Eklavya University

SESSION

2023-24

B.C.A. I SEMESTER

SYLLABUS

OF

NEP

School of Basic and Applied Sciences

EKLAVYA UNIVERSITY, DAMOH (M.P.)

Scheme of Examination BCA I Sem

For batch admitted in Academic Session 2023-24

Subject wise distribution of marks and corresponding credits

S.No.	Name Of Course	Subject Code	Subject Name	Maximum Marks Allotted				Total Marks	Contact Periods Per week			Total Credits
				Theory Slot		Practical Slot						
				External (End Semester Exam)	Internals (Through CCE)	External (End Semester Exam)	Lab Work/ sessional		L	T	P	
1	Major	23S1BCAA1T	Computer Fundamental organization & architecture	60	40	-	-	100	4	-	-	4
2	Minor	23S1BCAM1T	Programming Using C	60	40	-	-	100	4	-	-	4
3	Elective	23S1BCAC1G	Computational Mathematics	60	40	-	-	100	4	-	-	4
		23S1BCAC2G	Discrete Mathematics									
4	Foundation Course	23FC1A	English	50	-	-	-	50	2	-	-	2
5			Environmental Education	50	-	-	-	50	2	-	-	2
6	LAB - 1	23S1BCAA1P	Computer Fundamental organization & Architecture	-	-	60	40	100	-	-	2	2
7	LAB - 2	23S1BCAM1P	Programming using C	-	-	60	40	100	-	-	2	2
Total				280	120	120	80	600	16	0	4	20

Induction programme of three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiencey Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations.

EKLAVYA UNIVERSITY
ज्ञान प्रज्ञये लक्ष्य संधानम्

School of Basic And Applied Sciences

Class				**Bachelor of Computer Application (BCA)**
Semester				**I Semester**
Subject & Subject Code				**Computer Fundamentals Organization and Architecture (Major) & 23S1BCAA1T**
Max. Marks				**60(ESE) +40(I) = 100**
Credit			**Total Credits**	
L	T	P	4	
4	0	0		

Course Outcome:

After the completion of this course, a student will be able to do the following:

1. Understand the basic structure, operation and characteristics of digital computer.
2. Design simple combinational digital circuits based on give parameters.
3. Understand the Working of arithmetic and logic unit.
4. Know about hierarchical memory system including cache memories and virtual memory.
5. Know the contribution of Indians in the field of computer architecture related technology

Unit	Syllabus	Periods
UNIT - I	Fundamentals of computer: Definition, Characteristics, Capabilities and Limitation. Type of Computer: Analog, Digital, Micro, Mini, mainframe & super computer, Work Station, Server computer. Generation of computer. Smart system: definition characteristics and application. Definition of Embedded system, GIS, GPS, Cloud Computing. Uses of computer in e-governance and various public domains and services. Number System.	6
UNIT - II	Block diagram of computer and its function unit. Concept of hardware, software and firmware.Type of software. Input devices- keyboard, scanner, mouse, light pen, bar code reader, OMR, OCR, MICR, track ball, joystick, touch screen camera, mic etc. Output device: monitors- classification of monitors based on technology-CRT & flat panel LCD, LED monitors, speakers, printers-dot matrix printer, ink jet printer, laser printer,3D printer, Wi-Fi enable, plotters and their types, LCD/LED projectors. Computer and its types, Storage device: Magnetic tapes, Floppy Disks compact Disc – CD-ROM, CD-RW, VCD, DVD, DVD-RW, usb drives, Blue Ray Disc. SD/MMC Memory cards.	7
UNIT - III	Fundamentals of Digital Electronic: Data type, Complements, Fixed- point Representation, Floating- Point Representation, Binary and other Codes, ErrorDetection Code. Logic Gates, Boolean Algebra, Map Simplification, Combinational Circuits, Sequential Circuit, simple combinational circuit design problem. Combinational Circuits- Adder- Subtractor, Multiplexer, Demultiplexer, Decoders, Encoders Sequential Circuits- Flip- Flops, Registers, Counters.	6

01/06/23 01.06.23 01/06/23

1/6/23 01/06/23 01/06/23

UNIT - IV	Basic Computer Organization: Instruction codes, computer Registers, Computer Instructions, Timing & Control, Instruction Cycles, Memory Reference Instruction, Input - Output & Interrupts, Instruction formats, Addressing modes, Instruction code, Machine language, Assembly language. Register Transfer and Micro operations: Register Transfer Language, Register Transfer, Bus & Memory Transfer, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro-operations.	7
UNIT - V	Processor and Control Unit: Hardwired vs. Micro programmed Control Unit, General Register Organization, Stack Organization, Instruction Format. Data Transfer & Manipulation, Program Control Introductory concept of RISG, CISC, advantages and disadvantages of both. Pipelining – concept of pipelining, introduction to pipelined data path and control – Handling Data hazards & control hazards	6
UNIT - VI	Memory and I/O System- Peripheral Devices, I/O Interface, Data Transfer Schemes- Program Control, Interrupt, DMA Transfer. I/O Processor. Memory Hierarchy, Processor vs. Memory Speed, High-Speed Memories, Main memory & its types, Auxiliary memory, Cache Memory, Associative Memory, Interleaving. concept of Virtual Memory Hardware support for Memory Management.	7
UNIT - VII	Indian contribution to the field- Contribution of reputed scientists of Indian origin – like – Dr, Vinod Dharn -Father of Intel Pentium Processor, Dr. Ajay Bhat - Co-Inventor of USB Technology, Dr. Vinod Khosla -co-founder of sun Microsystems, Dr. Vijay P Bhatkar – architect of Indian's national initiative supercomputing, and many others. Parallel Computing Projects of Indian – PARAM, ANUPAM, FLOSOL VER CHIPPS etc. Other relevant contributors and contributions.	2

Text Books: –

1. M. Morris. "Computer System Architecture". PHI.
2. Heuring Jordan, "Computer Design & Architecture"(A.W.L.)

Reference Book:

1. William Staling, "Computer Organization & Architecture", Pearson Education Asia.
2. V. Carl Hamacher, "Computer Organization:, TMH
3. Tannenbaum, "Structured computer Organization', PHI.
4. Er. Rajiv Chopra, "Computer Architecture", Revised 3rd Edition, S. Chand & Company Pvt. Ltd

Suggestive Digital Platform Web Links:

1. https://www.youtube.com/watch?v=4TzMyXmzL8M
2. https://nptel.ac.in/courses/106106166
3. https://nptel.ac.in/courses/106106134

Suggested equivalent online courses: https://nptel.ac.in/courses/106105163

01/06/23 01.06.23 01/06/23 01/06/23 01/06/23 01/06/23

School of Basic And Applied Sciences

Class				Bachelor of Computer Application (BCA)
Semester				I Semester
Subject & Subject Code				Computer Fundamentals Organization and Architecture (Major-P) & 23S1BCAA1P
Max. Marks				60(E) +40(I) = 100
Credit			Total Credits	
L	T	P	2	
0	0	2		

Course Outcome:

After the completion of this course, a student shall be able to do the following:

1. Realization of the basic logic and universal gates.
2. Verify the behaviour of logic gates using truth tables.
3. Implement Binary-to -Gray, and Gray-to-Binary code conversions.
4. Design half and full adder circuits using basic gates.
5. Design and construct flip flops and verify the excitation tables.
6. Familiarity with parts of the computer and peripheral devices used with the computer.

Computer Fundamentals

a). Identify various parts of the computer by physical examination.

b). Identify various parts inside the CPU like motherboard, SMPS, ports, buses, IC chips, Processor, HDD, RAM, etc.

c). Identify various I/O devices available in the lab physically.

Digital Electronics

a). Verification and interpretation of truth table for AND, OR, NOT gates

b). Verification and interpretation of truth table for NAND, NOR gates

c). Verification and interpretation of truth table for Ex-OR, Ex-NOR gates

d). Study of half adder using XOR and NAND gates and verification of its operation

e). Study of full adder using XOR and NAND gates and verification of its operation.

f). Study of half subtractor and verification of its operation

g). Study of full subtractor and verification of its operation

01/06/23 01.06.23 01/06/23 01/06/23 01/06/23 1/6/23 01/06/23

h). Realization of logic functions with the help of NAND -Universal Gates

i). Realization of logic functions with the help of NOR-Universal Gates

j). Verify the truth table of RS flip-flops using NAND and NOR gates

k). Verify the truth table of JK flip-flops using NAND and NOR gates

1). Verify the truth table of T and D flip-flops using NAND and NOR gates

m). Implementation of 4x1 multiplexer using logic gates

n). Implementation of 1x4 demultiplexer using logic gates

o). Verify Gray to Binary conversion using NAND gates only

p). Verify Gray to Binary conversion using NAND gates only

Textbooks-

1. M. Morris Mano, "Computer System Architecture", PHI.
2. Heuring Jordan, "Computer System Design & Architecture" (A.W.L.).

Reference Books:

1. William Stalling, "Computer Organization & Architecture", Pearson Education Asia.
2. V" Carl Hamacher, "Computer Organization", TMH
3. Tannenbaum. "Structured Computer Organization", PHI

Assessment and Evaluation			
Suggested Continous Evaluation Methods:			
Internal Assessment	**Marks**	**External Assessment**	**Marks**
Class Interaction/ Quiz	10	Viva Voice on Practical	10
Attendence	10	Practical Record File	10
Assignment (Charts/Model/Seminar/Rural Service/Technology Dissemination/Report of Excursion/Lab Visits/Survey/Industrial Visit)	20	Table Work/ Experiments	40
Total	40		60

01/06/23 01.06.23

01/06/23 1/6/23 01/06/23

01/06/23

School of Basic & Applied Sciences

Class				**BACHELOR OF SCIENCE (BCA)**
Semester				**SEMESTER - I**
Subject & Subject Code				**PROGRAMMING IN C (Minor) & 23S1BCAM1T**
Max. Marks				**60(ESE) +40(I) = 100**
Credit			**Total Credits**	
L	**T**	**P**	**4**	
4	**0**	**0**		

Course Outcome:

The Students will be able to:

1. List and Demonstrate Basic Terminology Used in Computer Programming Write, Compile and Debug Programs in C Language.
2. Understand and Apply Variable, Conditional Statements, Loops, Functions in C.
3. Practice Pointers, Structure, Union in Programming.
4. Explain and Differentiate the Process of Problem Solving Using Procedural Programming Language.
5. Understand and Practice Concepts in C.

Unit	Syllabus	Periods
UNIT - I	Problem Identification Analysis Design Coding Testing & Debugging Implementation Modification & Maintenance; Algorithms & Flowcharts; Characteristics of a Good Program; Top Down Design; Bottom-Up Design.	8
UNIT - II	History of C; Structure of a C Program; Data Types; Constant & Variable Naming Variables, Operators & Expressions Priority &Associatively of Operators; Control Constructs; Case Switch Statement; Arrays and its Types; Formatted & Unformatted I/O; Type Modifiers & Storage Classes; Ternary Operator; Type Conversion & Type Casting.	8
UNIT - III	Functions Basics; Arguments; Return Value; Parameter Passing Techniques – Call by Value Call by Reference; Return Statement; Scope Visibility and Life-Time Rules for Various Types of Variable; Calling a Function; Recursion, Types of Recursion- Direct Indirect Tree and Tail Recursion When to Avoid Recursion.	8
UNIT - IV	Special Constructs: Break Continue Exit() Goto & Labels; Pointers: & and * Operators Pointer Expression Pointer Arithmetic String; Pointer V/S Array; Pointer to Pointer; Array of Pointer & its Limitation; Function Returning Pointers; Pointer to Function ,Pointer as Function Parameter; Structure: Basics Pointer to Structure Referential Operator Self Referential Structures Structure Within Structure Array in Structure Array of Structures; Union: Basics Declaration and use; Difference B/W Structure and Union.	8

01/06/23 01.06.23 01/06/23 01/06/23 1/6/23 01/06/23

UNIT - V	DMA: Dynamic Memory Management Concept and its Functions; File Handling: File Handling Concept and its Related Functions; Types of File and Differences b/w Them; Command Line Argument; File as Command Line Argument; C Preprocessor: Basics; Various Preprocessor Directives and Their use.	8

Text Books : –

1 Kerninghan& Ritchie "The C Programming Language", PHI

2 Schildt "C:the Complete Reference", 4th Ed TMH

3 Kanetkar Y. "Let Us C", BPB.

4 M. Kumar 'Programming In C++" TMH Publications

5 Kanetkar Y.: "Pointers in C",BPB

References Books:

1 Gottfried : "Problem Solving in C" Schaum Series

2 Balagurusami "Programming in ANSI C" 7th Ed McGraw Hill Education.

EKLAVYA UNIVERSITY
ज्ञान प्राप्ते लक्ष्य संधानम्

School of Basic & Applied Sciences

Class			Bachelor Of Computer Application (BCA)
Semester			I Semester
Subject & Subject Code			Programming In C Lab (Minor) & 23S1BCAM1P
Max. Marks			60 (E) + 40 (IA) = 100
Credit		Total Credits	
L	T	P	2
0	0	2	

C PROGRAMMING LAB:

1. Write a Program in C to Calculate Simple Interest When the Values of Principal Rate and Time are given.
2. Write a Program in C to Calculate Area of a Circle When its Radius is Input from Keyboard.
3. Write a Program in C to Calculate Temperature in Centigrade When Temperature in Fahrenheit is Input from Keyboard.
4. Write a Program in C to Calculate Area of a Triangle When its Three Sides are Input from Keyboard (by Hero's Formula).
5. Write a Program in C to Determine Whether an Input Year is Leap Year or Not.
6. Write a Program in C to Display the Table of a Number Input from Keyboard in the Following Format:
   N X 1 = N
   Eg: 5 X 1 = 5
   i.5 X 2 = 10
7. Write a Program in C to Display the Table of Tables from 1 to 10.
8. Write a Program in C to Display the Following Patterns
9. Write a Program to Calculate the Factorial of a Number Input from Keyboard Using Recursive Method.
10. Write a Program in C to Show How to Pass an Array to a User Defined Function.
11. Write a Program in C to Display Largest Element of an Array When the Elements of the Array are Input from Keyboard.
12. Write a Program in C to Calculate Area of a Circle in a User Defined Function.
13. Write a Program in C to Swap Two Numbers Using Call by Value and Call by Address.
14. Write a Program in C to Reads Name Roll No Percentage of Five Students and Display Them Using Array of Structures.
15. Write a Program in C to Show How to Pass a Structure to a User Defined Function.
16. Write a Program to Calculate Total Marks Percentage and Grade of a Student. Marks Obtained in Each of the Five Subjects are to Be Input by the User. Assign Grades According to the Following Criteria:
    a. Grade a: Percentage >=80
    b. Grade B: Percentage>=70 and <80
    c. Grade C: Percentage>=60 and <70
    d. Grade D: Percentage>=40 and <60

01/06/23 07.06.23 01/06/23 7 01/06/23 7/6/23

e. Grade E: Percentage<40

17. Write a Menu-Driven Program Using User-Defined Functions to Find the Area of Rectangle Square Circle and Triangle By Accepting Suitable Input Parameters from User.
18. Write a Program in C to Display the First N Terms of Fibonacci Series.
19. Write a Program in C to Calculate the Sum of Two Compatible Matrices.
20. Write a Program in C to Calculate the Product of Two Compatible Matrices.
21. Group Assignment
    I. Design Simple Calculators
    II. Design Marksheet for MCA
    III. Design Ludo Game

Assessment and Evaluation			
Suggested Continous Evaluation Methods:			
Internal Assessment	**Marks**	**External Assessment**	**Marks**
Class Interaction/ Quiz	10	Viva Voice on Practical	10
Attendence	10	Practical Record File	10
Assignment (Charts/Model/Seminar/Rural Service/Technology Dissemination/Report of Excursion/Lab Visits/Survey/Industrial Visit)	20	Table Work/ Experiments	40
Total	40		60

01/06/23 01.06.23 01/06/23 01/06/23 01/06/23

EKLAVYA UNIVERSITY
ज्ञान प्राप्तये लक्ष्य संधानम्

School of Basic And Applied Sciences

Class				**Bachelor of Computer Application (BCA)**
Semester				**I Semester**
Subject & Subject Code				**Computational Mathematics (Elective-I) & 23S1BCAC1G**
Max. Marks				**60 (ESE) + 40(I) = 100**
Credit			**Total Credits**	
L	**T**	**P**	**4**	
4	**0**	**0**		

Course Learning Outcomes (CLO)

On successful completion of the course, the students shall be able to:

1. Implement trigonometric solutions for measurements in real-world scenarios.
2. Implement matrices and simultaneous equations to solve complex problems.
3. Use statistical tools efficiently.
4. Use Mathematical Logic and predicate calculus for solving problems.
5. Apply the concepts of set theory for finding solutions to the related problems.

Unit 1	Topics	Periods
I	**Trigonometry:** Angles & their Measurements, Values of Trigonometric Ratios, Height and Distances. Elementary Matrices and Types of matrices.	8
II	**Equations:** Simultaneous linear equation, Methods of solving Simultaneous equations, Quadratic Equations.	8
III	**Statistics:** Frequency Distribution, Measure of Central Tendency: Mean, Mod, Median. Measures of variation: Mean deviation, Standard Deviation	8
IV	**Mathematical Logic:** Statements and notations, Connectives: Negation, Co Textbook, And Disjunction, Statement formulas, and truth textbook Tautologies, Tautological implications, contradiction contingency.	8
V	**Set Theory:** Basic concepts of set theory, enhance, enhance, and equality of sets, the power set, types of sets, operation on sets, Venn diagrams	8

01/06/23 01.06.23 01/06/23 01/06/23. 01/06/23 01/06/23

Text Books:

1. Business Mathematics S.M. SHUKLA, Sahitya Bhawan Publications.
2. Business Mathematics D.C Agrawal, Sree Sai Prakashan.
3. S.K. Sarkar: A Text book of Discrete Mathematics, S Chand, 2005.
4. A text book of Discrete Mathematics, 9/E, Sarkar S.K, S. Chand New Delhi, 2016.

Reference Books:

1. Fundamental of Statistics ELHANCE & ELHANCE, Kitab Mahal Publication.
2. Mathematical Statistics, 8/E RAY and SHARMA, Ram Prasad and Sons.
3. Business Mathematics, J.K Singh, Himalaya Publishing House 2017
4. Business Mathematics, 9/E, Sancheti, and Kapoor, Sultan Chand and Sons, 2014.
5. Discrete Mathematics structures with application to computer Science, Indian Edition, J.P. Tremblay, R Manohar, McGraw Hill Education 2017
6. "Discrete Mathematical", 2/E, J.K Sharma, Macmillan publication, 2005.

Suggested Digital Platform Web Links-

1. https://www.highereeducation.mp.gov.in/?page=xhzIQnpZwkyIQo2b%2Fy5G7w%3D%3D
2. https://freevideolactures.com/university/iit-roorkee/
3. https://epathshala.ncert.org.in/

01/06/23 01.06.23 01/06/23 01/06/23 01/06/23 01/06/23

School of Basic And Applied Sciences

Class				**Bachelor of Computer Application (BCA)**
Semester				**I Semester**
Subject & Subject Code				**Discrete Mathematics (Elective-II)& 23S1BCAC2G**
Max. Marks				**60(ESE) +40(I) = 100**
Credit			**Total Credits**	
L	**T**	**P**	**4**	
4	**0**	**0**		

Course Outcome:

The course the student

1. Apply the Boolean algebra, switching circuits, and their applications.
2. Minimize the Boolean Function using Karnaugh Map.
3. Understand the lattices and their types.
4. Graphs, their types, and their applications in the study of shortest path algorithms.
5. Test whether the two given graphs are isomorphic.
6. Understand the Eulerian and Hamiltonian graphs.
7. Represent graphs using adjacency and incidence matrices.
8. Understand the discrete numeric functions, generating functions, and Recurrence Relations.

Units	Syllabus	Periods
UNIT - I	**Relation**: Binary, Inverse, Composite and Equivalence relation, Equivalence classes and their properties, Partition of a set, Partial order relation, Partially ordered and ordered sets, Hasse diagram.Paths in relation and digraphs. **Lattices**: Definition and examples, Dual, bounded, distributive, and complemented lattices.	8
UNIT - II	**Boolean Algebra**: Definition and properties, Switching circuits and their applications, Logic gates and circuits. **Boolean functions**: Disjunctive and conjunctive normal forms, Bool's expansion theorem, Minimize the Boolean function using Karnaugh Map.	8
UNIT - III	**Graphs**: Definition and types of graphs. Subgraphs, Walk, path and circuit, Connected and disconnected graphs, Euler graph, Hamiltonian path, and circuit, Dijkstra's Algorithm for shortest path in a weighted graph.	8
UNIT - IV	**Tress**: Definition and its properties, Rooted, Binary, and spanning tree Rank and nullity of a graph, Kruskal's and prims's Algorithm Cut-set and its properties, Fundamental Circuit and Cut-Set, Planar graphs. **Matrix representation of graphs**: Incidence, Adjacency, Circuit, Cut- Set, Path.	8

01/06/23 01.06.23 01/06/23 01/06/23

1/6/23 01/06/23 01/06/23

UNIT - V	**Discrete numeric and generating function**: Operations on numeric functions, Asymptotic behaviour of numeric functions, Generating functions. **Recurrence relations and recursive algorithms**: Recurrence relations, Linear recurrence relations with constant coefficients, Homogeneous solutions, Particular solutions, Total solutions, and Solutions by the method of generating functions.	8

Keywords/Tags:
Relation, Hasse Diagram, Lattices Algebra, Boolean function, Graph and subgraph, path and circuit, Tree, Spanning tree, Cut-set Matrix representation of the graph, Discrete numeric function, Generating function, Recurrence relation, Recursive algorithm.

Text Books: –

1. J.P. Tremblay and R. Manohar, Discrete Mathematical Structures With Applications to Computer Science, McGraw Hill Education, 1st edition, 2017
2. C.L. Liu: Elements of Discrete Mathematics McGraw Hill Education, 4th edition, 2017
3. Narsingh Deo: Graph Theory with Applications to Engineering and Computer Science, Prentice Hall India Learning Private Limited, 1979.

References Books:

1. Seymour Lipschutz and Mark Lipson: Discrete Mathematics (Schaums Outline), McGraw Hill Education, 3rd edition, 2017.
2. Edgar G. Goodacre and Michael M. Parmenter, Discrete Mathematics with Graph Theory, Pearson Education pt.Ltd., Indian Reprint 2003.

Suggested Digital Platforms and web links:

https://www.highereeducation.mp.gov.in/?page=xhzIQnpZwkyIQo2b%2Fy5G7w%3D%3D

Suggested equivalent Online courses:

1. https://nptel.ac.in/courses/111106086
2. https://ugcmoocs.inflibnet.ac.in/index.php/courses/view-ug/311

01/06/23 01.06.23 01/06/23 1/6/23 01/06/23 01/06/23