STUDY AND EVALUATION SCHEME
BACHELOR OF COMPUTER APPLICATION
UNIVERSITY OF LUCKNOW, LUCKNOW
Total Credits = 132

YEAR: FIRST, SEMESTER –I

Sl. No.	Paper Code	Subject	Periods			Evaluation Scheme				Sub Total	Credit
						Sessional Exam			Exam. ESE		
			L	T	P	CT	TA	Total			
1	BCA-101	Essentials of Professional Communication	3	1	0	20	10	30	70	100	4
2	BCA-102	Principal of Management	3	0	0	20	10	30	70	100	3
3	BCA-103	Mathematics-I	3	1	0	20	10	30	70	100	4
4	BCA-104	Computer Fundamentals and Programming in C	3	1	0	20	10	30	70	100	4
5	BCA-105	Fundamentals of Environmental Sciences	3	0	0	20	10	30	70	100	3
PRACTICALS											
6	BCA-106P	Computer Application Lab	0	0	3	10	10	20	30	50	2
7	BCA-107P	Programming in C Lab	0	0	2	10	10	20	30	50	1
8	BCA-108P	Professional Communication Lab	0	0	2	10	10	20	30	50	1
9	BCA-GP	General Proficiency	-	-	-	-	-	-	-	50	-
		Total	15	3	7					700	22

YEAR: FIRST, SEMESTER –II

Sl. No.	Paper Code	Subject	Periods			Evaluation Scheme				Sub Total	Credit
						Sessional Exam			Exam. ESE		
			L	T	P	CT	TA	Total			
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
PRACTICALS											
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	-
		Total	15	3	7					700	22

(A.A. Zilli)

YEAR: SECOND, SEMESTER –III

Sl. No.	Paper Code	Subject	Periods			Evaluation Scheme				Sub Total	Credit
						Sessional Exam			Exam. ESE		
			L	T	P	CT	TA	Total			
1	BCA-301	Computer Based Numerical and Statistical Techniques	3	0	0	20	10	30	70	100	3
2	BCA-302	Object Oriented Programming using Java	3	1	0	20	10	30	70	100	4
3	BCA-303	Operating System	3	1	0	20	10	30	70	100	4
4	BCA-304	Management information System	3	0	0	20	10	30	70	100	3
5	BCA-305	Computer Architecture	3	1	0	20	10	30	70	100	4
PRACTICALS											
6	BCA-306P	Computer Based Numerical and Statistical Techniques Lab	0	0	2	10	10	20	30	50	1
7	BCA-307P	Object Oriented Programming & Java Lab	0	0	3	10	10	20	30	50	2
8	BCA-308P	Operating System Lab	0	0	2	10	10	20	30	50	1
9	BCA-GP	General Proficiency	-	-	-	-	-	-	-	50	-
		Total	15	3	7					700	22

YEAR: SECOND, SEMESTER –IV

Sl. No.	Paper Code	Subject	Periods			Evaluation Scheme				Sub Total	Credit
						Sessional Exam			Exam. ESE		
			L	T	P	CT	TA	Total			
1	BCA-401	Discrete Mathematics	3	1	0	20	10	30	70	100	4
2	BCA-402	Business Economics	3	0	0	20	10	30	70	100	3
3	BCA-403	Computer Graphics and Multimedia systems	3	1	0	20	10	30	70	100	4
4	BCA-404	Data Base Management System	3	1	0	20	10	30	70	100	4
5	BCA-405	Software Engineering	3	0	0	20	10	30	70	100	3
PRACTICALS											
6	BCA-406P	Graphics and Multimedia System Lab	0	0	3	10	10	20	30	50	2
7	BCA-407P	Data Base Management System Lab	0	0	2	10	10	20	30	50	1
8	BCA-408P	Software Engineering Lab	0	0	2	10	10	20	30	50	1
9	BCA-GP	General Proficiency	-	-	-	-	-	-	-	50	-
		Total	15	3	7					700	22

YEAR: THIRD, SEMESTER –V

Sl. No.	Paper Code	Subject	Periods			Evaluation Scheme				Sub Total	Credit
						Sessional Exam			Exam. ESE		
			L	T	P	CT	TA	Total			
1	BCA-501	Data Communication and Computer Network	3	1	0	20	10	30	70	100	4
2	BCA-502	Design and Analysis of Algorithm	3	1	0	20	10	30	70	100	4
3	BCA-503	Web design Concept	3	0	0	20	10	30	70	100	3
4	BCA-504	UNIX and Shell Programming	3	1	0	20	10	30	70	100	4
5	BCA-505	Elective-I	3	0	0	20	10	30	70	100	3
PRACTICALS											
6	BCA-506P	UNIX Lab	0	0	2	10	10	20	30	50	1
7	BCA-507P	Web Design lab	0	0	3	10	10	20	30	50	2
8	BCA-508P	Data Communication and computer network Lab	0	0	2	10	10	20	30	50	1
9	BCA-GP	General Proficiency	-	-	-	-	-	-	-	50	-
		Total	15	3	7					700	22

Elective-I

1. Data Mining and Ware Housing
2. Software Testing Methodology *
3. Open Source Software
4. Information System: Analysis, Design & Implementation

YEAR: THIRD, SEMESTER –VI

Sl. No.	Paper Code	Subject	Periods			Evaluation Scheme				Sub Total	Credit
						Sessional Exam			Exam. ESE		
			L	T	P	CT	TA	Total			
1	BCA-601	E-Commerce	3	1	0	20	10	30	70	100	4
2	BCA-602	Cyber Law and Internet Security	3	1	0	20	10	30	70	100	4
3	BCA-603	Mobile Computing	3	0	0	20	10	30	70	100	3
4	BCA-604	Elective-II	3	1	0	20	10	30	70	100	4
PRACTICAL/PROJECT											
5	BCA-605P	Advanced Technology (Dot Net) Lab	0	0	3	10	10	20	30	50	2
6	BCA-Pro	Project	0	0	6	-	50	50	150	200	5
7	BCA-GP	General Proficiency	-	-	-	-	-	-	-	50	-
		Total	12	3	9					700	22

Elective-II

1. Optimization Techniques
2. Microprocessor
3. Data Compression
4. Cryptography*

BCA-101

ESSENTIAL OF PROFESSIONAL COMMUNICATION

L	T	P
3	1	0

Unit I **(8)**

Basics of Communication: Definition, Meaning, Process, Types, Forms, Levels, Flow, Importance and Features of Communication; Language as a tool of Communication; Barriers to Communication; 7 Cs of Communication

Unit II **(12)**

Basic Grammar: Parts of Speech; Articles; Pronouns; Verbs; Prepositions; Conjunctions; Tenses

Unit III **(8)**

Vocabulary and Paragraph Development: Word formation, Homophones, Homonyms, Synonyms, Antonyms; Sentence Formation: Subject and Predicate; Paragraph Development: Techniques and Methods of Paragraph Development, Précis Writing, Note Taking, Summary

Unit IV **(12)**

Written Communication: Writing Process and Strategies; Letter Writing: Application writing, Sales Letter; Purchase Letter, Claim Letter, Adjustment Letter; Proposal Writing: Importance and Methods, Elements of Proposal; Report Writing: Importance, Process, Building Questionnaire, Elements, Memo, Notice, Basic E-mail Etiquettes

Text and Reference Books:

1. Developing Communication Skills by Krishna Mohan and MeeraBennerji, Macmillan India Ltd.
2. A Manual of Practical Communication by L U B Pandey and R P Singh, AITBS Publications India Ltd.
3. Professional Communication by Meenakshi Raman and Sangeeta Sharma, OUP
4. Functional Skills in Language and Literature by R P Singh, OUP
5. How to Write Correct English by R P Sinha, Bharti BhawanPrakashan

BCA-102

PRINCIPLE OF MANAGEMENT

L T P
3 0 0

Unit I **(8)**

Nature of Management: Meaning, Definition, it's nature purpose, importance & Functions, Management as Art, Science & Profession- Management as social System Concepts of management-Administration-Organization, Management Skills, Levels of Management. Evolution of Management Thought. Business Ethics & Social Responsibility.

Unit II **(10)**

Planning: Meaning- Need & Importance, types, Process of Planning, Barriers to Effective Planning, levels – advantages & limitations. Forecasting- Need & Techniques Decision making-Types - Process of rational decision making & techniques of decision making Organizing – Elements of organizing & processes: Types of organizations.

Staffing: Fundamentals of staffing, Recruitment and selection, Training and development.

Unit III **(10)**

Fundamentals of Organizational Behavior: Nature, Scope, Definition and Goals of Organizational Behavior; Fundamental Concepts of Organizational Behavior; Models of Organizational Behavior; Emerging aspects of Organizational Behavior: Meaning Cultural Diversity, Managing the Perception Process. Perception, Attitude, Values and Motivation Concept, Nature, Process, Importance, Management Behavioral aspect of Perception. Effects of employee attitudes; Personal and Organizational Values; Job Satisfaction; Nature and Importance of Motivation; Achievement Motive;

Unit IV **(12)**

Motivation: Importance – theories Leadership – Meaning – styles, qualities & function of leader Controlling - Need, Nature, importance, Process & Techniques, Total Quality Management Coordination – Need – Importance. Management of Change: Models for Change, Force for Change, Need for Change, Alternative Change Techniques, New Trends in Organization Change, Stress Management. Strategic Management Definition, Classes of Decisions, Levels of Decision, Strategy, Role of different Strategist, Relevance of Strategic Management and its Benefits.

Text and Reference Books:

1. Essential Of Management – Horold Koontz And Iteinz Weibrich- Mcgrawhills International
2. Management Theory & Practice – J.N.Chandan
3. Organizational Behavior Text, Cases And Games- By K.Aswathappa, Himalaya Publishing
4. House, Mumbai, Sixth Edition (2005)
5. Organizational Behavior – Anjali Ghanekar

BCA-103

MATHEMATICS-I

L	T	P
3	1	0

Unit I **(12)**

Matrix Algebra: Types of Matrices, Inverse of a matrix by elementary transformations, Rank of a matrix (Echelon & Normal form). Linear dependence. Consistency of linear system of equations and their solution, Characteristic equation. Eigen values and Eigen vectors, Cayley-Hamilton Theorem (without proof), Complex and Unitary Matrices and its properties.

Unit II **(10)**

Differential Calculus–I: Successive Differentiation, Leibnitz's theorem, Limit, Continuity and Differentiability of functions of several variables. Partial derivatives, Euler's theorem for homogeneous functions, Total derivatives, Change of variables, Curve tracing in cartesian coordinates.

Unit III **(10)**

Differential Calculus–II: Taylor's and Maclaurin's Theorem, Expansion of function of several variables, Jacobian, Approximation of errors. Extrema of functions of several variables, Lagrange's method of multipliers (Simple applications), Beta and Gamma functions (simple problems).

Unit IV **(8)**

Vector Calculus: Point function. Gradient, Divergence and Curl of a vector and their physical interpretations. Vector identities. Tangent and Normal, Directional derivatives. Line, Surface and Volume integrals. Applications of Green's, Stake's and Gauss divergence theorems (without proof).

Text and Reference Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers.
2. Thomas & Finley, Calculus, Narosa Publishing House
3. B. V. Ramana, Higher Engineering Mathematics, Tata Me Graw- Hill Publishing Company Ltd.
4. Shanti Narayan ,Differential Calculus , S. Chand & Co Publishers.
5. Shanti Narayan ,Integral Calculus , S. Chand & Co Publishers.
6. K. Hoffman and R. Kunze , Linear Algebra, Prentice-Hall.
7. B. Kolman & D.R. Hill- Linear Algebra With Applications, Pearson Education, SeventhEdition – 2003
8. S. Singh, Linear Algebra, Vikas Publication, New Delhi-2000.

BCA-104

COMPUTER FUNDAMENTALS AND PROGRAMMING IN C

L T P
3 1 0

(10)

Unit I

Basics of Computer: Block Diagram of Computer; Characteristics of Computer, Classification of Computers, Generation of Computers, Input/ Output devices, Memory Hierarchy.

Operating system: Definition, purpose, function, services and types.

Number system: Binary, octal and hexadecimal number systems, their mutual conversions, Binary arithmetic.

Basics of Computer Programming Languages: Concept of algorithm and flow charts, Types of computer languages: Machine Language, Assembly Language and High Level Language, Concept of Assembler, Compiler, Interpreter, Loader and Linker.

(10)

Unit II

C Language Fundamentals: Character set, Keywords, Identifiers, Variables: Declaration and Initialization of variables, Scope of variables, Constant, Types of constant, Data type and sizes, Types of operators: Unary and Binary operators, Bit wise operators, Type conversion. Decision Control Statements: if, if-else, Nested if else, else if ladder, Switch statement, Break, Continue statement. Loops: for, while, do-while, Nesting of loops. Structure of C program, Compilation and Execution of C programs. Errors, Types of errors.

(10)

Unit III

Functions: Declaration and definition, Function call, Types of function, Parameter passing, Call by value, Call by reference, Storage classes, Recursion.

(10)

Unit IV

Arrays: Array notation and representation, manipulating array elements, using multi-dimensional arrays. Structure, union, enumerated data types

Pointers: Introduction, declaration, standard C pre-processors, defining and calling macros.

Text and Reference Books:

1. The C programming by Kernighan Brain W. and Ritchie Dennis M., Pearson Education .
2. Computer Concepts and Programming in C by Vikas Gupta, Wiley India Publication
3. Computer Fundamentals and Programming in C. Reema Thareja, Oxford Publication
4. Computer Concepts and Programming in C, E Balaguruswami, McGraw Hill
5. Computer Science- A Structured Programming Approach Using C, by Behrouz A. Forouzan, Richard F. Gilberg, Thomson, Third Edition , Cengage Learning - 2007.
6. Problem Solving and Program Design in C, by Jeri R. Hanly, Elliot B. Koffman, Pearson Addison-Wesley, 2006.

BCA-105

FUNDAMENTALS OF ENVIRONMENTAL SCIENCES

L T P
3 0 0

Unit I **(10)**

Fundamentals of Environmental Sciences: Definition, Scope, Importance of Environmental Sciences and Need of public awareness. Ecosystem- Definition, Energy flow in ecosystem, Ecological succession and Balanced ecosystem. Effect of Human Activities on environment of Agriculture, Housing, Industry, Mining and Transportation activities. Basics of Environmental Impact, Assessment and Sustainable development.

Unit II **(10)**

Natural Resources & Environmental Quality standard: Water resources- Availability and quality aspects of water. Mineral resources, Material Cycle- Carbon, Nitrogen & Sulphur cycles. Different types of energy-Conventional and nonconventional energy resources.

Unit III **(10)**

Environmental Pollution & Current Environmental issues: Environmental Pollution-Definition, Causes, Effects and control measure of:

1. Air Pollution
2. Water Pollution
3. Soil pollution
4. Marine Pollution

Importance of current environmental issues: Population growth, Climate change & Global warming and its causes, Urbanization, Acid rain. Ozone layer depletion- causes and effects on health, Control measures. Photochemical smog, Solid waste management, Waste water treatment.

Unit IV **(10)**

Environmental Quality standard & Legal aspects: Modern techniques used in analysis of Pollutants- Determination of disinfectants, Pesticides, Ambient Quality standards.
Role of Government, Legal aspects, Environment protection Act, Introduction to ISO 14000, Green building concept.

Text and Reference Books:

1. Environmental Studies- Dr. D. L. Manjunath, Pearson Education
2. Text book of Environment Studies- Erach Bharucha
3. Environmental Studies- Arun K Tripathi, Teri Publication. 2017.
4. Text book of Environmental studies-S. K. Dhameja, Rai Publication
5. Principle of Environmental Sciences – Jan J.Boersema - Spinger
6. Environmental studies- R. Rajagopalan- Oxford Publication-2005.

BCA-106P

COMPUTER APPLICATION LAB

L T P
0 0 3

Note: at least 2 practical needs to be conducted from each section.

1. **Introduction to MS Word**
   (a) Creating
   (b) Formatting
   (c) Tables
   (d) Drawings
   (e) Printing

Practical:

(i) Prepare a grocery list having four columns (Serial number, The name of the product, quantity and price) for the month of April, 06.
- Font specifications for Title (Grocery List): 14-point Arial font in bold and italics.
- The headings of the columns should be in 12-point and bold.
- The rest of the document should be in 10-point Times New Roman.
- Leave a gap of 12-points after the title.

(ii) Create a telephone directory.
- The heading should be 16-point Arial Font in bold
- The rest of the document should use 10-point font size
- Other headings should use 10-point Courier New Font.
- The footer should show the page number as well as the date last updated.

(iii) Create your resume

2. **Introduction to MS Excel**
   (a) Creating
   (b) Formatting
   (c) Tables
   (d) Charts
   (e) Printing

Practical:

(i) Enter the Following data in Excel Sheet

State	Qtr1	Qtr2	Qtr3	Qtr4	Qtr Total(Avg)	Rate	Amount
Rajasthan	2014	2541	2351	2014		12	
Delhi	2314	2589	6541	3215		14	
U.P.	1234	5216	4521	2365		15	
Harayana	8523	2654	1258	3269		16	
Punjab	9521	2547	3569	2546		17	

(a) Apply Formatting as follow:

- Title in TIMES NEW ROMAN
- Font Size - 14
- Remaining text - ARIAL, Font Size -10
- State names and Qtr. Heading Bold,
- Numbers in two decimal places.
- Qtr. Heading in center Alignment.
- Apply Border to whole data.

(b) Calculate

- Calculate Average for each quarter
- Calculate Amount = Rate * Qtr Total(Avg).

(ii) Given the following worksheet

Roll No.	Name	Marks	Grade
1001	Dhoni	84	
1002	Virat	58	
1003	Raina	66	
1004	Rahul	42	
1005	Sachin	99	

Calculate the grade of these students on the basis of following guidelines:
If Marks Then Grade
>= 80 A+
>= 60 < 80 A
>= 50 < 60 B
< 50 F

(iii) Given the following worksheet

Salesman Id	Qtr1	Qtr2	Qtr3	Qtr4	Qtr Total	Commision
S001	5010	6012	6200	5200		
S002	7000	8000	9000	6325		
S003	4000	4500	3254	2145		
S004	6541	5241	6541	3265		
S005	5326	6200	8795	6900		

Calculate the commission earned by the salesmen on the basis of following Candidates:
If Total Sales Commission
< 20000 0% of sales
> 20000 and < 25000 4% of sales
> 25000 and < 30000 5.5% of sales
> 30000 and < 35000 8% of sales
>= 35000 11% of sales
The total sales is sum of sales of all the four quarters.

3. Introduction to MS Power Point

(a) Creating
(b) Formatting
(c) Graphics
(d) Effects
(e) Printing

Practical:

(i) Create a presentation on Memory Hierarchy of a digital computer system
(ii) Create a presentation on Functionalities of Operating System
(iii) Create a presentation on Input/ Output Devices of a digital computer system

4. Introduction to MS Access

(a) Database concepts
(b) Tables
(c) Forms
(d) Reports
(e) Printing

Practical:

(i) Create a Database
(ii) Create a table
(iii) Add data to table
(iv) Create a query

5. Using essential accessories

(a) Notepad
(b) MS-Paint
(c) Calculator

Practical:

(i) Create your resume in Notepad
(ii) Create a natural scenery in MS-Paint
(iii) Use system calculator to convert the degree Celsius value into Fahrenheit value

Books Recommended:

1. MS-Office 2000 (For Windows), Steve Sagman
2. MS-Office 2007, Michael Price
3. Comdex Windows 7 with Office 2010, Vikas Gupta

BCA-107P

PROGRAMMING IN C LAB

L	T	P
0	0	2

1. Write C program to print a message on output screen.
2. Write C program to print sum of two integers given by the user.
3. Write C program to find largest of three integers.
4. Write C program to find factorial of an integer.
5. Write C program to check whether the given number is palindrome or not.
6. Write C program to find Sum of Digits of an integer.
7. Write C program to find product of digits of an integer.
8. Write C program to find whether the given integer is a prime number.
9. Write C program to find the reverse of a number.
10. Write C program to find whether the given integer is an Armstrong number.
11. Write C program to print sum of even and odd numbers from 1 to N numbers.
12. Write C program to print the Fibonacci series.
13. Write C program to find sum and average of n integers using linear array
14. Write C program to find factorial of n by recursion using user defined functions.
15. Write C program to interchange two values using Call by value and Call by reference.
16. Write C program to convert binary number into decimal number.
17. Write C program to convert decimal number into binary number.
18. Write C program that simply takes elements of the array from the user and finds the sum of these elements.
19. Write C program to perform addition, multiplication, transpose on matrices.
20. Write a C program for searching an integer in a linear array using Linear Search Technique
21. Write C program to display the mark sheet of a student using structure.

BCA-108P

PROFESSIONAL COMMUNICATION LAB

L	T	P
0	0	2

1. Self Introduction
2. Soft Skills—Grooming
3. Soft Skills—Behavioural
4. Speech Delivery – I
5. Speech Delivery – II
6. Debate
7. Group Discussion – I
8. Group Discussion – II
9. Role Play – I
10. Technology in Oral Communication—Public Address System

Books Recommended:

1. Spoken English—A Manual of Speech and Phonetics by R K Bansal and J B Harrison, Orient Blackswan
2. A Course in Phonetics and Spoken English by Sethi and Dhamija, PHI
3. English Pronouncing Dictionary by Daniel Joans, CUP

1. The marks distribution for General proficiency paper incorporated in each semester of BCA will be as follows:

S.N.	Assessment	Marks
1.	Discipline/ Behavior of Students Inside/Outside Institute Campus Verified by Head of the Department with visual documents for record.	20
2.	Participation of Students in Games/Sports/Cultural/Literary/ Hobby Events Verified by Head of the Department with visual documents for record.	20
3.	Academic Activities/ Special Lecture/ Industrial Visits by Students Verified by Head of the Department with visual documents for record.	10

2. Each BCA student shall appear in compulsory paper and clear this paper which is essential for the award of Undergraduate degree as decided by University of Lucknow.

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**
PRACTICALS											
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	-
		Total	**15**	**3**	**7**					**700**	**22**

Abbreviations:
CT: Class Test
TA: Teacher's Assessment
ESE: End Semester Examination

BC

MATHEMA

L	T	P
3	1	0

UNIT - I: MULTIPLE INTEGRALS **8**

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.

(4)

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. l. Hughes, R. C. Ginnett and G. J. Curphy (McGrow Hill, 8e)
3. Negotiation by Himanshu Rai (McGrow Hill)

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BCA-203

DIGITAL ELECTRONICS AND COMPUTER ORGANIZATION

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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, Subtracter 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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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

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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 Prespective, 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

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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

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BCA-207P

DATA STRUCTURE LAB

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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.

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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.