FACULTY OF ENGINEERING & TECHNOLOGY

SYLLABUS FOR THE BATCH FROM YEAR 2023 TO YEAR 2026

FOR

BCA

(BACHELOR OF COMPUTER APPLICATIONS)
(Credit Based Grading System)

SEMESTER: I–VI
EXAMINATIONS:2023-26

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GURU NANAK DEV UNIVERSITY AMRITSAR
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BCA (Bachelor of Computer Applications) (CBGS)
Syllabus for the Batch from Year 2023 To 2026

SCHEME
SEMESTER – I

			Credits		
Subject Code	**Paper Name**	**M. Marks**	**L**	**T**	**P**
BCA01001T	Introduction to Programming – C	75	3	1	0
BCA01002T	Introduction to Computers and Information Technology	75	3	1	0
BCA01003T	Applied & Discrete Mathematics	75	3	1	0
BCA01004L	Practical–I (MS Office 2010 and Basic C Programming)	75	0	0	2
ENL-121	ENL-121 Communication Skills in English – I	100	4	0	0
PBL601 ***PBL611** ***PHC110**	Punjabi Compulsory **OR** *Mudhli Punjabi **OR** * Punjab History & Culture (From Earliest Times to C 320)	100	4	0	0
	Total:	**500**	**17**	**3**	**2**
		Grand Total:		**22**	

*Special Note:-

1. ਜਿਹੜੇ ਵਿਦਿਆਰਥੀ **Domicile/Non-Domicile of Punjab** ਹਨ ਅਤੇ ਉਨ੍ਹਾਂ ਨੇ ਅੱਠਵੀਂ/ਦਸਵੀਂ ਜਮਾਤ ਤੱਕ ਪੰਜਾਬੀ ਵਿਸ਼ਾ ਪੜ੍ਹਿਆ ਹੈ, ਉਹ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ (ਲਾਜ਼ਮੀ) ਪੜ੍ਹਨਗੇ।

2. ਜਿਹੜੇ ਵਿਦਿਆਰਥੀ **Non-Domicile of Punjab** ਹਨ ਅਤੇ ਅੱਠਵੀਂ/ਦਸਵੀਂ ਜਮਾਤ ਤੱਕ ਪੰਜਾਬੀ ਵਿਸ਼ਾ ਨਹੀਂ ਪੜ੍ਹਿਆ ਹੈ, ਉਹ ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਜਾਂ ਪੰਜਾਬ ਹਿਸਟਰੀ ਐਂਡ ਕਲਚਰ ਵਿੱਚੋਂ ਕੋਈ ਇੱਕ ਵਿਸ਼ਾ ਚੁਣ ਸਕਦੇ ਹਨ।

3. ਜਿਹੜੇ ਵਿਦਿਆਰਥੀ **Domicile of Punjab** ਹਨ, ਪੰਤੂ ਕਿਸੇ ਕਾਰਣ ਪੰਜਾਬ ਤੋਂ ਬਾਹਰ ਪੜ੍ਹੇ ਹਨ ਅਤੇ ਉਨ੍ਹਾਂ ਨੇ ਅੱਠਵੀਂ/ਦਸਵੀਂ ਜਮਾਤ ਤੱਕ ਪੰਜਾਬੀ ਵਿਸ਼ਾ ਨਹੀਂ ਪੜ੍ਹਿਆ ਹੈ, ਉਹ ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਦਾ ਹੀ ਵਿਸ਼ਾ ਪੜ੍ਹਣਗੇ।

4. ਜਿਹੜੇ ਵਿਦਿਆਰਥੀ **Domicile of Punjab** ਹਨ ਅਤੇ ਪੰਜਾਬ ਦੇ ਕੇਂਦਰੀ ਵਿਦਿਆਲਿਆ ਜਾਂ ਕਿਸੇ ਹੋਰ ਸਕੂਲ ਵਿੱਚ ਪੜ੍ਹੇ ਹਨ ਅਤੇ ਕਿਸੇ ਕਾਰਣ ਉਨ੍ਹਾਂ ਨੇ ਅੱਠਵੀਂ/ਦਸਵੀਂ ਜਮਾਤ ਤੱਕ ਪੰਜਾਬੀ ਵਿਸ਼ਾ ਨਹੀਂ ਪੜ੍ਹਿਆ ਹੈ, ਉਹ ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਦਾ ਵਿਸ਼ਾ ਹੀ ਪੜ੍ਹਣਗੇ।

BCA (Bachelor of Computer Applications) (CBGS)
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SEMESTER – II

Subject Code	Paper Name	M. Marks	Credits		
			L	T	P
BCA02001T	Introduction to Programming – C ++	75	3	1	0
BCA02002T	Principles of Digital Electronics	75	3	1	0
BCA02003T	Numerical Methods & Statistical Techniques	75	3	1	0
BCA02004L	Practical – I (Advanced C++ Programming)	75	0	0	2
ENL222	ENL222 Communication Skills in English – II (Theory)	100	3	0	1
ENP222	ENP222 Communication Skills in English – II (Theory)				
PBL-602	Punjabi Compulsory **OR**	100	4	0	0
*PBL-612	Mudhli Punjabi **OR**				
*PHC111	Punjab History & Culture (C 320 TO 1000 A.D.)				
** SOA-105	**Drug Abuse: Problem, Management and Prevention (Compulsory Paper)**	**50**	**2**	**0**	**0**
	Total:	**500**	**16**	**3**	**3**
		Grand Total:		**22**	

*Special Note:-

1. ਜਿਹੜੇ ਵਿਦਿਆਰਥੀ **Domicile/Non-Domicile of Punjab** ਹਨ ਅਤੇ ਉਨ੍ਹਾਂ ਨੇ ਅੱਠਵੀ/ਦਸਵੀਂ ਜਮਾਤ ਤੱਕ ਪੰਜਾਬੀ ਵਿਸ਼ਾ ਪੜ੍ਹਿਆ ਹੈ, ਉਹ ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ (ਲਾਜ਼ਮੀ) ਪੜ੍ਹਨਗੇ।

2. ਜਿਹੜੇ ਵਿਦਿਆਰਥੀ **Non-Domicile of Punjab** ਹਨ ਅਤੇ ਅੱਠਵੀ/ਦਸਵੀਂ ਜਮਾਤ ਤੱਕ ਪੰਜਾਬੀ ਵਿਸ਼ਾ ਨਹੀਂ ਪੜ੍ਹਿਆ ਹੈ, ਉਹ ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਜਾਂ ਪੰਜਾਬ ਹਿਸਟਰੀ ਐਂਡ ਕਲਚਰ ਵਿੱਚੋਂ ਕੋਈ ਇੱਕ ਵਿਸ਼ਾ ਚੁਣ ਸਕਦੇ ਹਨ।

3. ਜਿਹੜੇ ਵਿਦਿਆਰਥੀ **Domicile of Punjab** ਹਨ, ਪੰਤੂ ਕਿਸੇ ਕਾਰਣ ਪੰਜਾਬ ਤੋਂ ਬਾਹਰ ਪੜ੍ਹੇ ਹਨ ਅਤੇ ਉਨ੍ਹਾਂ ਨੇ ਅੱਠਵੀ/ਦਸਵੀਂ ਜਮਾਤ ਤੱਕ ਪੰਜਾਬੀ ਵਿਸ਼ਾ ਨਹੀਂ ਪੜ੍ਹਿਆ ਹੈ, ਉਹ ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਦਾ ਹੀ ਵਿਸ਼ਾ ਪੜ੍ਹਨਗੇ।

4. ਜਿਹੜੇ ਵਿਦਿਆਰਥੀ **Domicile of Punjab** ਹਨ ਅਤੇ ਪੰਜਾਬ ਦੇ ਕੇਂਦਰੀ ਵਿਦਿਆਲਿਆ ਜਾਂ ਕਿਸੇ ਹੋਰ ਸਕੂਲ ਵਿੱਚ ਪੜ੍ਹੇ ਹਨ ਅਤੇ ਕਿਸੇ ਕਾਰਣ ਉਨ੍ਹਾਂ ਨੇ ਅੱਠਵੀ/ਦਸਵੀਂ ਜਮਾਤ ਤੱਕ ਪੰਜਾਬੀ ਵਿਸ਼ਾ ਨਹੀਂ ਪੜ੍ਹਿਆ ਹੈ, ਉਹ ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਦਾ ਵਿਸ਼ਾ ਹੀ ਪੜ੍ਹਣਗੇ।

**Marks of Paper SOA-105 Drug Abuse: Problem, Management and Prevention (Compulsory Paper) will not be included in Grand Total.

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SEMESTER – III

Subject Code	Paper Name	M. Marks	Credits		
			L	**T**	**P**
BCA03001T	Computer Architecture	100	3	1	0
BCA03002T	Database Management System	100	3	1	0
BCA03003T	Introduction to Python Programming	100	3	1	0
BCA03005T	Multimedia Technology and Applications	100	3	1	0
BCA03004L	Programming Lab –I Based on Python Programming Languase.	50	0	0	2
BCA03006L	Programming Lab –II Practical in Oracle	50	0	0	2
	Total:	**500**	**12**	**4**	**4**
	Grand Total:		**20**		

SEMESTER – IV

Subject Code	Paper	M. Marks	Credits		
			L	**T**	**P**
BCA04001T	Data Structure and File Processing	100	3	1	0
BCA04002T	Information Systems	100	3	1	0
BCA04003T	Internet Applications	100	3	1	0
BCA04004T	System Software	100	3	1	0
BCA04005L	Lab–I Data Structures Implementation using C++	50	0	0	2
BCA04006L	Lab–II Web Designing and use of Internet	50	0	0	2
***ESL-221**	**Environmental Studies (Compulsory Paper)**	**100**	**2**	**0**	**0**
	Total:	**500**	**12**	**4**	**4**
	Grand Total:		**20**		

* Marks of Paper EVS will not be included in Grand Total.

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SEMESTER – V

Subject Code	Paper Name	M. Marks	Credits		
			L	T	P
BCA05001T	Software Engineering	100	3	1	0
BCA05002T	Web Technologies	100	3	1	0
BCA05003T	Operating System	100	3	1	0
BCA05004T	JAVA Programming Language	100	3	1	0
BCA05005L	Lab based on JAVA Programming Language	50	0	0	2
BCA05006L	Lab based on Website Designing using HTML, JAVA Script and PHP	50	0	0	2
	Total:	500	12	4	4
	Grand Total:		20		

SEMESTER – VI

Subject Code	Paper Name	M. Marks	Credits		
			L	T	P
BCA06001T	Computer Graphics	100	3	1	0
BCA06002T	Computer Networks	100	3	1	0
BCA06003L	Lab. Implementation of Applications of Computer Graphics in C++/C	50	0	0	2
BCA06004L	Project	300	0	0	12
	Total:	550	6	2	14
	Grand Total:		22		

BCA (Bachelor of Computer Applications) (CBGS)
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SEMESTER-I

BCA01001T: INTRODUCTION TO PROGRAMMING - C

Time: 3 Hours
M. Marks: 75

Credits
L T P
3 1 0

Instructions for the Paper Setters: -
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION–A
Fundamentals: Character set, Identifiers and Key Words, Data types, Constants, Variables, Expressions, Statements, Symbolic Constants.
Operations and Expressions: Arithmetic operators, Unary operators, Relational Operators, Logical Operators, Assignment and Conditional Operators, Library functions. Data Input and Output statements

SECTION–B
Control Statements: Preliminaries, While, Do–while and For statements, Nested loops, If–else, Switch, Break – Continue statements.
Program Structure Storage Class: Automatic, external and static variables, multiple programs, more about library functions.

SECTION–C
Functions: Brief overview, defining, accessing functions, passing arguments to function, specifying argument data types, function prototypes, recursion.
Arrays: Defining, processing an array, passing arrays to a function, multi–dimensional arrays.
Strings: String declaration, string functions and string manipulation

SECTION–D
Structures & Unions: Defining and processing a structure, user defined data types, structures and pointers, passing structures to functions, self-referenced structure, unions.
Pointers: Fundamentals, pointer declaration, passing pointer to a function, pointer and one-dimensional arrays, operation on pointers, pointers & multi–dimensional arrays of pointers, passing functions, other functions, more about pointer declarations.

References:

1.   Balaguruswamy: "Programming in ANSI C".

2.   Scaum Outline Series: "Programming in C".

3.   Dennis & Ritchie: "Programming in C".

4.   Stephen G. Kochar: "C Programming".

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SEMESTER-I

BCA01002T: INTRODUCTION TO COMPUTERS AND INFORMATION TECHNOLOGY

Time: 3 Hours
M. Marks: 75

Credits
L T P
3 1 0

Instructions for the Paper Setters: -
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION–A

Introduction to Computers and its Applications:
- Computer as a system, basic concepts, functional units and their inter relation.
- Milestones in Hardware and Software.
- Batch oriented / on–line / real time applications.
- Application of computers.

SECTION–B

Interacting with the Computer:
Input Devices: Keyboard, mouse, pens, touch screens, Bar Code reader, joystick, source data automation, (MICR, OMR,OCR), screen assisted data entry: portable / handheld terminals for data collection, vision input systems.
Output Devices: Monitor, Serial line page printers, plotters, voice response units.

SECTION–C

Data Storage Devices and Media: Primary storage (Storage addresses and capacity, type of memory), Secondary storage, Magnetic storage devices and Optical Storage Devices
Word Processor using Microsoft Office: Overview, creating, saving, opening, importing, exporting and inserting files, formatting pages, paragraphs and sections, indents and outdents, creating lists and numbering. Headings, styles, fonts and font size Editing, positioning and viewing texts, Finding and replacing text, inserting page breaks, page numbers, book marks, symbols and dates. Using tabs and tables, header, footer and printing

SEMESTER-I

SECTION–D

Presentation Software using Microsoft Office: Presentation overview, entering information, Presentation creation, opening and saving presentation, inserting audio and video
Spreadsheet using Microsoft Office: Spreadsheet overview, Editing, Formatting, Creating formulas, Graphs.

Text/References:

1.   Computer Fundamentals   –   P.K. Sinha.

2.   Introduction to Computers   –   N. Subramanian.

3.   Introduction to Computers   –   Peter Norton Mcgraw Hill.

4.   MS–Office   _   BPB Publications.

5.   Windows Based Computer Courses   Gurvinder Singh & Rachpal Singh, Kalyani Pub.

6.   Ebooks at OpenOffice.org

7.   A Conceptual Guide to OpenOffice.org3, 2nd Edition, R. Gabriel Gurley

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SEMESTER-I
BCA01003T: APPLIED & DISCRETE MATHEMATICS

Time: 3 Hours
M. Marks: 75

Credits
L T P
3 1 0

Instructions for the Paper Setters: -
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION–A
Sets and Relations: Definition of sets, subsets, complement of a set, universal set, intersection and union of sets, De-Morgan's laws, Cartesian products, Equivalent sets, Countable and uncountable sets, minset, Partitions of sets, Relations: Basic definitions, graphs of relations, properties of relations

SECTION–B
Logic and Propositional Calculus: Proposition and Compound Propositions, basic Logical Operations, Propositions and Truth Tables, Tautologies and Contradictions, Logical Equivalence, Duality law, Algebra of propositions, Conditional and Bi conditional Statements, Arguments, Logical Implication, Propositional Functions, Predicates and Quantifiers, Negation of Quantified Statements, Inference theory of the predicates calculus.

SECTION–C
Boolean Algebra: Boolean algebra and its duality, Duality, Boolean Algebra as Lattices, Boolean identities, sub-algebra, Representation Theorem, Sum-of-Products Form for Sets, Sum of-Products Form for Boolean Algebra, Minimal Boolean Expressions, Prime Implicants, Boolean Functions, Karnaugh Maps.

SECTION–D
Matrices: Introduction of a Matrix, its different kinds, matrix addition and scalar multiplication, multiplication of matrices, transpose etc. Square matrices, inverse and rank of a square matrix, Matrix Inversion method.

References:
1. Lipschutz, S. and Lipson, M.: Discrete Mathematics (Schaum's outlines Series).
2. Kolman and Busby "Discrete Mathematical structures for Computer Sciences" PHI.
3. Alan Doerr,"Applied Discrete Structures for Computer Science", Galgotia Publications.
4. Trambley, J.P. and Manohar,R: Discrete Mathematical Structures with Applications to Computer Science.

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SEMESTER-I

BCA01004L: Practical – I

(MS Office 2010 & Basic C Programming)

M. Marks: 75

Operational Knowledge of:

Credits
L T P
0   0 2

1.   C Programming

2.   Windows Based Operating System

3.   MS – OFFICE (Word and Power Point)

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SEMESTER–I
ENL121: COMMUNICATION SKILLS IN ENGLISH–I
(THEORY)

Time: 3 Hours   **Credits: 4-0-0**
(6 periods per week)
Max. Marks: 100

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.
The syllabus is divided in four sections as mentioned below:

SECTION–A
Reading Skills: Reading Tactics and strategies; Reading purposes–kinds of purposes and associated comprehension; Reading for direct meanings.

SECTION–B
Reading for understanding concepts, details, coherence, logical progression and meanings of phrases/ expressions.
Activities:
• Comprehension questions in multiple choice format
• Short comprehension questions based on content and development of ideas

SECTION–C
Writing Skills: Guidelines for effective writing; writing styles for application, personal letter, official/ business letter.
Activities:
• Formatting personal and business letters.
• Organising the details in a sequential order

SECTION–D
Resume, memo, notices etc.; outline and revision.

Activities:

• Converting a biographical note into a sequenced resume or vice-versa
• Ordering and sub-dividing the contents while making notes.
• Writing notices for circulation/ boards

Recommended Books:

• *Oxford Guide to Effective Writing and Speaking* by John Seely.
• *English Grammar in Use* (Fourth Edition) by Raymond Murphy, CUP

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SEMESTER–I

PBL601: ਪੰਜਾਬੀ (ਲਾਜ਼ਮੀ)

ਕਰੈਡਿਟ 4-0-0

Time: 03 Hours

Max. Marks: 100

(6 ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ)

ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਭਾਗ ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਭਾਗ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਅੰਕ ਬਰਾਬਰ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

ਪਾਠ-ਕ੍ਰਮ

ਸੈਕਸ਼ਨ-ਏ

ਸਰਵੋਤਮ ਪੰਜਾਬੀ ਕਵਿਤਾ ਤੇ ਕਹਾਣੀ

(ਸੰਪਾ. ਡਾ. ਰਮਿੰਦਰ ਕੌਰ, ਡਾ. ਮੇਘਾ ਸਲਵਾਨ) ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

(ਕਵਿਤਾ ਭਾਗ)

(ਕਵਿਤਾ ਦੀ ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ/ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ)

ਸੈਕਸ਼ਨ-ਬੀ

ਮੰਚ ਘਰ

ਡਾ. ਕੁਲਦੀਪ ਸਿੰਘ ਧੀਰ, ਡਾ. ਹਿਰਦੇਜੀਤ ਸਿੰਘ ਭੋਗਲ (ਸੰਪਾ.), ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

(ਵਿਸ਼ਾ-ਵਸਤੂ, ਪਾਤਰ ਚਿਤਰਨ)

ਸੈਕਸ਼ਨ-ਸੀ

(ੳ) ਪੈਰ੍ਹਾ ਰਚਨਾ

(ਅ) ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ

ਸੈਕਸ਼ਨ-ਡੀ

ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ:

ਭਾਸ਼ਾ ਦਾ ਟਕਸਾਲੀ ਰੂਪ, ਭਾਸ਼ਾ ਅਤੇ ਉਪਭਾਸ਼ਾ ਵਿਚਲਾ ਅੰਤਰ, ਪੰਜਾਬੀ ਉਪਭਾਸ਼ਾਵਾਂ ਦੇ ਪਛਾਣ ਚਿੰਨ੍ਹ, ਪੰਜਾਬੀ ਭਾਸ਼ਾ-ਨਿਕਾਸ ਤੇ ਵਿਕਾਸ

ਸਹਾਇਕ ਪੁਸਤਕਾਂ

1. ਰਾਜਿੰਦਰਪਾਲ ਸਿੰਘ ਬਰਾੜ, **ਪੰਜਾਬੀ ਕਵਿਤਾ ਦਾ ਇਤਿਹਾਸ**, ਪੰਜਾਬੀ ਅਕਾਦਮੀ, ਦਿੱਲੀ।
2. ਬ੍ਰਹਮਜਗਦੀਸ਼ ਸਿੰਘ, **ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਾਵਿ ਸਿਧਾਂਤ, ਇਤਿਹਾਸ ਅਤੇ ਪ੍ਰਵਿਰਤੀਆਂ**, ਵਾਰਿਸ ਸ਼ਾਹ ਫਾਊਡੇਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
3. ਬਲਦੇਵ ਸਿੰਘ ਧਾਲੀਵਾਲ, **ਪੰਜਾਬੀ ਕਹਾਣੀ ਦਾ ਇਤਿਹਾਸ**, ਪੰਜਾਬੀ ਅਕਾਦਮੀ, ਦਿੱਲੀ।
4. ਸਤਿੰਦਰ ਸਿੰਘ, **ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਵਾਰਤਕ ਦਾ ਇਤਿਹਾਸ**, ਪੰਜਾਬੀ ਅਕਾਦਮੀ, ਦਿੱਲੀ।
5. ਡਾ. ਰਮਿੰਦਰ ਕੌਰ, **ਪੰਜਾਬੀ ਕਹਾਣੀ ਦਾ ਸਫ਼ਰ ਤੇ ਸ਼ਾਸਤਰ ਭਾਗ-I**, ਸਿੰਘ ਬ੍ਰਦਰਜ਼, ਅੰਮ੍ਰਿਤਸਰ।
6. ਹਰਕੀਰਤ ਸਿੰਘ, **ਭਾਸ਼ਾ ਤੇ ਭਾਸ਼ਾ ਵਿਗਿਆਨ**, ਲਾਹੌਰ ਬੁੱਕ ਸ਼ਾਪ, ਲੁਧਿਆਣਾ।
7. ਹਰਕੀਰਤ ਸਿੰਘ ਤੇ ਗਿਆਨੀ ਲਾਲ ਸਿੰਘ, **ਕਾਲਜ ਪੰਜਾਬੀ ਵਿਆਕਰਨ**, ਪੰਜਾਬ ਯੂਨੀਵਰਸਿਟੀ, ਚੰਡੀਗੜ੍ਹ।
8. ਬੂਟਾ ਸਿੰਘ ਬਰਾੜ, **ਪੰਜਾਬੀ ਵਿਆਕਰਨ : ਸਿਧਾਂਤ ਤੇ ਵਿਹਾਰ**, ਚੇਤਨਾ ਪ੍ਰਕਾਸ਼ਨ, ਲੁਧਿਆਣਾ।
9. ਮਿੰਨੀ ਸਲਵਾਨ, **ਪੰਜਾਬੀ ਵਿਆਕਰਨ : ਮੁੱਢਲੇ ਸੰਕਲਪ**, ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ
10. **ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਬੋਧ**, ਕਸਤੂਰੀ ਲਾਲ ਐਂਡ ਸੰਨਜ਼, ਅੰਮ੍ਰਿਤਸਰ।

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SEMESTER–I

PBL611: ਮੁੱਢਲੀ ਪੰਜਾਬੀ
(In lieu of Compulsory Punjabi)

ਕਰੈਡਿਟ 4-0-0

Time: 03 Hours   **Max. Marks: 100**
(6 ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ)

ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਭਾਗ ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਭਾਗ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

ਪਾਠ-ਕ੍ਰਮ
ਸੈਕਸ਼ਨ-ਏ

ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ

(ੳ) ਨਾਮਕਰਨ ਤੇ ਸੰਖੇਪ ਜਾਣ-ਪਛਾਣ : ਗੁਰਮੁਖੀ ਵਰਣਮਾਲਾ, ਅਖਰ ਕ੍ਰਮ, ਸਵਰ ਵਾਹਕ (ੳ ਅ ੲ), ਲਗਾਂ-ਮਾਤਰਾਂ, ਪੈਰ ਵਿਚ ਬਿੰਦੀ ਵਾਲੇ ਵਰਣ, ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣ, ਬਿੰਦੀ, ਟਿਪੀ, ਅਧਕ।

(ਅ) ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ

ਸੈਕਸ਼ਨ-ਬੀ

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

ਸੈਕਸ਼ਨ-ਸੀ

ਪੰਜਾਬੀ ਸ਼ਬਦ ਜੋੜ : ਮੁਕਤਾ (ਦੋ ਅਖਰਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਤਿੰਨ ਅਖਰਾਂ ਵਾਲੇ ਸ਼ਬਦ), ਸਿਹਾਰੀ ਵਾਲੇ ਸ਼ਬਦ, ਬਿਹਾਰੀ ਵਾਲੇ ਸ਼ਬਦ, ਔਂਕੜ ਵਾਲੇ ਸ਼ਬਦ, ਦੁਲੈਂਕੜ ਵਾਲੇ ਸ਼ਬਦ, ਲਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਦੁਲਾਵਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਹੋੜੇ ਵਾਲੇ ਸ਼ਬਦ, ਕਨੌੜੇ ਵਾਲੇ ਸ਼ਬਦ।

ਸੈਕਸ਼ਨ-ਡੀ

ਲਗਾਖਰ (ਬਿੰਦੀ, ਟਿਪੀ, ਅਧਕ ਵਾਲੇ ਸ਼ਬਦ)
ਸ਼ੁਧ, ਅਸ਼ੁਧ (ਪੈਰ੍ਹੇ ਵਿਚ ਲਿਖੇ ਅਸ਼ੁਧ ਸ਼ਬਦਾਂ ਨੂੰ ਸ਼ੁਧ ਕਰਨਾ)

ਸਹਾਇਕ ਪੁਸਤਕਾਂ

1. ਬ੍ਰਹਮਜਗਦੀਸ਼ ਸਿੰਘ, **ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ**, ਵਾਰਿਸ ਸ਼ਾਹ ਫਾਊਂਡੇਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
2. ਪ੍ਰੋ. ਸੈਰੀ ਸਿੰਘ, ਪ੍ਰੋ. ਬ੍ਰਹਮਜਗਦੀਸ਼ ਸਿੰਘ, **ਭਾਸ਼ਾ ਵਿਗਿਆਨ : ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ**, ਵਾਰਿਸ ਸ਼ਾਹ ਫਾਊਂਡੇਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
3. **ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਬੋਧ**, ਕਸਤੂਰੀ ਲਾਲ ਐਂਡ ਸੰਨਜ਼, ਅੰਮ੍ਰਿਤਸਰ।
4. ਮਿੰਨੀ ਸਲਵਾਨ, **ਪੰਜਾਬੀ ਵਿਆਕਰਨ : ਮੁਢਲੇ ਸੰਕਲਪ**, ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।

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SEMESTER – I
PHC110 -Punjab History & Culture (From Earliest Times to C 320)
(Special Paper in lieu of Punjabi Compulsory)
(For those students who are not domicile of Punjab)

Credits

Time: 3 Hours   **L T P**
Max. Marks: 100   **4 0 0**
Instructions for the Paper Setters

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION- A
1.   Physical features of the Punjab and its impact on history.
2.   Sources of the ancient history of Punjab

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

SECTION- C
5.   Social, Religious and Economic life during *Rig* Vedic Age.
6.   Social, Religious and Economic life during Later Vedic Age.

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

Suggested Readings
1.   L. M Joshi (ed.), *History and Culture of the Punjab*, Art-I, Patiala, 1989 (3rd edition)
2.   L.M. Joshi and Fauja Singh (ed.), *History of Punjab*, Vol.I, Patiala 1977.
3.   Budha Parkash, *Glimpses of Ancient Punjab*, Patiala, 1983.
4.   B.N. Sharma, *Life in Northern India*, Delhi. 1966.
5.   Chopra, P.N., Puri, B.N., & Das, M.N.(1974). *A Social, Cultural & Economic History of India,* Vol. I, New Delhi: Macmillan India.

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SEMESTER-II
BCA02001T: INTRODUCTION TO PROGRAMMING - C++

Time: 3 Hours   **Credits**
M. Marks: 75   **L   T   P**
                                                                        3   1   0

Instructions for the Paper Setters: -
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION–A
Programming Paradigms: Introduction to the object oriented approach towards programming by discussing Traditional, Structured Programming methodology.
Objects & Classes: Object Definition, Instance, Encapsulation, Data Hiding, Abstraction, Inheritance, Messages, Method, Polymorphism, Classes, Candidate & Abstract Classes to be examples of the Design process.

SECTION–B
Object Oriented Programming using C++: Characteristics of OOP, Overview of C++, I/O using cout and cin, Objects and Classes, Member functions and data, private & public, constructor & destructor, Constructor Overloading, Types of Constructors.

SECTION–C
Function Overloading: Function Overloading, Default Arguments, Ambiguity in Function Overloading.
Operator Overloading: Overloading unary and binary operators, Type Conversion using Operator Overloading

SECTION–D
Inheritance: Concept of inheritance, Base & derived classes, Access Specifiers, Class Hierarchies, Types of Inheritance with examples.
Virtual Functions and Polymorphism: Virtual functions, friend functions, static function, this pointer, polymorphism, Types of Polymorphism with examples, templates, class templates.

Books:

1. Teach Yourself C++, Herbert Schildth, Tata McGraw Hill.

2. Designing Object Oriented Software Rebacca Wirfs - Brock Brian Wilerson, PHI.

3. Object Oriented Programming in Turbo C++, Robert Lafore, Galgotia Publication.

4. Designing Object Oriented Applications using C++ & Booch Method, Robert C. Martin.

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SEMESTER-II
BCA02002T: PRINCIPLES OF DIGITAL ELECTRONICS

Time: 3 Hours
M. Marks: 75

Credits
L T P
3 1 0

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION–A
Number System: Introduction, number conversion system , binary arithmetic, representation of signed binary numbers, 1's and 2's complement, Codes: straight binary code, BCD Code Excess3 Code, Grey Code ASCII, Integer and floating point representation

SECTION–B
Logic Gates and Boolean Algebra: Logic gates, Universal Gates, Boolean algebra and Minimization techniques, canonical forms of Boolean expressions, K-Map

SECTION–C
Combinational Circuits: Adder, Subtracter, Multiplexer, Demultiplexer, Decoder, Encoder

Sequential Circuits: Flip-flops, clocks and timers, registers, counter

SECTION–D
Semiconductor memories: Introduction, Static and dynamic devices, read only & random access memory chips, PROMS and EPROMS Address selection logic. Read and write control timing diagrams for ICs

References:

1.   Integrated Electronics by Millman, Halkias McGraw Hill.
2.   Malvino: Digital Computer Electronics, McGraw Hill.
3.   D.A. Hodges & H.G. Jackson, Analysis and Design of Integrated Circuits, International, 1983.
4.   Joph. F. Wakerley, Digital Principles and Practices.
5.   Ujjenbeck, John: Digital Electronics: A Modern Approach, Prentice Hall, 1994.
6.   Mano, M. Morris: Digital Logic and Computer Design, Edition, 1993.

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SEMESTER-II

BCA02003T: NUMERICAL METHODS & STATISTICAL TECHNIQUES

Time: 3 Hours
M. Marks: 75

Credits
L T P
3 1 0

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.
I.   That the program for numerical and statistical methods are to be written in C.
II.   Paper setter indicating thereby that the greater weightage is to be given to exercises rather than theoretical derivation of all numerical and statistical methods.

Note for Candidate:
Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections. The students can use only Non–programmable & Non–storage type calculator.

SECTION–A
Introduction:
1. Numerical Methods, Numerical methods versus numerical analysis, Errors and Measures of Errors.
2. Non–linear Equations, Iterative Solutions, Multiple roots and other difficulties, Interpolation methods, Methods of bi–section, False position method, Newton Raphson – Method.
3. Simultaneous Solution of Equations, Gauss Elimination Method Gauss Jordan Method.

SECTION–B
1. Numerical Integration and different Trapezoidal Rule, Simpson's 3/8 Rule.
2. Interpolation and Curve Fitting, Lagrangian Polynomials, Newton's Methods: Forward Difference Method, Backward Difference Method Divided Difference Method.

SECTION–C
Statistical Techniques:
1. Measure of Central Tendency, Mean Arithmetic, Mean geometric, Mean harmonic, Mean, Median, Mode.
2. Measures of dispersion, Mean deviation, Standard deviation, Co–efficient of variation.
3. Correlation.

SEMESTER-II

SECTION–D

1. Least square fit linear trend, Non–linear trend.

   $Y = ax^b$

   $Y = ab^x$

   $Y = ae^x$

   Polynomial fit: $Y = a+bx+cn^2$

Books Recommended:

1. V. Rajaraman: Computer Oriented Numerical Methods, Prentice Hall of India Private Ltd., New Delhi.

2. B.S. Grewal, Numerical Methods for Engineering, Sultan Chand Publication.

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SEMESTER-II

BCA02004L: Practical–I

(Advanced C++ Programming)

Credits
L T P
0 0 2

M. Marks: 75

Operational Knowledge and Implementation of Numerical Methods & Statistical techniques using C++ language.

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SEMESTER–II
ENL222: COMMUNICATION SKILLS IN ENGLISH – II
(THEORY)

Time: 3 Hours   **Credits: 3-0-1**
(6 periods per week)
Max. Marks: 100
Theory Marks: 70
Practical Marks: 30

Instructions for the Paper Setters: -
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.
Course Contents:

SECTION–A
Listening Skills: Barriers to listening; effective listening skills; feedback skills.
Activities: Listening exercises – Listening to conversation, News and TV reports
SECTION–B
Attending telephone calls; note taking and note making.
Activities: Taking notes on a speech/lecture
SECTION–C
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.
Activities: **1)** Making conversation and taking turns
                      2) Oral description or explanation of a common object, situation or concept
SECTION–D
The study of sounds of English,
Stress and Intonation,
Situation based Conversation in English,
Essentials of Spoken English.
Activities: Giving Interviews

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SEMESTER–II

ENP222: COMMUNICATION SKILLS IN ENGLISH – II

PRACTICAL / ORAL TESTING

Marks: 30

Course Contents:-
1. Oral Presentation with/without audio visual aids.
2. Group Discussion.
3. Listening to any recorded or live material and asking oral questions for listening comprehension.

Questions:-
1. Oral Presentation will be of 5 to 10 minutes duration (Topic can be given in advance or it can be student's own choice). Use of audio visual aids is desirable.
2. Group discussion comprising 8 to 10 students on a familiar topic. Time for each group will be 15 to 20 minutes.

Note: Oral test will be conducted by external examiner with the help of internal examiner.

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SEMESTER–II

PBL602 : ਪੰਜਾਬੀ (ਲਾਜ਼ਮੀ)

ਕਰੈਡਿਟ 4-0-0

Time: 03 Hours   **Max. Marks: 100**
(6 ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ)

ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ
1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਭਾਗ ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਭਾਗ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ
   ਕਿਸੇ ਵੀ ਭਾਗ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਅੰਕ ਬਰਾਬਰ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ
   ਸਕਦਾ ਹੈ।

ਪਾਠ-ਕ੍ਰਮ

ਸੈਕਸ਼ਨ-ਏ

I.   **ਸਰਵੋਤਮ ਪੰਜਾਬੀ ਕਵਿਤਾ ਤੇ ਕਹਾਣੀ**
      (ਸੰਪਾ. ਡਾ. ਰਮਿੰਦਰ ਕੌਰ, ਡਾ. ਮੇਘਾ ਸਲਵਾਨ)
      ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।
      (ਕਹਾਣੀ ਭਾਗ)
      ਕਹਾਣੀ ਦਾ ਸਾਰ/ਵਿਸ਼ਾ-ਵਸਤੂ

ਸੈਕਸ਼ਨ-ਬੀ

ਸ਼ਿਰੋਮਣੀ ਪੰਜਾਬੀ ਕਾਵਿ (ਭਾਗ–II)
ਡਾ. ਰਮਿੰਦਰ ਕੌਰ, ਡਾ. ਮੇਘਾ ਸਲਵਾਨ (ਸੰਪਾ.),
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।
(ਇਸ ਪੁਸਤਕ ਵਿਚੋਂ ਸ਼ੇਖ ਫਰੀਦ, ਸ਼ਾਹ ਹੁਸੈਨ, ਬੁੱਲ੍ਹੇ ਸ਼ਾਹ, ਪੀਲੂ, ਵਾਰਿਸ ਸ਼ਾਹ, ਕਾਦਰਯਾਰ,
ਗੁਰੂ ਗੋਬਿੰਦ ਸਿੰਘ ਜੀ ਅਤੇ ਸ਼ਾਹ ਮੁਹੰਮਦ ਦਾ ਕਾਵਿ ਹੀ ਪੜ੍ਹਾਇਆ ਜਾਵੇਗਾ।)
ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ

ਸੈਕਸ਼ਨ-ਸੀ

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

ਸੈਕਸ਼ਨ-ਡੀ

ਦਫ਼ਤਰੀ ਚਿੱਠੀ ਪੱਤਰ
ਮੁਹਾਵਰੇ ਅਤੇ ਅਖਾਣ

ਸਹਾਇਕ ਪੁਸਤਕਾਂ
1. ਸਤਿੰਦਰ ਸਿੰਘ, **ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਵਾਰਤਕ ਦਾ ਇਤਿਹਾਸ**, ਪੰਜਾਬੀ ਅਕਾਦਮੀ, ਦਿੱਲੀ।
2. ਪ੍ਰੋ. ਪਿਆਰਾ ਸਿੰਘ, **ਪੰਜਾਬੀ ਵਾਰਤਕ : ਸਿਧਾਂਤ ਇਤਿਹਾਸ ਪ੍ਰਵਿਰਤੀਆਂ**, ਨਿਊ ਬੁੱਕ ਕੰਪਨੀ, ਜਲੰਧਰ।
3. ਇੰਦਰਪ੍ਰੀਤ ਸਿੰਘ ਧਾਮੀ, **ਪੰਜਾਬੀ ਰੇਖਾ ਚਿਤਰ : ਰੂਪ ਤੇ ਪ੍ਰਕਾਰਜ**, ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
4. ਬਲਬੀਰ ਸਿੰਘ ਦਿਲ, **ਪੰਜਾਬੀ ਨਿਬੰਧ : ਸਰੂਪ, ਸਿਧਾਂਤ ਅਤੇ ਵਿਕਾਸ**, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ।
5. ਹਰਕੀਰਤ ਸਿੰਘ ਤੇ ਗਿਆਨੀ ਲਾਲ ਸਿੰਘ, **ਕਾਲਜ ਪੰਜਾਬੀ ਵਿਆਕਰਨ**, ਪੰਜਾਬ ਯੂਨੀਵਰਸਿਟੀ, ਚੰਡੀਗੜ੍ਹ।
6. ਡਾ. ਅਮਰ ਕੋਮਲ (ਸੰਪਾ.), **ਚੋਣਵੇਂ ਪੰਜਾਬੀ ਨਿਬੰਧ** (ਭੂਮਿਕਾ), ਨੈਸ਼ਨਲ ਬੁੱਕ ਟਰੱਸਟ, ਇੰਡੀਆ।
7. ਅਬਨਾਸ਼ ਕੌਰ, **ਪੰਜਾਬੀ ਰੇਖਾ ਚਿੱਤਰ**, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ, ਪਟਿਆਲਾ।
8. ਮਿੰਨੀ ਸਲਵਾਨ, **ਪੰਜਾਬੀ ਵਿਆਕਰਨ : ਮੁੱਢਲੇ ਸੰਕਲਪ**, ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
9. ਬੂਟਾ ਸਿੰਘ ਬਰਾੜ, **ਪੰਜਾਬੀ ਵਿਆਕਰਨ : ਸਿਧਾਂਤ ਤੇ ਵਿਹਾਰ**, ਚੇਤਨਾ ਪ੍ਰਕਾਸ਼ਨ, ਲੁਧਿਆਣਾ।

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SEMESTER - II

PBL612: ਮੁੱਢਲੀ ਪੰਜਾਬੀ
(In lieu of Compulsory Punjabi)

ਕਰੈਡਿਟ 4-0-0

Time: 03 Hours

Max. Marks : 100
(6 ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ)

ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਭਾਗ ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਭਾਗ ਵਿੱਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿੱਚ ਕਰ ਸਕਦਾ ਹੈ।

ਪਾਠ-ਕ੍ਰਮ

ਸੈਕਸ਼ਨ-ਏ

ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ : ਧਾਤੂ, ਵਧੇਤਰ (ਅਗੇਤਰ, ਮਧੇਤਰ, ਪਿਛੇਤਰ), ਪੰਜਾਬੀ ਕੋਸ਼ਗਤ ਸ਼ਬਦ ਅਤੇ ਵਿਆਕਰਣਿਕ ਸ਼ਬਦ

ਸੈਕਸ਼ਨ-ਬੀ

(ੳ)   ਸੰਯੁਕਤ ਸ਼ਬਦ, ਸਮਾਸੀ ਸ਼ਬਦ, ਦੋਜਾਤੀ ਸ਼ਬਦ, ਦੋਹਰੇ/ਦੁਹਰੁਕਤੀ ਸ਼ਬਦ ਅਤੇ ਮਿਸ਼ਰਤ ਸ਼ਬਦ
(ਅ)   ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ

ਸੈਕਸ਼ਨ-ਸੀ

ਇਕ-ਵਚਨ, ਬਹੁ-ਵਚਨ, ਲਿੰਗ-ਪੁਲਿੰਗ, ਬਹੁ-ਅਰਥਕ ਸ਼ਬਦ, ਸਮਾਨ-ਅਰਥਕ ਸ਼ਬਦ, ਬਹੁਤੇ ਸ਼ਬਦਾਂ ਲਈ ਇਕ ਸ਼ਬਦ, ਸ਼ਬਦ ਜੋੜ, ਵਿਰੋਧਆਰਥਕ ਸ਼ਬਦ।

ਸੈਕਸ਼ਨ-ਡੀ

ਨਿਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ: ਖਾਣ-ਪੀਣ, ਸਾਕਾਦਾਰੀ, ਰੁਤਾਂ, ਮਹੀਨਿਆਂ, ਗਿਣਤੀ, ਮੌਸਮ, ਮਾਰਕੀਟ/ਬਾਜ਼ਾਰ, ਵਪਾਰ, ਧੰਦਿਆਂ ਆਦਿ ਨਾਲ ਸੰਬੰਧਿਤ।

ਸਹਾਇਕ ਪੁਸਤਕਾਂ

1. ਜੋਤੀ ਸ਼ਰਮਾ, **ਪੰਜਾਬੀ ਵਿਆਕਰਨ**, ਵਾਰਿਸ ਸ਼ਾਹ ਫਾਊਂਡੇਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
2. **ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਬੋਧ**, ਕਸਤੂਰੀ ਲਾਲ ਐਂਡ ਸੰਨਜ਼, ਅੰਮ੍ਰਿਤਸਰ।
3. ਮਿੰਨੀ ਸਲਵਾਨ, **ਪੰਜਾਬੀ ਵਿਆਕਰਨ : ਮੁਢਲੇ ਸੰਕਲਪ**, ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
4. ਰੰਜੂ ਬਾਲਾ, **ਅਰਥ ਵਿਗਿਆਨ**, ਆਰਸੀ ਪਬਲਿਸ਼ਰਜ਼, ਦਿਲੀ।

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SEMESTER – II

PHC111 -Punjab History & Culture (C 320 to 1000 A.D.)
(Special Paper in lieu of Punjabi compulsory)
(For those students who are not domicile of Punjab)

Time: 3 Hours
Max. Marks : 100
Instructions for the Paper Setters

	Credits
	L T P
	4 0 0

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION- A

1.   Alexander's Invasion and its Impact
2.   Punjab under Chandragupta Maurya and Ashoka.

SECTION- B

3.   The Kushans and their Contribution to the Punjab.
4.   The Panjab under the Gupta Empire.

SECTION- C

5.   The Punjab under the Vardhana Emperors
6.   Socio-cultural History of Punjab from 7th to 1000 A.D.

SECTION- D

7.   Development of languages and Education with Special reference to Taxila
8.   Development of Art & Architecture

Suggested Readings

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

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SEMESTER – II

SOA-105 :DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION
(COMPULSORY PAPER)

Time: 3 Hours
Max. Marks: 50

Credits
L T P
2 0 0

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section – A
Meaning of Drug Abuse:
  1) Meaning, Nature and Extent of Drug Abuse in India and Punjab.
  2) Consequences of Drug Abuse for:
  Individual   :   Education, Employment, Income.
  Family   :   Violence.
  Society   :   Crime.
  Nation   :   Law and Order problem.

Section – B
Management of Drug Abuse:
  (i)   Medical Management: Medication for treatment and to reduce withdrawal effects.
  (ii)   Psychiatric Management: Counselling, Behavioural and Cognitive therapy.
  (iii) Social Management: Family, Group therapy and Environmental Intervention, Rehabilitation.

Section – C
Prevention of Drug abuse:
  (i)   Role of family: Parent child relationship, Family support, Supervision, Shaping values, Active Scrutiny.
  (ii)   School: Counselling, Teacher as role-model. Parent-teacher-Health Professional Coordination, Random testing on students.

Section – D
Controlling Drug Abuse:
  (i)   Media: Restraint on advertisements of drugs, advertisements on bad effects of drugs, Publicity and media, Campaigns against drug abuse, Educational and awareness program
  (ii)   Legislation: NDPs act, Statutory warnings, Policing of Borders, Checking Supply/Smuggling of Drugs, Strict enforcement of laws, Time bound trials.

SEMESTER-II

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. Kapoor. T. (1985) *Drug epidemic among Indian Youth*, New Delhi: Mittal Pub.
5. Kessel, Neil and Henry Walton. 1982, *Alcohalism. Harmond Worth:* Penguin Books.
6. Modi, Ishwar and Modi, Shalini (1997) *Drugs: Addiction and Prevention*, Jaipur: Rawat Publication.
7. National Household Survey of Alcohol and Drug abuse. (2003) New Delhi, Clinical Epidemiological Unit, All India Institute of Medical Sciences, 2004.
8. Ross Coomber and Others. 2013, *Key Concept in Drugs and Society.* New Delhi: Sage Publications.
9. Sain, Bhim 1991, *Drug Addiction Alcoholism,* Smoking obscenity New Delhi: Mittal Publications.
10. Sandhu, Ranvinder Singh, 2009, *Drug Addiction in Punjab*: A Sociological Study. Amritsar: Guru Nanak Dev University.
11. Singh, Chandra Paul 2000. *Alcohol and Dependence among Industrial Workers*: Delhi: Shipra.
12. Sussman, S and Ames, S.L. (2008). *Drug Abuse: Concepts, Prevention and Cessation,* Cambridge University Press.
13. Verma, P.S. 2017, "*Punjab's Drug Problem: Contours and Characterstics",* Economic and Political Weekly, Vol. LII, No. 3, P.P. 40-43.
14. World Drug Report 2016, United Nations office of Drug and Crime.
15. World Drug Report 2017, United Nations office of Drug and Crime.

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SEMESTER-III

BCA03001T: COMPUTER ARCHITECTURE

Time: 3 Hours
M. Marks: 100

Credits
L T P
3 1 0

Instructions for the Paper Setters: -
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION–A
Information Representation: Register Transfer Language, Various Registers, Implementing Common Bus Using Multiplexers: Logical; Arithmetic & Shift Micro – operations.
Basic Computer Design   Instruction Codes, Computer Instructions, Timing Signals, Instruction Cycle, Design of a Basic Computer.

SECTION–B
CPU Design General Register Organization, Stack Organized CPU, Instruction Formats, Addressing Modes, Program Control, Hardwired & Microprogrammed (Wilhe's Design) Control Unit, RISC and CISC Characteristics.
SECTION–C
Memory Organization   Memory Hierarchy, Designs & Concepts of Main Memory, Auxiliary Memory, Associative Memory, Cache and Virtual Memory.

SECTION–D
I/O Organization I/O Interface, Modes of Transfer, Program Interrupt, DMA & I/O Processor.
Pipeline & Vector Processing   Introduction to Parallel Processing and Pipelining, SISD, SIMD & MISD, MIMD Machines.

References:

Computer System Architecture: M.M. Mano (PHI)

Computer Architecture: J.P. Hayes.

Computer Architecture: Patterson & Hemessy.

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SEMESTER-III
BCA03002T: DATABASE MANAGEMENT SYSTEM

Time: 3 Hours
M. Marks: 100

Credits
L T P
3 1 0

Instructions for the Paper Setters: -
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION–A
Introduction to Data, Field, Record, File, Database, Database management system. Structure of database system, Advantage and disadvantage, levels of database system, Relational model, hierarchical model, network model, comparison of these models, E–R diagram, different keys used in a relational system, SQL.

SECTION–B
DBA, responsibilities of DBA, Relational form like INF, 2NF, 3NF, BCNF, 4th NF, 5th NF, DBTG, concurrency control and its management, protection, security, recovery of database.

SECTION–C
SQL: Introduction to SQL–DDL, DML, DCL, Join methods & sub query, Union Intersection, Minus, Built in Functions, Views, Security amongst users, Sequences, Indexing Cursors–Implicit & Explicit, Functions & Packages Database Triggers.

SECTION–D
Big Data: Introduction to Big Data and Analytics, Introduction to NoSQL

Books and References:
1. Introduction to Database System by C.J. Date.
2. Database Management System by B.C. Desai.
3. Database Concept by Korth.
4. Simplified Approach to DBMS– Kalyani Publishers
5. Oracle – Developer – 2000 by Ivan Bayross.
6. Database System Concepts & Oracle (SQL/PLSQ) – AP Publishers.
7. https://www.mongodb.com/nosql-explained
8. Introduction to NoSQL (Ebook), NoSQL Seminar 2012 @ TUT, Arto Salminen

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SEMESTER-III
BCA03003T: INTRODUCTION TO PYTHON PROGRAMMING

Time: 3 Hrs.
M. Marks: 100

Credits
L T P
3 1 0

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION–A
Introduction to Python: Python's Technical Strengths, Execution Model, Process of Computational Problem Solving, Different ways to run Python Programs.
Data and Expressions: Literals, Variables and Identifiers, Operators, Expressions, Strings, Statements and Data Types, Boolean Expressions (Conditions), Logical Operators, Selection Control, Nested conditions, Debugging
Lists & Dictionaries: List Structures, Lists (Sequences) in Python, Iterating Over Lists (Sequences) in Python, Dictionaries and Files, Looping and dictionaries, Advanced text parsing

SECTION–B
Control Structures: Conditional blocks using if, else and elif,While statement, Definite loops using For, Loop Patterns,
Functions, Packages and Modules: Fundamental Concepts, Program Routines, Flow of Execution, Parameters &Arguments, Recursive Functions, Recursive Problem Solving, Iteration vs. Recursion, Understanding Packages, Modules, Top-Down Design, Python Modules Importing own module as well as external modules and packages.

SECTION–C
Files: Opening Files, Using Text Files, Reading files, Writing files, Understanding read functions, read(), readline() and readlines(), Understanding write functions, write() and writelines(), Manipulating file pointer using seek, String Processing, Exception Handling
Objects and Their Use: Introduction to Object Oriented Programming, Concept of class, object and instances, Constructor, class attributes and destructors, Real time use of class in live projects, Inheritance, overlapping and overloading operators, Adding and retrieving dynamic attributes of classes, Programming using Oops support

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SEMESTER-III

SECTION–D

Using Databases and SQL: Database Concepts, SQL basic summary, SQL Database connection using python, creating and searching tables, Programming using database connections, Basic Data modelling, Programming with multiple tables

Reference Books:

1. Python for Informatics, Charles Severance, version 0.0.7

2. Introduction to Computer Science Using Python: A Computational Problem-SolvingFocus, Charles Dierbach, Wiley Publications, 2012, ISBN : 978-0-470-91204-1

3. Introduction To Computation And Programming Using Python, GUTTAG JOHN V, PHI,2014, ISBN-13: 978-8120348660

4. Introduction to Computating& Problem Solving Through Python, Jeeva Jose and Sojan P.Lal, Khanna Publishers, 2015, ISBN-13: 978-9382609810

5. Introduction to Computing and Programming in Python, Mark J. Guzdial, PearsonEducation, 2015, ISBN-13: 978-9332556591

6. Fundamentals of Python by Kenneth Lambert, Course Technology, Cengage Learning ,2015

7. Learning Python by Mark Lutz, 5th Edition, O'Reilly Media, 2013

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SEMESTER – III
BCA03005T : Multimedia Technology and Applications

M. Marks: 100   **Credits**

Time: 3 Hours   **L-T-P**
                                                                                     3-1-0

Instructions for the Paper Setters:

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION–A

Introduction: Multimedia, history of Multimedia, components, uses of multimedia. Multimedia market, resources for multimedia developers, types of products. Hardware and software, multimedia computer architecture. Overview of Multimedia application softwares (e.g. Adobe Photoshop, Audacity, Final Cut Pro, WordPress, Blender)

Text: Elements of Text, Text data files, using text in Multimedia applications, font editing & design tools, Hypermedia & Hypertext.

SECTION–B

Images: Still Images – Bitmaps, Vector Drawing, 3D Drawing & rendering, Natural Light & Colours, Computerized Colours, Colour Palletes, Image File Formats

Graphics: Elements of graphics, images and colour, graphics file and application formats, obtaining images for multimedia use, using graphics in multimedia applications

SECTION–C

Sound: Digital Audio, MIDI Audio, MIDI vs Digital Audio, Audio File Formats.

Video: How Video Works, Analog Video, Digital Video, Video File Formats, Video Shooting and Editing

SECTION–D

Animation: Principle of Animations. Animation Techniques, Animation File Formats

Making Multimedia: Stages of a multimedia project, requirements to make good multimedia, Multimedia Hardware, Macintosh and Windows production Platforms, Hardware peripherals, Connections, Memory and storage devices, Multimedia software and Authoring tools.

Course Outcome:
- To provide various concepts of multimedia and its applications
- To understand the basic concepts of Multimedia Systems
- To learn representations, perceptions and applications of Multimedia
- To understand the technologies behind multimedia applications

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SEMESTER – III

References:
1. Multimedia Technology and Applications, David Hillman, Galgotia Publications Pvt Ltd.
2. Fundamentals of Multimedia, Le-Nian Li and Mark S. Drew, Pearson Education International
3. Tay Vaughan, Multimedia Making it Work, Tata McGraw – Hill Edition
4. V.K. Jain, Introduction to Multimedia and its applications, Khanna Publishing
5. K. Andleigh and K. Thakkar, "Multimedia System Design", PHI

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SEMESTER-III

Credits
L   T   P

BCA03004L (Programming Lab-I)   **0   0   2**

Lab – I: Based on Python Programming Language   :   50 Marks

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SEMESTER-III

		Credits
BCA03006L: (Programming Lab-II)		**L T P**
		0 0 2

Lab – II: Practical in Oracle   :   50 Marks

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Syllabus for the Batch from Year 2023 To 2026

SEMESTER-IV
BCA04001T: DATA STRUCTURES AND FILE PROCESSING

Time: 3 Hours	**Credits**
M. Marks: 100	**L T P**
	3 1 0

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION–A

Basic Data Structures: Introduction to elementary Data Organization and operations, complexity of Algorithms and Time space trade off, Arrays, Stacks, Queues, Linked Lists.

SECTION–B

Trees Binary Trees & Binary Search Trees. Graphs and Algorithms to manipulate them.

Searching Techniques: Linear and Binary Search.

SECTION–C

Sorting Techniques: Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort.

SECTION–D

File Organization: Concept of field, record, file, blocking and compaction.

File Organization Techniques: Sequential, indexed, indexed sequential, Direct, Hashing. Concept of master and transaction files.

Text/References:

1. Data Structure – Seymour Lipschutz, Schaum Outline Series.

2. File Structure & Data Structures by E. Loomis.

3. Data Structures by Trabley & Soreuson.

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SEMESTER-IV

BCA04002T: INFORMATION SYSTEMS

Time: 3 Hours
M. Marks: 100

Credits
L T P
3 1 0

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION–A
Fundamental aspects of Information, Capturing of Information, Converting Information to Computer – readable form, source of Information, on–line Information access and capture.

SECTION–B
What are systems? Information Systems? Categories of Information Systems, Development Life Cycle of Information system.

SECTION–C
Various types of information systems: Transaction processing systems, office Automation systems, MIS and decision support system.

SECTION–D
Case studies of the Information System: Accounting Information systems, Inventory control systems & Marketing systems.

References:

1. "Information Systems" by Mudride & Ross.
2. "Business Information Systems", Muneesh Kumar.
3. "Information Systems for Managers", Ashok Arora and A.K. Shaya Bhatia.

BCA (Bachelor of Computer Applications) (CBGS)
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SEMESTER-IV

BCA04003T: INTERNET APPLICATIONS

Time: 3 Hours
M. Marks: 100

Credits
L T P
3 1 0

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION–A
Introduction: About internet and its working, business use of internet, services offered by internet, Evolution of internet, internet service provider (ISP), windows environment for dial up networking (connecting to internet), internet addressing (DNS) and IP addresses).

E–Mail Basic Introduction: Advantage and disadvantage, structure of an e–mail message, working of e–mail (sending and receiving messages), managing e–mail (creating new folder, deleting messages, forwarding messages, filtering messages).

SECTION–B
Internet Protocol: Introduction, file transfer protocol (FTP), Gopher, Telnet, other protocols like HTTP and TCPIP.

WWW: Introduction, working of WWW, Web browsing (opening, viewing, saving and printing a web page and bookmark), web designing using HTML, DHTML with programming techniques.

SECTION–C
Search Engine: About search engine, component of search engine, working of search engine, difference between search engine and web directory.

SECTION–D
Intranet and Extranet: Introduction, application of intranet, business value of intranet, working of intranet, role of extranet, working of extranet, difference between intranet and extranet.

References:

1. "Understanding The Internet", Kieth Sutherland, Butterworth-Heinemann; 1st Edition (October 31, 2000).
2. "Internet Technologies", S. K. Bansal, APH Publishing Corporation (April 1, 2002).
3. "Data Communications and Networking", Behrouz A. Forouzan, 3rd Edition.

BCA (Bachelor of Computer Applications) (CBGS)
Syllabus for the Batch from Year 2023 To 2026

SEMESTER-IV
BCA04004T: SYSTEM SOFTWARE

Time: 3 Hours   **Credits**
M. Marks: 100   **L T P**
                                                     3 1 0

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION–A
Introduction to System Software
Introduction to System Software and its components
Translators, loaders, interpreters, compiler, assemblers

SECTION–B
Assemblers:
Overview of assembly process, design of one pass and two assemblers

Macroprocessors:
Macro definition and expansion, conditional macro expansion, Recursive macro expansion

SECTION–C
Compilers:
Phases of Compilation Process, Lexical Analysis, Parsing, Storage Management Optimization
Incremental Compilers, Cross Compilers.
SECTION–D
Loaders and Linkage Editors:
Basic loader functions. Relocation, program linking, linkage, editors, dynamic linking, Bootstrap loaders

References:
1. Leland L. Beck: System Software, An Introduction to System Programming, Addison Wesley.
2. D.M. Dhamdhere: Introduction to System Software, Tata McGraw Hill.
3. D.M. Dhamdhere: System Software and Operating System, Tata McGraw Hill, 1992.
4. Madrich, Stuarte: Operating Systems, McGraw Hill, 1974.
5. Stern Nancy Assembler Language Programming for IBM and IBM Compatible Computers, John Wiley, 1991.

BCA (Bachelor of Computer Applications) (CBGS)
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SEMESTER-IV

BCA04005L: LAB - I

Credits

Time: 3 Hours

M. Marks: 50

L T P

0 0 2

Lab – Data Structure implementation using C++

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SEMESTER-IV

BCA04006L: LAB - II

Time: 3 Hours
M. Marks: 50

Credits
L T P
0 0 2

Lab – Web Designing and use of Internet

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SEMESTER-IV

ESL-221: Environmental Studies (Compulsory Paper)

L	T	P
2	0	0

Time: 3 Hrs.   **Max. Marks: 100**

Exam Pattern: **End Semester Examination- 75 marks**
                                      Project Report/Field Study- 25 marks [based on submitted report]
                                      Total Marks- 100

Instructions for the Paper Setters:-75 marks

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Project Report / Internal Assessment:

Field work – 25 marks [Field work equal to 5 lecture hours]
The candidate will submit a hand written field work report showing photographs, sketches, observations, perspective of any topic related to Environment or Ecosystem. The exhaustive list for project report/area of study are given just for reference:

1. Visit to a local area to document environmental assets: River / Forest/ Grassland / Hill / Mountain / Water body / Pond / Lake / Solid Waste Disposal / Water Treatment Plant / Wastewater Treatment Facility etc.
2. Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
3. Study of common plants, insects, birds
4. Study of tree in your areas with their botanical names and soil types
5. Study of birds and their nesting habits
6. Study of local pond in terms of wastewater inflow and water quality
7. Study of industrial units in your area. Name of industry, type of industry, Size (Large, Medium or small scale)
8. Study of common disease in the village and basic data from community health centre
9. Adopt any five young plants and photograph its growth
10. Analyze the Total dissolved solids of ground water samples in your area.
11. Study of Particulate Matter ($PM_{2.5}$ or PM_{10}) data from Sameer website. Download from Play store.
12. Perspective on any field on Environmental Studies with secondary data taken from Central Pollution Control Board, State Pollution Control Board, State Science & Technology Council etc.

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SEMESTER-IV
SECTION A
1. The multidisciplinary nature of environmental studies
Definition, scope and importance, Need for public awareness

2. Natural Resources: Renewable and non-renewable resources:
Natural resources and associated problems.
(a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
(b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
(c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
(d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
(e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
(f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
   * Role of an individual in conservation of natural resources.
   * Equitable use of resources for sustainable lifestyles.
SECTION B
3. Ecosystems
   * Concept of an ecosystem
   * Structure and function of an ecosystem
   * Producers, consumers and decomposers
   * Energy flow in the ecosystem
   * Ecological succession
   * Food chains, food webs and ecological pyramids
   * Introduction, types, characteristic features, structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)

4. Biodiversity and its conservation
   * Introduction – Definition: genetic, species and ecosystem diversity
   * Biogeographical classification of India
   * Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values
   * Biodiversity at global, national and local levels
   * India as a mega-diversity nation
   * Hot-spots of biodiversity
   * Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts
   * Endangered and endemic species of India
   * Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

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SEMESTER-IV

SECTION C

5. Environnemental Pollution
Définition
- Causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear pollution
- Solid waste management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution
- Pollution case studies
- Disaster management: floods, earthquake, cyclone and landslides

6. Social Issues and the Environment
- From unsustainable to sustainable development
- Urban problems and related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- Environmental ethics: Issues and possible solutions
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation
- Consumerism and waste products
- Environmental Protection Act, 1986
- Air (Prevention and Control of Pollution) Act, 1981
- Water (Prevention and control of Pollution) Act, 1974
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation
- Public awareness

SECTION D

7. Human Population and the Environment
- Population growth, variation among nations
- Population explosion – Family Welfare Programmes
- Environment and human health
- Human Rights
- Value Education
- HIV / AIDS
- Women and Child Welfare
- Role of Information Technology in Environment and Human Health
- Case Studies

BCA (Bachelor of Computer Applications) (CBGS)
Syllabus for the Batch from Year 2023 To 2026

SEMESTER-IV

Field Work

- Visit to a local area to document environmental assets river/forest/ grassland/ hill/ mountain
- Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
- Study of common plants, insects, birds
- Study of simple ecosystems-pond, river, hill slopes, etc

Field work comprises of 5 hours of field work / visit/ assignment to be submitted by each candidate to the Teacher in-charge for evaluation latest by 1st week of before the commencement of theory exam.

ADVISORY FOR PUSHPAGUJRAL SCIENCE CITY, KAPURTHALA :

The Under Graduate students studying Environmental Studies (Compulsory Paper for All UG College Courses) may be taken to Pushpa Gujral Science City, Kapurthala in lieu of Field study report of 25 marks.

Although students will submit a hand written reports with pictures/ graphs/ tables related to biodiversity, ecology, health, biotechnology, energy, water etc. in about 10 pages to the teacher in-charge.

Above advisory is issued to promote scientific temperament in undergraduate classes and is optional. Further, the report will only be considered if there will be a minimum strength of 25 students along with deputed teacher by the college.

References:
1. Bharucha, E. 2005. Textbook of Environmental Studies, Universities Press, Hyderabad.
2. Down to Earth, Centre for Science and Environment, New Delhi.
3. Heywood, V.H. &Waston, R.T. 1995. Global Biodiversity Assessment, Cambridge House, Delhi.
4. Joseph, K. &Nagendran, R. 2004. Essentials of Environmental Studies, Pearson Education (Singapore) Pte. Ltd., Delhi.
5. Kaushik, A. & Kaushik, C.P. 2004. Perspective in Environmental Studies, New Age International (P) Ltd, New Delhi.
6. Rajagopalan, R. 2011. Environmental Studies from Crisis to Cure. Oxford University Press, New Delhi.
7. Sharma, J. P., Sharma. N.K. &Yadav, N.S. 2005. Comprehensive Environmental Studies, Laxmi Publications, New Delhi.
8. Sharma, P. D. 2009. Ecology and Environment, Rastogi Publications, Meerut.
9. State of India's Environment 2018 by Centre for Sciences and Environment, New Delhi
10. Subramanian, V. 2002. A Text Book in Environmental Sciences, Narosa Publishing House, New Delhi.

BCA (Bachelor of Computer Applications) (CBGS)
Syllabus for the Batch from Year 2023 To 2026

SEMESTER-V
BCA05001T: SOFTWARE ENGINEERING

Time: 3 Hours   **Credits**
M. Marks: 100   **L T P**
                                                                                               3 1 0

Instructions for the Paper Setters: -
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION–A
Introduction to Software: Definition, Software characteristics, Software components, Software Applications.
Introduction to Software Engineering: Definition, Software Engineering Paradigms, waterfall method, prototyping, interactive Enhancement, The Spiral model, Fourth Generation Technique.
Software Metrics: Role of Metrics and measurement, Metrics for software productivity and quality, Measurement software, size–oriented metrics, function oriented metrics, Metrics for software quality.

SECTION–B
Software Requirement Specification (SRS): Problem analysis, structuring information, Data flow diagram and data dictionary, structured analysis, Characteristics and component of (SRS).
Planning a Software Project: Cost estimation, uncertainties in cost estimation, Single variable model, COCOMO model, On software size estimation, Project scheduling and milestones, Software & Personal Planning, Rayleigh curve, Personal Plan, Quality Assurance Plan, Verification & Validation (V & V), inspection & review.
System Design: Design Objectives, Design Principles, problem, Partitioning, Abstraction, Top Down and Bottom–up techniques.

SECTION–C
Coding: Coding by Top–down and Bottom–up, Structured Programming, Information Hiding, Programming style, Internal Documentation.
Testing: Level of testing, Test cases and test criteria, Functional Testing, Structural Testing.

SECTION–D
System Maintenance: Types of Maintenance, Corrective and Preventive Maintenance.

References:
1.   Software Engineering, Roger S. Pressman.
2.   Integrated Approach to Software Engineering, Pankaj Jalote.

BCA (Bachelor of Computer Applications) (CBGS)
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SEMESTER-V

BCA05002T: WEB TECHNOLOGIES

Time: 3 Hrs.   **Credits**
M. Marks: 100   **L T P**
                                                                                                  3 1 0

Instructions for the Paper Setters: -
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION–A
Introduction to websites, Static vs dynamic websites, server side and client side scripting
HTML 5 : Introduction , Structure of a web page , HTML Elements, HTML attributes, Basic Text Formatting tags, Comments, Links, Lists, Image, Style, Forms, Table, Media, Classes, iframes.
CSS3 : Introduction , stylesheets , selectors , styling – backgrounds, texts , fonts , links , lists , tables , Box model JAVASCRIPT: Introduction, datatypes, variables, comments ,Operators, functions and events, basics of JQuery and AJAX

SECTION–B
Introduction to PHP, basics, Data types, variables, comments, control statements, functions, PHP with web design, working with files, uploading a file, sessions, cookies, error handling , database connectivity with mysql .

SECTION–C
HOSTING : Overview of Domain , Hosting , SSL Certificates and steps to host a website online. Introduction to Emerging Web Technologies: Introduction to Chatbot, Artificial Intelligence and Machine Learning basics used in websites.

SECTION–D
EMERGING WEB TECHNOLOGIES: Basics of Internet Of Things (IOT) used in Websites, Basics of BlockChain Technology in Websites, Augmented Reality and Virtual Reality and Basics of Single page applications websites using Angular.

References:
1. Chris Bates, "Web Programming- Building Internet Applications", Wiley India, 2006.
2. David William Baron, The World of Scripting Languages.
3. Programming PHP Rasmus Leadoff and Levin Tatroe O''' Reilly Publication.
4. Steven Holzner Php: The Complete Reference 1st Edition McGraw Hill Publication.
5. Achyut S Godbole and Atul Kahate, "Web Technologies", Tata McGraw Hill.

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SEMESTER-V

BCA05003T: OPERATING SYSTEM

Time: 3 Hours
M. Marks: 100

Credits
L T P
3 1 0

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION–A
Introduction: Definition, Early Systems, Simple Batch system, Multi programmed Batch. Time Sharing Systems, Personal Computer System, Parallel Systems, Distributed Systems, Real–time Systems.
Processes: Process concepts, Process Scheduling, Threads.
CPU–Scheduling: Basic concepts, Scheduling Criteria, Scheduling Algorithms, Algorithm Evaluation.

SECTION–B
Process Synchronization: Critical – section problem, semaphores, classical problem of synchronization.
Memory Management: Background, Logical v/s Physical address space, swapping, continuous allocation, paging, segmentation.

SECTION- C
Virtual Memory: Background, demand paging, performance of demand paging, page replacement, page replacement algorithms, thrashing.
Secondary Storage Structures: Disk structures, Disk scheduling, Disk Reliability.

SECTION–D
Deadlocks: System Model, Deadlock characterization, methods for handing deadlocks, Deadlocks Prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock, combined approach to deadlock handling.

References:

1. Operating System Concepts, Fourth Edition by Silberschatz Galvin Addison Wesley.

2. Operating Systems, A Design Oriented Approach" by Crowley, Published by Tata McGraw Hill.

3. Operating Systems, Second Edition by Dietel, Addison Wesley.

BCA (Bachelor of Computer Applications) (CBGS)
Syllabus for the Batch from Year 2023 To 2026

SEMESTER-V
BCA05004T: JAVA PROGRAMMING LANGUAGE

Time: 3 Hours
Max. Marks: 100

Credits
L T P
3 1 0

Instructions for the Paper Setters: -
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION–A
JAVA BASICS: Introduction to Java, Features of Java, Structure of a Java Program, primitive data types, keywords, Identifiers, literals, operators and comments.
OOPS: Object Oriented concepts Advantage of OOPs, Objects and Classes,
Strings: Declaring a string, Immutable string, string comparison, concatenation, substring, string tokenizer.

SECTION–B
Inheritance: what is inheritance, types of inheritance, static import, Method overloading, method overriding, Runtime polymorphism, super keyword, final keyword
Interfaces: Abstract classes, declaring an interface, relationship between classes and interface, interface inheritance, implementing multiple inheritance using interface
Packages: what are packages, advantages of using packages, accessing package from another package, subpackaging, running packages by setting path and classpath.

SECTION–C
Exception Handling: what is exception handling, checked and unchecked exceptions, try-catch, try-multiple catch, try – finally, throw and throws
Multithreading: What is a thread, life cycle of a thread, creating a thread ,sleeping a thread , joining a thread , thread priority.

SECTION–D
Input/Output: File input stream, File output stream, Buffered output stream, Buffered input stream.
Database connectivity: JDBC, JDBC drivers, steps to connect to the database, connectivity with MYsql

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Syllabus for the Batch from Year 2023 To 2026

SEMESTER-V

References:

1. "Java–The Complete Reference", Hurbert Schildt, Tata MacGraw Hill.
2. "Introduction to Java Programming", Y. Daniel Mliang, Pearsons Publications.
3. "Beginning Web Programming with HTML, XHTML, and CSS", Jon Duckett, John Wiley & Sons, 06 Aug. 2004.

BCA (Bachelor of Computer Applications) (CBGS)
Syllabus for the Batch from Year 2023 To 2026

SEMESTER-V

BCA05005L: Lab based on JAVA
Programming Language

Credits
L T P
0 0 2

Time: 3 Hours   **Marks: 50**

BCA (Bachelor of Computer Applications) (CBGS)
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SEMESTER-V

Credits
L T P
0 0 2

Time: 3 Hours   **Marks: 50**

BCA05006L: Lab based on Website Designing using HTML, JAVA Script and PHP

BCA (Bachelor of Computer Applications) (CBGS)
Syllabus for the Batch from Year 2023 To Year 2026

SEMESTER-VI

BCA06001T: COMPUTER GRAPHICS

Time: 3 Hours
Total Marks: 100

Credits
L T P
3 1 0

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section. The students can use only Non–programmable & Non–storage type calculator.

SECTION–A

Overview of Graphics system: Computer Graphics and their applications.
Display Devices: CRT Monitors (Random – Scan and Raster Scan, DVST, Plasma – Panel Display, LED and LCD Monitors.

SECTION–B

Elementary Drawing: Points and various line drawing Algorithms and their comparisons. Circle generating algorithms, Algorithms for ellipse, arc and spiral
Two Dimensional Transformations: Basic Transformations, Scaling, Translation, Rotation, Reflection, Shear, Matrix representation of Basic transformations and homogenous coordinates.

SECTION–C

Composite Transformations: Windowing and clipping. Windowing concepts, clipping and its algorithms. Window–to–view port transformations.

SECTION–D

Three Dimensional concepts. 3 D Coordinate Systems. 3D transformations. translation, scaling, rotation, projections, parallel projections. Perspective projection.

References:

1.   Computer Graphics by Donal Hearn M. Pardive Baker (PHI) Easter Economy Edition.
2.   Computer Graphics by Roy A. Plastock and Gordon Kalley – Schaum's Series.
3.   Computer Graphics by Marc Berger.

BCA (Bachelor of Computer Applications) (CBGS)
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SEMESTER-VI
BCA06002T: COMPUTER NETWORKS

Time: 3 Hours
M. Marks: 100

Credits
L T P
3 1 0

Instructions for the Paper Setters: -

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION–A

Introduction: Network Definition, Basic Components of a Network, Network types and topologies, Uses of Computer Networks.

Transmission Media: Coaxial cable, twisted pair cable, fiber optics & satellites. OSI reference model, TCP/IP reference model, comparison of OSI and TCP reference model.

SECTION–B

Introduction to Analog and Digital Transmission: Telephone system, Modems, Types of modems, pulse code modulation.

Transmission & Switching: Multiplexing, circuit switching, packet switching, hybrid switching.

SECTION–C

Local Area Network Protocols: CSMA Protocols, IEEE standards 802, Token Bus, Token Ring.

Data Link Layer Design Issues: Services provided to Network layer, Framing, error control, flow control, link management. Error detection & correction, Elementary Datalink Protocols.

Design Issues of Network Layer: Services provided to transport layer, routing, connection, internet & World Wide Web.

SECTION–D

Network Security and Privacy: Brief Introduction to Cryptography.

Network Services: File transfer, Access & Management, Electronic Mail, Remote login

References:

1. Tannanbum, A.S.: Computer Networks, Prentice Hall, 1992, 3rd Edition.
2. Stallings, William: Local Networks: An Introduction: Macmillan Publishing Co.
      Stallings, William: Data Computer Communication, Macmillan Publishing Co.

BCA (Bachelor of Computer Applications) (CBGS)
Syllabus for the Batch from Year 2023 To Year 2026

SEMESTER-VI

BCA06003L: Programming Laboratory

Time: 3 Hours   **Marks: 50**

Lab: **Implementation of Applications of Computer Graphics in C++/C**

BCA (Bachelor of Computer Applications) (CBGS)
Syllabus for the Batch from Year 2023 To Year 2026

SEMESTER-VI

BCA06004L: PROJECT

Credits

Max. Marks: 300   **L T P**
                                                                                       0 0 12

General Instructions:

1.   A software module based on the work done in the entire course is to be developed.

2.   The soft copy of the module shall be submitted to the College/Institute till April 30 of the respective semester.

3.   The software module shall be developed in groups, consisting of at most two students in a group.

4.   The respective college shall depute guide(s)/supervisor(s) under whose supervision the software module shall be developed. The guide/supervisor shall clarify that the work done is original & authenticated. The certificate found to be incorrect at any stage shall attract the proceedings against all the stakeholders, as per the University rules.

5.   The evaluation of the module shall be done as per the common ordinance of UG/PG w.e.f. 2023-24 under semester system.