
BT-BTL122	Cell Biology	3	3	-	-	3	56	-	19	75	38-39
BT-BTP122	Cell Biology Lab	2	-	-	1	1	-	19	6	25	40-41
BT-BTL123	Fundamentals of biotechnology	4	4	-	-	4	75	-	25	100	42-43
BT-BTP123	Fundamentals of biotechnology Lab	2	-	-	1	1	-	19	6	25	44-45
BT-BTL124	Industrial Biotechnology-I	4	4	-	-	4	75	-	25	100	46-47
BT-BTP124	Industrial Biotechnology-I Lab	2	-	-	1	1	-	19	6	25	48-49
Ability Enhancement Courses (Compulsory Courses)											
BCSE-1222	Communication Skills in English-II	4	3	1	-	4	60	15	25	100	51-52
Skill Enhancement Courses-1											
SEC-126	Basics of Computers (Practical)	2	-	-	1	1		19	6	25	54
Value-Added courses											
ZDA-121	***Drug Abuse: Problem, Management and Prevention	1	1	-	-	1				25	56-57
Core Courses											
BHPB-1201 BPBI-1202 BPHC-1204	Punjabi Compulsory OR *Basic Punjabi OR **Punjab History & Culture	4	4	-	-	4	75	-	25	100	59-64
Total		34	23	1	5	29	416	110	174	700	

Note:

1. *Special Paper in lieu of Punjabi Compulsory.
2. **For those students who are not domicile of Punjab
3. ***This paper marks will not be included in the total marks.
4. For theory one credit is equal to 1 hours and for practical one credit is equal to 2 hours.

**B.Sc. Biotechnology/
B.Sc. (Hons.) Biotechnology**
(SEMESTER-I)

**Discipline Specific
Courses**

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(SEMESTER-I)

**BT-BTL-111
Biochemistry-I (Biomolecules)**

**Credits: 4-0-0
Maximum Marks: 100
Theory: 75
Internal Assessment: 25**

Time: 3 Hours

Note for the paper setters/examiners:

60 Hrs.

The question paper will consist of five sections: A, B, C, D, and E. Section A is compulsory and will consist of 8 short-answer type questions covering the whole syllabus, with each question carrying 2.5 marks. Candidates are required to attempt six questions from this Section. Sections B, C, D, and E will have two questions from the Unit I, II, III and IV of the syllabus and carry 15 marks. Candidates are required to attempt one question each from Sections B, C, D, and E of the question paper.

Course objectives: Course contents are designed to enable students to learn:

1. Water as mother liquor of life, its properties, ionisation, relationship between pH and pK and cellular buffers.
2. Classification and properties of Carbohydrates, structure and function of disaccharides, Homo and Heteropolysaccharides Polysaccharides.
3. Classification and properties fatty acids, lipids, their structure and function.
4. Classification of amino acids, their chemical reactions, protein classification and structural organization.

Course content

Unit I

(15 Hrs.)

Water and its Properties: Role of water in life, Structure of water molecules, Physico-chemical properties of water, Role of hydrogen bonding and non-covalent interactions in water, Dissociation and association constants, pH and buffers: Lowis concept of acids and bases, ionic product of water, pH scale, weak acids and bases, ionization of weak acids, titration of weak acids by strong base, pI, pka, Hasselbach Hendersson equation and its implications.

Unit II

(15 Hrs.)

Carbohydrates: Introduction, Monosaccharides: Families of monosaccharides: aldoses and ketoses, trioses, tetroses, pentoses, and hexoses, epimers, and anomers of glucose. Furanose and pyranose forms of glucose and fructose, Mutarotation,

Structure and functions of monosaccharide derivatives, Disaccharides; concept of reducing and non-reducing sugars, Haworth projections of Maltose, lactose, and sucrose, Isomaltose. Structural and functional properties of Polysaccharides: storage polysaccharides - starch and glycogen; Structural

Polysaccharides - cellulose, and chitin; Heteropolysaccharides: Peptidoglycan, Proteoglycan, glycoproteins

Unit III

(15 Hrs.)

Lipids: Classification of lipids and fatty acids. General structure and function of major lipid subclasses, acylglycerols, phosphoglycerides, Sphingolipids, glycosphingolipids and terpenes, sterols, steroids.

Unit IV

(15 Hrs.)

Proteins: Structure of amino acids, non-protein and rare amino acids and their chemical reactions. Peptide bond, Structural organization of proteins (Primary, Secondary, Tertiary, Quaternary, domain structure), protein classification and function. Forces stabilizing Primary, Secondary and Tertiary protein structures.

Books Recommended

David L. Nelson and Michael Cox (2017) Lehninger Principles of Biochemistry, 7th ed, WH Freeman

Jeremy M. Berg, Lubert Stryer, John Tymoczko, Gregory Gatto (2019) Biochemistry, 9th Ed., WH Freeman

Ferrier (2017) Lippincott's Illustrated Reviews Biochemistry, 7th Ed, Wolters Kluwer India Pvt. Ltd.

Course Outcomes

Sr. No.	On completing the course, the students will be able to:
CO-1	Learn water- a unique element in this universe along with its utility and its role as an elixir of life on the earth.
CO-2	Get knowledge on 'Hydrates of Carbon' as most important energy producing molecules within the living cell along with their diverse roles
CO-3	Understand the compositional related role of Lipids as group of diverse molecules compiled under single term, present as the most prominent components of the biological membranes along with their physiological roles.
CO-4	Study apprehension about the composition and roles of proteins as biological macromolecular functional units of living cell along with their structural hierarchy.

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(SEMESTER-I)

BT-BTP111

Biochemistry-I (Biomolecules) Lab

Credits : 0-0-1

Maximum Marks: 25

Practical: 19

Internal Assessment:06

Time: 3 Hours

30 Hrs.

Note. The question paper will be set by the examiner based on the syllabus

Course objectives

Course contents are designed to enable students to

- 1 Understand the spectrum of light based upon different wavelengths.
- 2 Comprehend the laws governing the absorption of light by biomolecules.
- 3 Perform spectrophotometric investigations.
- 4 Know inside of the concept of acidity (pH), basicity (pOH) and ionisation insolutions as well as indicators.
- 5 Learn about the volumetric titrations.

Course content

- 1 Verification of Beer Lamberts Law for P-nitrophenol or cobalt chloride.
- 2 Estimation of carbohydrate in given solution by anthrone method.
- 3 Study the presence of reducing/non-reducing sugar in biological samples.
- 4 Protein estimation by Lowry's method
- 5 Protein estimation by Bradford method.
- 6 Protein estimation by Biuret method.
- 7 The determination of acid value of a fat.
- 8 The determination of saponification value of a fat

Books Recommended

- 1 David L. Nelson and Michael Cox (2017) Lehninger Principles of Biochemistry, 7th ed, WH Freeman
- 2 Jeremy M. Berg, Lubert Stryer, John Tymoczko , Gregory Gatto (2019) Biochemistry, 9th Ed., WH Freeman
- 3 Ferrier (2017) Lippincott's Illustrated Reviews Biochemistry, 7th Ed, Wolters KluwerIndia Pvt. Ltd.
- 4 J L Jain , Sunjay Jain , Nitin Jain (2016) Fundamentals of Biochemistry, 7th Ed, S Chand
- 5 Satyanarayana (2020) Biochemistry, 5th Ed, Elsevier

Course Outcomes

Sr. No.	On completing the course, the students will be able to:
CO-1	Study Spectrophotometric analysis viz. (Ultra violet and Visible) using spectrophotometer and colorimeter.
CO-2	Understand quantitative estimations of Protein by different methods based upon the amino acid composition.
CO-3	Study the carbohydrate content estimations and sample analysis for different types of sugars.
CO-4	Study quality characteristics analysis for fats viz. acid and saponification value.
CO-5	Study acid-base volumetric titrations along with PK determination.

**B.Sc. Biotechnology/ B.Sc. (Hons.) Biotechnology (Under NEP 2020) (Semester-I-VIII) (CBGS)
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(SEMESTER-I)

**BT-BTL112
General Microbiology-I**

**Credits : 4-0-0
Maximum Marks: 100
Theory: 75
Internal Assessment: 25**

Time: 3 Hours

60 Hrs.

Note for the paper setters/examiners:

The question paper will consist of five sections: A, B, C, D, and E. Section A is compulsory and will consist of 8 short-answer type questions covering the whole syllabus, with each question carrying 2.5 marks. Candidates are required to attempt six questions from this Section. Sections B, C, D, and E will have two questions from the Unit I, II, III and IV of the syllabus and carry 15 marks. Candidates are required to attempt one question each from Sections B, C, D, and E of the question paper.

Course Objectives

1. To correlate the knowledge of fundamental Science's conceptual approach in the applied fields of Microbiology.
2. To make the pupils aware of the relation between Microbiology and Biotechnology.
3. The students made to learn all the realms of Microbiology (Mycology, Bacteriology, Virology etc.) in a comprehensive way.
4. The theoretical knowledge imparted by regular class work, assignments, class tests etc. will be further strengthened by use and application of ultra-modern instrumentation in world class labs to give first hand practical knowledge of Microbiology.
5. The students will be given exposure to latest happening in world around by arranging workshops, expert lectures by the intelligentsia from research/industry and academia.

Course Content

Unit I

(15 Hrs.)

Introduction to Microbiology- Need to study Microbiology. Historical Perspective and Important discoveries related to Microbiology. Relationship between Microbiology and Biotechnology. Tools and techniques in Microbiology and their applications in Biotechnology. The Microbial Biotechnology. General Features- Bacteria, Fungi, Neurospora, Yeast and Viruses. Microbes in extreme environments- the thermophiles, halophiles, acidophiles, psychrophiles and alkalophiles.

Unit II

(15 Hrs.)

Basic concept of Microbial growth. Concept of growth in batch culture and continuous culture. Microbial growth media and its composition and classification, Sterilization-Basic concept, physical and chemical methods of sterilization. Sterilization-Basic concept, physical and chemical methods of sterilization. Bacterial nutrition-Introduction, Nutritional forms of bacteria, Basic concept of Transport mechanisms of nutrients across microbial cell membranes.

Unit III

(15 Hrs.)

Principles and application of bright field, dark field phase contrast, fluorescence & immunofluorescence, electron microscopy. Gram positive and Gram negative bacteria. Nature of the Microbial Cell Surface and Structure and anatomy of bacterial cell walls, Types of bacterial flagella. Different types of bacterial staining.

Unit IV

(15 Hrs.)

Bacterial Classification: Bacterial classification and taxonomy based on Bergey's Manual of Determinative bacteriology—General outline only. An introduction to Bacterial Serotypes. Microbial culture collection centres, Methods of Microbial preservation. Discovery of penicillin, strain improvement programme of *Penicillium* sp. To obtain higher yield of penicillin.

Books Recommended:

- 1 Davis, B.D., Dulbecco. R., Eisen, H.N. and Ginsberg, H.S. (1990). Microbiology: 4th Edition, Harper & Row, Publishers, Singapore.
- 2 Tortora, G.J., Funke, B.R. and Case, C.L. (1994). Microbiology: An introduction: 5th Edition, The Benjamin / Cummings Publishing Company, Inc.
- 3 Stanier, R.Y. (1995). General microbiology, MacMillan Press, London.
- 4 Pelczar, M.T. (1995). Microbiology, Tata McGraw Hill Publication, New Delhi.
- 5 Schlegel. H. G., (1995). General Microbiology 7th Edition, Cambridge Univ. Press.
- 6 Prescott and Dunn (1999). Industrial Microbiology 4th Edition, By S.K. Jain for CBS Publishers & Distributors.
- 7 Chander, M. And Puri, P. (2008). A Concise Course in Microbiology. Krishna Brothers Publishers, Old Railway Road, Jalandhar.
- 8 Postgate. J. (2000). Microbes & Man 4th Edition, Cambridge Univ. Press.
- 9 Tortora. G.J., Funke. B.R., 2001. Microbiology: An Introduction, Benjamin Cummings.

Course Outcome

Sr. No.	On completing the course, the students will be able to:
CO-1	Study the concepts of microbial biotechnology and general features of various micro-organisms, antibiotics.
CO-2	Study bacterial growth curves and batch cultures
CO-3	Learn the principle, working and design of various microscopes.
CO-4	Gain knowledge on role of microbes in food industry.
CO-5	Get themselves acquainted with microbes and know about fruits and fines coming from microbes.

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(SEMESTER-I)

BT-BTP112

General Microbiology-I Lab

Credits: 0-0-1

Maximum Marks: 25

Practical: 19

Internal Assessment:6

30 Hrs

Time: 3 Hours

Note: The question paper will be set by the examiner based on the syllabus.

Course Objectives

- 1 To correlate the knowledge of the theoretical fields of Microbiology with practical.
- 2 To make the pupils aware of the role of Microbiology in daily life.
- 3 The students made to learn all the general features and identification of various microbessuch as fungi, bacteria, virus etc.
- 4 To teach them microbiology practicals applicable in dairy, diagnostics and other industries.
- 5 The students will be given opportunity to perform each and every experiment, get resultsand infer upon their findings.

Course Content

- 1 Aseptic techniques of sterilization. Do and don't in microbiology lab.
- 2 Cleaning of glassware.
- 3 Preparation of media, cotton plugging and sterilization
- 4 Isolation of micro-organism from air, water and soil samples. Dilution and pour plating, Colony purification by streaking method.
- 5 Identification of bacteria by simple staining, negative staining and Gram staining.
- 6 Detection of specific bacteria by Wet mount preparation method and Hanging drop mount method.

Books Recommended:

- A Cappuccino, J.G. and Sherman, N. (1999). Microbiology: A Laboratory Manual 4th Ed: Harlow, Addition-Wesley.
- B Dubey R.C. and Maheshwari (2012) Practical Microbiology 5th edition: S. Chand and company ltd.New Delhi.

Course Outcome

Sr. No.	On completing the course, the students will be able to:
CO-1	Become aware of role of microbes in daily life.
CO-2	Learn to maintain proper hygiene in day to day life.
CO-3	Have hands on experience of quality control testing in food, feed, diagnostic and water testing industry.
CO-4	Learn planning and execution of the procedure involved in a systematic way.
CO-5	Learn ethics of working and team spirit.

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(SEMESTER-I)

BO-BTL113

Botany-I

Credits : 3-0-0

Maximum Marks: 75

Theory: 56

Internal Assessment: 19

Time: 3 Hours

45 Hrs

Note for the paper setters/examiners:

The question paper will consist of five sections: A, B, C, D, and E. Section A is compulsory and will consist of 8 short-answer type questions covering the whole syllabus, with each question carrying 2 marks. Candidates are required to attempt six questions from this Section. Sections B, C, D, and E will have two questions from the Unit I, II, III and IV of the syllabus and carry 11 marks. Candidates are required to attempt one question each from Sections B, C, D, and E of the question paper.

Course Objectives

- 1.1 To study the plant diversification and their different groups.
- 1.2 To study the internal structure (anatomy) of plants (root, stem and leaf).
- 1.3 To study the concept of reproduction (vegetative and sexual) in flowering plants.
- 1.4 To study the plant identification, botanical descriptions and classification of flowering plants

Unit I

(12 Hrs.)

Diversity in plants: General characters of Algae, Fungi, Lichens, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms. Concepts of species and hierarchical taxa, biological nomenclature.

Unit II

(11 Hrs.)

Anatomy of flowering plants: Meristems, simple and complex permanent tissues, internal structure of stem, root and leaf, secondary growth in stem and root of *Helianthus*.

Unit III

(11 Hrs.)

Reproduction in flowering plants: Structure and development of anther and male gametophyte, Structure and development of ovule and female gametophyte; Pollination (self and cross) and fertilization; structure and function of endosperm and embryo (dicot and monocot), polyembryony, self-incompatibility.

Unit IV

(11 Hrs.)

Taxonomy of flowering plants: Artificial (Linnaeus), natural (Bentham & Hooker) and phylogenetic (Engler and Prantl) systems of classification; Terminology pertaining to floral description, General characteristics (including economic importance) of following families of angiosperms; giving examples of few important genera: Solanaceae: *Solanum/Petunia*,

Rutaceae: *Citrus, Murraya*, Cruciferae- *Brassica*, Apiaceae (Umbelliferae) – *Coriander*, Asteraceae - *Helianthus*, Leguminosae –*Cassia/Acacia/Sweet pea*, Poaceae (Graminae)-*Triticum*

Books Recommended

- a Dickison, W.C. (2000). Integrative Plant Anatomy. Academic Press, California, USA.
- b Raven, P.H., Evert, R.F. and Eichhorn, S.E. (1999). Biology of Plants, 5th edition. W.H.Freeman and Co., Worth Publishers, New York.
- c Rudall, P. J. (2007). Anatomy of Flowering Plants: An Introduction to Structure and Development (3rd Edition). Cambridge University Press, UK.
- d Bhojwani, S.S. and Bhatnagar, S.P. (2000). The Embryology of Angiosperms, 4th revised and enlarged edition. Vikas Publishing House, Delhi.
- e Hartmann, H.T. and Kestler, D.E. (1976). Plant Propagation: Principles and Practices, 3rd edition, Prentice Hall of India Pvt. Ltd., New Delhi.
- f Vashistha, P. C. (2016). Botany for degree students. S. Chand and Company, New Delhi

Course Outcomes

Sr. No.	On completing the course, the students will be able to:
CO-1	Understand the diversity of plant kingdom
CO-2	Learn morphology and anatomy of plants
CO-3	Understand the process of reproduction and the development of reproductive organs in flowering plants
CO-4	Learn different systems of classification of plants
CO-5	Learn different terminologies pertaining to floral description
CO-6	Understand the economic importance of plants belonging to different families

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(SEMESTER-I)

**BO-BTP-113
Botany –I Lab**

**Credits : 0-0-1
Maximum Marks: 25
Practical: 19
Internal Assessment: 6
30 Hrs**

Time: 3 Hours

Note. The question paper will be set by the examiner based on the syllabus

Course objectives

- f.1 To study micro and megasporogenesis and female gametophytes and endosperms.
- f.2 To study the internal structure (anatomy) of plants (root, stem and leaf).
- f.3 The study floral diagram and floral formula of different flowers.
- f.4 To study botanical descriptions and classification of flowering plants

Course content

Plant Anatomy: Anatomical studies of stem, root and leaf in *Helianthus* and maize plant.

Embryology: Study of the permanent slides pertaining to micro and megasporogenesis and female gametophytes and endosperms.

Taxonomy:

- 1. Description of flowers including floral diagram, floral formula, V.S. of flower of the representative genera of families mentioned in syllabus.
- 2. Identification and short morphological economic note on the specimens included in Unit IV of the theory paper.

Course Outcomes

Sr. No.	On completing the course, the students will be able to:
CO-1	Learn different terminologies pertaining to description of flowers
CO-2	Learn anatomy of plants
CO-3	Understand the process of micro and megaspore genesis and female gametophytes and endosperms

Ability Enhancement Compulsory Courses-1

**B.Sc. Biotechnology/ B.Sc. (Hons.) Biotechnology (Under NEP 2020) (Semester-I-VIII) (CBGS)
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(SEMESTER-I)

COMMUNICATION SKILLS IN ENGLISH-I

**BCA/B.Sc. IT/ Bio Tech/BFST/BJMC/B.Sc(Fashion Designing)/B.Mm /BIMT/B.Sc.
(Artificial Intelligence and Data Science)/B.Sc (Data Analysis)/ B.A (Audio Video
Recording, Animation & Photography)/B.Sc (Travel & Tourism)/ B.Com (Tax Planning
and Management
B.Sc. (BIO-TECHNOLOGY) (SEMESTER-I)
BCSE-1122**

L	T	P	Credits
3	1	0	4

Time: 3 Hours

Max. Marks: 100

Theory: 60

Practical: 15

Internal Assessment: 25

Suggested Pattern of Question Paper:

The question paper will be divided into two sections. Section A will consist of Twelve(12) questions of One(1) mark each. Section B will consist of Six questions of Eight(8) marks each.

There will be internal choice wherever possible.

Section A

1. Do as directed
Articles, Conjunctions and Prepositions

(12X1=12 Marks)

Section B

1. Reading Skills: Reading Tactics and strategies; Reading purposes–kinds of purposes; Reading for direct meanings.
2. Comprehension questions of an unseen passage
3. Personal letter and Official/Business letters
4. Writing notices/agenda/minutes for public circulation on topics of professional interest.
5. Writing resume or converting a biographical note into resume
6. Translation from English to Vernacular (Punjabi/ Hindi) (Isolated Sentences)

(6X8=48 Marks)

Course Objectives:

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

Course Contents:

1. Reading Skills: Reading tactics and strategies; Reading purposes–kinds of purposes and associated comprehension; Reading for direct meanings; Reading for understanding concepts, details, coherence, logical progression and meanings of phrases/ expressions.

Activities:

- 1 Active reading of passages on general topics
 - 2 Reading newspaper, articles, editorials etc.
 - 3 Short questions based on content and development of ideas of a given paragraph.
- 2. Writing Skills:** Guidelines for effective writing; writing styles for application, resume, personal letter, official/ business letter, memo, notices etc.

Activities:

- 1 Personal and business letters.
- 2 Converting a biographical note into a sequenced resume.
- 3 Writing notices for circulation/ boards.
- 4 Making notes of given passage with headings and sub-headings
- 5 Writing newspaper reports based on given heading.

Recommended Books:

- 1 *Oxford Guide to Effective Writing and Speaking* by John Seely.
- 2 *The Written Word* by Vandana R Singh, Oxford University Press.
- 3. *Murphy's English Grammar* (by Raymond Murphy) CUP.

Course Outcomes:

The completion of this course enables students to:

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

PRACTICAL (Marks: 15)

Course Contents:-

- Reading dialogues (5 Marks)
- 2. Rapid reading (5 Marks)
- 3. Project file (5 Marks)

Skill Enhancement Courses-1

**B.Sc. Biotechnology/ B.Sc. (Hons.) Biotechnology (Under NEP 2020) (Semester-I-VIII) (CBGS)
(Batch 2024-2028)**

(SEMESTER-I)

B.Sc. (Medical, Non-Medical, Biotechnology, Travel and Tourism)

Semester – I

SEC-116: Basics of Computer

Time: 3

Credits		
L	T	P
2	0	0

Hours

Max. Marks: 50

Theory Marks: 37

Theory Internal Assessment Marks : 13

Note for paper setter and students:

- 1 Medium of Examination is English Language.**
- 2 There will be five sections.**
- 3 Section A is compulsory and will be of 09 marks consisting of 8 short answer type questions carrying 1.5 marks each covering the whole syllabus. The answer should not exceed 50 words. The students will have to attempt any 6 questions in this section.**
- 4 Sections B, C, D and E will be set from units I, II, III & IV respectively and will consist of two questions of 07 marks each from the respective unit. The students are required to attempt one question from each of these sections.**

Course Objectives

1. To familiarize the various parts of computer.
2. To study application of computers in different fields.
3. To recall the evolution of computers through various generation.
4. To acquire the knowledge of working of input and output devices.

Unit- I

Introduction to Computer, Data Processing, Concept of data and information, Classification of Computer.

Unit- II

Introduction to hardware, Software and its types, Main Memory: RAM, ROM, cache memory, Secondary Memory: Magnetic Tape, Magnetic Disk, Floppy disk, Hard Disk, Optical Disk.

Unit- III

E-mail: Basic introduction, advantage and disadvantage, structure of an e-mail message, working of e-mail (sending and receiving message), managing e-mail (creating new folder, deleting messages, forwarding messages, filtering messages) implementation of outlook express.

Unit- IV

WWW: introduction, working of WWW, web browsing

Search Engine: about search engine, component of search engine, working of searchengine, difference between search engine and web directory.

References:

1. Information Technology: Danis P. Curtin.
2. How the Internet Works :Preston Gralla.
3. MS Power Point 2010 Training Guide-: S. Jain, BPB Publishers
4. Microsoft Office PowerPoint 2007: Torben Lage Frandsen

Course Outcomes:

At the end of course students will be able to:

1. Acquire the computer terminology
2. Gain insight of working of input and output devices.
3. Develop skills of working with MS-Word, MS-Powerpoint.
4. Understand the concept of storing of data in memory and its types.

Value Added Courses

(SEMESTER-I)

S. No.	Course Code	Course Title	Credits			Total Credit	Period/wk.	Max. Marks	Total Marks
			L	T	P				
		Value Added Course							
1	ZDA111	Drug Abuse: Problem Management and Prevention -I	1	-	-	1	2	25	25 NC

SEMESTER-I

Course Code: ZDA111

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

Time: 3 Hours

**Credit hrs./wk.:1
Max. Marks: 25**

Instructions for the Paper Setters:

1. There will be two sections A and B.
2. Section A is compulsory and will be of 5 marks consisting of 8 short answer type questions carrying 1 marks each covering the whole syllabus. The candidates are required to attempt 5 questions out of 8 short answer type questions. The answer should not exceed 50 words.
3. Candidates shall be required to attempt 4 questions from Section B, selecting one question from each unit and each question carries 5 marks. Preferably, the question should not be split into more than two sub-parts.

Course Objectives- The course aims to-

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

UNIT-I

• Meaning of Drug Abuse

Meaning of drug abuse

Nature and Extent of Drug Abuse: State and National Scenario

UNIT-II

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

UNIT-III

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

UNIT-IV

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

References:

1. Ahuja, Ram (2003), Social Problems in India, Rawat Publication, Jaipur.
2. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
3. Inciardi, J.A. 1981. The Drug Crime Connection. Beverly Hills: Sage Publications. 23
4. Jasjit Kaur Randhawa & Samreet Randhawa, "Drug Abuse Problem, Management & Prevention", KLS, ISBN No. 978-81-936570-8-9, (2019).
5. Kapoor. T. (1985) Drug epidemic among Indian Youth, New Delhi: Mittal Pub.
6. Modi, Ishwar and Modi, Shalini (1997) Drugs: Addiction and Prevention, Jaipur: Rawat Publication.
7. Sain, Bhim 1991, Drug Addiction Alcoholism, Smoking obscenity New Delhi: Mittal Publications.
8. Sandhu, Ranvinder Singh, 2009, Drug Addiction in Punjab: A Sociological Study. Amritsar. Guru Nanak Dev University.
9. Singh, C. P. 2000. Alcohol and Dependence among Industrial Workers: Delhi: Shipra.
10. Sussman, S and Ames, S.L. (2008). Drug Abuse: Concepts, Prevention and Cessation, Cambridge University Press.
11. World Drug Report 2011, United Nations office of Drug and Crime.

Course Outcomes: The students will be able-

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

Core Courses

(SEMESTER-I)

B. Sc. Hons. (Physics, Chemistry, Maths), B. Sc. Bio Tech./ IT/ Fashion Designing/ Food Sc., B. A. JMC, BCA, B.Sc. Data Analytics, B.Sc. Artificial Intelligence and Data Science, B.Sc. (Hons.) Early Childhood Care & Education, B.A. (Hons.) Journalism with Media Studies, Bachelor in Tourism & Travel Management, B.A. (Audio Video Recording, Animation & Photography), Bachelor of Vocational (B.Voc.) (Software Development, Theatre and Stage Craft, Food Processing, Textile Design & Apparel Technology, Renewable Energy Technology)

Semester-I
Punjabi (Compulsory)-1
ਪੰਜਾਬੀ (ਲਾਜ਼ਮੀ)-1

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

Course title & Code	Total Teaching Hours	Total Credits/ Hours per week	Credit distribution			Total Marks 100		Time Allowed in Exam	Eligibility criteria	Pre-requisite of the course (if any)
			L	T	P	Theory	IA			
ਪੰਜਾਬੀ (ਲਾਜ਼ਮੀ)-1 BHPB-1101	60	4	4	0	0	75	25	3 Hours	Class 12th pass in any stream	Studied Punjabi up to 10th Standard

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

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

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਕਾਵਿ ਕਥਾ, (ਕਵਿਤਾ ਅਤੇ ਕਹਾਣੀ) ਡਾ. ਮਹਿਲ ਸਿੰਘ (ਮੁੱਖ ਸੰਪਾਦਕ) ਅਤੇ ਡਾ. ਆਤਮ ਸਿੰਘ ਰੰਧਾਵਾ (ਸੰਪਾਦਕ), ਕਸਤੂਰੀ ਲਾਲ ਐਂਡ ਸਨਜ਼, ਅੰਮ੍ਰਿਤਸਰ।

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

ਭਾਗ-ਦੂਜਾ

ਪੰਜਾਬ ਦੇ ਮਹਾਨ ਕਲਾਕਾਰ (ਬਲਵੰਤ ਗਾਰਗੀ)

ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।
(ਅੰਮ੍ਰਿਤਾ ਸ਼ੇਰਗਿੱਲ ਤੋਂ ਭਾਈ ਸਮੁੰਦ ਸਿੰਘ ਤਕ)
(ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ/ਨਾਇਕ ਬਿੰਬ)

ਭਾਗ-ਤੀਜਾ

(ੳ) ਪੈਰਾ ਰਚਨਾ (ਤਿੰਨਾਂ ਵਿਚੋਂ ਇਕ)
(ਅ) ਪੈਰਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ

ਭਾਗ-ਚੌਥਾ

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

**B.Sc. Biotechnology/ B.Sc. (Hons.) Biotechnology (Under NEP 2020) (Semester-I-VIII) (CBGS)
(Batch 2024-2028)**

(SEMESTER-I)

B. Sc. Hons. (Physics, Chemistry, Maths), B. Sc. Bio Tech./ IT/ Fashion Designing/ Food Sc., B. A. JMC, BCA, B.Sc. Data Analytics, B.Sc. Artificial Intelligence and Data Science, B.Sc. (Hons.) Early Childhood Care & Education, B.A. (Hons.) Journalism with Media Studies, Bachelor in Tourism & Travel Management, B.A. (Audio Video Recording, Animation & Photography), Bachelor of Vocational (B.Voc.) (Software Development, Theatre and Stage Craft, Food Processing, Textile Design & Apparel Technology, Renewable Energy Technology)

Semester-I

Basic Punjabi -1

ਮੁਢਲੀ ਪੰਜਾਬੀ-1

(In Lieu of Compulsory Punjabi)

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

Course title & Code	Total Teaching Hours	Total Credits/ Hours per week	Credit distribution			Total Marks 100		Time Allowed in Exam	Eligibility criteria	Pre- requisite of the course (if any)
			L	T	P	Theory	IA			
ਮੁਢਲੀ ਪੰਜਾਬੀ-1 BPBI-1102	60	4	4	0	0	75	25	3 Hours	Class 12th pass in any stream	NOT Studied Punjabi up to 10th Standard

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

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਭਾਗ ਵਿਚ 01-01 ਅੰਕ ਦੇ ਅਤਿ-ਸੰਖੇਪ ਉੱਤਰ ਵਾਲੇ (Objective Type) 11 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜੋ ਕਿ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ ਹੋਣਗੇ ਅਤੇ ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਦੂਸਰੇ ਅਤੇ ਤੀਸਰੇ ਭਾਗ ਵਿਚ, ਸਿਲੇਬਸ ਦੇ ਪਹਿਲੇ ਅਤੇ ਦੂਸਰੇ ਭਾਗ ਵਿਚੋਂ 8-8 ਅੰਕਾਂ ਦੇ 3-3 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨ੍ਹਾਂ ਵਿਚੋਂ ਵਿਦਿਆਰਥੀ ਨੇ ਕੋਈ 2-2 ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ। ਇਸੇ ਤਰ੍ਹਾਂ ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚੌਥੇ ਭਾਗ ਵਿਚ 4-4 ਅੰਕਾਂ ਦੇ 5 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨ੍ਹਾਂ ਵਿਚੋਂ ਵਿਦਿਆਰਥੀ ਨੇ 4 ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ। ਭਾਗ ਪੰਜਵੇਂ ਵਿਚ 2-2 ਅੰਕਾਂ ਦੇ 10 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨ੍ਹਾਂ ਵਿਚੋਂ ਵਿਦਿਆਰਥੀ ਨੇ 8 ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ।

**ਪਾਠ-ਕ੍ਰਮ
ਭਾਗ-ਪਹਿਲਾ**

(ੳ) ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ:

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

(ਅ) ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ

ਭਾਗ-ਦੂਜਾ

ਗੁਰਮੁਖੀ ਆਰਥੋਗਰਾਫੀ ਅਤੇ ਉਚਾਰਨ:

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

ਭਾਗ-ਤੀਜਾ

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

ਭਾਗ-ਚੌਥਾ

ਸ਼ੁੱਧ-ਅਸ਼ੁੱਧ ਸ਼ਬਦ

**B.Sc. Biotechnology/ B.Sc. (Hons.) Biotechnology (Under NEP 2020) (Semester-I-VIII) (CBGS)
(Batch 2024-2028)**

(SEMESTER-I)

BA, B.A. SS/ B. A. (Hons. – English), B. Com. (Hons., Regular, Account. & Finance), B. Sc. Bio-Tech./Comp. Sc./Eco./Fashion Designing/Food Science/IT/Med./Non Med., B.Sc. (Hons. –Botany, Chemistry, Mathematics, Physics, Zoology),i B. of Mult.; B. in Int. & Mob. Tech.; BBA; BCA; BJMC; B. Voc. (Software Development, Theatre and Stage Craft, FoodProcessing, Textile Design & Apparel Technology) BTTM (Bachelor of Tour and Travel Management)

SEMESTER-I

**PUNJAB HISTORY & CULTURE (From Earliest Times to c. 320 BC)(Special Paper in lieu
of Punjabi compulsory)**

(For those students who are not domicile of Punjab)

Course Code: BPHC-1104

Credit: 04

L- T- P

04-0-0

Time: 3 Hours

Total Marks: 100

Theory: 75

Internal Assessment: 25

Instructions for the Paper Setters:

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

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

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

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

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

Unit-I

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

Unit-II

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

Unit-III

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

Unit-IV

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

Suggested Readings:-

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

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

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

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

Course Outcomes:

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

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

**B.Sc. Biotechnology/
B.Sc. (Hons.) Biotechnology**
(SEMESTER-II)

**Discipline Specific
Courses**

**B.Sc. Biotechnology/ B.Sc. (Hons.) Biotechnology (Under NEP 2020) (Semester-I-VIII) (CBGS)
(Batch 2024-2028)**

**(SEMESTER-II)
BT-BTL-121**

Genetics

Credits : 4-0-0

Maximum Marks: 100

Theory: 75

Internal Assessment: 25

Time: 3 Hours

60 Hrs

Note for the paper setters/examiners

The question paper will consist of five sections: A, B, C, D, and E. Section A is compulsory and will consist of 8 short-answer type questions covering the whole syllabus, with each question carrying 2.5 marks. Candidates are required to attempt six questions from this Section. Sections B, C, D, and E will have two questions from the Unit I, II, III and IV of the syllabus and carry 15 marks. Candidates are required to attempt one question each from Sections B, C, D, and E of the question paper.

Course Objectives

1. The objective of this course is to introduce the students with the concepts of chromosomal organisation, extra-chromosomal inheritance and chromosomal aberrations.
2. To inculcate the concepts of Mendel's laws of inheritance, crossing over, linkage and how the gene transfer from parents to offspring's.
3. To introduce students with the concept of extra Chromosomal (Cytoplasmic) inheritance like inheritance of mitochondrial DNA, chloroplast DNA, kappa articles in Paramecium, Sigma factor in Drosophila, cytoplasmic male sterility (CMS) in maize & its relevancy.
4. To enhance the hand-on experience in dermatographics, to prepare mitotic slides & the practical learning ability.
5. To introduces the students with concept of Basic Microbial Genetics: Conjugation, transduction & transformation and how the gene flows in a horizontal manner.

Course Contents

Unit I

(15 Hrs.)

Organization of Chromosomes: The structure of prokaryotic and eukaryotic chromosome (macromolecular organization and ultrastructure), karyotype, idiogram, centromere and telomere structure, significance of telomerase, euchromatin and heterochromatin, Special chromosomes: Polytene chromosomes and Lampbrush chromosomes, satellite DNA, the supercoiling of DNA.

Unit II

(15 Hrs.)

Mendel's Laws of Inheritance: Principle of segregation and Independent assortment, Monohybrid, dihybrid and trihybrid crosses, Back cross and test cross. Interaction of Genes: Incomplete inheritance and co-dominance, pleiotropism, modification of F2 ratios: epistasis, complementary genes, supplementary genes, inhibitory genes, duplicate genes, lethality and collaborators genes. Multiple allelism.

Unit III

(15 Hrs.)

Linkage: Coupling and repulsion hypothesis, chromosomal theory of linkage, complete and incomplete linkage, linkage groups and significance of linkage.

Crossing Over: Introduction, mechanism of meiotic crossing over, types of crossing over, factors affecting it and its significance.

Basic Microbial Genetics: Conjugation, transduction, transformation

Unit IV

(15 Hrs.)

Extra Chromosomal (Cytoplasmic) Inheritance: features; inheritance of mitochondrial DNA, chloroplast DNA, kappa articles in *Paramecium*, Sigma factor in *Drosophila*, cytoplasmic male sterility (CMS) in maize.

Chromosomal aberrations: Structural: deletion, duplication, inversion, translocation; Numerical: polyploidy, aneuploidy; significance of chromosomal aberrations.

Course Outcome

Sr. No.	On completing the course, the students will be able to:
CO-1	Understand the chemical basis of heredity
CO-2	Gain knowledge on genetic methodology and how quantification of heritable traits in families and populations provide insight on the cellular and molecular mechanisms.
CO-3	Gain ability to evaluate conclusions that are based on genetic data.
CO-4	Understand the role of genetic technologies in industries related to biotechnology, pharmaceuticals, energy, and other fields.
CO-5	Learn teamwork and leadership skills including group analysis of data, working together in the research laboratory, joint compositions of written reports, substantive participation in research group meetings etc.

**B.Sc. Biotechnology/ B.Sc. (Hons.) Biotechnology (Under NEP 2020) (Semester-I-VIII) (CBGS)
(Batch 2024-2028)**

**(SEMESTER-II)
BT-BTP121
Genetics Lab**

**Credits : 0-0-1
Maximum Marks: 25
Practical: 19
Internal Assessment: 06**

Note. The question paper will be set by the examiner based on the syllabus.

Time: 3 Hours

30 Hrs

Course Objectives

1. To make students to solve numerical problem related to mendelism, paternity disputes & multiple allelism.
2. An understanding of the inheritance and expression of human blood groups.
3. An understanding of the clinical relevance of genetic concepts.
4. Ability to the hand-on experience in dermatographics, to prepare mitotic slides & thepractical learning ability.
5. Knowledge of Internet genetics resources.
6. An historical perspective of how genetics has evolved

Course content

1. Demonstration of Law of segregation and Independent assortment (use of coloured beads, capsules etc.).
2. Numerical problems on Mendelism and on modified F2 ratios.
3. Numerical problems on Paternity disputes (Blood groups)
4. Segregation demonstration in preserved material
5. Study of polytene chromosomes from permanent slides.
6. Dermatographics : Palm print taking and finger tip patterns.
7. Preparation and study of mitosis slides from onion root tips by squash method.

Course Outcome

Sr. No.	On completing the course, the students will be able to:
CO-1	Study the structural and numerical chromosomal aberrations and their consequences.
CO-2	Solve numerical problem related to mendelism, paternity disputes & multiple allelism.
CO-3	Know about various syndromes in humans.
CO-4	Understand the sex linked inherited characters and diseases.
CO-5	Get in depth knowledge about gene interaction, penetrance and expressivity
CO-6	Demonstrate proficiency in understanding the basic structure of atom and interpret the inheritance of characters by using linkage and crossing over.

**B.Sc. Biotechnology/ B.Sc. (Hons.) Biotechnology (Under NEP 2020) (Semester-I-VIII) (CBGS)
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(SEMESTER-II)

BT-BTL122

Cell Biology

Credits : 3-0-0

Maximum Marks: 75

Theory: 56

Internal Assessment: 19

Time:3Hours

Note for the paper setters/examiners:

45 Hrs.

The question paper will consist of five sections: A, B, C, D, and E. Section A is compulsory and will consist of 8 short-answer type questions covering the whole syllabus, with each question carrying 2 marks. Candidates are required to attempt six questions from this Section. Sections B, C, D, and E will have two questions from the Unit I, II, III and IV of the syllabus and carry 11 marks. Candidates are required to attempt one question each from Sections B, C, D, and E of the question paper.

Course Objectives

- 1 To make students understand the concept of cell as the basic entity of living systems and the level of organization from cell to organism.
- 2 To elaborate the concept of cell theory. Students will learn the characteristics of different cells: PPLO's, bacteria, eukaryotic microbes, plant and animal cells
- 3 To make students understand the structural organization of cell and function of different organelles.
- 4 Students will become aware how Cell Division takes place and learn about different stages of Cell Cycle, Cell-cell interaction, Cell locomotion
- 5 To make students aware of Biological Membranes, their supramolecular architecture, Solute transport; Model membranes and Liposomes.

Course content

Unit I

(12 Hrs.)

Cell as a basic unit of living systems. The cell theory Broad Classification of Cell Types: PPLO's, bacteria, eukaryotic microbes, plant and animal cells. A detailed classification of cell types within an organism. Cell, tissue, organ and organism as different levels of organizations of otherwise genetically similar cells.

Unit II

(11 Hrs.)

Structure and function of cell organelles, ultrastructure of cell membrane, cytosol, Golgi bodies, endoplasmic reticulum (rough and smooth), ribosomes, cytoskeletal structures (actin, microtubules etc.), Mitochondria, chloroplasts, lysosomes, peroxisomes, nucleus (nuclear membrane, nucleoplasm, nucleolus, chromatin).

Unit III

(11 Hrs.)

Cell Division and Cell Cycle: mitosis, meiosis, stages of cell cycle, binary fission, amitosis and its regulation. Cell-cell interaction Cell locomotion (amoeboid, flagellar and ciliar).

Unit IV

(11 Hrs.)

Biological Membranes: Supramolecular architecture of membranes; Solute transport across membranes; Model membranes and Liposomes.

Books Recommended:

- 1.1 De-Robertis, F.D.P. and De-Robertis Jr. E.M.F. (1991) Cell and Molecular Biology, Saunders, Philadelphia.
- 1.2 Lodish, H., Baltimore, D., Berk, A., Zipursky, S.L., Matsudaira, P. and Darnell, J. (1995). Molecular Cell Biology 3rd Edition, Scientific American Books Inc.
- 1.3 Geoffrey, M. (2000). The Cell: A molecular approach 2nd Edition, ASM Press.

Course Outcome

Sr. No.	On completing the course, the students will be able to:
CO-1	Learn about the Cell and the projections about the origin of the cell along with the key features of The Cell theory. Students will be able to differentiate prokaryotic and eukaryotic cells in details
CO-2	Learn about the structural details and the functional organization of the cell; ultrastructure of cell membranes
CO-3	Learn about the structure and function of cell organelles (cytosol, Golgi bodies, endoplasmic reticulum (rough and smooth), ribosomes, cytoskeletal structures (actin, microtubules etc.), Mitochondria, chloroplasts, lysosomes, peroxysomes, nucleus (nuclear membrane, nucleoplasm, nucleolus, chromatin).
CO-4	Understand the concept of Cell Division and Cell Cycle, Cell-cell interaction Cell locomotion (amoeboid, flagellar and ciliar)
CO-5	Gain knowledge about biological Membranes, supramolecular architecture and solute transport across membranes; Model membranes and Liposomes.

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(Batch 2024-2028)**

(SEMESTER-II)

**BT-BTP122
Cell Biology Lab**

**Credits : 0-0-1
Maximum Marks: 25
Practical: 19
Internal Assessment:06**

Time:3Hours

30 Hrs.

Course Objectives

- 1 To enable students to differentiate Prokaryotic and Eukaryotic cells
- 2 To enable Students study electron micrographs of various cell organelles
- 3 To enable students to prepare and study Permanent Slides:
- 4 To enable students to perform microscopic examination of Buccal Smear, Barr body
- 5 To enable students prepare Plant Tissue specimens by microtomy

Course content

1. Study of Cells:
 - a. Prokaryotic cells: Lactobacillus, E. coli. Blue green algae.
 - b. Eukaryotic cells: Testicular material (for studies of spermatogenesis)
2. Study of electron micrographs of various cell organelles-plasma membrane, Mitochondria, Golgi complex, Lysosomes, Endoplasmic Reticulum (smooth and granular), Cilia, Centrioles, inclusions like glycogen, lipids, etc.
3. Preparation of Permanent Slides: Principles and procedures- Section cutting of tissues and staining of tissues with Haematoxylin/eosin method.
4. Study of permanent slides of various tissues (gut region, liver, lung, spleen, kidney, pancreas, testis, ovary, tongue, skin etc.).
5. Preparation of Buccal Smear for microscopic examination.
6. Barr body observation in human squamous epithelial cells.
7. Microtomy of Plant Tissue specimens (Stem & Root)

Books Recommended:

- 1 Shah, V.C., Bhatavdekar, J., Chinoy, N.J. and Murthy, S.K. (1988). Essential techniques in Cell Biology. Anand Book Depot, Ahmedabad.
- 2 Celis, J.E. (1998) Cell Biology: A Laboratory handbook. Vol. 1-3. Academic Press, UK.

Course Outcome

Sr. No.	On completing the course, the students will be able to:
CO-1	Define the characteristics and differentiate Prokaryotic cells (Lactobacillus, E. coli. Blue green algae) from Eukaryotic cells; Testicular material (for studies of spermatogenesis)
CO-2	Identify the electron micrographs of various cell organelles like plasma membrane, Mitochondria, Golgi complex, Lysosomes, Endoplasmic Reticulum (smooth and granular), Cilia, Centrioles, inclusions like glycogen, lipids, etc.
CO-3	Perform section cutting of tissues and learn staining methods (Haematoxylin/eosin method) of tissues for the preparation of permanent slides, identify permanent slides of various tissues (gut region, liver, lung, spleen, kidney, pancreas, testis, ovary, tongue, skin etc.).
CO-4	Handle the preparation and microscopic examination of Buccal Smear, observe Barr body in human squamous epithelial cells.
CO-5	Perform microtomy of Plant Tissue specimens

**B.Sc. Biotechnology/ B.Sc. (Hons.) Biotechnology (Under NEP 2020) (Semester-I-VIII) (CBGS)
(Batch 2024-2028)**

(SEMESTER-II)

**BT-BTL-123
Fundamentals of Biotechnology**

**Credits: 4-0-0
Maximum Marks: 100
Theory: 75
Internal Assessment: 25**

Time: 3 Hours

Note for the paper setters/examiners:

60 Hrs.

The question paper will consist of five sections: A, B, C, D, and E. Section A is compulsory and will consist of 8 short-answer type questions covering the whole syllabus, with each question carrying 2.5 marks. Candidates are required to attempt six questions from this Section. Sections B, C, D, and E will have two questions from the Unit I, II, III and IV of the syllabus and carry 15 marks. Candidates are required to attempt one question each from Sections B, C, D, and E of the question paper.

Course Objectives

- 1 Students will learn Emergence, basics of biotechnology and scope of Biotechnology as a career.
- 2 Applications of Biotechnology in health care, agriculture, bioremediation and forensics.
- 3 The students will learn to use the different biotechnological tools to develop new drugs for the welfare of society.
- 4 The students will become familiar with entrepreneurship opportunities in Biotechnology and importance of IPRs in Biotechnology.
- 5 At the end students will learn role of Biotechnology in the Society and future of Biotechnology.

Course content

Unit I

(15 Hrs.)

Emergence, scope and basics of Biotechnology

Historical perspective, Appraise the interplay of science & technology in the development of biotechnology, Definition, areas and overview of the Fundamentals of Biotechnology, Biotechnology Research in India. Biotechnology Institutions in India (Public and Private Sector), Biotech Success Stories, Biotech Policy Initiatives. careers and employment opportunities in biotechnology

Unit II

(15 Hrs.)

Applications of Biotechnology: An Overview

Applying Biotechnology to Modern life styles: Healthcare – Biopharma : Recombinant human insulin; molecular diagnostics : PCR for infectious disease (viral / bacterial), Applications of PCR, blood screening and genetic testing, Gene therapy, genetic counseling); Agriculture & food production (Genetically engineered food, Seed banks, aquaculture); Green biotechnology (Bioremediation, Biofuels, Conservation); Forensics & biodefense.

Unit III

(15 Hrs.)

Bio business and IPRs in Biotechnology

Commercialization of Biotechnology: Concerns and Consequences, Biotechnology Industry Practices & Government regulations, Concept and market potential of Bio business, Requirements and Objectives of Patent, Patentable and non-patentable inventions, process of writing and filing a patent, patenting genes/ gene fragments /SNPs/ proteins / stem cells

Patents related to bacteria, viruses, fungi and medicinal plants. IPR: Introduction, types (Tradeseecret, Copyright, trademark)

Unit IV

(15 Hrs.)

Biotechnology & Society

Ethical Issues & Regulating the use of Biotechnology: Human cloning, GM foods and GMOs,stem cell; The future of Biotechnology.

Books Prescribed:

- 1 David P Clark & Nanette J. Pazdernik (2017) *Biotechnology – Applying the Genetic Revolution*, Elsevier Academic Press.
- 2 Bernard R Glick, Jack J Pasternak and Cheryl L Patten (2010) *Molecular Biotechnology: Principles and applications of Recombinant DNA*, ASM Press.
- 3 Singh, B.D. (2018). *Biotechnology expanding horizons*, Kalyani Publishers, NewDelhi.
- 4 Singh, I. and Kaur, B (2010) *Patent law and Entrepreneurship*, 3rd Edition, KalyaniPublishers.

Course Outcome

- CO-1.** The students will be able to learn about the use of biotechnological applications in healthcare and society welfare.
- CO-2.** The students will explore new biotechnological tools and their use in improvement of society by discovering new drugs and techniques to increase livelihood.
- CO-3.** The students will learn the application of bioinformatic tool- BLAST and its applications in determining the structure and function of different biomolecules.
- CO-4.** The students will be able to examine the recent discoveries related to structure and functioning of biomolecules through use of different bioinformatics tools.
- CO-5.** The students will be learn about fundamentals of bioinformatics and will use This knowledge to explore recent discoveries in the field of biotechnology.

**B.Sc. Biotechnology/ B.Sc. (Hons.) Biotechnology (Under NEP 2020) (Semester-I-VIII) (CBGS)
(Batch 2024-2028)**

(SEMESTER-II)

**BT-BTP-123
Fundamentals of Biotechnology Lab**

**Credits: 0-0-1
Maximum Marks: 25
Theory: 19
Internal Assessment: 06**

30 Hrs

Time: 3 Hours

Course Objectives

- Students will learn about basic laboratory practices to be followed in biotechnology.
- The students will gain knowledge about the working of different instruments like waterbath, spectrophotometer, centrifuge, UV- transilluminator and Hot air oven.
- The working of laminar air flow along with the use of BOD instrument will be given to students in order to perform experiments in the controlled environment.
- The students will become aware about the handling and disposal of hazardous reagents such as acids, carcinogenic chemicals like acrylamide, ethidium bromide etc.
- The students will learn about the basic procedure to patent the different biotechnological products.

Course content

- 1 Good laboratory practices followed in biotechnology laboratory.
- 2 Introduction, use and maintenance of basic equipments in a biotechnology laboratory (Auto-pipettes, weighing balance, pH meter, Water bath, dry bath, Spectrophotometer, centrifuges, light microscope, electrophoretic apparatus, vortex mixer, magnetic stirrer, rocker, laminar hoods, autoclave, sonicator, UV transilluminator, hot air oven, BOD incubator).
- 3 Handling and disposal of hazardous reagents (acids, carcinogenic chemicals like acrylamide, ethidium bromide) and concept of chemical hoods.
- 4 Different steps for patent with the help of example.

Course Outcomes

- CO-1.** The students will gain information about the different steps in order to clean and maintain the biotechnological laboratory.
- CO-2.** The students will be able to get hand on training about the working of different instruments and by this they will gain knowledge to conduct biochemical testing of bio-molecules.
- CO-3.** The information about the procedure to dispose the harmful and toxic biomedical wastewill be helpful for students in order to avoid the spread of infectious diseases.
- CO-4.** The information regarding the protocol to patent the biotechnological products will boost students to develop useful products and safeguard them from illegal practices.
- CO-5.** This course will be very useful in laying the foundation for biotechnology students to explore different areas of biotechnology in useful manner.

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(SEMESTER-II)

**BT-BTL-124
Industrial Biotechnology-I**

**Credits: 4-0-0
Maximum Marks: 100
Theory: 75
Internal Assessment: 25**

Time: 3 Hours

Note for the paper setters/examiners:

60 Hrs.

The question paper will consist of five sections: A, B, C, D, and E. Section A is compulsory and will consist of 8 short-answer type questions covering the whole syllabus, with each question carrying 2.5 marks. Candidates are required to attempt six questions from this Section. Sections B, C, D, and E will have two questions from the Unit I, II, III and IV of the syllabus and carry 15 marks. Candidates are required to attempt one question each from Sections B, C, D, and E of the question paper.

Course Objectives

- 1 To comprehend the basic principles of Industrial biotechnology.
- 2 To describe the principles of fermentation process.
- 3 Understanding the different methods of microbial isolation, identification and preservation.
- 4 To learn about the methods used for strain improvement of industrially important microbes.
- 5 Theoretical knowledge about the production of dairy products, primary and secondary metabolites, and the role of enzymes in industries.

Course content

Unit I

(15 Hrs.)

History of general and industrial Microbiology, Basic concept of Industrial fermentation and its significance in industry. Differences between microbial industrial processes and chemical industrial processes. Production of modern biotechnology products- recombinant proteins having therapeutic and diagnostic applications (insulin and growth hormones)

Unit II

(15 Hrs.)

General study and characterization of industrial important microbes. Methods of isolation, screening, selection and Identification of industrial microbes. Maintenance and preservation of industrially important microbial cultures.

Unit III

(15 Hrs.)

Strain improvement of industrial important microbes: by using mutational programme and recombination systems (par sexual cycle, protoplast fusion and recombinant DNA techniques), Isolation of mutants (induced, auxotrophic, resistant and revert ant mutants), Inoculums Development, media formulation and process optimization of Industrial and agro industrial microbes.

Unit IV

(15 Hrs.)

Introduction to primary and secondary metabolites production. Dairy products like curd, yoghurt, Cheese, bread, proteases in leather processing industries.

Books Recommended:

- 1 Davis, B.D., Dulbecco. R., Eisen, H.N. and Ginsberg, H.S. (1990). Microbiology: 4thEdition, Harper & Row, Publishers, Singapore.
- 2 Tortora, G.J., Funke, B.R. and Case, C.L. (1994). Microbiology: An introduction: 5thEdition, The Benjamin / Cummings Publishing Company, Inc.
- 3 Stanier, R.Y. (1995). General microbiology, MacMillan Press, London.
- 4 Pelczar, M.T. (1995). Microbiology, Tata McGraw Hill Publication, New Delhi.
- 5 Schlegel. H. G., (1995). General Microbiology 7th Edition, Cambridge Univ. Press.
- 6 Prescott and Dunn (1999). Industrial Microbiology 4th Edition, By S.K. Jain for CBS Publishers & Distributors.
- 7 Purohit, S.S. (2000). Microbiology: Fundamentals and Applications (6th Edition), Agrobios (India).
- 8 Postgate. J. (2000). Microbes & Man 4th Edition, Cambridge Univ. Press.
- 9 Tortora. G.J., Funke. B.R., 2001. Microbiology: An Introduction, Benjamin Cummings.
- 10 Stanbury, P.F., Whitaker, A. and Hall, S.J. (2001), Principles of Fermentation Technology 2nd ed., Pergamon Press, Oxford.
- 11 Frazier, W.C. and Westhoff, D.C. (2003) Food Microbiology. 18th Edition, Tata McGraw Hill, Inc., New York.
- 12 Industrial Biotechnology: Approach to Clean Technology · Jogdand, S.N. Himalaya Publishing House 2006. ISBN: ISBN number: 9788183184250.

Course Outcome

Upon completion of this course, students will be able to:

- CO-1.** Apply biotechnology to industrial processes. Students will also gain knowledge about the basic fermentation process.
- CO-2.** Identify the suitable methods of isolation, identification and preservation of microbes. Students will also get to know about the inoculum development and media formulation process.
- CO-3.** Understand how bacteria and other microbes can be manipulated by recombinant DNA technology or selective isolation for use in industrial processes to generate products of interest.
- CO-4.** Learn the basic steps involved in production of curd, yoghurt, cheese, bread, primary and secondary metabolites. Students will also get familiarized with the role of proteases in leather processing industries.

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(Batch 2024-2028)**

(SEMESTER-II)

**BT-BTP-124
Industrial Biotechnology-I Lab**

**Credits: 0-0-1
Maximum Marks: 25
Theory: 19
Internal Assessment: 06**

30 Hrs

Time: 3 Hours

Note. The question paper will be set by the examiner based on the syllabus.

Course Objectives

- To learn about the basic methods of microbial isolation.
- Measurement of bacterial cell size.
- Identification of an organism in the coliform group.
- To know the importance of starter culture in fermentation process.
- To perform nitrate reduction test.

Course content

- 1 Isolation of microbial cells by serial dilution-spread plate method, pour plate.
- 2 Measurement of bacterial size.
- 3 Metabolic Characterization by IMVIC test
- 4 Alcoholic and Mixed–Acid Fermentation.
- 5 Starter culture preparation, evaluation and application.
- 6 Determination of nitrate reduction by bacteria.

Books Recommended:

- 1 Cappuccino J.G., Sherman N. (2007). Microbiology: A laboratory (Pearson BenjaminCummings).
- 2 Plummer D.T. (2004). An introduction to practical biochemistry (Tata McGraw Hill Publishers Co. Ltd., New Delhi).
- 3 Bansal, D.D., K Hardori, R., Gupta, M.M. (1985). Practical biochemistry (Standard Publication Chandigarh).
- 4 Dubey R.C. and Maheshwari (2012) Practical Microbiology 5th edition: S. Chand andcompany ltd. New Delhi.

Course Outcome

Upon completion of this course, students will be able to:

CO-1. Perform the serial dilution, spread plate and pour plate method of bacterial isolation.

CO-2. Measure the dimensions of microorganisms under microscope by a technique known as micrometry.

CO-3. Differentiate between coliforms, i.e., bacteria of the genera *Escherichia* and *Enterobacter*, into species and varieties.

CO-4. Prepare starter cultures for the fermentation processes.

CO-5. Determine whether the microorganism can reduce nitrate or not.

Ability Enhancement Compulsory Courses

**B.Sc. Biotechnology/ B.Sc. (Hons.) Biotechnology (Under NEP 2020) (Semester-I-VIII) (CBGS)
(Batch 2024-2028)**

(SEMESTER-II)

COMMUNICATION SKILLS IN ENGLISH-II

**BCA/B.Sc IT/ Bio Tech/ BFST/BJMC/B.Sc(Fashion Designing)/ B.Mm /BIMT/B.Sc.
(Artificial Intelligence and Data Science)/ B.Sc (Data Analysis)/ B.A (Audio Video
Recording, Animation & Photography)/B.Sc (Travel & Tourism)/ B.Com (Tax Planning
and Management)
Code :BCSE-1222**

L	T	P	Credits
3	1	0	4

Time: 3 Hours

Max. Marks: 100

Theory: 60

Practical: 15

Internal Assessment: 25

Suggested Pattern of Question Paper:

The question paper will be divided into two sections. Section A will consist of Twelve(12) questions of One(1) mark each. Section B will consist of Six questions of Eight(8) marks each. There will be internal choice wherever possible.

Section A

1. Do as directed (12X1=12Marks)
Tenses and Change of voice

Section B

- Listening Skills:** Barriers to listening; effective listening skills; feedback skills.
- Speaking and Conversational Skills:** Components of a meaningful and easy conversation; understanding the cue and making appropriate responses; forms of polite speech; asking and providing information on general topics.
- Drafting of a short speech on a given topic.
- Transcoding (given dialogue to prose or given prose to dialogue).
- Taking notes on a speech/lecture/telephonic conversations .
- Translation from Vernacular (Punjabi/ Hindi) to English (Paragraph) (6X8=48 Marks)

Course Objectives:

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

Course Contents:

- 1 **Listening Skills:** Barriers to listening; effective listening skills; feedback skills, attending telephone calls; note taking.

Activities:

- 1 Listening exercises – Listening to conversation, speech/ lecture and taking notes.
- 2 **Speaking and Conversational Skills:** Components of a meaningful and easy conversation; understanding the cue and making appropriate responses; forms of polite speech; asking and providing information on general topics, situation based Conversation in English; essentials of Spoken English

Activities:

- 1 Conversation; dialogue and speech
- 2 Oral description or explanation of a common object, situation or concept.
- 3 Interviews and group discussion

Recommended Books:

- 1 *Oxford Guide to Effective Writing and Speaking* by John Seely.
- 2 *The Written Word* by Vandana R Singh, Oxford University Press
3. *Murphy's English Grammar* (by Raymond Murphy) CUP

Course Outcomes:

The completion of this course enables students to:

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

PRACTICAL (Marks: 15)

Course Contents:-

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

Skill Enhancement Courses - I

**B.Sc. Biotechnology/ B.Sc. (Hons.) Biotechnology (Under NEP 2020) (Semester-I-VIII) (CBGS)
(Batch 2024-2028)**

(SEMESTER-II)

B.Sc. (Medical, Non-Medical, Biotechnology, Travel and Tourism)

Semester – II

SEC-126: Basics of Computer

(Practical)

Time: 3 Hours

Max. Marks: 25

Practical Marks: 19

Practical Internal Assessment Marks: 06

Credits		
L	T	P
0	0	1

MS office and its applications, Introduction to MS- Word- General- Formatting, Editing, Spell-grammar check, Printing and saving, Mail Merge MS Excel, Important commands ofMS office. Power Point Presentation; An overview.

Value Added Courses

**B.Sc. Biotechnology/ B.Sc. (Hons.) Biotechnology (Under NEP 2020) (Semester-I-VIII) (CBGS)
(Batch 2024-2028)**

(SEMESTER-II)

S. No.	Course Code	Course Title	Credits			Total Credit	Period/wk.	Max. Marks	Total Marks
			L	T	P				
		Value Added Course							
1	ZDA121	Drug Abuse: Problem Management and Prevention -II	1	-	-	1	2	25	25 NC

SEMESTER-II

Course Code: ZDA121

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

Credit hrs/wk.: 1

Max. Marks: 25

Time: 3 Hours

Instructions for the Paper Setters:

- 1 There will be two sections A and B.
- 2 Section A is compulsory and will be of 5 marks consisting of 8 short answer type questions carrying 1 mark each covering the whole syllabus. The candidates are required to attempt 5 questions out of 8 short answer type questions. The answer should not exceed 50 words.
- 3 Candidates shall be required to attempt 4 questions from Section B, selecting one question from each unit and each question carries 5 marks. Preferably, the question should not be split into more than two sub-parts.

Course Objectives: The course aim is to-

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

UNIT-I

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

UNIT-II

School: Counselling, Teacher as role-model.

Parent-Teacher-Health Professional Coordination, Random testing on students

UNIT-III

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

UNIT-IV

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

References:

- 1 Ahuja, Ram (2003), Social Problems in India, Rawat Publication, Jaipur.
- 2 Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
- 3 Inciardi, J.A. 1981. The Drug Crime Connection. Beverly Hills: Sage Publications.
- 4 Jasjit Kaur Randhawa & Samreet Randhawa, “Drug Abuse Problem, Management & Prevention”, KLS, ISBN No. 978-81-936570-8-9, (2019).
- 5 Kapoor. T. (1985) Drug epidemic among Indian Youth, New Delhi: Mittal Pub.
- 6 Modi, Ishwar and Modi, Shalini (1997) Drugs: Addiction and Prevention, Jaipur: Rawat Publication.
- 7 Sain, Bhim 1991, Drug Addiction Alcoholism, Smoking obscenity New Delhi: Mittal Publications.
- 8 Sandhu, Ranvinder Singh, 2009, Drug Addiction in Punjab: A Sociological Study. Amritsar. Guru Nanak Dev University.
- 9 Singh, C. P. 2000. Alcohol and Dependence among Industrial Workers: Delhi: Shipra.
- 10 Sussman, S and Ames, S.L. (2008). Drug Abuse: Concepts, Prevention and Cessation, Cambridge University Press.
- 11 World Drug Report 2011, United Nations office of Drug and Crime.

Course Outcomes: The students will be able to-

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

Core Courses

B.Sc. Biotechnology/ B.Sc. (Hons.) Biotechnology (Under NEP 2020) (Semester-I-VIII) (CBGS)
(Batch 2024-2028)

(SEMESTER-II)

B. Sc. Hons. (Physics, Chemistry, Maths), B. Sc. Bio Tech./ IT/ Fashion Designing/ Food Sc., B. A. JMC, BCA, B.Sc. Data Analytics, B.Sc. Artificial Intelligence and Data Science, B.Sc. (Hons.) Early Childhood Care & Education, B.A. (Hons.) Journalism with Media Studies, Bachelor in Tourism & Travel Management, B.A. (Audio Video Recording, Animation & Photography), Bachelor of Vocational (B.Voc.) (Software Development, Theatre and Stage Craft, Food Processing, Textile Design & Apparel Technology, Renewable Energy Technology)

Semester-II
Punjabi (Compulsory)-2
ਪੰਜਾਬੀ (ਲਾਜ਼ਮੀ)-2

Credit & Marks Distribution and Pre-Requisites of the Course

Course title & Code	Total Teaching Hours	Total Credits/ Hours per week	Credit distribution			Total Marks 100		Time Allowed in Exam
			L	T	P	Theory	IA	
ਪੰਜਾਬੀ (ਲਾਜ਼ਮੀ)-2 BHPB-1201	60	4	4	0	0	75	25	3 Hours

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective

- ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕਰਨਾ।
- ਆਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ।
- ਵਿਦਿਆਰਥੀ ਨੂੰ ਦਫਤਰੀ ਅਤੇ ਘਰੇਲੂ ਚਿੱਠੀ ਪੱਤਰ ਤੋਂ ਜਾਣੂ ਕਰਵਾਉਣਾ।
- ਭਾਸ਼ਾਈ ਗਿਆਨ ਵਿਚ ਵਾਧਾ ਕਰਨਾ।

ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)

- ਉਸ ਅੰਦਰ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪ੍ਰਫੁੱਲਿਤ ਹੋਣਗੀਆਂ।
- ਉਸ ਅੰਦਰ ਸਾਹਿਤ ਸਿਰਜਣਾ ਦੀ ਸੰਭਾਵਨਾ ਵਧੇਗੀ।
- ਵਿਦਿਆਰਥੀ ਚਿੱਠੀ-ਪੱਤਰ ਦੀ ਲਿਖਣ ਸ਼ੈਲੀ ਤੋਂ ਜਾਣੂ ਹੋਵੇਗਾ।
- ਉਹ ਭਾਸ਼ਾਈ ਬਣਤਰ ਤੋਂ ਜਾਣੂ ਹੋਵੇਗਾ।

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

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

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਵਾਰਤਕ ਦੇ ਰੰਗ, (ਨਿਬੰਧ ਅਤੇ ਰੇਖਾ-ਚਿਤਰ) (ਸੰਪਾਦਕ) ਡਾ. ਮਹਿਲ ਸਿੰਘ, ਕਸਤੂਰੀ ਲਾਲ ਐਂਡ ਸਨਜ਼, ਅੰਮ੍ਰਿਤਸਰ।
(ਨਿਬੰਧ ਭਾਗ ਵਿਚੋਂ ਸਾਰ/ਵਿਸ਼ਾ-ਵਸਤੂ। ਰੇਖਾ-ਚਿਤਰ ਭਾਗ ਵਿਚੋਂ ਸਾਰ/ਨਾਇਕ ਬਿੰਬ)

ਭਾਗ-ਦੂਜਾ

ਪੰਜਾਬ ਦੇ ਮਹਾਨ ਕਲਾਕਾਰ (ਬਲਵੰਤ ਗਾਰਗੀ)
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।
(ਸਤੀਸ਼ ਗੁਜਰਾਲ ਤੋਂ ਸੁਰਿੰਦਰ ਕੌਰ ਤਕ)
(ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ/ਨਾਇਕ ਬਿੰਬ)

ਭਾਗ-ਤੀਜਾ

(ੳ) ਦਫ਼ਤਰੀ ਚਿੱਠੀ ਪੱਤਰ
(ਅ) ਮੁਹਾਵਰੇ ਅਤੇ ਅਖਾਣ

ਭਾਗ-ਚੌਥਾ

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

**B.Sc. Biotechnology/ B.Sc. (Hons.) Biotechnology (Under NEP 2020) (Semester-I-VIII) (CBGS)
(Batch 2024-2028)**

(SEMESTER-II)

B. Sc. Hons. (Physics, Chemistry, Maths), B. Sc. Bio Tech./ IT/ Fashion Designing/ Food Sc., B. A. JMC, BCA, B.Sc. Data Analytics, B.Sc. Artificial Intelligence and Data Science, B.Sc. (Hons.) Early Childhood Care & Education, B.A. (Hons.) Journalism with Media Studies, Bachelor in Tourism & Travel Management, B.A. (Audio Video Recording, Animation & Photography), Bachelor of Vocational (B.Voc.) (Software Development, Theatre and Stage Craft, Food Processing, Textile Design & Apparel Technology, Renewable Energy Technology)

Semester-II

Basic Punjabi -2

ਮੁਢਲੀ ਪੰਜਾਬੀ-2

(In Lieu of Compulsory Punjabi)

Credit & Marks Distribution and Pre-Requisites of the Course

Course title & Code	Total Teaching Hours	Total Credits/ Hours per week	Credit distribution			Total Marks 100		Time Allowed in Exam
			L	T	P	Theory	IA	
ਮੁਢਲੀ ਪੰਜਾਬੀ-2 BPBI-1202	60	4	4	0	0	75	25	3 Hours

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

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਭਾਗ ਵਿਚ 01-01 ਅੰਕ ਦੇ ਅਤਿ-ਸੰਖੇਪ ਉੱਤਰ ਵਾਲੇ (Objective Type) 11 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜੋ ਕਿ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ ਹੋਣਗੇ ਅਤੇ ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਦੂਸਰੇ ਅਤੇ ਤੀਸਰੇ ਭਾਗ ਵਿਚ, ਸਿਲੇਬਸ ਦੇ ਪਹਿਲੇ ਅਤੇ ਦੂਸਰੇ ਭਾਗ ਵਿਚੋਂ 8-8 ਅੰਕਾਂ ਦੇ 3-3 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨ੍ਹਾਂ ਵਿਚੋਂ ਵਿਦਿਆਰਥੀ ਨੇ ਕੋਈ 2-2 ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ। ਇਸੇ ਤਰ੍ਹਾਂ ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚੌਥੇ ਭਾਗ ਵਿਚ 4-4 ਅੰਕਾਂ ਦੇ 5 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨ੍ਹਾਂ ਵਿਚੋਂ ਵਿਦਿਆਰਥੀ ਨੇ 4 ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ। ਭਾਗ ਪੰਜਵੇਂ ਵਿਚ 8-8 ਅੰਕਾਂ ਦੇ 3 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨ੍ਹਾਂ ਵਿਚੋਂ ਵਿਦਿਆਰਥੀ ਨੇ 2 ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ-ਪਹਿਲਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ:

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

ਭਾਗ-ਦੂਜਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਪ੍ਰਕਾਰ:

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

(ਅ) ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ

ਭਾਗ-ਤੀਜਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਰਚਨਾ:

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

ਭਾਗ-ਚੌਥਾ

ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ

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

**B.Sc. Biotechnology/ B.Sc. (Hons.) Biotechnology (Under NEP 2020) (Semester-I-VIII) (CBGS)
(Batch 2024-2028)**

(SEMESTER-II)

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

SEMESTER-II

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

(Special Paper in lieu of Punjabi compulsory)

(For those students who are not domicile of Punjab)

Course Code: BPHC-1204

Credit: 04

L- T- P

04-0-0

Time: 3 Hours

Total Marks: 100

Theory: 75

Internal Assessment: 25

Instructions for the Paper Setters:

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

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

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

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

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

Unit-I

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

Unit-II

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

Unit-III

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

Unit-IV

7. Development of Languages and Literature.
8. Development of Art & Architecture.

Suggested Readings:-

- L. Joshi (ed.), *History and Culture of the Punjab*, Part-I, Patiala, 1989 (3rd edition).
- L.M. Joshi and Fauja Singh (ed), *History of Punjab*, Vol. I, Patiala 1977.
- Budha Parkash, *Glimpses of Ancient Punjab*, Patiala, 1983.
- B.N. Sharma, *Life in Northern India*, Delhi. 1966.

Course Outcomes:

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

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