

BABU BANARASI DAS UNIVERSITY, LUCKNOW

B. Sc. (Honours) Computer Science

COURSE STRUCTURE (Under CBCS)

Course	Code	Title	Teaching			Evaluation				Credits	
						Theory		Lab/Seminar/ Viva Voce/ Dissertation			Total
			L	T	P	CIA	ESE	CIA	ESE		
Core	BSC1101	Programming Fundamentals using C/C++	4	-	4	40	60	20	30	150	6
Core	BSC1102	Computer System Architecture	5	1	-	40	60	-	-	100	6
GE		Generic Elective - I								-	6
AECC	BSAE1101	Communicative English	2	-	-	40	60	-	-	100	2
GP	BSGP11	General Proficiency	-	-	-	-	-	100	-	100	1
21											
SEMESTER – II											
Core	BSC1201	Programming in JAVA	4	-	4	40	60	20	30	150	6
Core	BSC1202	Discrete Structure	5	1	-	40	60	-	-	100	6
GE		Generic Elective - II									6
AECC	BSAE1201	Environmental Studies	2	-	-	40	60	-	-	100	2
GP	BSGP12	General Proficiency	-	-	-	-	-	100	-	100	1
21											
SEMESTER – III											
Core	BSC1301	Data Structures	4	-	4	40	60	20	30	150	6
Core	BSC1302	Operating Systems	4	-	4	40	60	20	30	150	6
Core	BSC1303	Computer Networks	5	1	-	40	60	-	-	100	6
GE		Generic Elective - III									6
SEC		Skill Enhancement Course - I									2
GP	BSGP 13	General Proficiency	-	-	-	-	-	100	-	100	1
27											
SEMESTER – IV											
Core	BSC 1401	Design and Analysis of Algorithms	4	-	4	40	60	20	30	150	6
Core	BSC 1402	Software Engineering	5	1	-	40	60	-	-	100	6
Core	BSC 1403	Database Management Systems	4	-	4	40	60	20	30	150	6
GE		Generic Elective - IV									6
SEC		Skill Enhancement Course - II									2
GP	BSGP 14	General Proficiency	-	-	-	-	-	100	-	100	1
27											
SEMESTER – V											
Core	BSC 1501	Internet Technologies	4	-	4	40	60	20	30	150	6
Core	BSC 1502	Theory of Computation	5	1	-	40	60	-	-	100	6
DSE		Discipline Specific Elective - I									6
DSE		Discipline Specific Elective - II									6
Lab	BSC S5	Seminar	-	-	-	-	-	100	-	100	2
26											
SEMESTER – VI											
Core	BSC 1601	Artificial Intelligence	4	-	4	40	60	50	-	150	6
Core	BSC 1602	Computer Graphics	4	-	4	40	60	50	-	150	6
DSE		Discipline Specific Elective - III									6
DSE		Discipline Specific Elective - IV									6
Lab	BSC V6	Viva Voce	-	-	-	-	-	-	100	100	2
26											

ELECTIVE COURSES – B. Sc. (H) Computer Science

Code	Title	Teaching			Evaluation				Credits	
					Theory		Lab/Seminar/ Viva Voce/ Dissertation			Total
		L	T	P	CIA	ESE	CIA	ESE		
Generic Elective – I										
BSM 1101	Calculus	5	1	-	40	60	-	-	100	6
BSE 1101	Basic Circuit Theory & Network Analysis	4	-	4	40	60	20	30	150	6
Generic Elective – II										
BSM 1202	Differential Equation	5	1	-	40	60	-	-	100	6
BSE 1201	Semiconductor Devices	4	-	4	40	60	20	30	150	6
Generic Elective – III										
BSM 1303	PDE and System of ODE	5	1	-	40	60	-	-	100	6
BSE 1302	Digital Electronics	5	1	-	40	60	-	-	100	6
Generic Elective – IV										
BSM 1401	Numerical Methods	5	1	-	40	60	-	-	100	6
BSE 1402	Signal Systems	5	1	-	40	60	-	-	100	6

Discipline Specific Elective – I										
BSC 1551	Microprocessor	4	-	4	40	60	20	30	150	6
BSC 1552	Data Mining	5	1	-	40	60	-	-	100	6
BSC 1553	Big Data Analysis	5	1	-	40	60	-	-	100	6
Discipline Specific Elective – II										
BSC 1554	Network Programming	5	1	-	40	60	-	-	100	6
BSC 1555	Cloud Computing	5	1	-	40	60	-	-	100	6
BSC 1556	System Programming	5	1	-	40	60	-	-	100	6
Discipline Specific Elective – III										
BSC 1651	Information Security	5	1	-	40	60	-	-	100	6
BSC 1652	Digital Image Processing	5	1	-	40	60	-	-	100	6
BSC 1653	Soft Computing	5	1	-	40	60	-	-	100	6
Discipline Specific Elective – IV										
BSC 1654	Machine Learning	5	1	-	40	60	-	-	100	6
BSC 1655	Introduction to Data Science	5	1	-	40	60	-	-	100	6
BSC 1656	Dissertation	-	-	-	-	-	50	50	100	6

Skill Enhancement Course – I										
BSM 1301	LaTeX and HTML	1	-	2	40	60	50	-	150	2
BSC 1311	Internet Technologies	2	-	-	40	60	-	-	100	2
Skill Enhancement Course – II										
BSC 1411	Linux / Unix Programming	1	-	2	40	60	50	-	150	2
BSC 1412	Programming in MATLAB	1	-	2	40	60	50	-	150	2

Course Name	Programming Fundamental using C/C++		
Category: Core	Code: BSC 1101	Credits: 6	L-5 T-1 P-0
Exam: Theory 3 Hrs, Practical 2 Hrs	ESE: 60 Marks	CIA: 40 Marks	

SYLLABUS

Module I: Introduction to C

(13 Lectures)

History of C and , Overview of Procedural Programming, Using main() function, Compiling and Executing Simple Programs in C, Data Types, Variables, Constants, Operators and Basic I/O, Expressions, Conditional Statements and Iterative Statements, Simple Expressions in C (including Operators Precedence, Conditional Statements, Understanding syntax and utility of Iterative Statements (while, do-while, and for loops), Use of break and continue in Loops, Using Nested Statements (Conditional as well as Iterative)

Module II: Functions and Arrays

(20 Lectures)

Functions, Call by Value, Call by Reference, Functions returning value, Arrays, Derived Data Types (Structures and Unions) , Understanding utility of structures and unions, Declaring, initializing and using simple structures and unions, Manipulating individual members of structures and unions, Array of Structures, Individual data members as structures, Passing and returning structures from functions, Structure with union as members, Union with structures as members,

Module III: Pointers & Memory Allocation in C

(14 Lectures)

Pointers and References in C, Pointer, Pointers to Pointers, Pointers to structures, Problems with Pointers, Passing pointers as function arguments, Returning a pointer from a function, using arrays as pointers, Passing arrays to functions.

Differentiating between static and dynamic memory allocation, use of malloc(), calloc() and free() functions, use of new and delete operators, storage of variables in static and dynamic memory allocation,

Module IV: File Handling in C

(13 Lectures)

File I/O, Preprocessor Directives, Opening and closing a file, Reading and writing Text Files, Using put(), get(), read() and write() functions, Random access in files, Understanding the Preprocessor Directives, (#include, #define, #error, #if, #else, #elif, #endif, #ifdef, #ifndef and #undef), Macros.

Text Book:

1. E Balaguruswamy, Computer Concepts and Programming in C, TataMcGraw Hill Publications
2. Yashavant P. Kanetkar, Let Us C , BPB Publications

Reference Books:

1. Jeri R. Hanly, Elliot B.Koffman, Problem Solving and Program Design in C, Pearson Addison-Wesley.
2. Behrouz A. Computer Science-A Structured Programming Approach Using C.

COMPUTER SCIENCE LAB (C-I): Programming Fundamentals using C/C++ Lab Practical: 60 Lectures

1. WAP to print the sum and product of digits of an integer.
2. WAP to reverse a number.
3. WAP to compute the sum of the first n terms of the following series $S = 1 + 1/2 + 1/3 + 1/4 + \dots$
4. WAP to compute the sum of the first n terms of the following series $S = 1 - 2 + 3 - 4 + 5 - \dots$
5. Write a function that checks whether a given string is Palindrome or not. Use this function to find whether the string entered by user is Palindrome or not.
6. Write a function to find whether a given no. is prime or not. Use the same to generate the prime numbers less than 100.
7. WAP to compute the factors of a given number.
8. Write a macro that swaps two numbers. WAP to use it.
9. WAP to print a triangle of stars as follows (take number of lines from user):

```
*  
***  
*****  
*****  
*****
```

10. WAP to perform following actions on an array entered by the user:
 - i) Print the even-valued elements
 - ii) Print the odd-valued elements
 - iii) Calculate and print the sum and average of the elements of array
 - iv) Print the maximum and minimum element of array
 - v) Remove the duplicates from the array
 - vi) Print the array in reverse order

The program should present a menu to the user and ask for one of the options. The menu should also include options to re-enter array and to quit the program.

11. WAP that prints a table indicating the number of occurrences of each alphabet in the text entered as command line arguments.
12. Write a program that swaps two numbers using pointers.
13. Write a program in which a function is passed address of two variables and then alter its contents.
14. Write a program which takes the radius of a circle as input from the user, passes it to another function that computes the area and the circumference of the circle and displays the value of area and circumference from the main() function.
15. Write a program to find sum of n elements entered by the user. To write this program, allocate memory dynamically using malloc() /calloc() functions or new operator.
16. Write a menu driven program to perform following operations on strings:
 - a) Show address of each character in string
 - b) Concatenate two strings without using strcat function.
 - c) Concatenate two strings using strcat function.
 - d) Compare two strings
 - e) Calculate length of the string (use pointers)
 - f) Convert all lowercase characters to uppercase

- g) Convert all uppercase characters to lowercase
- h) Calculate number of vowels
- i) Reverse the string

17. Given two ordered arrays of integers, write a program to merge the two-arrays to get an ordered array.

18. WAP to display Fibonacci series (i)using recursion, (ii) using iteration

19. WAP to calculate Factorial of a number (i)using recursion, (ii) using iteration

20. WAP to calculate GCD of two numbers (i) with recursion (ii) without recursion.

21. Create Matrix class using templates. Write a menu-driven program to perform following Matrix

operations (2-D array implementation):

a) Sum b) Difference c) Product d) Transpose

22. Create the Person class. Create some objects of this class (by taking information from the user). Inherit the class Person to create two classes Teacher and Student class. Maintain the respective information in the classes and create, display and delete objects of these two classes (Use Runtime Polymorphism).

23. Create a class Triangle. Include overloaded functions for calculating area. Overload assignment operator and equality operator.

24. Create a class Box containing length, breath and height. Include following methods in it: a)

Calculate surface Area

b) Calculate Volume

c) Increment, Overload ++ operator (both prefix & postfix)

d) Decrement, Overload -- operator (both prefix & postfix)

e) Overload operator == (to check equality of two boxes), as a friend function

f) Overload Assignment operator

g) Check if it is a Cube or cuboid

Write a program which takes input from the user for length, breath and height to test the above class.

25. Create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.

26. Write a program to retrieve the student information from file created in previous question and print it in following format:

Roll No. Name Marks

27. Copy the contents of one text file to another file, after removing all whitespaces.

28. Write a function that reverses the elements of an array in place. The function must accept only one pointer value and return void

29. Write a program that will read 10 integers from user and store them in an array. Implement array using pointers. The program will print the array elements in ascending and descending order.

Course Name	Computer System Architecture		
Category: Core	Code: BSC1102	Credits: 6	L-5 T-1 P-0
Exam: Theory 3 Hrs, Practical 2 Hrs	ESE: 60 Marks	CIA: 40 Marks	

SYLLABUS

Module- I

Introduction :

Logic gates, boolean algebra, combinational circuits, circuit simplification, flip-flops, decoders, multiplexers, registers, counters and memory units.

Module- II

Data Representation and Basic Computer Arithmetic:

Number systems, complements, fixed and floating point representation, addition, subtraction, magnitude comparison, multiplication algorithms for integers.

Module- III

Basic Computer Organization and Central Processing Unit Design :

Computer registers, bus system, instruction set, timing and control, instruction cycle, memory reference, input-output and interrupt, Interconnection Structures, Bus Interconnection, design of basic computer.

Register organization, arithmetic and logical micro-operations, stack organization, micro programmed control. Instruction formats, addressing modes, instruction codes, RISC, CISC architectures, pipelining and parallel architecture.

Module- IV

Memory and Input-Output Organization :

Cache memory, Associative memory, mapping. Input / Output: External Devices, I/O Modules, Programmed I/O, Interrupt-Driven I/O, Direct Memory Access.

Text Book:

- 1.M. M. Mano, Computer System Architecture, Pearson Education 1992
2. M. M. Mano , Digital Design, Pearson Education Asia,2013

Reference Books:

- 1.Patterson, "Computer Organization and Design", Elsevier Publication
2. Tannenbaum, "Structured Computer Organization",PHI
- 3.John P Hays, "Computer Organization", McGraw Hill.
- 4.P Pal Chaudhary, "Computer Organization &Design",PHI.
5. W. Stallings, Computer Organization and Architecture Designing for Performance, 8th Edition, Prentice Hall of India,2009

COMPUTER SCIENCE LAB (C-II): Computer System Architecture:

1. Create the micro operations and associate with instructions as given in the chapter (except interrupts). Design the register set, memory and the instruction set. Use this machine for the assignments of this section.
2. Create a Fetch routine of the instruction cycle.
3. Simulate the machine to determine the contents of AC, E, PC, AR and IR registers in hexadecimal after the execution of each of following register reference instructions:
 - a. CLA e. CIR i. SNA
 - b. CLE f. CIL j. SZA
 - c. CMA g. INC k. SZE
 - d. CME h. SPA l. HLT

Initialize the contents of AC to (A937)₁₆, that of PC to (022)₁₆ and E to 1.

4. Simulate the machine for the following memory-reference instructions with I= 0 and address part = 082. The instruction to be stored at address 022 in RAM. Initialize the memory word at address 082 with the operand B8F2 and AC with A937. Determine the contents of AC, DR, PC, AR and IR in hexadecimal after the execution.
 - a. ADD e. BUN f. BSA
 - b. ANDg. ISZ
 - c. LDA
 - d. STA
5. Simulate the machine for the memory-reference instructions referred in above question with I= 1 and address part = 082. The instruction to be stored at address 026 in RAM. Initialize the memory word at address 082 with the value 298. Initialize the memory word at address 298 with operand B8F2 and AC with A937. Determine the contents of AC, DR, PC, AR and IR in hexadecimal after the execution.