

## Guru Jambheshwar University of Science & Technology, Hisar

### Scheme for Theory + Practical Based Subjects

#### **Guidelines for Scheme of examination of UG Course Computer Science-B.A. Pass course (under semester system)**

The Scheme of Examination of undergraduate (UG) Courses (**Theory-70 marks (Two Papers) + Practical-30 marks Based Subjects**) under Faculty of Humanities & Social Sciences run by affiliated degree colleges will be under (50+20) + 30 (External + Internal + Practical) for practical based courses. Pass percentage will be ...

For the UG courses under Faculty of Humanities & Social Sciences, the guidelines regarding scheme and paper setting will be followed as:

For the end semester examinations regarding practical subjects, nine questions are to be set by the examiner. The candidates shall attempt five questions in all. First question will be compulsory of 05 marks based on the entire syllabus. It will comprise of five short answer type questions of one mark each. Students are required to attempt any four questions out of remaining eight questions (these eight questions may be (in) up to four units depending on the subject). All remaining questions shall carry equal marks.
---

<b>Scheme:</b> [25 Paper-I+25 Paper-II+(10+10)] + 30 [External + (Internal) + Practical]
--

1 <sup>st</sup> question=05 marks (05 short answer type questions of 1 mark each)
---

Rest four questions: 05 marks each i.e. 4 x 05=20
---

Total = (25+10+25+10) + 30 = 100 marks
--

<b>Components of Internal Assessment (Breakdown of 10 marks in each Paper)</b>	
--	--

(a)	Class Test: 2.5 marks
-----	-----------------------

(b)	Assignment: 2.5 marks
-----	-----------------------

(c)	Participation in Class Discussions: 1.5 marks
-----	---

(d)	Term Paper/written test/2 <sup>nd</sup> assignment: 2.5 marks
-----	---

(e)	Attendance: 2 marks* (Paper-I+Paper-II+Practicals)
-----	--

\*Weightage of 2 marks for **Attendance** component out of 20 marks for Internal Assessment shall be available only to those students who attend **75% and more** of classroom lectures and practical. The break-up of marks for **attendance component** for theory + practical papers shall be as under:

(a) 75% and above up to 85%: 01 mark

(b) Above 85%: 02 marks

## **B.A.-I Computer Science (Pass Course) 1<sup>st</sup> Semester**

### **BACS – 111: Fundamentals of Computer**

**Maximum Marks: 35**

**External Assessment: 25**

**Internal Assessment: 10**

**Time: 3 Hours**

#### **Note:**

1. The question paper will consist of **nine** questions. The candidate shall attempt **five** questions in all. The Question No. 1 will be **compulsory**. The Candidate shall attempt four more questions selecting at least one from each Unit. The paper will carry 35 marks out of which 10 marks will be earmarked for internal assessment.
2. The **Compulsory Question No.1** will be short answer type questions containing **five** questions of equal marks (i.e., 1 mark each) spread over the whole syllabus. Other questions will carry the 05 marks each.

#### **UNIT I**

##### **Computer Fundamentals:**

Introduction to Computers: Characteristics and Limitations of Computers, Evolution of Computers, Classification of Computers. Computer Languages. Computer Programs, Structured Programming Concepts

##### **Basic Computer Organization:**

Units of a computer, CPU, ALU, Memory Hierarchy, Registers, I/O devices. Mother Board,

#### **UNIT II**

##### **Word Processing:**

Introduction to MS-Word, Creating & Editing: Formatting Document, Page, Table; Bookmark, Mail Merge, Macros.

##### **Spread Sheets:**

Introduction to MS-Excel, Creating & Editing Worksheet, Formatting data, Formulas and Functions, Creating Charts, Pivot Tables.

##### **Power Point Presentations:**

Creating, Manipulating & Enhancing Slides, Organizational Charts, Animations & Sounds, Inserting Animated Pictures.

#### **UNIT III**

##### **Operating Systems:**

Introduction to Operating System: Functions of Operating System, Services; Properties: Batch Processing, Multitasking, Multiprogramming, Interactivity, Distributed environment, Spooling;

##### **Types of Operating System:**

Single user and Multiuser, Batch OS, Multiprogramming OS, Multitasking OS, Real-Time OS, Time-Sharing OS, Distributed OS, Network OS.

## UNIT IV

### **Internet Basics:**

History of Internet, Web Browsers, Web Servers, Hypertext Transfer Protocol, Internet Protocols Addressing, Internet Connection Types, How Internet Works, ISPs, Search Engines, Emails and Its Working, Internet Security, Uses of Internet, Computer Networks and their advantages, Types of Computer Network, Network Topologies, Basics of Transmission Media. Cloud Computing Basics: Overview, Applications, Intranets and the Cloud. Benefits, Limitations and Security Concerns.

### **Text/ Reference Books**

1. Satish Jain, Kratika, M. Geetha, "MS Office", BPB Publications, 2010.
2. ITL Education Solutio, "Introduction to Computer Science", Pearson Education, 2<sup>nd</sup> Edition 2012.
3. P. K. Sinha, "Computer Fundamentals", 6<sup>th</sup> edition, 2003.
4. Tony Feldman, "Introduction to Digital Media", Routledge; 1 edition, 1996.
5. Bartee, Thomas C, "Digital Computer Fundamentals", McGraw-Hill Inc., 6<sup>th</sup> Edition, 1984.

## **B.A.-I Computer Science (Pass Course) 1<sup>st</sup> Semester**

### **BACS – 112: Programming in ‘C’**

**Maximum Marks: 35**

**External Assessment: 25**

**Internal Assessment: 10**

**Time: 3 Hours**

#### **Note:**

1. The question paper will consist of **nine** questions. The candidate shall attempt **five** questions in all. The Question No. 1 will be **compulsory**. The Candidate shall attempt four more questions selecting at least one from each Unit. The paper will carry 35 marks out of which 10 marks will be earmarked for internal assessment.
2. The **Compulsory Question No.1** will be short answer type questions containing **five** questions of equal marks (i.e., 1 mark each) spread over the whole syllabus. Other questions will carry the 05 marks each.

#### **UNIT – 1**

##### **Introduction to C Programming:**

History of C, Character Set, Identifiers and Keywords, Constants, Types of C Constants, Rules for Constructing Integer, Real and character Constants, Variables, Data Types, rules for constructing variables. Input/output: Unformatted & formatted I/O function, Input functions: scanf(), getch(), getche(), getchar(), gets(); output functions: printf(), putchar(), puts().

##### **Operators and Expressions:**

Arithmetic, relational, logical, bitwise, unary, assignment, conditional operators and special operators, Type Conversion in Assignments, Hierarchy of Operations, Structure of a C program.

#### **UNIT – 2**

##### **Decision Control Structure:**

Decision making Decision making with IF statement, IF-ELSE statement, Nested IF statement, ELSE-IF ladder.

##### **Loop Control Structure:**

While and do-while, for loop and Nested for loop,

##### **Case Control Structure:**

Decision using switch; goto, break and continue statements.

##### **Functions:**

Library functions and user defined functions, Global and Local variables, Function Declaration, Calling and definition of function, Methods of parameter passing to functions, recursion, Storage Classes in C.

## UNIT – 3

### **Arrays:**

Introduction, Array declaration, Accessing values in an array, Initializing values in an array, Single and Two Dimensional Arrays, Initializing a 2-Dimensional Array, Passing array elements to a function: Call by value and call by reference, Arrays of characters, Insertion and deletion operations, Searching the elements in an array, Using matrices in arrays, Passing an Entire Array to a Function.

### **Pointers:**

Pointer declaration, Address operator “&”, Indirection operator “\*”, Pointer and arrays, Pointers and 2-Dimensional Arrays, Pointer to an Array, Passing 2-D array to a Function, Array of Pointers.

### **Dynamic Memory Allocation:**

malloc(), calloc(), realloc(), free() functions.

## UNIT – 4

### **String Manipulation in C:**

Declaring and Initializing string variables, Reading and writing strings, String Handling functions (strlen(), strcpy(), strcmp(), strcat(), strrev()).

### **Structures and Unions:**

Declaration of structures, Structure Initialization, Accessing structure members, Arrays of structure, Nested structures, Structure with pointers, Union.

### **Files in C:**

Introduction, Opening and Closing files, Basic I/O operation on files.

### **Text/ Reference Books:**

1. Yashvant Kanetkar, “Let Us C”, 15<sup>th</sup> Edition, BPB Publications, 2016.
2. Salaria, R.S. : Test Your Skills in C, Salaria Publications, New Delhi.
3. E. Balaguruswami : Programming with C Language, Tata McGraw Hill, New Delhi.
4. Byron S. Gottfried : Programming in C, McGraw Hills Publishers, New York.
5. M.T. Somashekara : Programming in C, Prentice Hall of India.

**B.A.-I Computer Science (Pass Course) 1<sup>st</sup> Semester**  
**BACS – 113: Computer Lab-I (4 Hours per week)**  
**Based on Fundamentals of Computer and Programming in ‘C’**

**Maximum Marks: 30**

**Time: 3 Hours**

**List of Experiments:**

**Section- A (Fundamentals of Computer)**

1. Create an admission form in MS-Word. You need to use Text-Boxes, Shapes, Colors, formatting options, table and horizontal lines.
2. Send a birthday invitation to your 100 friends using Mail-Merge.
3. Study and use various functions like Sum, Average, Maximum, and Minimum in MS-Excel.
4. Fill 50 students' records in MS-Excel sheet1. The fields must be Roll No., Name, Father Name, Course Joined, Marks obtained in three subjects. Create a marks-sheet in sheet2.
5. Create 10 slides in MS-PowerPoint related to internet advantages and disadvantages in daily life. Add animations to these all slides.

**Section-B (Programming in ‘C’)**

1. Program to convert a given decimal number into its binary equivalent using bitwise operators.
2. Program to accept a positive integer and find the sum of the digits in it.
3. Find The Roots of Quadratic Equation using if else statement.
4. Program to generate prime numbers.
5. Program to multiply two matrices.
6. Program to find GCD and LCM using non-recursive function.
7. Program to generate terms of Fibonacci series using recursive function.
8. Program to read a string and check whether it is a palindrome or not (using library functions).
9. Program to create a file called emp.txt and store information about a person, in terms of his name, age and salary.
10. Program to add two complex numbers using structure to store a complex number.

**Note: In addition to the above experiments, the teacher may add more programs on the behalf of the theory syllabus.**

**B.A.-I Computer Science (Pass Course) II<sup>nd</sup> Semester**  
**BACS – 121: Data Structure using ‘C’**

**Maximum Marks: 35**

**External Assessment: 25**

**Internal Assessment: 10**

**Time: 3 Hours**

**Note:**

1. The question paper will consist of **nine** questions. The candidate shall attempt **five** questions in all. The Question No. 1 will be **compulsory**. The Candidate shall attempt four more questions selecting at least one from each Unit. The paper will carry 35 marks out of which 10 marks will be earmarked for internal assessment.
2. The **Compulsory Question No.1** will be short answer type questions containing **five** questions of equal marks (i.e., 1 mark each) spread over the whole syllabus. Other questions will carry the 05 marks each.

**UNIT – 1**

**Data Structure Basics:**

Introduction to Complexity, Introduction to Data Structures, Classification of data structure, Abstract data type; Data Structure Operations, Applications of Data Structure.

**Arrays:**

Definition of array, Single and Multi-dimensional Arrays, Representation of single and 2-dimensional arrays and their address calculation, basic operations on single dimensional arrays, Algorithm for insertion and deletion operations; Sparse Matrices and its representation.

**Stacks:**

Definition of stack, Operations on stack, Algorithms for push and pop operations using array. Stack Applications: Prefix, Infix and Postfix expressions, Conversion of Infix expressions to Postfix expression using stack; Recursion.

**UNIT – 2**

**Queues:**

Introduction to Queue. Operations on Queues, Circular queue, Algorithm for insertion and deletion in simple queue and circular queue using array. De-queue, Priority Queues.

**Linked Lists:**

Introduction, Array vs Linked list; Singly, Doubly and Circular linked Lists and representation of linked lists in memory. Implementation of Stack and simple Queue as single Linked List.

**UNIT -3**

**Trees:**

Introduction to Tree as a data structure, Basic Terminology; Binary Trees, Traversal of binary trees: In-order, Pre-order & post-order. Binary tree non recursive traversal algorithms. Binary Search Tree, (Creation, and Traversals of Binary Search Trees)

**Graphs:**

Introduction, Memory Representation, Graph Traversal (DFS and BFS)

**UNIT - 4****Searching:**

Binary and Linear Search

**Sorting:**

Bubble sort, Insertion sort, Selection sort, Merge Sort, Quick sort. Comparison of various Searching and Sorting algorithms.

**Text/ Reference Books:**

1. Ellis Horowitz & Sartaj Sahni, "Fundamentals of Data structures in C", 2<sup>nd</sup> Edition, Silicon Press, 2007.
2. R. B. Patel, "Expert Data Structures with C", 3<sup>rd</sup> Edition, Khanna Book Publishing, 2014.
3. A. M. Tenenbaum, Langsam, "Data Structures using 'C'," Pearson Education, 2009.
4. Lipschultz L. Seymour, 2001 : Data Structure, Schaum Outline Series, TMH, New Delhi.
5. Salaria, R. S. : Data Structures & Algorithm Using C, Khanna Book Publishing Co. (P.) Ltd., New Delhi.
6. Salaria, R. S., Test Your Skills in Data Structures, Khanna Book Publishing Co. (P.) Ltd., New Delhi.
7. Sofat Sanjeev, Data Structure with C and C++, Khanna Book Publishing Co. Patel, R.B., Expert Data Structure in C, Khanna Book Publishing Co.



**B.A.-I Computer Science (Pass Course) II<sup>nd</sup> Semester**  
**BACS – 122: Computer Organization**

**Maximum Marks: 35**  
**External Assessment: 25**  
**Internal Assessment: 10**  
**Time: 3 Hours**

**Note:**

1. The question paper will consist of **nine** questions. The candidate shall attempt **five** questions in all. The Question No. 1 will be **compulsory**. The Candidate shall attempt four more questions selecting at least one from each Unit. The paper will carry 35 marks out of which 10 marks will be earmarked for internal assessment.
2. The **Compulsory Question No.1** will be short answer type questions containing **five** questions of equal marks (i.e., 1 mark each) spread over the whole syllabus. Other questions will carry the 05 marks each.

**UNIT – 1**

**Data Representation:**

Number Systems: Decimal, Binary, Octal, Hexadecimal, Conversion from one number system to other; Binary arithmetic operations, Representation of Negative Numbers: 1's complement and 2's complement; fixed and floating point representation, character representation (BCD, EBCDIC and ASCII Code), BCD number system; Weighted Codes, Self Complementing Code, Excess-3 code, Gray and Cyclic code.

**UNIT – 2**

**Boolean Algebra:**

Introduction, Definition, Postulates of Boolean Algebra, Fundamental Theorems of Boolean Algebra; Duality Principle, Demorgan's Theorems, Boolean Expressions and Truth Tables, Standard SOP and POS forms, Canonical representation of Boolean expressions, Simplification of Boolean Expressions using theorems of Boolean algebra, Minimization Techniques for Boolean Expressions using Karnaugh Map.

**Logic Gates:**

AND, OR, NOT, NOR, NAND & XOR Gates and their Truth tables.

**UNIT – 3**

**Combinational Circuits:**

Half Adder & Full Adder, Half Subtractor & Full Subtractor, Adder & Subtractor, decoders, multiplexors. Realization of Boolean expressions using decoders and multiplexor.

**Sequential Circuits:**

Flip-Flops, Types- RS, T, D, JK and Master-Slave JK flip flop, Triggering of Flip Flops; Flip Flop conversions, Shift Registers, Synchronous and Asynchronous Counters.

**UNIT – 4**

**Basic Computer Organization and Design:**

Register Organization, Bus system, instruction set, timing and control, instruction cycle, memory reference, input-output and interrupt.

**Programming the Basic Computer:**

Instruction formats, addressing modes, instruction codes.

**Input-output Organization:**

Peripheral devices, I/O interface, Modes of data transfer, Direct Memory Access.

**Text/ Reference Books:**

1. William H.Gothman, “Digital Electronics-An Introduction to Theory and Practice” 2<sup>nd</sup> Edition, Prentice Hall of India Pvt. Ltd., 2009.
2. Mano, M. Morris,“Digital Logic and Computer Design”, Prentice Hall of India Pvt.Ltd., 2000.
3. W.Stallings,“Computer Organization & Architecture”, Pearson Education, 7th Edition, New Delhi, 2006.
4. N. Carter,“Computer Architecture”, Schaums Outline Series, Tata McGraw Hill, New Delhi, 2006.

**B.A.-I Computer Science (Pass Course) II<sup>nd</sup> Semester**  
**BACS – 123: Computer Lab-II (4 Hours per week)**  
**Based on Data Structure using ‘C’**

**Maximum Marks: 30**

**Time: 3 Hours**

**List of Experiments:**

1. Program to convert a given infix expression to postfix.
2. Program to insert/delete an element in/from an array at a given location.
3. Program to implement Stack using structure
4. Program to implement Single Queue using structure
5. Program to insert, delete and display the linked list (Beginning, End and given position)
6. Program to generate BST and traverse recursively (infix).
7. Program to generate BST and traverse recursively (prefix).
8. Program to generate BST and traverse recursively (postfix).
9. Program for Binary Search.
10. Program for sorting an array using any sorting technique

**Note: In addition to the above experiments, the teacher may add more programs on the behalf of the theory syllabus.**