

**SYLLABUS FOR THE BATCH FROM THE YEAR 2023 TO YEAR 2026**

**Programme Code: BCA**

**Programme Name: Bachelor of Computer Applications**

**(Semester I-VI)**

**Examinations: 2023-2026**



**P.G. Department of Computer Science & Applications**

**Khalsa College, Amritsar**

**Bachelor of Computer Applications  
Semester – I**

SN	Course Code	Course Name	Distribution of The Marks				Lectures Per week			Credit Distribution			Total Credit L+T+P	Page No.
			Theory	Internal Assessment	Practical	Total	L	T	P	L	T	P		
<b>Discipline Specific Course(DSC)</b>														
1	BCA-111 (Major)	Introduction to Programming –C	75	25	-	100	5	1	0	3	1	0	4	3-4
2	BCA-112 (Major)	Introduction to Computers and Information Technology	75	25	-	100	5	1	0	3	1	0	4	5-6
3	BCA-113 (Major)	Applied & Discrete Mathematics	75	25	-	100	5	1	0	3	1	0	4	7-8
<b>Ability Enhancement Course (AEC)</b>														
4	BCSE-1122	Communication Skills in English	60	25	15	100	4	0	2	3	0	1	4	9-10
5	BHPB-1101/ BPBI 1102/ BPHC-1104	Punjabi (Compulsory)/ Basic Punjabi (Mudhli Punjabi) Punjab History & Culture	75	25	-	100	6	0	0	4	0	0	4	11 12 13-14
<b>Skill Enhancement Course(SEC)</b>														
6	BCA-114P	Lab I (MS Office 2010/Open Office )	-	25	75	100	0	0	6	0	0	4	4	15-16
7	BCA-115P	Lab II (Programming in C)	-	25	75	100	0	0	6	0	0	4	4	17-18
<b>Value Added Course VAC)</b>														
8	BDA111	*Drug Abuse: Problem, Management and Prevention(Compulsory	-	-	-	50	3	0	0	2	0	0	2	19-20
									<b>Total Credits=30</b>					

**Note: \*This paper marks will not be included in the total marks.**

**Bachelor of Computer Applications (Semester – I)**  
**BCA-111: Introduction to Programming – C**  
**Discipline Specific Course (DSC)**

**Time: 3 Hrs.**

**Total Marks: 100**

Credits		
L	T	P
3	1	0

**Theory Marks: 75**

**Theory Internal Assessment Marks:25**

**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 15 marks consisting of 8 short answer type questions carrying 2.5 mark 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 15 marks each from the respective unit. The students are required to attempt one question from each of these sections.**

**Course Objectives:**

<b>1.</b>	The course is designed to provide complete knowledge of C language.
<b>2.</b>	Students will be able to develop logics which will help them to create programs, applications in C.
<b>3.</b>	Also, by learning the basic programming constructs they can easily switch over to any other language in future.
<b>4.</b>	The course enhances the capability of designing the programs using array ,functions and pointers.
<b>5.</b>	To build small size applications.

**UNIT –I**

**Introduction to C:** Evolution and characteristics of C, Program development tools (Flowcharts, Algorithms), Structure of C Program, Different Errors in C program.

**C-Fundamentals:** Character set, Various Tokens, Data types, Data input and output statements.

**Operators:** Different operators in C and Hierarchy of Operators (Precedence and Associativity).

**Control Statements:** Decision making statements, Iterative/Looping statements, Transfer Statements.

**UNIT -II**

**Program Structure Storage Class:** Automatic, external and static variables, multiple programs, more about library functions.

**Functions:** Brief overview, defining, accessing functions, library and user defining function, passing arguments to function, Recursion.

### UNIT -III

**Arrays and String:** Defining, processing an array, passing arrays to a function, multi-dimensional arrays, string declaration, library string handling function.

**Structure and Union:** Defining Structure and Union Variables, Self Referential Structure, Comparison of Structure with Union.

### UNIT -IV

**Pointers:** Understanding Pointers, pointer declaration and Initialization, operation on pointers, passing pointer to a function, pointer and one-dimensional arrays.

**File Handling:** Opening and closing of files, different modes (Reading and writing).

#### References:

1. Let Us C By Yashwant Kanetkar, BPB Publication, 14<sup>th</sup> Edition, 2017.
2. The Complete Reference by Herbert Schildt, Indian edition 4<sup>th</sup> edition ,2017
3. Schaum Outline Series: “Programming with C”,4<sup>th</sup> edition,2018

#### Course Outcomes:

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

<b>CO-1.</b>	Use the fundamentals of C programming in trivial problem solving
<b>CO-2.</b>	Identify solution to a problem and apply control structures and user defined functions for solving the problem
<b>CO-3.</b>	Demonstrate the use of Strings and string handling functions
<b>CO-4.</b>	Ability to work with arrays of complex objects.
<b>CO-5.</b>	Apply skill of identifying appropriate programming constructs for problem solving.

**Bachelor of Computer Applications (Semester – I)**  
**BCA-112: Introduction to Computers and Information Technology**  
**Discipline Specific Course (DSC)**

**Time: 3 Hrs.**

**Total Marks: 100**

Credits		
L	T	P
3	1	0

**Theory Marks: 75**

**Theory Internal Assessment Marks:25**

**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 15 marks consisting of 8 short answer type questions carrying 2.5 mark 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 15 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.
5.	To impart the knowledge of operating system and its types.
6.	Hands on practice of MS office software.
7.	To Acquire knowledge about computer hardware and software, the Internet.

### **UNIT-I**

#### **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.

#### **Interacting with the Computer**

**Input Devices:** Keyboard, mouse, light pen, touch screens, Bar Code reader, joystick, source data automation, (MICR, OMR, OCR), screen assisted data entry: portable / handheld terminals for data collection.

## UNIT -II

**Computer Viruses:** Definition, Types of viruses, use of Antivirus software.

Internet basics: Its uses and Applications.

**Output Devices:** Monitor, Serial line page printers, plotters, voice response units.

**Word Processor:** Overview, creating, saving, opening, importing, exporting and inserting files, formatting pages, paragraphs and sections, indents and out dents, 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.

## UNIT-III

**Data Storage Devices and Media:** Primary storage (Storage addresses and capacity, type of memory), Secondary storage, Magnetic storage devices and Optical Storage Devices

**Presentation Software:** Presentation overview, entering information, Presentation creation, opening and saving presentation, inserting audio and video.

## UNIT -IV

**Spreadsheet:** Spreadsheet overview, Editing, Formatting, Creating formulas, Graphs.

Any Open-Source Software like Apache Open Office, Libre Office, Google Docs or Microsoft Office may be used.

### References:

1. Computer Fundamentals – P.K.Sinha, Sixth Edition, BPB Publications
2. Introduction to Computers – N. Subramanian, McGraw Hill Education India Pvt Ltd (5 March 2001)
3. Introduction to Computers – Peter Norton, Fifth Edition McGraw Hill Education
4. MS–Office – BPB Publications.
5. Windows Based Computer Courses – Gurvinder Singh & Rachhpal Singh, Kalyani Publishers (1 January 2003)
6. Ebooks at OpenOffice.org
7. A Conceptual guide to OpenOffice , 2<sup>nd</sup> Edition, R. Gabriel Gurley

### Course Outcomes (Cos):

At the end of course students will be able to:

<b>CO-1</b>	Acquire the computer terminology
<b>CO-2</b>	Gain insight of working of input and output devices.
<b>CO-3</b>	Develop skills of working with MS-Word, MS-Powerpoint, MS-excel.
<b>CO-4</b>	Possess the knowledge of importance of operating system in computer.
<b>CO-5</b>	Understand the concept of storing of data in memory and its types.

**Bachelor of Computer Applications (Semester – I)**  
**BCA-113: Applied & Discrete Mathematics**  
**Discipline Specific Course (DSC)**

**Time: 3 Hrs.**

**Total Marks: 100**

Credits		
L	T	P
3	1	0

**Theory Marks: 75**

**Theory Internal Assessment Marks:25**

**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 15 marks consisting of 8 short answer type questions carrying 2.5 mark 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 15 marks each from the respective unit. The students are required to attempt one question from each of these sections.**

**Course Objectives**

1.	To understand sets and perform different operations on sets.
2.	To Identify functions and their properties.
3.	To enable the students how to think logically and mathematically.
4.	To have knowledge about mathematical concepts that are implemented in computer programming.
5.	To strengthen the ability of students to solve problems related to symbolic logic, matrix operations and Boolean algebra.

**UNIT-I**

**Sets and Relations:** Definition of sets, Types, Subsets, Superset, Power set, complement of a set, universal set, intersection and union of sets, Difference of sets, De-Morgan's laws, Cartesian products, Equivalent sets, Partitions of sets, Relations: Basic definitions, Domain and Range, Types of Relations, graphs of relations, properties of relations.

**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.

## UNIT -II

**Boolean Algebra:** Introduction to Boolean algebra, Boolean algebra laws, Properties of Boolean algebra, Duality, Boolean Algebra as Lattices, Boolean identities, sub-algebra, Sum-of-Products Form for Sets, Sum of-Products Form for Boolean Algebra, Normal Forms, Minimal Boolean Expressions, Prime Implicants, Boolean Functions, Karnaugh Maps.

## UNIT-III

**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, Solution of Linear equations using matrices, Matrix Inversion method.

## UNIT -IV

**Graph Theory** Introduction, Types of graph, Simple and Multiple Graphs, Directed and Undirected Graphs, Planer and Non-Planer Graphs, Eulerian and Hamiltonian Graph, Degree of vertex, Sub graphs, Isomorphic and Homeomorphic Graphs, Warshall's algorithm, Dijkstra's Shortest path algorithm, chromatic number, Bipartite Graph, Graph coloring, path, circuit, Adjacent and incidence matrices.

### References:

1. Discrete Mathematics (Schaum's Outlines) by Seymour Lipschutz, Marc Laras Lipson, 3<sup>rd</sup> Edition, McGraw Hill Education, 2017
2. Discrete Mathematical structures for Computer Sciences, Varsha H. Patil, Revised 3rd Edition Paperback – 1 July 2017, PHI.
3. Applied Discrete Structures for Computer Science by Alan Doerr, March 1991, Galgotia Publications Pvt Ltd.
4. Discrete Mathematical Structures with Applications to Computer Science, by Jean-Paul Tremblay, R Manohar, 2017, McGraw Hill Education.
5. Essential Discrete Mathematics for Computer Science by Harry Lewis, Rachel Zax, Princeton University Press, 2019.

### Course Outcomes:

At the end of this course the student shall be able to:

<b>CO-1.</b>	Simplify and evaluate basic logic statements using compound statements, implications, inverses, converses, and contrapositives using truth tables and the properties of logic.
<b>CO-2.</b>	Develop ability of conversion of logic sentence in terms of predicates, quantifiers, and logical connectives.
<b>CO-3.</b>	Use various matrix operations such as matrix addition, multiplication, and transpose, inverse and calculating rank of matrix.
<b>CO-4.</b>	Apply the operations of sets, relations and use Venn diagrams to solve real life mathematical.
<b>CO-5.</b>	Understand in-depth knowledge of graph theory from the point of view of problem solving strategy used in game design and assignment problems.
<b>CO-6.</b>	Evaluate the Boolean functions and simplify the expressions using properties of Boolean algebra.



**Bachelor of Computer Applications (Semester – I)**  
**COMMUNICATION SKILLS IN ENGLISH**  
**Code: BCSE-1122**

L	T	P	Credits
3	0	1	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:**

- a. Active reading of passages on general topics
- b. Reading newspaper, articles, editorials etc.
- c. 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:**

- a) Personal and business letters.
- b) Converting a biographical note into a sequenced resume.

- c) Writing notices for circulation/ boards.
- d) Making notes of given passage with headings and sub-headings
- e) 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:-**

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

**Bachelor of Computer Applications (Semester – I)**  
Compulsory Course  
**ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ**

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

Course title & Code	Total Teaching Hours	Credits	Credit distribution			Total Marks 100		Time Allowed in Exam	Eligibility criteria	Pre-requisite of the course (if any)
			Lecture	Tutorial	Practical	Theory	Internal Assessment			
<b>ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ</b> <b>BHPB-1101</b>	60	4	4	0	0	75	25	3 Hours	Class 12th pass in any stream	Studied Punjabi up to 10th Standard

<p><b>ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective</b></p> <ul style="list-style-type: none"> <li>ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕਰਨਾ।</li> <li>ਆਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਵਿਕਸਤ ਕਰਨਾ।</li> <li>ਮਾਤ ਭਾਸ਼ਾ ਦੀ ਸਮਝ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ।</li> </ul>	<p><b>ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)</b></p> <ul style="list-style-type: none"> <li>ਉਸ ਵਿਚ ਸਾਹਿਤ ਰੁਚੀਆਂ ਵਿਕਸਤ ਹੋਣਗੀਆਂ।</li> <li>ਉਸ ਵਿਚ ਸਾਹਿਤ ਸਿਰਜਣਾ ਦੀ ਸੰਭਾਵਨਾ ਵਧੇਗੀ।</li> <li>ਉਸ ਵਿਚ ਕਿਸੇ ਵੀ ਵਿਸ਼ੇ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਕਰਨ ਦਾ ਬੋਧ ਹੋਵੇਗਾ।</li> <li>ਉਹ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਨਿਕਾਸ ਤੇ ਵਿਕਾਸ ਬਾਰੇ ਗਿਆਨ ਹਾਸਲ ਕਰਨਗੇ</li> </ul>
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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। ਸਿਲੇਬਸ ਦੇ ਬਾਕੀ ਚਾਰ ਭਾਗਾਂ ਵਿਚ 02-02 ਲੇਖ ਨੁਮਾ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰੇਕ ਭਾਗ ਵਿਚੋਂ 01-01 ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ 15 ਅੰਕ ਹੋਣਗੇ। ਪੇਪਰ ਸੈੱਟਰ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

**ਨੋਟ:** ਇੰਟਰਨਲ ਅਸੈਸਮੈਂਟ 25 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁੱਲ ਅੰਕ 75+25= 100 ਹਨ।

**ਪਾਠ-ਕ੍ਰਮ**

**ਭਾਗ-ਪਹਿਲਾ**

**ਸਾਹਿਤ ਦੇ ਰੰਗ,** ਡਾ. ਮਹਿਲ ਸਿੰਘ (ਸੰਪਾ.), ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।

**ਭਾਗ ਪਹਿਲਾ - ਕਵਿਤਾ ਅਤੇ ਕਹਾਣੀ,** ਡਾ. ਮਹਿਲ ਸਿੰਘ ਅਤੇ ਡਾ. ਆਤਮ ਰੰਧਾਵਾ (ਸਹਿ ਸੰਪਾ.)

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

**ਭਾਗ-ਦੂਜਾ**

**ਪੰਜਾਬ ਦੇ ਮਹਾਨ ਕਲਾਕਾਰ** (ਸੰਪਾ. ਬਲਵੰਤ ਗਾਰਗੀ)

ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

(ਅੰਮ੍ਰਿਤਾ ਸ਼ੇਰਗਿੱਲ ਤੋਂ ਭਾਈ ਸਮੁੰਦ ਸਿੰਘ ਤਕ)

(ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ/ਨਾਇਕ ਬਿੰਬ)

**ਭਾਗ-ਤੀਜਾ**

(ੳ) 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।

## Bachelor of Computer Applications (Semester – I)

### Compulsory Course

### ਮੁਢਲੀ ਪੰਜਾਬੀ

(In Lieu of Compulsory Punjabi)

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

Course title & Code	Total Teaching Hours	Credits	Credit distribution			Total Marks 100		Time Allowed in Exam	Eligibility criteria	Pre-requisite of the course (if any)
			Lecture	Tutorial	Practical	Theory	Internal Assessment			
ਮੁਢਲੀ ਪੰਜਾਬੀ BPBI-1102	60	4	4	0	0	75	25	3 Hours	Class 12th pass in any stream	NOT Studied Punjabi up to 10th Standard

<p><b>ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective</b></p> <ul style="list-style-type: none"> <li>• ਵਿਦਿਆਰਥੀ ਨੂੰ ਗੁਰਮੁਖੀ ਲਿਪੀ ਤੋਂ ਜਾਣੂ ਕਰਾਉਣਾ।</li> <li>• ਵਿਦਿਆਰਥੀ ਨੂੰ ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਪੜ੍ਹਨਾ-ਲਿਖਣਾ ਸਿਖਾਉਣਾ।</li> <li>• ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀਆਂ ਵਿਆਕਰਨਕ ਬਾਰੀਕੀਆਂ ਤੋਂ ਜਾਣੂ ਕਰਾਉਣਾ।</li> <li>• ਸ਼ੁੱਧ ਸੰਚਾਰ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ।</li> </ul>	<p><b>ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)</b></p> <ul style="list-style-type: none"> <li>• ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ ਦੀ ਸਿਖਲਾਈ ਵਿਚ ਮੁਹਾਰਤ ਹਾਸਲ ਕਰਨਗੇ।</li> <li>• ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਵਿਚ ਮੁਹਾਰਨੀ, ਲਗਾਂ-ਮਾਤਰਾਂ, ਸਵਰ ਅਤੇ ਵਿਅੰਜਨ ਅੱਖਰਾਂ ਦੀ ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ ਸੰਬੰਧੀ ਸਮਝ ਵਿਕਸਿਤ ਹੋਵੇਗੀ।</li> <li>• ਪੰਜਾਬੀ ਸ਼ਬਦ-ਜੋੜਾਂ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਲ ਕਰਕੇ ਉਹ ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਲਿਖਣ-ਪੜ੍ਹਨ ਦੇ ਸਮਰੱਥ ਹੋਣਗੇ।</li> <li>• ਉਹ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਸ਼ੁੱਧ ਰੂਪਾਂ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਲ ਕਰਨਗੇ।</li> </ul>
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#### ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਭਾਗ ਵਿਚ 01-01 ਅੰਕ ਦੇ ਅਤਿ-ਸੰਖੇਪ ਉੱਤਰ ਵਾਲੇ (Objective Type) 11 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜੋ ਕਿ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ ਹੋਣਗੇ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਦੂਸਰੇ ਭਾਗ ਵਿਚ, ਸਿਲੇਬਸ ਦੇ ਪਹਿਲੇ ਭਾਗ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨਾਂ ਵਿਚੋਂ ਕੋਈ ਦੋ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ 8-8 ਅੰਕ ਹੋਣਗੇ। ਇਸੇ ਤਰ੍ਹਾਂ ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਤੀਸਰੇ ਭਾਗ ਵਿਚ ਤਿੰਨ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿੰਨਾਂ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ 8-8 ਅੰਕ ਹੋਣਗੇ। ਭਾਗ ਚੌਥੇ ਵਿਚ ਪੰਜ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨਾਂ ਵਿਚੋਂ ਚਾਰ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ 4-4 ਅੰਕ ਹੋਣਗੇ। ਭਾਗ ਪੰਜਵੇਂ ਵਿਚ ਦਸ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨਾਂ ਵਿਚੋਂ 8 ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ। ਹਰ ਪ੍ਰਸ਼ਨ ਦੇ 2-2 ਅੰਕ ਹੋਣਗੇ।

**ਨੋਟ:** ਇੰਟਰਨਲ ਅਸੈਸਮੈਂਟ 25 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਖਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁੱਲ ਅੰਕ 75+25 = 100 ਹਨ।

#### ਪਾਠ-ਕ੍ਰਮ

#### ਭਾਗ-ਪਹਿਲਾ

(ੳ) ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ:

ਨਾਮਕਰਣ ਤੇ ਸੰਖੇਪ ਜਾਣ-ਪਛਾਣ: ਗੁਰਮੁਖੀ ਵਰਣਮਾਲਾ, ਅੱਖਰ ਕ੍ਰਮ, ਸਵਰ ਵਾਹਕ (ੳ, ਅ, 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, ਕਨੌੜੇ ਵਾਲੇ ਸ਼ਬਦ, ਲਗਾਖਰ (ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ) ਵਾਲੇ ਸ਼ਬਦ

#### ਭਾਗ-ਚੌਥਾ

ਸ਼ੁੱਧ-ਅਸ਼ੁੱਧ ਸ਼ਬਦ

**Bachelor of Computer Applications (Semester – I)**

**SEMESTER–I**

**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)**

**Course Code: BPHC-1104**

**Time: 3 Hours**

**Credit Hours (per week): 04**

**L-T- P**

**4-0-0**

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

### **Suggested Readings:-**

- a. L. Joshi (ed), *History and Culture of the Punjab*, Art-I, Patiala, 1989 (3rd edition)
- b. L.M. Joshi and Fauja Singh (ed), *History of Punjab*, Vol. I, Patiala 1977.
- c. Budha Parkash, *Glimpses of Ancient Punjab*, Patiala, 1983.
- d. 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

**Bachelor of Computer Applications (Semester –I)**  
**BCA-114P: Lab-I Open office/Ms office**  
**Skill Enhancement Course (SEC)**

**Time: 3 Hrs.**

**Total Marks: 100**

Credits		
L	T	P
0	0	4

**Practical Marks: 75**

**Practical Internal Assessment Marks:25**

**Course Objectives:**

<b>1.</b>	Teach the fundamentals so students can efficiently use MS Word
<b>2.</b>	Provide a knowledge base for Computer Fundamentals & MS Word upon which you can build.
<b>3.</b>	Use real-world examples and procedures that will prepare you to be a skilled user of Computer & MS Word, MS Power Point & MS Excel.
<b>4.</b>	Provide hands-on use of Microsoft Office applications Word, Excel and Power Point. Completion of the assignments will result in MS Office applications knowledge and skills.

**Practical Open office/Ms office**

**MS–Word 2010:**

1. Introduction to Parts of Word Window
2. Creating New Documents, Saving Documents, Opening an Existing documents
3. Formatting and its types.
4. Importing and exporting files
5. Finding and replacing text
6. Inserting files, page numbers, bookmarks, symbols, dates, page breaks, page numbers and Headers and Footers.
7. Various ways of creating a Table, various operations and its formatting
8. Page Setup
9. Mail Merge.
10. Printing document

**MS Power Point 2010:**

1. Power point elements: Templates, Views, Exploring Power Point ribbons
2. Creation, opening and saving presentation

3. Inserting information: Table, picture, clip Art, audio and video
4. Apply transition, animation.
5. Views (Starting Slide Show, View slide sorter view, notes view, outlines view)

**MS Excel 2010:**

1. Exploring Spreadsheet window
2. Entering, Editing and formatting Data
3. Entering and Editing Formulas, various functions used in excel
4. Cell Referencing (Absolute, Relative and mixed)
5. Printing.

**Course Outcomes:**

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

<b>CO-1.</b>	Identify the applications of computer in daily life.
<b>CO-2.</b>	Understand the practical concepts of MSWord, MS Excel and MS PowerPoint.
<b>CO-3.</b>	Knowledge and understanding on successful completion of this subject the students have the ability to perform tools of MS Office.
<b>CO-4.</b>	Develop skills of working with MS Word, MS Powerpoint, MS excel.



**Bachelor of Computer Applications (Semester –I)**  
**BCA-115P: Lab-II Programming in C**  
**Skill Enhancement Course (SEC)**

**Time: 3 Hrs.**

**Total Marks: 100**

Credits		
L	T	P
0	0	4

**Practical Marks: 75**

**Practical Internal Assessment Marks:25**

**Course Objectives:**

1.	To learn the fundamental programming concepts and methodologies which are essential to building good C programs.
2.	To practice the fundamental programming methodologies in the C programming language via laboratory experiences. Microsoft Visual Studio Code is the programming environment that will be used.
3.	To code, document, test and implement a well-structured, robust computer program using the C programming language.
4.	To write reusable modules (collections of functions).

**Practical Programming in C**

**Programming based on following topics**

**Fundamentals:** Implementation of printf() and scanf()

**Operators:** Arithmetic operators, Unary operators, Relational Operators, Logical Operators, Assignment and Conditional Operators

**Control Statements:** While, Do–while and for statements, Nested loops, If– else, Switch, Break – Continue statements

**Functions:** defining and accessing functions, passing arguments to function, and recursion.

**Arrays:** Defining and accessing an array element, passing arrays to a function, multi–dimensional arrays.

**Strings:** string inbuilt functions

**Structures & Unions:** Defining, accessing structure and union variables.

**Pointer:** Declarations and Accessing pointer variables and operations on pointers.

**Data Files:** File opening and closing , Modes ( reading, writing).

**Course Outcomes:**

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

<b>CO-1.</b>	Use the fundamentals of C programming in trivial problem solving.
<b>CO-2.</b>	Apply skill of identifying appropriate programming constructs for problem solving.
<b>CO-3.</b>	Ability to work with arrays of complex objects.
<b>CO-4.</b>	Enhance skill on problem solving by constructing algorithms.
<b>CO-5.</b>	Apply skill of identifying appropriate programming constructs for problem Solving.

**Bachelor of Computer Applications (Semester –I)**  
**Course Code: ZDA111**  
**Course Title- Drug Abuse: Problem, Management and Prevention**  
**PROBLEM OF DRUG ABUSE**  
**(Compulsory for all Under Graduate Classes)**

**Time: 3 Hours**

**Credit hrs./wk.:2**  
**Max. Marks: 50**

**Instructions for the Paper Setters:**

- 1) There will be a total of 9 questions of which 5 are to be attempted.
- 2) Question 1 is compulsory and having 10 short answer type questions (1 mark each).
- 3) The remaining 8 questions (10 marks each) shall include 2 questions from each unit.  
 Candidates shall be required to attempt 4 questions, one from each unit. Preferably, the question should not be split into more than two sub-parts.

**Course Objectives- The course aims to:**

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

**UNIT-I**

- **Meaning of Drug Abuse**  
 Meaning of drug abuse  
 Nature and Extent of Drug Abuse: State and National Scenario

**UNIT-II**

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

**UNIT-III**

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

**UNIT-IV**

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

## References:

1. Ahuja, Ram (2003), Social Problems in India, Rawat Publication, Jaipur.
2. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
3. Inciardi, J.A. 1981. The Drug Crime Connection. Beverly Hills: Sage Publications. 23
4. Jasjit Kaur Randhawa & Samreet Randhawa, “Drug Abuse-Problem, Management & Prevention”, KLS, ISBN No. 978-81-936570-6-5, (2018).
5. Jasjit Kaur Randhawa & Samreet Randhawa, “Drug Abuse Problem, Management & Prevention”, KLS, ISBN No. 978-81-936570-8-9, (2019).
6. Jasjit Kaur Randhawa & Samreet Randhawa, “voZrI d[otos'A^(BPky'oh) ;wZf;nk, gqpzXB ns/o'eEkw”, KLS, ISBN No. 978-81-936570-7-1, (2018).
7. Jasjit Kaur Randhawa, “Drug Abuse -Management & Prevention”, KLS, ISBN No. 978-93-81278-80-2, (2018).
8. Kapoor. T. (1985) Drug epidemic among Indian Youth, New Delhi: Mittal Pub.
9. Modi, Ishwar and Modi, Shalini (1997) Drugs: Addiction and Prevention, Jaipur: Rawat Publication.
10. National Household Survey of Alcohol and Drug abuse. (2003) New Delhi, Clinical Epidemiological Unit, All India Institute of Medical Sciences, 2004.
11. Rama Gandotra & Jasjit Kaur Randhawa, “voZrI d[otos'A^(BPky'oh) gqpzXB ns/o'eEkw”, KLS, ISBN No. 978-93-81278-87-1, (2018).
12. Sain, Bhim 1991, Drug Addiction Alcoholism, Smoking obscenity New Delhi: Mittal Publications.
13. Sandhu, Ranvinder Singh, 2009, Drug Addiction in Punjab: A Sociological Study. Amritsar. Guru Nanak Dev University.
14. Singh, C. P. 2000. Alcohol and Dependence among Industrial Workers: Delhi: Shipra.
15. Sussman, S and Ames, S.L. (2008). Drug Abuse: Concepts, Prevention and Cessation, Cambridge University Press.
16. World Drug Report 2010, United Nations office of Drug and Crime.
17. World Drug Report 2011, United Nations office of Drug and Crime.

## Course Outcomes:

The students will be able:

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

# Bachelor of Computer Applications

## Semester – II

SN	Course Code	Course Name	Distribution of The Marks				Lectures Per week			Credit Distribution			Total Credit L+T+P	Page No.
			Theory	Internal Assessment	Practical	Total	L	T	P	L	T	P		
<b>Discipline Specific Course(DSC)</b>														
1	BCA-121 (Major)	Introduction to Programming –C++	75	25	0	100	5	1	0	3	1	0	4	22-23
2	BCA-122 (Major)	Principles of Digital Electronics	75	25	0	100	5	1	0	3	1	0	4	24-25
3	BCA-123 (Major)	Numerical Methods & Statistical Techniques	75	25	0	100	5	1	0	3	1	0	4	26-28
<b>Ability Enhancement Course (AEC)</b>														
4	BCSE-1222	Communication Skills in English	60	25	15	100	4	0	2	3	0	1	4	29-30
5	BHPB-1201/ BPBI-1202/ BPHC-1204	Punjabi/Basic Punjabi (Mudhli Punjabi) (Compulsory)/ Punjab History & Culture	75	25	-	100	6	0	0	4	0	0	4	31 32 33-34
<b>Skill Enhancement Course(SEC)</b>														
6	BCA-124P	Lab-I(C++Programming Language )	0	25	75	100	0	0	6	0	0	4	4	35
7	BCA-125P	Lab-II(Implementation of Numerical Methods in C/C++ )	0	25	75	100	0	0	6	0	0	4	4	36
<b>Value Added Course(VAC)</b>														
8	BDA112	*Drug Abuse: Problem, Management and Prevention(Compulsory)	-	-	-	50	3	0	0	2	0	0	2	37-38
												<b>Total Credits=30</b>		

**Note: \*This paper marks will not be included in the total marks.**

**Bachelor of Computer Applications (Semester – II)**  
**BCA-121: Introduction to Programming - C++**  
**Discipline Specific Course (DSC)**

**Time: 3 Hrs.**

**Total Marks: 100**

Credits		
L	T	P
3	1	0

**Theory Marks: 75**

**Theory Internal Assessment Marks:25**

**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 15 marks consisting of 8 short answer type questions carrying 2.5 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 15 marks each from the respective unit. The students are required to attempt one question from each of these sections.**

**Course Objectives:**

The learning objectives of this course are:

1.	To understand how C++ improves C with object-oriented features.
2.	To learn how to design C++ classes for code reuse.
3.	To learn concepts like constructors and destructors, operator overloading, and control structures in C++.
4.	To Analyse how to implement copy constructors and class member functions.
5.	To understand the concept of data abstraction and encapsulation.
6.	To learn how to overload functions and operators in C++.
7.	To Know how containment and inheritance promote code reuse in C++.
8.	To learn how inheritance and virtual functions implement dynamic binding with polymorphism.
9.	To familiarize the students with file handling concepts in C++.

**UNIT-I**

**Programming Paradigms:** Introduction to the object-oriented approach towards programming by discussing Traditional, Structured Programming methodology, basic concepts of object oriented programming, Structure of C++ Program, data types, operators and Control Structures.

**Objects & Classes:** Object Definition, Instance, Encapsulation, Data Hiding, Abstraction, Inheritance, Messages, Method, Polymorphism, Classes, Candidate & Abstract Classes to be examples of the Design process.

### UNIT -II

**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.

**Function Overloading:** Function Overloading, Default Arguments, Ambiguity in Function Overloading.

### UNIT -III

**Operator Overloading:** Overloading unary and binary operators, Type Conversion using Operator Overloading

**Inheritance:** Concept of inheritance, Base & derived classes, Access specifiers, Class Hierarchies, Types of Inheritance with examples.

### UNIT -IV

**Virtual Functions and Polymorphism:** Virtual functions, friend functions, static function, this pointer, polymorphism, Types of Polymorphism with examples, templates, class templates.

**Files & Streams:** C++ Class Hierarchy, File Streams, Text File Handling & Binary File Handling, Error handling during file operations.

#### References:

1. Teach yourself C++, Herbert Schildt, Tata McGraw Hill, 3<sup>rd</sup> edition, 2000.
2. Designing Object Oriented Software Rebecca Wirfs – Brock, Brian Wilkerson, Lauren Wiener, PHI, Edition 3, Prentice Hall, 1990.
3. Object Oriented Programming in Turbo C++, Robert Lafore, Galgotia Publication, 4th Edition, 2000.
4. Designing Object Oriented C++ Applications using the Booch Method, Robert C. Martin, 1995 Englewood Cliffs, N.J. :Prentice Hall 1<sup>st</sup>, edition.

#### Course Outcomes:

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

CO-1.	Understand the difference between the top-down and bottom-up approach.
CO-2.	Describe the object-oriented programming approach in connection with C.
CO-3.	Apply the concepts of object-oriented programming.
CO-4.	Illustrate the process of data file manipulations using C++.
CO-5.	Apply virtual and pure virtual function & complex programming situations.
CO-6.	Able to understand and apply the concepts of friend function, constructors and destructors in program design.
CO-7.	Able to Design and implement various forms of inheritance, apply and analyse operator overloading and runtime polymorphism.

**Bachelor of Computer Applications (Semester – II)**  
**BCA-122: Principles of Digital Electronics**  
**Discipline Specific Course (DSC)**

**Time: 3 Hrs.**

**Total Marks: 100**

Credits		
L	T	P
3	1	0

**Theory Marks: 75**

**Theory Internal Assessment Marks:25**

**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 15 marks consisting of 8 short answer type questions carrying 2.5 mark 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 15 marks each from the respective unit. The students are required to attempt one question from each of these sections.**

**Course Objective:**

<b>1.</b>	To familiarize the concept of various number systems.
<b>2.</b>	To introduce the concept of logic gates and logic families.
<b>3.</b>	To acquire the knowledge of the minimization techniques using Boolean Laws and K-Maps.
<b>4.</b>	To design combinational circuits and sequential circuits using logic gates.
<b>5.</b>	To impart knowledge of how to design registers in digital electronics.
<b>6.</b>	To understand the concept of digital logic levels.

**UNIT-I**

**1. Number Systems**

Binary Codes (BCD, Excess-3, Gray codes, ASCII), Number Systems (Decimal, Binary, Octal and Hexadecimal Numbers and their conversions). Complement (1's, 2's, 9's, 10's). Signed Binary Numbers (Arithmetic Addition, Subtraction, Multiplication, Division), Subtraction using 1's Complement, Subtraction using 2's Complement.

**2. Boolean Algebra and Logic Gates**

Basic Definitions, Postulates and theorems of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, De-Morgan's Theorem, Principle of Duality, Reducing Boolean expressions, Digital Logic Gates: (AND, OR NOT, NAND, NOR, EX-OR, EX-NOR), Implementations using Basic Gates, Universal Gates.



## UNIT -II

### 3. Minimization Techniques

Canonical and Standard forms SOP and POS of Boolean functions, K-Maps simplifications up to Five-Variable Map, Sum of Product and Product of Sums Simplification, Don't-Care Conditions.

### 4. Combinational Logic

Half Adder and Full Adder, Half Subtractor, Full Subtractor, Decoders, Encoders, 2 bit multiplexer, 4 bit multiplexer, Demultiplexer, BCD to Binary code converter, Binary to gray code converter, Gray code to binary code converter.

## UNIT -III

### 5. Synchronous Sequential Logic

Sequential Circuits, Latches, Flip-Flops (SR, JK, JK Master Slave D and T-type). Negative edge and Positive edge triggered clocks

### 6. Registers and Counters

Shift Registers:(Serial-in Serial-out, Serial-in Parallel-out, Parallel-in Serial-out, Parallel-in Parallel-out), Universal Registers, Bidirectional registers , Ripple Counters, Synchronous and Asynchronous Counters, Mod counters up/down counters.

## UNIT -IV

### 7. Memory and Programmable Logic

Introduction, Random-Access Memory (static and dynamic), Read-Only Memory,(Eprom, EEPROM), Cache memory , Virtual memory, Programmable Array Logic.

8. **Digital Logic Families:** TTL, ECL, MOS, CMOS ( their operations and specifications)

### References:

1. Integrated Electronics by Millman, Halkias McGraw Hill, 2016
2. Malvino: Digital Computer Electronics, McGraw Hill, 1993
3. D.A. Hodges & H.G. Jackson, Analysis and Design of Integrated Circuits, International, 1983.
4. Joph. F. Wakerley, Digital Principles and Practices, 1990
5. Ujjenbeck, John: Digital Electronics: A Modern Approach, Prentice Hall, 1994.
6. Mano, M. Morris: Digital Logic and Computer Design, Edition, 1993.
7. Digital Electronics by R.K Gaur , 2012

### Course Outcomes:

At the end of course students will be able to:

<b>CO-1.</b>	Gain knowledge of different types of number systems and their conversions in digital electronics and different operations performed on them.
<b>CO-2.</b>	Use Boolean algebra to minimize and simplify Boolean expressions.
<b>CO-3.</b>	Illustrate realization of SOP and POS forms.
<b>CO-4.</b>	Design of various combinational circuits using logic gates.
<b>CO-5.</b>	Design and develop sequential circuits using flip flops.
<b>CO-6.</b>	Will gain knowledge about various logic families and their specifications.

**Bachelor of Computer Applications (Semester – II)**  
**BCA-123: Numerical Methods & Statistical Techniques**  
**Discipline Specific Course (DSC)**

**Time: 3 Hrs.**

**Total Marks: 100**

Credits		
L	T	P
3	1	0

**Theory Marks: 75**

**Theory Internal Assessment Marks:25**

**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 15 marks consisting of 8 short answer type questions carrying 2.5 mark 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 15 marks each from the respective unit. The students are required to attempt one question from each of these sections.**

**Note for Paper Setter:**

**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.**

**Course Objectives:**

<b>1.</b>	To understand and implement various concepts of numerical and statistical methods to solve real life problems.
<b>2.</b>	To develop the mathematical skills of the students in the areas of numerical methods.
<b>3.</b>	To provide conceptual understanding of various numerical methods like solution of non-linear equations ,system of linear equations, interpolation, numerical integration with an aim of helping the students to understand the fundamentals, concepts and practical use of these methods in the field of computer sciences and applications.
<b>4.</b>	To provide understanding of statistical problems like testing of hypotheses using various statistical techniques.

**UNIT-I**

**Introduction:**

**1. Approximations and Errors in Computation:** Numerical methods versus numerical analysis, significant digits, Errors types and Measures of Errors.

**2.Numerical solution of Algebraic and transcendental Equations:Non-linear equations,types,** Methods of finding non-linear equations(Bisection, False position method, Newton Raphson .

## UNIT -II

3.**System of Linear Equations:** Gauss Elimination Method, Gauss Jordan Method, Direct versus iterative linear method

4.**Numerical Integration:**Trapezoidal Rule, Simpson's 1/3 and 3/8 Rule,

## UNIT- III

6 **Interpolation:Finite differences**, Newton's interpolation method (Forward, Backward, Divided method ), Lagrange's method

7 **Trend Analysis:Least square methods,Comparison between moving averages method and least square methods**,Linear trend(  $Y = a+bx$ ) and Non-linear trends.

$$Y = ax^b$$

$$Y = ab^x$$

$$Y = ae^x$$

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

## UNIT -IV

### Statistical Techniques:

1. **Measure of Central Tendency:** Arithmetic, Geometric, Harmonic, Median, Mode.
2. **Measures of dispersion**, Mean deviation, Standard deviation, Co-efficient of variation.
3. **Correlation:** Types of Correlation, Karl Pearson's Correlation and rank correlation.
- 4.**Vital Statistics:**Methods of vital statistics,determination of population,rate of vital events,measurement of morality.

### References

1. V. Rajaraman: Computer Oriented Numerical Methods, Prentice Hall of India Private Ltd., New Delhi(2019), 4<sup>th</sup> edition.
2. R.S Salaria:Computed Oriented Numerical Method,Khanna Book publishing CO.(P)Ltd(2016) 5<sup>th</sup> edition.
3. M. K. Jain, S .R. K. Iyengar and R. K. Jain, *Numerical Methods for Scientific and Engineering Computation*, New Age International Publishers (2012), 6th edition.
4. S.P Gupta, Statistical Methods, Sultan Chand & Sons Publications(2021), 43<sup>rd</sup> edition.
5. Statistical office United Nations, *Handbook of Vital Statistics Methods*, United Nations Publication(1963),17<sup>th</sup> edition
6. Michael J.Siri and Daniel L.Cork *Vital Statistics: Summary of a Workshop*, National Academies Press (US), 2009.
7. E. Balagurusamy, "*Numerical Methods*", Tata McGraw-Hill Publishing Company Ltd., New Delhi, (2008) 24<sup>th</sup> edition.
8. Dr.B.S. Grewal: *Numerical Methods for Engineering*, Khanna Publications(2002),6<sup>th</sup> edition.

**Course Outcomes:**

On completion of this course students will able to:

<b>CO-1.</b>	Understand numerical techniques to find the roots of non-linear equations and solution of system of linear equations.
<b>CO-2.</b>	Apply numerical methods to obtain approximate solutions to mathematical problems.
<b>CO-3.</b>	Understand the difference operators and the use of interpolation.
<b>CO-4.</b>	Analyses and evaluate the accuracy of common numerical methods
<b>CO-5.</b>	Interpret calculation and errors in numerical method.
<b>CO-6.</b>	Writes mathematical solutions and their interpretation in a clear and concise manner.

**Bachelor of Computer Applications (Semester – II)**  
**COMMUNICATION SKILLS IN ENGLISH**  
**Code:BCSE-1222**

**Time: 3 Hours**

L	T	P	Credits
3	0	1	4

**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  
Tenses and Change of voice

(12X1=12Marks)

**Section B**

1. **Listening Skills:** Barriers to listening; effective listening skills; feedback skills.
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.
3. Drafting of a short speech on a given topic.
4. Transcoding (given dialogue to prose or given prose to dialogue).
5. Taking notes on a speech/lecture/telephonic conversations .
6. Translation from Vernacular (Punjabi/ Hindi) to English (Paragraph)

(6X8=48 Marks)

**Course Objectives:**

- I: To develop competence in oral and visual communication.
- II: To inculcate innovative and critical thinking among the students.
- III: To enable them to grasp the application of communication theories.
- IV: To acquire 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. **Listening Skills:** Barriers to listening; effective listening skills; feedback skills, attending telephone calls; note taking.

**Activities:**

- a) 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:**

- a) Conversation; dialogue and speech
- b) Oral description or explanation of a common object, situation or concept.
- c) 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)

## Bachelor of Computer Applications (Semester – II)

Compulsory Course

**ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ**

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

Course title & Code	Total Teaching Hours	Credits	Credit distribution			Total Marks 100		Time Allowed in Exam	Eligibility criteria	Pre-requisite of the course (if any)
			Lecture	Tutorial	Practical	Theory	Internal Assessment			
ਲਾਜ਼ਮੀ ਪੰਜਾਬੀ BHPB-1201	60	4	4	0	0	75	25	3 Hours	Class 12th pass in any stream	--

<p><b>ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective</b></p> <ul style="list-style-type: none"> <li>▪ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕਰਨਾ।</li> <li>▪ ਆਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ।</li> <li>▪ ਵਿਦਿਆਰਥੀ ਨੂੰ ਦਫਤਰੀ ਅਤੇ ਘਰੇਲੂ ਚਿੱਠੀ ਪੱਤਰ ਤੋਂ ਜਾਣੂ ਕਰਵਾਉਣਾ।</li> <li>▪ ਭਾਸ਼ਾਈ ਗਿਆਨ ਵਿਚ ਵਾਧਾ ਕਰਨਾ।</li> </ul>	<p><b>ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)</b></p> <ul style="list-style-type: none"> <li>▪ ਉਸ ਅੰਦਰ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪ੍ਰਫੁੱਲਿਤ ਹੋਣਗੀਆਂ।</li> <li>▪ ਉਸ ਅੰਦਰ ਸਾਹਿਤ ਸਿਰਜਣਾ ਦੀ ਸੰਭਾਵਨਾ ਵਧੇਗੀ।</li> <li>▪ ਵਿਦਿਆਰਥੀ ਚਿੱਠੀ-ਪੱਤਰ ਦੀ ਲਿਖਣ ਸ਼ੈਲੀ ਤੋਂ ਜਾਣੂ ਹੋਵੇਗਾ।</li> <li>▪ ਉਹ ਭਾਸ਼ਾਈ ਬਣਤਰ ਤੋਂ ਜਾਣੂ ਹੋਵੇਗਾ।</li> </ul>
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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। ਸਿਲੇਬਸ ਦੇ ਬਾਕੀ ਚਾਰ ਭਾਗਾਂ ਵਿਚ 02-02 ਲੇਖ ਨੁਮਾ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰੇਕ ਭਾਗ ਵਿਚੋਂ 01-01 ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ 15 ਅੰਕ ਹੋਣਗੇ। ਪੇਪਰ ਸੈੱਟਰ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

**ਨੋਟ:** ਇੰਟਰਨਲ ਅਸੈਸਮੈਂਟ 25 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁੱਲ ਅੰਕ 75+25= 100 ਹਨ।

#### ਪਾਠ-ਕ੍ਰਮ

##### ਭਾਗ-ਪਹਿਲਾ

**ਸਾਹਿਤ ਦੇ ਰੰਗ,** ਡਾ. ਮਹਿਲ ਸਿੰਘ (ਸੰਪਾ.), ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।

ਭਾਗ ਦੂਜਾ - ਵਾਰਤਕ ਅਤੇ ਰੇਖਾ-ਚਿੱਤਰ, ਡਾ. ਪਰਮਿੰਦਰ ਸਿੰਘ, ਡਾ. ਭੁਪਿੰਦਰ ਸਿੰਘ ਅਤੇ ਡਾ.ਕੁਲਦੀਪ ਸਿੰਘ ਢਿੱਲੋਂ (ਸਹਿ ਸੰਪਾ.)

(ਵਾਰਤਕ ਭਾਗ ਵਿਚੋਂ ਸਾਰ/ਵਿਸ਼ਾ-ਵਸਤੂ। ਰੇਖਾ-ਚਿੱਤਰ ਭਾਗ ਵਿਚੋਂ ਸਾਰ/ਨਾਇਕ ਬਿੰਬ)

##### ਭਾਗ-ਦੂਜਾ

**ਪੰਜਾਬ ਦੇ ਮਹਾਨ ਕਲਾਕਾਰ** (ਸੰਪਾ. ਬਲਵੰਤ ਗਾਰਗੀ)

ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

(ਸਤੀਸ਼ ਗੁਜਰਾਲ ਤੋਂ ਸੁਰਿੰਦਰ ਕੌਰ ਤਕ)

(ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ/ਨਾਇਕ ਬਿੰਬ)

##### ਭਾਗ-ਤੀਜਾ

(ੳ) ਦਫਤਰੀ ਚਿੱਠੀ ਪੱਤਰ

(ਅ) ਮੁਹਾਵਰੇ ਅਤੇ ਅਖਾਣ

##### ਭਾਗ-ਚੌਥਾ

(ੳ) ਸ਼ਬਦ-ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ-ਰਚਨਾ - ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਮੁੱਢਲੇ ਸੰਕਲਪ

(ਅ) ਸ਼ਬਦ-ਸ਼੍ਰੇਣੀਆਂ

**Bachelor of Computer Applications (Semester – II)**

Compulsory Course

**ਮੁਢਲੀ ਪੰਜਾਬੀ**

(In Lieu of Compulsory Punjabi)

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

Course title & Code	Total Teaching Hours	Credits	Credit distribution			Total Marks 100		Time Allowed in Exam	Eligibility criteria	Pre-requisite of the course (if any)
			Lecture	Tutorial	Practical	Theory	Internal Assessment			
ਮੁਢਲੀ ਪੰਜਾਬੀ  BPBI-1202	60	4	4	0	0	75	25	3 Hours	Class 12th pass in any stream	

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

ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਭਾਗ ਵਿਚ 01-01 ਅੰਕ ਦੇ ਅਤਿ-ਸੰਖੇਪ ਉੱਤਰ ਵਾਲੇ (Objective Type) 11 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜੋ ਕਿ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ ਹੋਣਗੇ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਦੂਸਰੇ ਭਾਗ ਵਿਚ, ਸਿਲੇਬਸ ਦੇ ਪਹਿਲੇ ਭਾਗ ਵਿਚੋਂ ਤਿੰਨ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨਾਂ ਵਿਚੋਂ ਕੋਈ ਦੋ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ 8-8 ਅੰਕ ਹੋਣਗੇ। ਇਸੇ ਤਰ੍ਹਾਂ ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਤੀਸਰੇ ਭਾਗ ਵਿਚ ਤਿੰਨ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿੰਨਾਂ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ 8-8 ਅੰਕ ਹੋਣਗੇ। ਭਾਗ ਚੌਥੇ ਵਿਚ ਪੰਜ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨਾਂ ਵਿਚੋਂ ਚਾਰ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ 4-4 ਅੰਕ ਹੋਣਗੇ। ਭਾਗ ਪੰਜਵੇਂ ਵਿਚ ਤਿੰਨ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨਾਂ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ 8-8 ਅੰਕ ਹੋਣਗੇ।

**ਨੋਟ:** ਇੰਟਰਨਲ ਅਸੈਸਮੈਂਟ 25 ਅੰਕਾਂ ਦੀ ਹੈ, ਜੋ ਕਾਲਜ ਵੱਲੋਂ ਨਿਰਧਾਰਿਤ ਦਿਸ਼ਾ ਨਿਰਦੇਸ਼ਾਂ ਅਨੁਸਾਰ ਥਿਊਰੀ ਅੰਕਾਂ ਤੋਂ ਵੱਖਰੀ ਹੋਵੇਗੀ। ਇਸ ਪੇਪਰ ਦੇ ਕੁੱਲ ਅੰਕ 75+25 = 100 ਹਨ।

**ਪਾਠ-ਕ੍ਰਮ**

**ਭਾਗ-ਪਹਿਲਾ**

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

**ਭਾਗ-ਦੂਜਾ**

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਪ੍ਰਕਾਰ:

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

(ਅ) ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ

**ਭਾਗ-ਤੀਜਾ**

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਰਚਨਾ:

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

**ਭਾਗ-ਚੌਥਾ**

ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ

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



**Bachelor of Computer Applications (Semester – II)**  
**PUNJAB HISTORY & CULTURE (C 321 TO 1000 A.D.)**  
(Special Paper in lieu of Punjabi compulsory)  
(For those students who are not domicile of Punjab)  
Course Code: BPHC-1204

**Time: 3 Hours**

**Credit Hours (per week): 04**

**Total. Marks: 100**

**L T P**

**Theory: 75**

**4 0 0**

**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:-

- a. L. Joshi (ed.), *History and Culture of the Punjab*, Part-I, Patiala, 1989 (3rd edition).
- b. L.M. Joshi and Fauja Singh (ed), *History of Punjab*, Vol.I, Patiala 1977.
- c. Budha Parkash, *Glimpses of Ancient Punjab*, Patiala, 1983.
- d. 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 India dynasties.
- CO-3** Study about the political developments from 7<sup>th</sup> century to 1000AD.
- CO-4** Understand socio-cultural history of the Punjab from 7<sup>th</sup> century to 1000 AD.
- CO-5** Analyse language, literature, art and architecture of Ancient Punjab.

**Bachelor of Computer Applications (Semester – II)**  
**BCA-124P: Lab-I (C++ Programming Language)**  
**Skill Enhancement Course (SEC)**

**Time: 3 Hrs.**

**Total Marks: 100**

Credits		
L	T	P
0	0	4

**Practical Marks: 75**

**Practical Internal Assessment Marks:25**

**Course Objectives:**

The learning objectives of this course are:

<b>1.</b>	To understand how C++ improves C with object-oriented features.
<b>2.</b>	To learn how containment and inheritance promote code reuse in C++.
<b>3.</b>	To learn how inheritance and virtual functions implement dynamic binding with polymorphism.
<b>4.</b>	To learn how to design C++ classes for code reuse.
<b>5.</b>	To know how to implement copy constructors and class member functions.

**Practical based on Programming in C++**

**Course Outcomes:**

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

<b>CO-1.</b>	Apply the concepts of object-oriented programming.
<b>CO-2.</b>	Illustrate the process of data file manipulations using C++.
<b>CO-3.</b>	Students will be able to identify different class attributes, member functions, base class and derived class and their relationships among them.
<b>CO-4.</b>	Apply virtual and pure virtual function & complex programming situations.

## Bachelor of Computer Applications (Semester – II)

### BCA-125P: Lab–II (Implementation of Numerical Methods in C++) Skill Enhancement Course (SEC)

Time: 3 Hrs.

Total Marks: 100

Credits		
L	T	P
0	0	4

Practical Marks: 75

Practical Internal Assessment Marks:25

#### Course Objectives:

1.	To enhance the problem solving skills of engineering students using an extremely powerful problem solving tool namely numerical methods.
2.	This will help students choose, develop and apply the appropriate numerical techniques for your problem, interpret the results, and assess accuracy.
3.	The problems cover  I. Systems of linear equations; linear least squares problems II. Interpolation and approximation.

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

#### Course Outcomes:

On completion of this course students will able to:

CO-7.	Understand numerical techniques to find the roots of non-linear equations and solution of system of linear equations.
CO-8.	Apply numerical methods to obtain approximate solutions to mathematical problems.
CO-9.	Understand the difference operators and the use of interpolation.
CO-10.	Analyses and evaluate the accuracy of common numerical methods
CO-11.	Interpret calculation and errors in numerical method.
CO-12.	Effectively writes mathematical solutions and their interpretation in a clear and concise manner. This will be assessed through class quizzes and tests and a final exam.

**Bachelor of Computer Applications (Semester – II)**  
**Course Code: ZDA121**  
**Course Title-DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION**  
**DRUG ABUSE: MANAGEMENT AND PREVENTION**  
**(Compulsory for all Under Graduate Classes)**

Time: 3 Hours

Credit hrs/wk.: 2  
Max. Marks: 50

**Instructions for the Paper Setters:**

- 1) There will be a total of 9 questions of which 5 are to be attempted.
- 2) Question 1 is compulsory and having 10 short answer type questions (1 mark each).
- 3) The remaining 8 questions (10 marks each) shall include 2 questions from each unit. Candidates shall be required to attempt 4 questions, one from each unit. Preferably, the question should not be split into more than two sub-parts.

**Course Objectives:**

The course aim is to

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

**UNIT-I**

- **Prevention of Drug abuse**

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

**UNIT-II**

- School: Counseling, Teacher as role-model.
- Parent-teacher-Health Professional Coordination, Random testing on students.

**UNIT-III**

- **Controlling Drug Abuse**

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

**UNIT-IV**

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

**References:**

1. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
2. Gandotra, R. and Randhawa, J.K. 2018. *Drug Abuse-Management and Prevention*. Kasturi Lal & Sons, Educational Publishers, Amritsar- Jalandhar.
3. Inciardi, J.A. 1981. *The Drug Crime Connection*. Beverly Hills: Sage Publications.
4. Modi, Ishwar and Modi, Shalini (1997) *Drugs: Addiction and Prevention*, Jaipur: Rawat Publication.
5. Randhawa, J.K. and Randhawa, Samreet 2018. *Drug Abuse-Management and Prevention*. Kasturi Lal & Sons, Educational Publishers, Amritsar- Jalandhar.
6. Sain, Bhim 1991, *Drug Addiction Alcoholism, Smoking obscenity* New Delhi: Mittal Publications.
7. Sandhu, Ranvinder Singh, 2009, *Drug Addiction in Punjab: A Sociological Study*. Amritsar: Guru Nanak Dev University.
8. Singh, C. P. 2000. *Alcohol and Dependence among Industrial Workers*: Delhi: Shipra.
9. World Drug Report 2011, United Nations office of Drug and Crime.
10. World Drug Report 2010, United Nations office of Drug and Crime

**Course Outcomes:**

The students will be able to:

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

## Bachelor of Computer Applications

### Semester – III

SN	Course Code	Course Name	Distribution of The Marks				Lectures Per week			Credit Distribution			Total Credit L+T+P	Page No.
			Theory	Internal Assessment	Practical	Total	L	T	P	L	T	P		
<b>Discipline Specific Course(DSC)</b>														
1	BCA-231 (Major)	Computer Architecture	75	25	0	100	5	1	0	3	1	0	4	40-41
2	BCA-232 (Major)	Database Management System	75	25	0	100	5	1	0	3	1	0	4	42-43
3	BCA-233 (Major)	Computational Problem Solving Using Python	75	25	0	100	5	1	0	3	1	0	4	44-45
<b>Skill Enhancement Course(SEC)</b>														
6	BCA-234P	Programming Lab I – Python	0	13	37	50	0	0	6	0	0	2	2	46
7	BCA-235P	Programming Lab II – Oracle	0	13	37	50	0	0	6	0	0	2	2	47
<b>Value Added Course(VAC)</b>														
8	ESL-221	*Environmental Studies – I (Compulsory)	-	-	-	50	2	0	0	2	0	0	2	48-50
									<b>Total Credits=18</b>					

**Note: \*This paper marks will not be included in the total marks.**

**Bachelor of Computer Applications (Semester – III)**  
**BCA-231: Computer Architecture**  
**Discipline Specific Course (DSC)**

**Time: 3 Hrs.**

**Total Marks: 100**

Credits		
L	T	P
3	1	0

**Theory Marks: 75**

**Theory Internal Assessment Marks:25**

**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 15 marks consisting of 8 short answer type questions carrying 2.5 mark 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 15 marks each from the respective unit. The students are required to attempt one question from each of these sections.**

**Course Objectives:**

Students will try to learn:

<b>1.</b>	Conceptualize the basics of organizational and architectural issues of a digital computer.
<b>2.</b>	Analyze processor performance improvement using instruction level parallelism.
<b>3.</b>	Study various data transfer techniques in digital computer.
<b>4.</b>	Articulate design issues in the development of processor or other components that satisfy design requirements and objectives.

**UNIT-I**

**Information Representation:** Register Transfer Language, Various Registers, Implementing Common Bus Using 16-bit and Multiplexers: Logical; Arithmetic & Shift Micro – operations.

**Basic Computer Design** Instruction Codes, Interfacing various Registers, Computer Instructions, Timing and control,, Interrupt cycle, Instruction Cycle, Design of a Basic Computer.

**UNIT-II**

**CPU Design** General register organization Stack Organized CPU, Instruction Formats, Addressing Modes, , RISC, CISC, Program Control, Hardwired & Microprogrammed Control Unit.

**UNIT-III**

**Memory Organization** Memory Hierarchy, Designs & Concepts of Main Memory, Auxiliary Memory Cache and Virtual Memory.



**I/O Organization** I/O Interface, Modes of Transfer, DMA-DMA Transfer and DMA Controller & I/O Processor.

#### **UNIT-IV**

**Pipeline & Vector Processing** Parallel Processing Pipelining- Arithmetic Pipelining and Instruction Pipelining, Parallel & Distributed Computers, SISD, SIMD & MISD, MIMD Machines, Vector Processing.

**Case study of VAX 11/780**

**References:**

1. Computer System Architecture by M. Morris Mano , Third Edition, Pearson Education Inc,1992
- 2.Computer Architecture: A Quantitative Approach by John L. Hennessy and David A. Patterson, Fifth Edition, Morgan Kaufmann Publishers,2012
3. Computer Organization & Architecture - Designing for Performance by William Stallings, Eighth Edition, Pearson, 2010
- 4.Computer Architecture and Organization: John .P. Hayes,McGraw Hill,1998
5. Computer Systems Design and Architecture “by Vincent P Heuring and Harry F Jordan second edition,2003

**Course Outcomes:**

Students will able to:

<b>CO-1.</b>	Describe basic organization of computer.
<b>CO-2.</b>	Demonstrate control unit operations and conceptualize instruction level parallelism.
<b>CO-3.</b>	Demonstrate and perform computer arithmetic operations.
<b>CO-4.</b>	Categorize memory organization and explain the function of each element of a memory hierarchy.
<b>CO-5.</b>	Identify and compare different methods for computer I/O mechanisms.

**Bachelor of Computer Applications (Semester – III)**  
**BCA-232: Database Management System**  
**Discipline Specific Course (DSC)**

**Time: 3 Hrs.**

**Total Marks: 100**

Credits		
L	T	P
3	1	0

**Theory Marks: 75**

**Theory Internal Assessment Marks:25**

**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 15 marks consisting of 8 short answer type questions carrying 2.5 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 15 marks each from the respective unit. The students are required to attempt one question from each of these sections.**

**Course Objectives:**

<b>1.</b>	To get acquaint students with the basics of DBMS, different Architectural Models for DBMS, Normalization of data, Concurrency control problems and its management, Protection, Security and recovery aspects of databases along with practical knowledge of databases using SQL and PL/SQL.
<b>2.</b>	The key goal is to prepare students for a professional career in the field of data administration and database design.
<b>3.</b>	To get acquaint students with basics of database security and administration.
<b>4.</b>	To get acquaint students with good knowledge of DBMS. During the course, students will learn about database design and database handling activities.

**UNIT-I**

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 data model -entities, attributes, relationships, generalization, specialization, specifying constraints. E–R diagram, different keys used in a relational system.

**UNIT-II**

SQL, definition of relation, relational model integrity rules, Relational form like 1NF, 2NF, 3NF, BCNF, 4<sup>th</sup> NF, 5<sup>th</sup> NF.

Concurrency Control and its management, protection, security, recovery of database.

### UNIT-III

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

### UNIT-IV

**Big Data:** Introduction to Big Data ,Hadoop Structure,Introduction to NoSQL

Introductory knowledge and classification of NoSQL databases based upon Column (HBase), Document (MongoDB), Keyvalue (Oracle NoSQL database), Graph, Multimodel and their query languages.

#### References:

- 1.Bayross I., SQL, PL/SQL the Programming Language of Oracle, BPB Publications (2009) 4th ed.
2. Hoffer J., Venkataraman, R. and Topi, H., Modern Database Management, Pearson (2016) 12th ed.
- 3.Silverschatz A., Korth F. H. and Sudarshan S., Database System Concepts, Tata McGraw Hill (2010) 6th ed.
4. Elmasri R. and Navathe B. S., Fundamentals of Database Systems, Pearson (2016) 7th ed

#### Course Outcomes:

At the end of this course the student shall be able to:

<b>CO-1.</b>	Knowledge & Understanding: Databases and their design & development
<b>CO-2.</b>	Intellectual Cognitive/ analytical skills: Normalization of Databases.
<b>CO-3.</b>	Practical Skills: Using SQL and PL/SQL.
<b>CO-4.</b>	Transferable skills: Usage of DBMS design and administration.

**Bachelor of Computer Applications (Semester – III)**  
**BCA-233: Computational Problem Solving Using Python**  
**Discipline Specific Course (DSC)**

**Time: 3 Hrs.**

**Total Marks: 100**

Credits		
L	T	P
3	1	0

**Theory Marks: 75**

**Theory Internal Assessment Marks:25**

**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 15 marks consisting of 8 short answer type questions carrying 2.5 mark 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 15 marks each from the respective unit. The students are required to attempt one question from each of these sections.**

**Course Objectives:**

<b>1.</b>	Build basic programs using fundamental programming constructs like variables, conditional logic, looping, and functions
<b>2.</b>	Work with user input to create fun and interactive programs
<b>3.</b>	Create simple games with images, animations, and audio using our custom beginner-friendly programming library.

### **UNIT-I**

**Introduction to Python:** Process of Computational Problem Solving, Python Programming Language

**Data and Expressions:** Literals, Variables and Identifiers, Operators, Expressions, Statements and Data Types

**Control Structures:** Boolean Expressions (Conditions), Logical Operators, Selection Control, Nested conditions, Debugging.

### **UNIT-II**

**Lists:** List Structures, Lists (Sequences) in Python, Iterating Over Lists (Sequences) in Python

**Iteration:** While statement, Definite loops using For, Loop Patterns,

**Functions:** Fundamental Concepts, Program Routines, Flow of Execution, Parameters & Arguments, Recursive Functions, Recursive Problem Solving, Iteration vs. Recursion

### **UNIT-III**

**Dictionaries:** Dictionaries and Files, Looping and dictionaries, Advanced text parsing

**Files:** Opening Files, Using Text Files

**String Processing:** Accessing Values from Strings, Updating Strings, Strings Special Operators and Formatting Operators, Built-in String Methods.

**Exception Handling:** Standard Exceptions, Assertions in Python, Handling an Exception in Python, Clause with no exception, Clause with multiple exceptions, try-finally Clause.

#### UNIT-IV

**Objects and Their Use:** Introduction to Object Oriented Programming

**Modular Design:** Modules, Top-Down Design, Python Modules

**Using Databases and SQL:** Database Concepts, SQLite Manager Firefox Add-on, SQL basic summary, Basic Data modeling, Programming with multiple tables.

#### References:

1. Python for Informatics, Charles Severance, version 0.0.7 2009
2. Introduction to Computer Science Using Python: A Computational Problem-Solving Focus, Charles Dierbach, Wiley Publications, 2012, ISBN : 978-0-470-91204-1
3. Introduction To Computation And Programming Using Python JOHN V GUTTAG,, PHI, 2014, The MIT Press, ISBN-13: 978-8120348660
4. Introduction to Computing & 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, Pearson Education, 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

#### Course Outcomes:

The students, after the completion of the course, are expected to:

<b>CO-1.</b>	Build basic programs using fundamental programming constructs like variables, conditional logic, looping, and functions.
<b>CO-2.</b>	Work with user input to create fun and interactive programs
<b>CO-3.</b>	Define and demonstrate the use of built-in data structures “lists” and “dictionary”
<b>CO-4.</b>	Design and implement a program to solve a real-world problem.
<b>CO-5.</b>	Design and implement GUI application and how to handle exceptions and files.
<b>CO-6.</b>	Make database connectivity in python programming language.
<b>CO-7.</b>	Identify the commonly used operations involving file systems.

**Bachelor of Computer Applications (Semester - III)**  
**Paper BCA-234P**  
**Programming Lab I –Python**  
**Skill Enhancement Course (SEC)**

**Time: 3 Hrs.**

**Total Marks: 50**

Credits		
L	T	P
0	0	2

**Practical Marks: 37**

**Practical Internal Assessment Marks:13**

**Course Objectives:**

<b>1.</b>	Build basic programs using fundamental programming constructs like variables, conditional logic, looping, and functions
<b>2.</b>	Work with user input to create fun and interactive programs
<b>3.</b>	Create simple games with images, animations, and audio using our custom beginner-friendly programming library.

**Lab – I: Based on Python**

**Course Outcomes:**

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

<b>CO-1.</b>	Build basic programs using fundamental programming constructs like variables, conditional logic, looping, and functions.
<b>CO-2.</b>	Work with user input to create fun and interactive programs
<b>CO-3.</b>	Define and demonstrate the use of built-in data structures “lists” and “dictionary”
<b>CO-4.</b>	Design and implement a program to solve a real-world problem.
<b>CO-5.</b>	Design and implement GUI application and how to handle exceptions and files.
<b>CO-6.</b>	Make database connectivity in python programming language.

**Bachelor of Computer Applications (Semester - III)**  
**BCA-235P**  
**Programming Lab II – Oracle**  
**Skill Enhancement Course (SEC)**

**Time: 3 Hrs.**

**Total Marks: 50**

P		
L	T	P
0	0	2

**Practical Marks: 37**

**Practical Internal Assessment Marks:13**

**Course Objectives:**

<b>1.</b>	Enhance the knowledge and understanding of Database analysis and design. Enhance the knowledge of the processes of Database Development and Administration using SQL and PL/SQL.
<b>2.</b>	Enhance Programming skills and techniques using SQL and PL/SQL.
<b>3.</b>	Develop efficient PL/SQL programs to access Oracle databases.
<b>4.</b>	Design modular applications using packages.
<b>5.</b>	Invoke native dynamic SQL to build runtime SQL statements.
<b>6.</b>	Manage data retrieval with cursors and cursor variables.
<b>7.</b>	Enhance performance using collection data types and bulk operations.
<b>8.</b>	Create triggers to solve business challenges and enforce business rules.

**Lab – II: Practical in Oracle**

**Course Outcomes:**

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

<b>CO-1.</b>	Use the Relational model and how it is supported by SQL and PL/SQL.
<b>CO-2.</b>	Use the PL/SQL code constructs of IF-THEN-ELSE and LOOP types as well as syntax and command functions.
<b>CO-3.</b>	Solve Database problems using Oracle: SQL and PL/SQL. This will include the use of Procedures, Functions, Packages, and Triggers.

**Bachelor of Computer Applications**  
**SEMESTER–III**  
**Course code: ESL–221**  
**Course Title: ENVIRONMENTAL STUDIES–I (COMPULSORY)**

**Credit Hours (Per Week): 2**  
**Total Hours: 30**  
**Maximum Marks: 50**

**Instructions for Paper Setters:** The question paper will consist of three sections. Candidate will be required to attempt all the sections. Each unit of the syllabus should be given equal weightage of marks. Paper to be set in English, Punjabi and Hindi.

**Section–A: (16 Marks):** It will consist of five short answer type questions. Candidates will be required to attempt four questions, each question carrying four marks. Answer to any of the questions should not exceed two pages.

**Section–B: (24 Marks):** It will consist of five questions. Candidates will be required to attempt four questions, each question carrying six marks. Answer to any of the questions should not exceed four pages.

**Section–C: (10 Marks):** It will consist of two questions. Candidate will be required to attempt one question (carrying ten marks) only. Answer to the question should not exceed 5 pages.

**Course Objectives**

CO-1	The main goal of Environmental studies is to create the environmental awareness to create a safe, green and sustainable environment.
CO-2	To make students aware about the importance of ecosystem, types of ecosystem, energy flow in an ecosystem, ecological succession, food chain and food web.
CO-3	To make students aware of water conservation, global warming, consumerism and waste products. and, also about the environmental protection acts.
CO-4	Role of National Service Scheme (NSS). Health and hygiene.

**Unit-I**

**The Multidisciplinary Nature of Environmental Studies:** Definition, components, scope and importance of environment/environmental studies, Need for public awareness.

**Natural Resources:** Definition, types, use, over exploitation, benefits, case studies (if any) and associated problems of following natural resources: Forest Resources, Water Resources, Mineral Resources, Food Resources, Energy Resources, Land Recourses *etc.*

Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.



## Unit-II

**Ecosystem:** General introduction, types (Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems *viz.* ponds, streams, lakes, rivers, oceans, estuaries), Structure and functions of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids.

## Unit-III

**Social Issues and Environment:** Sustainable development, Urban problems related to energy, Water conservation, rain water harvesting. 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 its cause. Case studies. Wasteland reclamation.

**Environmental Protection Act:** Air (prevention and Control of Pollution) Act. Water (prevention and Control of Pollution) Act. Wildlife Protection Act, Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness

## Unit-IV

### National Service Scheme

**Introduction and Basic Concepts of NSS:** History, philosophy, aims & objectives of NSS; Emblem, flag, motto, song, badge *etc.*; Organizational structure, roles and responsibilities of various NSS functionaries.

**Health, Hygiene & Sanitation:** Definition, needs and scope of health education; Food and Nutrition; Safe drinking water, water borne diseases and sanitation (Swachh Bharat Abhiyan); National Health Programme; Reproductive health.

### Suggested Books:

1. Agarwal, K. C. 2001. Environmental Biology, Nidhi Publications Ltd. Bikaner.
2. Bharucha, E. 2013 . Textbook of Environmental Studies, Universities Press, Hyderabad.
3. Basu, M., Xavier, S. 2016. Fundamentals of Environmental Studies, Cambridge University Press, India
3. Down to Earth, Centre for Science and Environment, New Delhi.
4. Jadhav, H. and Bhosale, V. M. 1995. Environmental Protection and Laws. Himalaya Pub.
5. Joseph, K. and Nagendran, R. 2004. Essentials of Environmental Studies, Pearson Education (Singapore) Pvt. Ltd., Delhi.
6. Kaushik, A. and Kaushik, C. P. 2004. Perspective in Environmental Studies, New Age International (P) Ltd, New Delhi.
7. Mahapatra, R., Jeevan, S.S. and Das, S. 2017. Environment Reader for Universities, Centre for Science and Environment, New Delhi.

8. Miller, T. G. Jr. 2000. Environmental Science, Wadsworth Publishing Co.
9. Raven, P.H., Hassenzahl, D.M. and Berg, L.R. 2012. Environment. 8th edition. John Wiley & Sons.
10. Sharma, P. D. 2005. Ecology and Environment, Rastogi Publications, Meerut.
11. Booklet on Safe Driving. Sukhmani Society (Suvidha Centre), District Court Complex, Amritsar
12. Kanta, S., 2012. Essentials of Environmental Studies, ABS Publications, Jalandhar.
13. Saroj A., Kaur R., Walia H., Kaur T, 2021. Environmental Studies - A Holistic Approach, KLS Publishers.

**Suggested Websites:**

1. <https://nss.gov.in>
2. <https://moef.gov.in>
3. <http://punervis.nic.in>
4. <https://www.unep.org>

**Course Outcomes:**

CO-1	To learn about the sustainable environment.
CO-2	To gain the knowledge ecosystem and its functioning.
CO-3	To know about the water conservation programs like rain water harvesting and water shedding and to gain knowledge of environmental (air, water and pollution) protections acts.
CO-4	To know about the role and importance of NSS– a volunteer organization, in making up a better environment and to maintain better health and hygiene.

## Bachelor of Computer Applications

### Semester – IV

SN	Course Code	Course Name	Distribution of The Marks				Lectures Per week			Credit Distribution			Total Credit L+T+P	Page No.
			Theory	Internal Assessment	Practical	Total	L	T	P	L	T	P		
<b>Discipline Specific Course(DSC)</b>														
1	BCA-241 (Major)	Data Structures & File Processing	75	25	0	100	5	1	0	3	1	0	4	52-53
2	BCA-242 (Major)	Information Technology	75	25	0	100	5	1	0	3	1	0	4	54-55
3	BCA-243 (Major)	Distributed Computing	75	25	0	100	5	1	0	3	1	0	4	56-57
4	BCA-244 (Major)	System Software	75	25	0	100	5	1	0	3	1	0	4	58-59
<b>Skill Enhancement Course(SEC)</b>														
5	BCA-245P	Lab I- (Data Structures implementation using C++)	0	13	37	50	0	0	6	0	0	2	2	60
6	BCA-246P	Lab II- (Distributed Computing)	0	13	37	50	0	0	6	0	0	2	2	61
<b>Value Added Course(VAC)</b>														
7	ESL-221	*Environmental Studies – I (Compulsory)	-	-	-	50	2	0	0	2	0	0	2	62-64
									<b>Total Credits=18</b>					

**Note:**

1. All the students are required to undergo 'Industrial Training' for 6 weeks in IT Companies after 4th semester final examinations. Final degree to the students will be awarded subject to their successfully completing the 'Industrial Training'.
2. 'Industrial Training' will be evaluated as satisfactory / unsatisfactory internally by the department.
3. Last date for submission of training Report within 1 Week after coming from training.
4. Marks of Paper EVS will not be included in Grand Total.

**Bachelor of Computer Applications (Semester - IV)**

**BCA-241: Data Structures and File Processing  
Discipline Specific Course (DSC)**

**Time: 3 Hrs.**

**Total Marks: 100**

Credits		
L	T	P
3	1	0

**Theory Marks: 75**

**Theory Internal Assessment Marks:25**

**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 15 marks consisting of 8 short answer type questions carrying 2.5 mark 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 15 marks each from the respective unit. The students are required to attempt one question from each of these sections.**

**Course Objectives:**

<b>1.</b>	The main objective of this course is to help students to understand the concept of organizing and managing data in computer's memory.
<b>2.</b>	Therefore, this course introduces different data structure techniques along with their representation in computer's memory.

**UNIT-I**

**Basic Data Structure:** Introduction to elementary Data Organization, Common Operation on Data Structures, Algorithm: Definition, Complexity, Asymptotic Notations: Big O ,Omega, Theta Notation, Time – Space tradeoff between Algorithms.

**Arrays:** Array Defined, Representing Arrays in Memory, Various Operations on Linear Arrays, Multidimensional Arrays :Definition, Representation(row, column wise),Sparse Matrices .

**Searching Techniques:** Linear and Binary Search.

**Linked Lists:** Introduction and Definition, Representing Linked Lists in Memory, Various Operations on Linked Lists, Header linked list, Two Way, Circular Linked List ,Advantages of using Linked Lists over Arrays, Applications of Linked list.

**UNIT-II**

**Stacks:** Description of STACK structure, Implementation of Stack using Arrays and Linked Lists, Applications of Stacks –Arithmetic expression: Types ,Conversion from infix notation to Postfix and their subsequent evaluation, Recursion,etc.

**Queues:** Description of queue structure, Implementation of queue using arrays and linked lists, Description of priorities of queues, Dequeues.

### UNIT-III

**Sorting Techniques:** Bubble Sort, Selection Sort, Insertion Sort, Merge Sort, Quick sort.

**Trees:** Description of Tree Structure and its Terminology, Binary Trees and Binary Search Trees and their representation in Memory, Insertion and Deletion in BST. Heap Sort.

### UNIT-IV

**Graphs:** Description of Graph Structure, Implement Graphs in Memory using Adjacency Matrix, Path Matrix. Traversing of Graph: BFS, DFS

**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.

#### References:

1. Seymour Lipschutz, **Theory and Problems of Data Structures**, Schaum's Outline Series, McGraw Hill Company, 2017
2. **Data Structures through C** by Yashwant Kanetkar, BPB Publications, 3<sup>rd</sup> edition, 2017
3. **Data Structures through C++**, by Yashwant Kanetkar, BPB Publications 4<sup>th</sup> edition, 2018
4. *Data Structures and Algorithms Made Easy* By Narasimha Karumanchi 5<sup>th</sup> edition, 2016

#### Course Outcomes:

After the course completion, the students will be able to

<b>CO-1</b>	Understand the concept of algorithm complexity and will acquire knowledge about mathematical notations which can be used to measure the algorithm's complexity.
<b>CO-2</b>	Comprehend different data structure techniques, such as array, stacks, queue, linked
<b>CO-3</b>	Apply linear search and binary search techniques in real word applications to identify the particular element.
<b>CO-4</b>	Get knowledge about different sorting algorithms along with their time complexities.
<b>CO-5</b>	Implement, trees, and graphs, along with the operations performed on them.
<b>CO-6</b>	Understand the memory representation of the above-mentioned data structures.
<b>CO-7</b>	Understand the concept of files and Hashing.

**Bachelor of Computer Applications (Semester - IV)**  
**BCA-242: Information Technology**  
**Discipline Specific Course (DSC)**

**Time: 3 Hrs.**

**Total Marks: 100**

Credits		
L	T	P
3	1	0

**Theory Marks: 75**

**Theory Internal Assessment Marks:25**

**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 15 marks consisting of 8 short answer type questions carrying 2.5 mark 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 15 marks each from the respective unit. The students are required to attempt one question from each of these sections.**

**Course Objectives:**

<b>1.</b>	It aims at acquainting students better with the essentials of Information, system and management. It encompasses study of Information Systems (IS), its functions, types and categories and SDLC mainly.
<b>2.</b>	Career prospectus after completion of course of study are as Data and Information manager, Data administrator, Data analyst, Information Officer, Application analyst, IT consultant, IT technical support officer and allied jobs.
<b>3.</b>	The primary goal is to prepare students for full knowledge of internet, its working ,application and its various protocols
<b>4.</b>	To get good knowledge of internet protocol, working of all protocols.
<b>5.</b>	To get knowledge of basics of cloud computing and IoT .

**UNIT-I**

**Information Systems**

Introduction to IT & its components, What is Information systems, Management Information System, Decision Support System, Expert System, Functional Information System, Open Information System, Transaction Processing System, office Automation systems, MIS and decision support system, SDLC & System development Tools.

**About internet and IoT:**

Introduction of IoT and applications of IoT, Architecture of IoT, Various platforms for IOT,Real time examples of IOT, Introduction to internet & its working ,various services offered by internet,

evolution of internet, internet service provider (ISP), windows environment for dial up networking (connecting to internet), audio on internet, Internet Addressing (DNS and IP addresses).

## UNIT-II

**Internet Protocol:** Introduction, file transfer protocol (FTP), Gopher, Telnet, other protocols like HTTP and TCP/IP.

**Introduction to Cloud Computing.** Introduction of Cloud Computing, benefits and limitations of cloud computing ,architecture of cloud computing.

### References:

- 1.Peter Norton(2010), “Introduction to Computers”, Glencoe, 7<sup>th</sup> edition Macmillan/McGraw Hill.
2. Patric, G.Mckeown, Living with the Computers, 2nd edition, HBT Publishers, USA.
3. Hussain & Hussain, Computer Technology, Applications & Social Implications, PHI.
- 4.“Internet Technologies”, S. K. Bansal, APH Publishing Corporation (April 1, 2002).
- 5.The Basics of Cloud Computing,Derrick Roundtree, edition 2014 Elsevier publishers
- 6.Fundamentals of IoT by Dr.V.Devi ,Dr.P.Radhakrishnan,Dr.C.shranya

### Course Outcomes

At the end of this course the student shall be able to:

<b>CO-1.</b>	Knowledge and Understanding: Software Development Life Cycle (SDLC) Development.
<b>CO-2.</b>	Transferable skills: Software requirement specification, S/W Design Tools, SDLC skills Knowledge and Understanding, Intellectual Skills, practical Skills, Transferable skills).
<b>CO-3.</b>	Knowledge and Understanding to define internet, www, various protocols and understand the working of internet
<b>CO-4.</b>	Intellectual (Cognitive/Analytical) Skills: Students will be able to identify which medium and topology should be used for networking. Students will be able to judge which connection should they use for getting an internet at home or work.
<b>CO-5.</b>	Practical Skills: Students will learn to able to create HTML based web pages and Create e-mail ids.

**Bachelor of Computer Applications (Semester - IV)**  
**BCA-243: Distributed Computing**  
**Discipline Specific Course (DSC)**

**Time: 3 Hrs.**

**Total Marks: 100**

Credits		
L	T	P
3	1	0

**Theory Marks: 75**

**Theory Internal Assessment Marks:25**

**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 15 marks consisting of 8 short answer type questions carrying 2.5 mark 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 15 marks each from the respective unit. The students are required to attempt one question from each of these sections.**

**Course Objectives:**

1.	Distributed Systems combine the computational power of multiple computers to solve complex problems.
2.	The individual computers in a distributed system are typically spread over broad geographies and possess heterogeneous processor and operating system architectures.
3.	To learn the principles, architectures, algorithms and programming models used in distributed systems.
4.	To examine state-of-the-art distributed systems, such as Google File System.
5.	To design and implement sample distributed systems.

**UNIT I**

**Basic Concepts** - Characterization of Distributed Systems, Examples, Resource Sharing, Web Challenges, System Models–,Architectural and Fundamental Models, Networking and Internetworking, Types of Networks, Network Principles , Internet Protocols .

**UNIT-II**

**Processes and Distributed Objects** - Inter–process Communication ,The API for the Internet Protocols ,External Data Representation and Marshalling , Client –Server Communication , Group Communication , Distributed Objects and Remote Invocation – Communication Between Distributed Objects , Remote Procedure Call , Events and Notifications .



### UNIT III

**Operating System Issues** - The OS Layer, Protection, Processes and Threads, Communication and Invocation, OS Architecture, Security Overview, Cryptographic Algorithms, Digital Signatures.

### UNIT-IV

**Distributed Transaction Processing** - Transactions, Nested Transactions, Locks, Optimistic Concurrency Control, Timestamp Ordering, Comparison of Flat and Nested Distributed Transactions, Atomic Commit Protocols, Concurrency Control in Distributed Transactions, Distributed Deadlocks, Recovery.

#### Refereces:

- 1.George Coulouris, Jean Dollimore and Tim Kindberg, “Distributed Systems Concepts and Design”, 3rd Edition, Pearson Education, 2002.
- 2.Andrew S. Tanenbaum, Maarten van Steen, Distributed Systems, “Principles and Paradigms”, Pearson Education, 2002.
- 3.Jennifer Welch Hagit Attiya, ”Distributed Computing :Fundamentals, Simulations and Advanced Topics”, 2<sup>nd</sup> edition, Wiley, 2006.
- 4.M.L. Liu, ”Distributed Computing: Principles and Applications”, 1<sup>st</sup> edition, Pearson Education, 2004.

#### Course Outcomes:

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

<b>CO-1.</b>	Understand the design principles in distributed systems and the architectures for distributed systems.
<b>CO-2.</b>	Apply various distributed algorithms related to clock synchronization, concurrency control, deadlock detection, load balancing, voting.
<b>CO-3.</b>	Analyze fault tolerance and recovery in distributed systems and algorithms for the same.
<b>CO-4.</b>	Analyze the design and functioning of existing distributed systems and file systems and implement different distributed algorithms over currently distributed platforms
<b>CO-5.</b>	Identify the core concepts of distributed systems: how several machines orchestrate to solve problems efficiently, reliable and scalable way correctly.

**Bachelor of Computer Applications (Semester - IV)**  
**BCA-244: SYSTEM SOFTWARE**  
**Discipline Specific Course (DSC)**

**Time: 3 Hrs.**

**Total Marks: 100**

Credits		
L	T	P
3	1	0

**Theory Marks: 75**

**Theory Internal Assessment Marks:25**

**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 15 marks consisting of 8 short answer type questions carrying 2.5 mark 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 15 marks each from the respective unit. The students are required to attempt one question from each of these sections.**

**Course Objective:**

<b>1.</b>	To understand the relationship between system software and machine architecture.
<b>2.</b>	To Learn the processing of an HLL program for execution on a computer
<b>3.</b>	To understand the process of scanning and parsing.

**UNIT-I**

**Introduction to System Software**

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

**UNIT-II**

**Assemblers**

Overview of assembly process, design of one pass and two assemblers

**Macroprocessors**

Macro definition and expansion, concatenation of macro parameters, generations of unlabelled, conditional macro expansion, Recursive macro expansion

**UNIT-III**

**Compilers**

Phases of Compilation Process, Lexical Analysis, Parsing, Storage Management Optimization  
Incremental Compilers, Cross Compilers.

**UNIT-IV**

**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, AddisonWesley.
2. D.M. Dhamdhare: Introduction to System Software, Tata McGraw Hill.
3. D.M. Dhamdhare: System Software and Operating System, Tata McGraw Hill, 1992.
4. Madrich, Stuarde: Operating Systems, McGraw Hill, 1974.
5. Stern Nancy Assembler Language Programming for IBM and IBM CompatibleComputers, John Wiley, 1991.

**Course Outcome:**

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

<b>CO-1.</b>	Understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger.
<b>CO-2.</b>	Describe the various concepts of assemblers and macro processors.
<b>CO-3.</b>	Understand various phases of compiler and compare its working with assembler.
<b>CO-4.</b>	Understand how linker and loader create an executable program from an object module created by assembler and compiler.
<b>CO-5.</b>	Know various editors and debugging techniques.

## Bachelor of Computer Applications (Semester - IV)

### BCA-245P: Lab I– (Data Structures implementation using C++) Skill Enhancement Course (SEC)

Time: 3 Hrs.

Total Marks: 50

Credits		
L	T	P
0	0	4

Practical Marks: 37

Practical Internal Assessment Marks:13

#### Course Objectives:

1.	The main objective of this practical lab is to make the students to be able to implement the programs utilizing different data structure techniques to organize and manage data in computer's memory.
2.	The students will gain an understanding of different approaches available for searching and sorting the data and further be able to identify the methods requiring minimum time to perform the pre-mentioned tasks.

#### Lab – Data Structure implementation using C++

#### Course Outcomes:

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

CO-1.	Implement the real world applications by making use of linear data structure, such as, arrays, stacks, queues, linked lists, trees and graphs, to handle the data stored in computer's memory.
CO-2.	Perform the implementation using non-linear data structure, such as, trees and graphs.
CO-3.	Perform traversing, insertion, and deletion operations on the above mentioned data structures.
CO-4.	Perform the search operations by making use of suitable search technique.
CO-5.	Sort the data by using different sorting techniques and can also assess the time requirement of the available sorting techniques.

**Bachelor of Computer Applications (Semester - IV)**  
**BCA-246P: Lab II– (Distributed Computing)**  
**Skill Enhancement Course (SEC)**

**Time: 3 Hrs.**

**Total Marks: 50**

Credits		
L	T	P
0	0	2

**Practical Marks: 37**

**Practical Internal Assessment Marks:13**

**Course Objectives:**

<b>1.</b>	Demonstrate knowledge of the essential elements and concepts related to distributed system technologies.
<b>2.</b>	Demonstrate knowledge of the core architectural aspects of distributed systems.
<b>3.</b>	Design and implement distributed applications demonstrate knowledge of details of the main underlying components of distributed systems (such as RPC, file systems).
<b>4.</b>	Demonstrate experience in building large-scale distributed applications.

**Lab II – Distributed Computed** (Client Server, Distributed Objects and operating system issues & HTML, DHTML).

**Course Outcomes:**

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

<b>CO-1.</b>	Practically implement the client-server architecture.
<b>CO-2.</b>	Understand the implementation of Remote Method Invocation.
<b>CO-3.</b>	Explain the design and development of distributed systems and distributed systems applications.
<b>CO-4.</b>	Implementation of Chat Server.
<b>CO-5.</b>	Implementation of Ping, trace routing, and IP-configuration commands.

**Bachelor of Computer Applications (Semester - IV)**  
**Course Code: ESL–222**  
**Course Title: ENVIRONMENTAL STUDIES–II (COMPULSORY)**

**Credit Hours (Per Week): 2**

**Total Hours: 30**

**Maximum Marks: 50**

**Instructions for Paper Setters:** The question paper will consist of three sections. Candidate will be required to attempt all the sections. Each unit of the syllabus should be given equal weightage of marks. Paper to be set in English, Punjabi and Hindi.

**Section–A: (16 Marks):** It will consist of five short answer type questions. Candidates will be required to attempt four questions, each question carrying four marks. Answer to any of the questions should not exceed two pages.

**Section–B: (24 Marks):** It will consist of five questions. Candidates will be required to attempt four questions, each question carrying six marks. Answer to any of the questions should not exceed four pages.

**Section–C: (10 Marks):** It will consist of two questions. Candidate will be required to attempt one question (carrying ten marks) only. Answer to the question should not exceed 5 pages.

**Course Objectives**

CO-1	To study the concept of Biodiversity – role, importance, values and its conservation. Hot spots and threats to biodiversity.
CO-2	To create awareness regarding environmental pollution, its causes and effects and preventive measure to control the different types of pollution.
CO-3	To make students aware of growing human population – causes and concern. Family welfare programs. Road safety (Traffic) rules.
CO-4	To know about entrepreneurship development and civil/self defense.

**Unit-I**

**Biodiversity and its Conservation:**

- Definition: Genetic, species and ecosystem diversity.
- Biogeographical classification of India.
- Value of Biodiversity: Consumptive use; productive use, social, ethical, aesthetic and optionvalues.
- Biodiversity of global, National and local levels.
- India as mega-diversity nation.
- Hot-spots of biodiversity.
- Threats to Biodiversity: Habitat loss, poaching of wild life, man wildlife conflicts. Threatened and endemic species of India.
- Endangered species, vulnerable species, and rare species.
- Conservation of Biodiversity: In situ and Ex-situ conservation of biodiversity. National Parks, Wild life sanctuaries, Biosphere reserve, Project Tiger, Project Elephant.

**Unit-II**

## **Environmental Pollution:**

### **Environmental Pollution: Concepts and Types**

- Definition, causes, effects and control measures of:
  - a) Air Pollution
  - b) Water Pollution
  - c) Soil Pollution
  - d) Marine Pollution
  - e) Noise Pollution
  - f) Thermal Pollution
  - g) Nuclear Hazards
  - h) Electronic Waste
- Concepts of hazards waste & human health risks.
- Solid Waste Management: Causes, effects and control measures of municipal, biomedical and e-waste
- Role of an individual in prevention of pollution.
- Pollution case studies.
- Disaster Management: Floods, Earthquake, Cyclone and Landslides.

### **Unit-III**

## **Human Population and the Environment**

- Human population growth: impacts on environment.
- Population explosion-Family welfare programme.
- Environment and human health: Concept of health and disease, common communicable and non communicable diseases, public awareness
- Human rights.
- Value education.
- Women and child welfare.
- Role of information technology in environment and human health.
- Environment movements in India: Chipko movement, Silent valley movement and other case studies.
- Road Safety Rules & Regulations: Use of Safety Devices while Driving, Do's and Don'ts while Driving, Role of Citizens or Public Participation, Responsibilities of Public under Motor Vehicle Act, 1988, General Traffic Signs.
- Accident & First Aid: First Aid to Road Accident Victims, Calling Patrolling Police & Ambulance.

### **Unit-IV**

## **National Service Scheme:**

- **Entrepreneurship Development:** Definition & Meaning; Qualities of good entrepreneur; Steps/ ways in opening an enterprise; Role of financial and support service Institutions.
- **Civil/Self Defense:** Civil defense services, aims and objectives of civil defense; Needs for self-defense training.

### Field Visits:

- 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.
- Contribution of the student to NSS/any other social cause for service of society.
- Visit to Museum/Science City
- Municipal solid waste management and handling.

**Note:** In this section the students will be required to visit and write on the environment of an area/ ecosystem/village industry/disaster/mine/dam/agriculture field/waste management/hospital etc. with its salient features, limitations, their implications and suggestion for improvement.

### References/Books:

1. Agarwal, K. C. 2001. Environmental Biology, Nidhi Publications Ltd. Bikaner.
2. Bharucha, E. 2005. Textbook of Environmental Studies, Universities Press, Hyderabad.
3. Down to Earth, Centre for Science and Environment, New Delhi.
4. Jadhav, H. & Bhosale, V. M. 1995. Environmental Protection and Laws. Himalaya Pub.
5. Joseph, K. and Nagendran, R. 2004. Essentials of Environmental Studies, Pearson Education (Singapore) Pte. Ltd., Delhi.
6. Kaushik, A. & Kaushik, C. P. 2004. Perspective in Environmental Studies, New Age International (P) Ltd, New Delhi.
7. Miller, T. G. Jr. 2000. Environmental Science, Wadsworth Publishing Co.
8. Sharma, P. D. 2005. Ecology and Environment, Rastogi Publications, Meerut.
9. Booklet on Safe Driving. Sukhmani Society (Suvidha Centre), District Court Complex, Amritsar
10. Asthana, D.K. 2006. Text Book of Environmental Studies, S. Chand Publishing.
11. Kanta, S., 2012. Essentials of Environmental Studies, ABS Publications, Jalandhar.
12. Basu, M., Xavier, S. 2016. Fundamentals of Environmental Studies, Cambridge University Press, India.
13. Mahapatra, R., Jeevan, SS, Das S. 2017. Environment Reader for Universities, Centre for Science and Environment, New Delhi.

### Course Outcomes:

CO-1	To know about the meaning of Biodiversity and its role in environment.
CO-2	To know about the causes of different forms of pollution and their control measures.
CO-3	To know about the causes and challenges of growing human population. Women and child welfare programs.
CO-4	To know the development of entrepreneurship and techniques of civil/self defense.



## Bachelor of Computer Applications

### Semester – V

SN	Course Code	Course Name	Distribution of The Marks				Lectures Per week			Credit Distribution			Total Credit L+T+P	Page No.
			Theory	Internal Assessment	Practical	Total	L	T	P	L	T	P		
<b>Discipline Specific Course(DSC)</b>														
1	BCA-351 (Major)	Computer Networks	75	25	0	100	5	1	0	3	1	0	4	66-67
2	BCA-352 (Major)	Programming in Java	75	25	0	100	5	1	0	3	1	0	4	68-69
3	BCA-353 (Major)	Software Engineering	75	25	0	100	5	1	0	3	1	0	4	70-71
4	BCA-354 (Major)	Advanced Web Technologies (ASP.NET)	75	25	0	100	5	1	0	3	1	0	4	72-73
<b>Skill Enhancement Course(SEC)</b>														
5	BCA-355P	Lab I– Programming and Web Development in ASP.NET	0	13	37	50	0	0	6	0	0	2	2	74
6	BCA-356P	Lab II– Programming in Java	0	13	37	50	0	0	6	0	0	2	2	75
									<b>Total Credits=20</b>					

**Bachelor of Computer Applications (Semester – V)**

**BCA-351: Computer Networks**

**Time: 3 Hrs.**

**Total Marks: 100**

Credits		
L	T	P
3	1	0

**Theory Marks: 75**

**Theory Internal Assessment Marks:25**

**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 15 marks consisting of 8 short answer type questions carrying 2.5 mark 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 15 marks each from the respective unit. The students are required to attempt one question from each of these sections.**

**Course Objectives:**

<b>1.</b>	To develop an understanding of different components of computer networks, various protocols, modern technologies and their applications.
<b>2.</b>	To understand the working principle of various communication protocols.
<b>3.</b>	Study the basic taxonomy and terminology of the computer Networking and enumerate the layers of OSI model and TCP/IP model.
<b>4.</b>	Gain core Knowledge of network layer routing protocols and IP addressing.
<b>5.</b>	To know the concept of data transfer between nodes.

**UNIT – I**

**Introduction:** Network Definition, Basic components of a network, network types and topologies, Uses of computer networks, network architecture, Transmission Media(Guided & Unguided),OSI & TCP Model & its comparison.

**Introduction to Analog and Digital Transmission:** Telephone system, Modems, Types of modems, pulse code modulation. Transmission & Switching: Multiplexing, circuit switching packet switching, hybrid switching, ISDN service transmission.

**UNIT – II**

**Local Area Network Protocols:** CSMA Protocols, BRAP, MLMA, IEEE standards 802,

Token Bus, Token Ring, FDDI.

**THE APPLICATION LAYER:** Domain name system, electronic mail, World Wide Web: architectural Overview, dynamic web document and http.

**APPLICATION LAYER PROTOCOLS:** Simple Network Management Protocol, File Transfer Protocol, Simple Mail Transfer Protocol, Telnet.

### UNIT – III

**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.

### UNIT – IV

**Network Security and Privacy:** Brief Introduction to Cryptography.

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

### References:

1. Tanenbaum A.S. ‘Computer Network’, PHI. 4th Edition
2. Stalings W., ‘Data and Computer Communications’, PHI. 8th Edition
3. Data Communication and Networking by Behrouz A Forouzan. 5th Edition
4. Kurose ,Computer Networking ,Pearson publication, Eight Editon

### Course Outcomes:

The students will be able to:

<b>CO-1.</b>	Identify the available internet access technologies and for each of these access technologies, provide a range of transmission rates and networking devices.
<b>CO-2.</b>	Recognize the technological trends of Computer Networking.
<b>CO-3.</b>	Discuss the process of Multiplexing, Switching and Transmission media in networks.
<b>CO-4.</b>	Describe the component and working of wireless networks.
<b>CO-5.</b>	Outline a suitable routing protocol for interconnected networks.

**Bachelor of Computer Applications (Semester – V)**

**BCA-352: Programming in Java**

**Time: 3 Hrs.**

**Total Marks: 100**

Credits		
L	T	P
3	1	0

**Theory Marks: 75**

**Theory Internal Assessment Marks:25**

**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 15 marks consisting of 8 short answer type questions carrying 2.5 mark 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 15 marks each from the respective unit. The students are required to attempt one question from each of these sections.**

**Course Objective:**

<b>1.</b>	To become familiar with the features of Java Language
<b>2.</b>	To discover how to write Java code according to Object-Oriented Programming principles.
<b>3.</b>	To become comfortable with concepts such as Classes, Objects, Inheritance, Polymorphism and Interfaces
<b>4.</b>	To understand how to design, implement, test, debug, and document programs that use basic data types and computation, simple I/O, conditional and control structures, string handling and functions.
<b>5.</b>	To understand the importance of Classes & objects along with constructors, Arrays and Vectors.

**UNIT –I**

**Basic concepts of Java Programming and applications of Java programming.**

Introduction to Java, JVM, Features of java, JDK Environment & tools like (java, javac, applet viewer, javadoc, jdb)

**Object Oriented Programming Concepts:** Overview of Programming, Paradigm, Classes, Abstraction, Encapsulation, Inheritance, Polymorphism, Difference between C++ and JAVA.

**UNIT-II**

**Java Programming Fundamentals :** Structure of java program , Data types ,Variables, Operators , Keywords ,Naming Convention ,Decision Making (if,switch) ,Looping(for, while),Type Casting.

**Classes and Objects:** Creating Classes and objects, Memory allocation for objects, Constructor, Implementation of Inheritance (Simple, Multilevel, Hierarchical),

Implementation of Polymorphism (Method Overloading , Method Overriding), Nested and Inner classes

### UNIT-III

**Arrays String and Vector:** Arrays, Creating an array, Types of Array (One Dimensional arrays, Two Dimensional array), Strings, String – Arrays, String Methods, String Buffer class, Vectors, Wrapper classes.

Abstract Class, Interface and Packages, Modifiers and Access Control (Default, public private protected), Abstract classes and methods, Interfaces, Packages (Packages Concept, Creating user defined packages, Java Built in packages, Java.lang->math,Java.util->Random, Date, Hash Table).

### UNIT-IV

**Multithreading:** Creating Threads using Different methods, Thread Priorities, Thread Synchronization, Inter process thread Communication.

**Exception Handling:** Exception types, using try catch and Multiple catch, Nested try, throw, throws and finally, Creating User defined Exceptions. File Handling: Byte Stream, character stream , file IO Basics , File Operations (Creating file, Reading, file(Character, byte), Writing File (Character, byte).

**Applet Programming:** Introduction, Types of applet, Applet Life cycle, Creating applet, Applet tag

### References:

1. “Java–The Complete Reference”, Herbert Schildt, Tata MacGraw Hill.
2. “Introduction to Java Programming”, Y. Daniel Mliang, Pearsons Publications.
3. Programming with JAVA - E Balgurusamy
4. JAVA:How to Programm- Paul Deital and Harvey Deital.

### Course Outcomes:

Students will be able to:

<b>CO-1.</b>	Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity.
<b>CO-2.</b>	Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem
<b>CO-3.</b>	Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.
<b>CO-4.</b>	Demonstrate understanding and use of different exception handling mechanisms and concept of multithreading for robust faster and efficient application development.
<b>CO-5.</b>	Identify and describe common abstract user interface components to design GUI in Java using Applet & AWT along with response to events.

## Bachelor of Computer Applications (Semester – V)

### BCA-353: Software Engineering

Time: 3 Hrs.

Total Marks: 100

Credits		
L	T	P
3	1	0

Theory Marks: 75

Theory Internal Assessment Marks:25

#### 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 15 marks consisting of 8 short answer type questions carrying 2.5 mark 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 15 marks each from the respective unit. The students are required to attempt one question from each of these sections.

#### Course Objectives:

1.	Give the basic knowledge in Software Engineering process, focusing on the different process models.
2.	To inculcate in students' different concepts of software engineering principles.
3.	To produce efficient, reliable, robust and cost- effective software solutions.
4.	Ability to develop, maintain and evaluate large-scale software systems.
5.	To gain the knowledge of how Analysis, Design, Implementation, Testing and Maintenance processes are conducted in a software project.

#### UNIT – I

**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.

#### UNIT – II

**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.

**Software Requirement Specification (SRS):** Problem analysis, structuring information, Data flow diagram and data dictionary, structured analysis, Characteristics and component of (SRS).

#### UNIT – III

**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, Partitioning, Abstraction, Top Down and Bottom–up techniques, Structure Design, Structure Charts, Design Methodology.

**Detailed Design:** Module specification, specifying functional module, PDL and Logic/Algorithm Design.

#### UNIT – IV

**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.

**Advanced Topics:** CASE Tools, Software Reengineering and its importance, Software reengineering process model, software reengineering tools and Business Process Reengineering : Business process, BPR Model

#### References:

1. Software Engineering, Roger S. Pressman 7th edition.
2. Integrated Approach to Software Engineering, Pankaj Jalote 2<sup>nd</sup> edition.
3. Software Engineering by Rajib Mall 5<sup>th</sup> edition.
4. Software Engineering 9<sup>th</sup> edition by Ian Sommerville.
5. Software Re-engineering, Robert S. Arnold IEEE Comp. Society IEEE Computer Society Press, Los Alamitos, Calif., ©1993

#### Course Outcomes:

On completion of this course student will be able to:

<b>CO-1.</b>	Plan a software engineering process life cycle , including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements
<b>CO-2.</b>	Able to elicit, analyse and specify software requirements through a productive working relationship with various stakeholders of the project
<b>CO-3.</b>	Perform various life cycle activities like Analysis, Design, Implementation, Testing and Maintenance.
<b>CO-4.</b>	Know how to develop the code from the design and effectively apply relevant standards and perform testing, and quality management and practice
<b>CO-5.</b>	Able to use modern engineering tools necessary for software project management, time management and software reuse.

**Bachelor of Computer Applications (Semester – V)**

**BCA-354: Advanced Web Technologies (ASP.NET)**

**Time: 3 Hrs.**

**Total Marks: 100**

Credits		
L	T	P
3	1	0

**Theory Marks: 75**

**Theory Internal Assessment Marks:25**

**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 15 marks consisting of 8 short answer type questions carrying 2.5 mark 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 15 marks each from the respective unit. The students are required to attempt one question from each of these sections.**

**Course Objectives:**

1.	Set up a programming environment for ASP.net programs.
2.	Develop a data driven web application.
3.	Connecting to data sources and managing them.
4.	Maintain session and controls related information for user used in multi-user web applications.
5.	Understand the fundamentals of developing modular application by using object-oriented methodologies.

**UNIT-I**

**Introduction of .NET Framework:** What is ASP.NET & its Architecture, CLR (Common Language Run time Environment) , CLR Services ,Just In time Compiler, What is AppDomain, Life Cycle of ASP.NET Page.

**Standard Controls:** Display information, accepting user input, Submitting form data, Displaying images, Using the panel control, Using the hyperlink control.

**Validation Controls:** Using the required field validator control, Using the range validator control using the compare validator control, Using the regular expression validator control, Using the custom validator control, Using the validation summary controls.

**UNIT-II**

**Rich Controls:** Accepting file uploads, displaying a calendar, displaying advertisement, displaying different page views, Displaying a wizard.

**Designing Website with Master Pages:** Creating master pages, modifying master page content, Loading master page dynamically.



### UNIT-III

**SQL Data Source Control:** Creating database connections, executing database commands, Using ASP.NET parameters with the SQL data source controls, programmatically executing SQL data source commands, Caching database data with the SQL data Source controls.

**List Controls:** Dropdown list control, Radio button list controls, list box controls, bulleted list controls, custom list controls.

### UNIT-IV

**Grid View Controls:** Grid view control fundamentals, using field with the grid view control, Working with grid view control events.

**Building Data Access Components with ADO.NET:** Connected the data access, Disconnected data access, executing a synchronous database commands, Building data base objects with the .NET framework.

#### References:

1. ASP.NET 3.5: Stephen Walther, Pearson Education, 2005
2. ASP.NET 4.0: In Simple Steps by Kogent Learning Solutions Inc.
3. ASP.NET 4.5: Black Book by Kogent Learning Solution Inc.
4. ASP.NET 4.5:Covers C# and VB Codes, Black Book, Dream tech Press (1 January 2013)
5. ASP.NET: The Complete Reference Book by Matthew Macdonald ,McGraw Hill education, 4th edition (1 July 2017)

#### Course Outcomes:

On completion of this course student will be able to:

<b>CO-1.</b>	Use the features of Dot Net Framework along with the features of ASP. NET & C#.
<b>CO-2.</b>	Design web applications using ASP.NET.
<b>CO-3.</b>	Learn ASP.NET controls in web applications.
<b>CO-4.</b>	Debug and deploy ASP.NET web applications.
<b>CO-5.</b>	Learn to create database driven ASP.NET web applications and web services.

**Bachelor of Computer Applications (Semester – V)**

**BCA-355P: Lab I**

**Programming and Web Development in ASP.NET**

**Time: 3 Hrs.**

**Total Marks: 50**

Credits		
L	T	P
0	0	2

**Practical Marks: 37**

**Practical Internal Assessment Marks:13**

**Course Objectives:**

<b>1.</b>	The students will Study the architecture of Dot Net framework and implement it using C# programming and visual studio.
<b>2.</b>	Understand the basic principles of website development using IDE and implement it.
<b>3.</b>	Learn advanced web development techniques using session and database connectivity.

**Lab I: Programming and Web Development in ASP.NET**

**Course Outcomes:**

On completion of this course student will be able to:

<b>CO-1.</b>	Use the features of Dot Net Framework along with the features of ASP. NET & C#.
<b>CO-2.</b>	Design web applications using ASP.NET.
<b>CO-3.</b>	Learn ASP.NET controls in web applications.
<b>CO-4.</b>	Debug and deploy ASP.NET web applications.
<b>CO-5.</b>	Learn to create database driven ASP.NET web applications and web services.

**Bachelor of Computer Applications (Semester – V)**

**BCA-356P: Lab II**

**Programming in Java**

**Time: 3 Hrs.**

**Total Marks: 50**

Credits		
L	T	P
0	0	2

**Practical Marks: 37**

**Practical Internal Assessment Marks:13**

**Course Objectives:**

1.	Java is the most prevalent programming language in the software industries for implementing the software systems.
2.	The main focus of this practical lab is to make the students proficient in developing the software systems by using Java programming language by teaching them the basic concepts and notions of JAVA.
1.	Students should be able to do programming using Visual Code Editor

**Lab II: Programming in Java**

**Course Outcomes:**

After completion of this course, the students will be able to

CO-1.	Apply the basic constructs for developing java programs.
CO-2.	Construct the applications incorporating inheritance and polymorphism features.
CO-3.	Implement inter-process communication by utilizing the concept of threads.
CO-4.	Develop applications capable of handling exceptions.
CO-5.	Develop Web pages using Applets.

## Bachelor of Computer Applications

### Semester – VI

SN	Course Code	Course Name	Distribution of The Marks				Lectures Per week			Credit Distribution			Total Credit L+T+P	Page No.
			Theory	Internal Assessment	Practical	Total	L	T	P	L	T	P		
<b>Discipline Specific Course(DSC)</b>														
1	BCA-361 (Major)	Computer Graphics	75	25	0	100	5	1	0	3	1	0	4	77-78
2	BCA-362 (Major)	Operating System	75	25	0	100	5	1	0	3	1	0	4	79-80
<b>Skill Enhancement Course(SEC)</b>														
5	BCA-363P	LabI: Implementation of Applications of Computer Graphics in C++/C	0	13	37	50	0	0	6	0	0	2	2	81
6	BCA-364P	Project	0	50	150	200	0	0	24	0	0	8	8	82
									<b>Total Credits=18</b>					

**Bachelor of Computer Applications (Semester – VI)**  
**BCA-361: Computer Graphics**

**Time: 3 Hrs.**

**Total Marks: 100**

Credits		
L	T	P
3	1	0

**Theory Marks: 75**

**Theory Internal Assessment Marks:25**

**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 15 marks consisting of 8 short answer type questions carrying 2.5 mark 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 15 marks each from the respective unit. The students are required to attempt one question from each of these sections.**

**Course Objectives:**

1.	The course introduces the basic concepts of computer graphics.
2.	It provides the necessary theoretical background and demonstrates the application of computer science to graphics.
3.	Learning how to scale, translate (shift), shear (skew), and rotate different graphical objects
4.	Develop programming skills in computer graphics

**UNIT – I**

**Overview of Graphics System:** Pixel, frame, buffer, Computer Graphics and their applications

**Display Devices:** CRT Monitors (Random – Scan and Raster Scan, DVST, Plasma – Panel Display, LED and LCD Monitors.

**UNIT – II**

**Graphics Software.**

**Elementary Drawing:**

Points and various line drawing Algorithms: DDA, Integer DDA, Incremental DDA, Bresenham's algorithm and their comparisons. Circle generating algorithms: trigonometric, polynomial, Bresenham's and midpoint method. Side effects Due to scan conversion

**UNIT – III**

**Two Dimensional Transformations:** Basic Transformations, Scaling, Translation, Rotation, Reflection, Shear, Matrix representation of Basic transformations and homogenous coordinates. Composite Transformations

**Window and clipping:** Windowing concepts, Window-to-view port transformations.

**Clipping and its algorithms.**

**Simple line clipping algorithms:** Cohen–Sutherland Algorithm, Midpoint Subdivision Line Algorithm.

**Three Dimensional concepts:** 3D Coordinate Systems. 3 transformations. translation, scaling, rotation.

**UNIT – IV**

**Projections:** parallel projections and Perspective projection.

**Implementation in C/C++** program for drawing 2 D objects – line rectangle, arc, circle and ellipse. Programming for 2–D and 3–D transformations which include translation, rotation, scaling, reflection and shear.

**References:**

1. Donald Hearn & M. Pauline Baker, 'Computer Graphics', Printice Hall of India Private Limited, 2008.
2. Foley, Van Dam, Feiner, Hughes, 'Computer Graphics: Principles and Practice', Addison-Wesley, 2006.
3. David F. Rogers, 'Procedural Elements for Computer Graphics', McGraw Hill Book Company, 2006.
4. Roy Plastock 'Computer Graphics', Schaum's outlines ,McGraw Hill Book Company, 2007.

**Course Outcomes:**

On completion of the course, the student should have the following learning outcomes defined interms of knowledge, skills and general competence:

<b>CO-1.</b>	Understand the basics of computer graphics, different graphics systems and applications of computer graphics.
<b>CO-2.</b>	Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.
<b>CO-3.</b>	Use of geometric transformations on graphics objects and their application in composite form.
<b>CO-4.</b>	Extract scene with different clipping methods and its transformation to graphics display device.
<b>CO-5.</b>	Explore projections for display of 3D scene on 2D screen

**Bachelor of Computer Applications (Semester – VI)**  
**BCA-362: Operating System**

**Time: 3 Hrs.**

**Total Marks: 100**

Credits		
L	T	P
3	1	0

**Theory Marks: 75**

**Theory Internal Assessment Marks:25**

**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 15 marks consisting of 8 short answer type questions carrying 2.5 mark 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 15 marks each from the respective unit. The students are required to attempt one question from each of these sections.**

**Course Objectives:**

1.	To understand the need of operating system.
2.	To understand the history of operating system.
3.	To study different types of operating systems.
4.	To understand what a process is and how processes are synchronized and scheduled.
5.	To understand the services provided by and the design of an operating system.
6.	To understand the structure and organization of the file system.
7.	To understand different approaches to memory management.
8.	Students should be able to use system calls for managing processes, memory and the file system.

**UNIT – I**

**Introduction:** Definition, Need of Operating System, Functions of Operating System, Early Systems, Evolution of Operating Systems, Single User Operating System and Multiuser Operating System, Multiprogramming, Difference between Multiprogramming, multitasking, multithreading and multiprocessing, Simple Batch system, Multi programmed Batch. Time Sharing Systems, spooling, Personal Computer System, Parallel Systems, Distributed Systems, Real-time Operating Systems. Types of Real-time Operating Systems, Factors for selecting an RTOS, Applications of Real Time Operating System.

**UNIT – II**

**Processes:** Process concepts, Process states, Process control block, Process Scheduling, operation on processes, Cooperating processes, Threads.

**CPU–Scheduling:** Basic concepts, CPU-I/O burst cycle, Preemptive scheduling, Dispatcher, scheduling criteria, scheduling algorithms (FCFS, SJF, Priority, RR), algorithm evaluation.

**UNIT – III**

**Process Synchronization:** Critical – section problem, semaphores, classical problem of synchronization (Producer-consumer, Reader-Writer, Dining philosopher).

**Deadlocks:** System Model, Deadlock characterization, methods for handling deadlocks, Deadlocks Prevention, Deadlock avoidance, Deadlock Detection and Recovery from deadlock, Combined approach to deadlock handling.

#### UNIT – IV

**Memory Management:** Background, Logical v/s Physical address space, swapping, continuous allocation, paging, segmentation.

**Virtual Memory:** Background, demand paging, Performance of Demand Paging, Page Replacement, Page Replacement Algorithms, Allocation of Frames, Thrashing.

**Secondary Storage Structures:** Disk structures, Disk scheduling, Disk Reliability.

At the end of this course the student shall be able to

1.	Learn about architecture of operating system.
2.	Learn how different operating systems came in picture.
3.	Learn about the large variety of operating systems available.
4.	Learn about operating systems, functions of operating systems, system calls.
5.	Learn about process coordination and process scheduling algorithms.
6.	Learn about memory management, critical section and deadlock handling algorithms.
7.	Learn about file management and disk scheduling algorithms.
8.	Able to implement various algorithms required for management, scheduling, allocation and communication used in Operating System.

#### References:

1. “Operating System Concepts”, Fourth Edition by Silberschatz Galvin Addison Wesley, 1996.
2. “Operating Systems: A Design Oriented Approach” by Crowley, Published by Tata McGraw Hill, 2001.
3. “Operating Systems” Second Edition by Dietel, Addison Wesley, 2017.
4. Madnick & Donovan: Operating System, McGraw Hill, 1978.
5. A.C. Shaw: Logic Design of Operating Sytem, Prentice Hall, 1988.



## Bachelor of Computer Applications (Semester – VI)

### BCA-363P: Lab I- Implementation of Applications of Computer Graphics in C++/C

Time: 3 Hrs.

Total Marks: 50

Credits		
L	T	P
0	0	2

Practical Marks: 37

Practical Internal Assessment Marks:13

#### Course Objectives:

1.	Understand the need of developing graphics application
2.	To make the students understand graphics concepts and develop, design and implement two and three-dimensional graphical structures
3.	Learn the representation and transformation of graphical objects.

#### Lab I (Programming Lab of Computer Graphics in C++/C )

##### Course Outcomes:

At the end of this course student will:

<b>CO-1.</b>	Understand the basic concepts of computer graphics.
<b>CO-2.</b>	Understand how to generate line, circle and ellipse also how to create 2D object.
<b>CO-3.</b>	Implement basic transformations on objects.
<b>CO-4.</b>	Implement clipping algorithm on lines.
<b>CO-5.</b>	Understand various 3D Transformation techniques

## Bachelor of Computer Applications (Semester – VI)

### BCA-364P: PROJECT

Time: 3 Hrs.

Total Marks: 200

Credits		
L	T	P
0	0	8

Practical Marks: 150

Practical Internal Assessment Marks:50

#### Course Objectives:

1.	Develop skills in presentation and discussion of research topics in a public forum.
2.	Exposure to a variety of research projects and activities in order to enrich their academic experience
3.	It makes the student confident in designing an Online Project with advanced technologies on their choice
4.	Students are trained to meet the requirements of the industry.

#### General Instructions:

1. A software module based on the work done in the entire course is to be developed. Students can opt any programming language and DBMS on the basis of their area of interest.
2. The soft copy of the module shall be submitted to the College/Institute till April 20 or prescribed date.
3. The software module shall be developed in groups, consisting of at most two students in a group.
4. A detailed report consisting Requirement Analysis, Feasibility analysis, DFD, E-R diagrams and Test cases must be prepared by students under the supervision of their respective guide.
5. The 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.
6. The evaluation of the module shall be done as per the common ordinance of UG/PG w.e.f. 2012-2013 under semester system.
7. Students have to study existing systems based on their project topic in detail at client/customer site. Training certificate of industrial training should be submitted to the College and also attached in the project.

#### Course Outcomes:

At the end of this course student will be able:

CO-1.	To carry out time planning for the project.
CO-2.	To follow correct grounding and shielding practices
CO-3.	To do effective trouble-shooting of the mini project.
CO-4.	Demonstrate a through and systematic understanding of project contents.
CO-5.	Understand methodologies and professional way of documentation and communication.
CO-6.	Know the key stages in development of the project.