

**STUDY AND EVALUATION SCHEME  
BACHELOR OF COMPUTER APPLICATION  
UNIVERSITY OF LUCKNOW, LUCKNOW**

**YEAR: FIRST, SEMESTER –II**

Sl. No.	Paper Code	Subject	Periods			Evaluation Scheme				Sub Total	Credit
						Sessional			Exam.		
			L	T	P	CT	TA	Total	ESE		
1	BCA-201	Mathematics-II	3	1	0	20	10	30	70	100	4
2	BCA-202	Advanced Professional Communication	3	0	0	20	10	30	70	100	3
3	BCA-203	Digital Electronics and Computer Organization	3	1	0	20	10	30	70	100	4
4	BCA-204	Data Structure using C	3	1	0	20	10	30	70	100	4
5	BCA-205	Accounting and Financial Management	3	0	0	20	10	30	70	100	3
<b>PRACTICALS</b>											
6	BCA-206P	Advanced Professional Communication Lab	0	0	2	10	10	20	30	50	1
7	BCA-207P	Data Structure Lab	0	0	3	10	10	20	30	50	2
8	BCA-208P	Digital Electronics and Computer Organization Lab	0	0	2	10	10	20	30	50	1
9	BCA-GP	General Proficiency	-	-	-	-	-	-	-	50	-
		<b>Total</b>	<b>15</b>	<b>3</b>	<b>7</b>					<b>700</b>	<b>22</b>

Abbreviations:

CT: Class Test

TA: Teacher's Assessment

ESE: End Semester Examination



BCA

MATHEMATICS

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3 1 0  
8

**UNIT - I: MULTIPLE INTEGRALS**

Double and triple integrals, Change of order of integration, Change of variables, Application of integration to lengths, Surface areas and Volumes- Cartesian and Polar coordinates.

**UNIT -II: ORDINARY DIFFERENTIAL EQUATIONS**

12

Definition and examples, Order and Degree of differential equations, Solutions of first order first degree differential equations, Variable Separable, Equations reducible to variable separable, Linear differential equations, Bernoulli's Differential equations, Linear differential equations of  $n^{th}$  order with constant coefficients, Complementary function and particular integral.

**UNIT - III: PARTIAL DIFFERENTIAL EQUATIONS**

10

Origin of first order partial differential equations, Partial differential equations of the first order and degree one, Lagrange's solution, Partial differential equation of first order and degree greater than one. Charpit's method of solution. Solution of second order linear partial differential equations with constant coefficients.

**UNIT - IV: STATISTICS & PROBABILITY**

10

Moments, Moment generating functions, Skewness, Kurtosis, Correlation and Regression analysis, Binomial, Poisson and Normal distributions, Test of significance: Chi-square test, t-test.

**Text Books:**

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers.
2. E. Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons.
3. J.N.Kapur, Mathematical Statistics, S. Chand & company Ltd., 2000.

**Reference Books:**

1. N.P.Bali and Dr. Manish Goyal, Engineering Mathematics University Science Press, Laxmi Publications, Pvt. Ltd.
2. V. Ramana, Higher Engineering Mathematics, Tata Me Graw- Hill Publishing Company Ltd.
3. M. D. Raisinghania, Advanced Differential Equations, S. Chand & Company Ltd.
4. M.Renardy and R.C.Rogers, An introduction to Partial Differential Equations, New York, Springer.
5. C.B.Gupta, Vijay Gupta, Introduction to Statistical Methods, Vikas Publishing.
6. Devore, Probability and Statistics, Thomson (Cengage) Learning, 2007.

## BCA-202

## ADVANCED PROFESSIONAL COMMUNICATION

L T P  
3 0 0**Unit-I**

(10)

**Communication for Employment:** Difference between Resume, CV and Biodata, Types of Resume, Preparing a professional Resume, Offline job application, Online job application, Cover Letter for job application, Application on online job portals (Naukri.com, Angellist, Indeed.com etc), Use of social media for job application (LinkedIn, Facebook).

**Unit-II**

(15)

**Advanced Grammar:** Phrase, Clause, Verb Phrase, Complex Sentences, Coordination, Focus, Phrasal Verbs.

**Unit-III**

(10)

**Business Etiquettes:** Netiquettes; the art of Negotiation: Types, Characteristics, and Methods; Leadership: Leadership as a process, Leadership Attributes (Personality types and traits for Leadership, Intelligence and Emotional Intelligence in Leadership), Skills for building strong leadership (Credibility, Communication, Listening with understanding, Assertiveness, Effective stress management, Problem solving, Decision making and Improving Creativity); Personality assessment and Grooming; Presentation Strategies.

**Unit-IV**

(05)

**Improving Language through Literature:**

1. "Of Studies" by Francis Bacon;
2. "Obituary" by Ramanujam;
3. "Australia" by A D Hope

**Text Books:**

1. Bakshi, R. N. (2000) A Course in English Grammar. Orient Longman, Hyderabad.
2. Mishra, Binod et al (2015, 6th reprint) Communication Skills for Engineers and Scientists. PHI, New Delhi.

**Reference Books:**

1. Effective Technical Communication by Barun K. Mitra, Oxford Univ. Press, 2006, New Delhi Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., New Delhi.
2. Leadership by R. I. Hughes, R. C. Ginnett and G. J. Curphy (McGraw Hill, 8e)
3. Negotiation by Himanshu Rai (McGraw Hill)



DIGITAL ELECTRONICS AND COMPUTER ORGANIZATION

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3 1 0

Unit-I

(08)

**Basics of Digital Electronics:** Character Codes (BCD, ASCII, EBCDIC) and its arithmetic, Signed binary numbers, Cyclic codes, error detecting code. Introduction to logic gates. **Gate-level minimization:** Boolean algebra: definition, axioms, basic theorems, and properties, Boolean functions, Canonical and standard forms, NAND and NOR implementation, K- map method up to five variable, don't care conditions.

Unit-II

(10)

**Combinational Logic:** Combinational circuits, analysis and design procedures, binary adder-subtractor, Introduction to decoders, encoders, multiplexers, De-multiplexers. **Sequential logic:** Sequential circuits, Latches, flip flops, analysis of clocked sequential circuits. Registers and Counters: Shift registers, Ripple counters. **Synchronous and Asynchronous Circuits:** Analysis of clocked sequential circuits, State reduction & assignments, Design procedure. Analysis procedure of Asynchronous sequential circuits, circuit with latches, design procedure.

Unit-III

(10)

**Basics of Computer Organization:** Functional units of digital computer and their interconnections, buses. Register, bus and memory transfer. Processor organization, general register organization, stack organization and addressing modes. **Arithmetic and logic unit:** Fixed and floating point representation, IEEE standard for floating point representation, Signed Adder, Subtractor circuits. Multiplication: Signed operand multiplication, Booth's algorithm. Division and logic operations. Arithmetic & logic unit design.

Unit-IV

(12)

**Control Unit:** Instruction types, formats, instruction cycles and sub-cycles, micro-operations, execution of a complete instruction. Introduction to microprogrammed control organization. **Memory:** Basic concept and hierarchy, semiconductor RAM memories. ROM memories. Cache memories: concept, design issues. **Input / Output:** Peripheral devices, I/O interface, I/O ports, Interrupts: Types of interrupts and exceptions. Modes of Data Transfer: Programmed I/O, interrupt initiated I/O and Direct Memory Access.

Text Books:

1. Computer System Architecture, M. Mano (PHI)
2. Computer Organization, W. Stallings (PHI)

Reference Books:

1. Computer Organization, Vravice, Zaky & Hamacher (TMH Publication)
2. Structured Computer Organization, Tannenbaum (PHI)
3. Computer Organization, John P.Hayes (McGraw Hill)
4. Digital Logic and Computer Design, M. Morris Mano, (Pearson Education India)
5. Digital Circuit and Design, DP Kothari and JS Dhillon, (Pearson Education)
6. Computer Organization and Design, P Pal Chaudhary, (PHI)

BCA-204

DATA STRUCTURES USING C

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3 1 0

Unit-I

(10)

**Introduction:** Basic Terminology, Elementary Data Organization, Built in Data Types, Abstract Data Types. **Linked lists:** Representation and Implementation of Singly Linked List using Array, and Pointer, Doubly Linked List, Operations on a Linked List: Insertion, Deletion, And Traversal.

Unit-II

(10)

**Stacks:** Array and Linked List Implementation of Stack, Basic operations: Push & Pop; Application of stack: Prefix and Postfix Expressions, Evaluation of postfix expression. **Recursion-** Principles and types of recursion; example of recursion: Fibonacci series, and Tower of Hanoi Problem. **Queues:** Array and linked list implementation of queues, Basic operations: Create, Add, Delete.

Unit-III

(12)

**Trees:** Basic terminology, Binary Trees, Binary Tree Representation: Array and Linked List Representation, Strictly Binary Trees, Complete Binary Trees, Extended Binary Trees, Tree Traversal algorithms. **Binary Search Trees:** Insertion, Deletion and Searching. Concept & Basic Operations on AVL Tree. **Searching, Hashing and Sorting:** Binary Search, Concept of Hashing & Collision resolution Techniques, Insertion Sort, Selection Sort, Bubble Sort, Quick Sort.

Unit-IV

(08)

**Graphs:** Terminology & Representations, Graphs & Multi-graphs, Directed Graphs, Sequential Representations of Graphs, Adjacency Matrices, Traversal, Minimum Cost Spanning Trees. Graph Traversal: Depth First Search and Breadth First Search, Minimum Cost Spanning Trees: Prims and Kruskal algorithm.

Text Books

1. Aaron M. Tenenbaum, Yedidyah Langsam and Moshe J. Augenstein "Data Structures Using C and C++", PHI
2. R. Kruse et al, "Data Structures and Program Design in C", Pearson Education
3. Thareja, "Data Structure Using C" Oxford Higher Education.

Reference Books

1. Lipschutz, "Data Structures" Schaum's Outline Series, TMH
2. Jean Paul Trembley and Paul G. Sorenson, "An Introduction to Data Structures with applications", McGraw Hill
3. Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publication

BCA-205

ACCOUNTING AND FINANCIAL MANAGEMENT

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**Unit-I** (10)

**Overview:** Meaning, objectives, Accounting Principles-concepts and conventions, Branches of Accounting, Accounting Cycle, Debit and Credit, Types of Account, Book-keeping, Source Document, Accounting Equation, Users of Accounting Information, Accounting Standards in India, Matching of Indian Accounting Standards with International Accounting Standards, Capital and Revenue items.

**Unit-II** (10)

**Basics of Accounting:** System of Accounting, Double Entry System, Introduction to Journal, Journalizing the transactions, Ledger and Posting, Trial Balance: Meaning, Methods and Error not disclosed by Trial Balance, Preparation of Final Accounts: Trading, Profit and Loss Account and Balance Sheet with simple adjustment entries.

**Unit-III** (10)

**Financial Statement Analysis:** Meaning, Objectives, Types and Methods. Ratio Analysis: Profitability Ratio, Activity Ratio, Liquidity Ratio and Solvency Ratio. **Fund Flow Statement:** Meaning, Objective, Concept of Gross and Net Working Capital. **Cash Flow Statement:** Meaning, Objectives, Various Cash and Non-Cash Transactions. Application of Computer in Accounting.

**Unit-IV** (10)

**Introduction to Financial Management:** Meaning, Nature, Approaches to Financial Management, Objectives: Profit Maximization and Wealth Maximization, Financial Decisions: Financing, Investment and Dividend Decisions, Liquidity Vs Profitability, Time Value of Money, Valuation Concept: Compounding and Discounting Principles, Sources of Finance: Short term and Long term.

**Text Books:**

1. Narayanswami- Financial Accounting: A Managerial Perspective, PHI
2. Tulsian- Financial Accounting, Pearson
3. Ravi M Kishore- Financial Management, Taxmann

**Reference Books:**

1. Mukherjee- Financial Accounting for Management, TMH
2. Khan and Jain- Financial Management, Tata McGraw Hill
3. Ghosh T P – Accounting and Finance for Managers, Taxmann
4. Ramchandran & Kakani- Financial Accounting for Management, TMH
5. Ashish K. Bhattacharya- Essentials of Financial Accounting, PHI
6. Chowdhary Anil - Fundamentals of Accounting and Financial Analysis, Pearson Education



BCA-206P

ADVANCED PROFESSIONAL COMMUNICATION LAB

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LIST OF PRACTICALS

1. Technical GD – I
2. Technical GD – II
3. Body Language at Workplace
4. Paper presentation techniques for Workshop and Seminars
5. Personality Test
6. Technical Presentation – I
7. Technical Presentation – II
8. Preparations for Personal Interview

Reference Books:

1. Pronouncing Dictionary by Daniel Jones
2. A Textbook of English Phonetics for Indian Students by T. Balasubramanian



Write Program in C for the following:

1. Arrays
  - a. To implement addition of two 2D arrays.
  - b. To implement multiplication of two 2D arrays.
2. To implement Singly Linked List
3. Stack
  - a. To implement stack using array.
  - b. To implement stack using linked list.
4. Queue
  - a. To implement queue using array.
  - b. To implement queue using linked list.
5. To implement binary tree using linked list.
6. To implement binary search tree using linked list.
7. To implement tree traversals using linked list.
8. Graph Traversal
  - a. To implement BFS using linked list.
  - b. To implement DFS using linked list.
9. To implement Binary Search.
10. To implement Bubble Sorting.
11. To implement Selection Sorting.
12. To implement Insertion Sorting.



BCA-208P

DIGITAL ELECTRONICS AND COMPUTER ORGANIZATION LAB

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Note: Minimum ten experiments are to be performed from the following list.

1. Nomenclature of digital ICs, specifications, study of the data sheet, Concept of Vcc and ground, verification of the truth tables of logic gates using TTL ICs.
2. Realization of basic gates using Universal logic gates.
3. Implementation of the given Boolean function using logic gates in both SOP and POS forms.
4. Verification of state tables of RS, JK, T and D flip-flops using NAND & NOR gates.
5. Decoder/Encoder
  - a. Implementation and verification of Decoder using logic gates.
  - b. Implementation and verification of Encoder using logic gates.
6. Implementing HALF ADDER, FULL ADDER using basic logic gates.
7. Multiplexer/ Demultiplexer
  - a. Implementation of 4:1 multiplexer using logic gates.
  - b. Implementation of 1:4 demultiplexer using logic gates.
8. Implementation of 4-bit parallel adder using 7483 IC.
9. Universal Shift Register
  - a. Realization of Universal Shift Register using JK flip-flops & logic gates.
  - b. Realization of Universal Shift Register using multiplexer & flip-flops.
10. Counters
  - a. Design, and verify the 4-bit synchronous counter.
  - b. Design, and verify the 4-bit asynchronous counter.
11. Design of an 8-bit ARITHMETIC LOGIC UNIT.
12. Design the data path of a computer from its register transfer language description.

