BCA-301: Mathematics-III
(Differential Equations)

Level of Knowledge: Expert Knowledge
Course Objective: The objective of this course is to familiarize the students with Differential Equations
Scheme of Examination
Total marks 100.
Internal marks 40.
External marks 60.
The question paper will contain questions equally distributed in all units. The papers may contain the combination of Numerical/Objective/ Conceptual /Analytical/ Theoretical in each question.

Course Contents

Unit 1.

Differential equations of first order and first degree: Variable Separable Equations, Homogeneous Differential Equations, Linear differential equations, Reducible to Linear Differential Equations, Exact Differential Equations and Change of Variables.

Unit 2

Differential equations of first order and higher degree: Differential Equations Solvable for P, Solvable for Y and X and Clairaut's Equation.

Linear Differential Equations of higher order: Linear Differential Equations of higher order with constants coefficients, Differential Equations Reducible to Linear Differential Equations with constants coefficients.

Unit 3

Linear Differential Equations of second order: Linear Differential Equations of second order, Method of Variation of Parameters

Simultaneous Differential Equations: D-operator Method, Method of Differentiation, Simultaneous Differential Equation of the form dx/P=dy/Q=dz/R

Unit 4

Initial & Boundary Value Problem: Initial & Boundary Value Problem, Picard's Method of Successive approximation, Series Solution Method of Ferobnius

Unit 5

Partial differential equations: Definition, and formation, Partial differential Equations of first order, Lagrange's method, standard forms, Charpit's method, Linear Partial differential Equations of higher order with Constant Coefficients.

Text Readings:

1. Agrawal D.C. :**Mathematics III Differential Equations,** Shree Sai Prakashan, Meerut 2nd Edition
2. Pathak H. K. & Agrawal D.C. : **A Text Book of Differential Equation** , Shikha Sahitya Prakashan, Meerut 5th Edition
3. . Kapoor M.M: **A Text Book of Differential Equation Pithampur Pub. Co., New Delhi**.

BCA-302: Object Oriented Programming Through C++

Level of Knowledge: Expert Knowledge
Course Objective: The objective of this course is to introduce the concept of Object Oriented Programming Through C++.
Scheme of Examination
Total marks 100.
Internal marks 20.
Practical Marks 20
External Marks 60
The question paper will contain questions equally distributed in all units. The papers may contain the combination of Numerical/Objective/ Conceptual /Analytical/ Theoretical in each question.

Course Contents

Unit 1.

Introduction of OOP's Languages: Characteristics of OOP's languages, Application of OOP.

OOP's Paradigm concepts : Objects, class, Data abstraction, Data Encapsulation, Inheritance, Polymorphism, Static and Dynamic Binding, Message passing, Benefit of OOP's, Disadvantages of OOP's.

Unit 2.

C++ Programming Basics: Basic Program Structure, Preprocessor Directive, Data Types, Operators, Manipulator, Type Conversions, C++ Stream Class.

Control Structures: For, Do, While, Do-while, If, If-else, Switch.

Jump Statements: Break, Continue, Goto, Exit.

Unit 3.

Functions and Arrays: Classes and instances, Building and Destroying instances constructors and Destructors.

Defining classes in Object Oriented Languages: Modifiers, Friend and In-line functions, String handling functions.

Unit 4.

Data Encapsulation: Implementation of Encapsulation.

Polymorphism: Polymorphism Operator Overloading, Function Overloading, Virtual Functions.

Unit 5.

Inheritance: Reusability of code through Inheritance, Type Inheritance, Data Abstraction, Abstract classes, Specification of code.

Templates: Templates and Exception Handling.

List of Suggested Practicals

1. Write a program to illustrate the use of various stream classes of C++.
2. Write a program to find the maximum of three using conditional operator.
3. Write a program to find the largest, second largest and thired largest in a given array.
4. Write a program to generate Armstrong series.
5. Write a program to find the factorial of a given no.
6. Write a program to generate the Fibonacci series.
7. Write a program to check whether the given no is Palindrome or not.
8. Write a program to find the GCD and LCM of two no's.
9. Write a program to read a n x m matrix and find
    a. The average of each row
    b. The average of each column
10. Write a program to print the boundary elements of matrix.
11. Write a program to print the diagonal elements of matrix.
12. Write a function which accepts object as a parameter and return objects.
13. Write a program to overload ++ operator to increment age of person by one month.
14. Write a program to overload + operator to concatenate two strings.
15. Write a program to illustrate the use of scope resolution operator.
16. Write a program to find the square root using inline function.
17. Write a program to illustrate the use of friend function.
18. Write a program to write a program to illustrate the use of constructor.

Text Readings:

1. Steven C. Lawlor :**The Art of Programming and Computer Science with C++**, Course Technology; 1 edition
2. Balaguruswamy : **Object Oriented Programming with C++,** Tata Mgraw Hill (2008)
3. Robert Lafore :**Object Oriented Programming in C++ ,** Sams; 4 edition

BCA-303: Digital Computer Electronics

Level of Knowledge: Expert Knowledge
Course Objective: The objective of this course is to introduce the concept of Digital Electronics.
Scheme of Examination
Total marks 100.
Internal marks 20.
Practical Marks 20
External marks 60.
The question paper will contain questions equally distributed in all units. The papers may contain the combination of Numerical/Objective/ Conceptual /Analytical/ Theoretical in each question.

Course Contents

Unit 1.

Number systems: Decimal, Binary, Octal, Hexadecimal and their interconversion.
Codes: ASCII , Grey code, Excess-3 code, BCD numbers
Binary Calculations: Binary Addition, Subtraction, Multiplication and Division(1's and 2's Complement methods).

Unit 2.

Logic Gates: Introduction of Logic Gates, NOT, OR, AND, NAND, NOR, XOR, XNOR gates.
Boolean Algebra: Boolean Algebra, De Morgan's Theorem.
Application of gates: Half adder and full adder.

Unit 3.

Boolean functions : Boolean Functions & truth table, SOP, POS, minterms, Simplification of logical circuits using Boolean Algebra & Karnaugh maps.

Unit 4.

TTL Circuits: Introduction of TTL Circuits, Digital Ics 74 series, TTL, characteristics, Totempole and open collector gates, Comparison between different types of TTL.
Multiplexer, Demultiplexer, Encoders, Decoders.

Unit 5:

Flip- flop: Introduction to Flip- flop RS Flip-flop, Level clocked D, F/P edge triggered D flip-flop, edge triggered JK Flip-flop. Racing in F/F, JK masters-slave Flip-flop.

Registers and Counters: Introduction to Buffer registers, shift registers, ripple counters, synchronous counters, ring counters, presettable counters, Mod counters.

Practical Exercise

1. Study of Logic Gates (AND,OR, NOR, XOR, NAND)
2. Study of Half & Full Adder
3. Study of Multiplexer & demultiplexer
4. Study of Encoder & Decoder
5. Study of Analog to Digital Converter
6. Study of Digital to Analog Converter
7. Study of Timer IC 555
8. Study of Flip- Flop (JK, D, T etc…..)
9. Study of Counter & Shift Register.

Suggested Readings:

1. Malvino: **Digital Computer Electronics**, McGraw-Hill Education
2. Basavraj: **B Digital Fundamentals**, Vikas Publishing House Pvt. Ltd.
3 Bartee : **Digital Computer Fundamentals ,** Mcgraw-Hill College; 6 Sub edition

BCA 304 – Accounting and Financial Management

Level of Knowledge: Expert Knowledge

Course Objective: The objective of this course is to introduce the concept of Accounting and Financial Management

Scheme of Examination
Total marks 100.
Internal marks 40.
External marks 60.

The question paper will contain questions equally distributed in all units. The papers may contain the combination of Numerical/Objective/ Conceptual /Analytical/ Theoretical in each question.

Course Contents

Unit 1.

Introduction to Accounting & Accounting Procedures

- Meaning & Need of Accounting
- Basic Concepts of Accounting
- Conventions of Accounting
- Concepts of Double Entry System Of Accounting
- Rules for Debit and Credit Entries & Types Of Accounts
- Recording of Journal Entries
- Posting In Ledger Accounts
- Cash Book
- Concepts and Preparation of Subsidiary Books
- Preparation of Trial Balance.

Unit 2.

Bank Reconciliation Statement

- Simple Practical Problems Relating to final accounts

Unit 3.

Preparation of Trading Account ,Profit & Loss Account & Balance Sheet

- Simple Practical Problems Relating to final accounts

Unit 4.

Depreciation

- Concepts of Depreciation
- Two Methods of Providing Depreciation WDV and SLM
- Simple Practical Problems Relating to Depreciation

Unit 5.

Statement of changes in Financial Position

- Funds Flow Statement
- Cash flow Analysis
- Ratio Analysis :

1. Current Ratio
2. Quick Ratio
3. Debtors Turnover Ratio
4. Inventory Turnover Ratio
5. Debt-Equity Ratio

6. Proprietary Ratio
7. Gross Profit Ratio
8. Net Profit Ratio

- Simple Practical Problems Relating to the Funds Flow, Cash Flow & Ratios

Text Readings

1. Grewal T.S ,**Introduction to Accountancy**, New Delhi, Sultan Chand Publications
2. Maheshwari S.N, **Introduction to Accounting**, New Delhi, Vikas Publishing House
3. Gupta Shashi K and. Sharma R.K, **Financial management Theory and Practice**,5th edition. Kalyani Publications ,New Delhi

Suggested Readings:

1. Rustagi R.P., **Financial management, theory concept and problems ed. 3rd** Galgotia Publication Company New Delhi.

2. Mukhargee Hanif, **Modern Accountancy**, Tata McGraw Hill.

BCA-305: Data Structures

Level of Knowledge: Expert Knowledge

Course Objective: The objective of this course is to introduce the concept of Data Structures.

Scheme of Examination
Total marks 100.
Internal marks 20.
Practical Marks 20
External marks 60.

The question paper will contain questions equally distributed in all units. The papers may contain the combination of Numerical/Objective/ Conceptual /Analytical/ Theoretical in each question.

Course Contents

Unit 1.

Introduction of Data Structure: Definition of data structure, Types, Static and Dynamic variables, representation and address calculation of Single and Multidimensional array in memory, Pointers, Sparse matrix representation, Time and Space Complexity and Algorithm.

Unit 2.

Stacks: Representation of Stacks, Operations on Stacks, Infix and Post fix notations, Multiple Stacks, Exchanging the value of two Stacks, Recursion Techniques, Expression Evaluations, Applications of stacks.

Unit 3.

Queues: Representation of Queues, Operations on Queues, Multiple Queues, Circular Queues, D-Queues, Application of Queues.

Unit4.

Link List: Singly Link List, Doubly Link List, Circular Link List, Generalized lists, problem solving with dynamic storage management, List Traversal, Insertion and Deletion Algorithms.

Unit 5:

Trees: Basic concepts and definitions, basic operations on Binary Trees, Tree Search and Insertion, Tree Deletion, Balanced Tree, Balanced Tree Insertion and Deletion, B-tree, Hash Table and Hash Techniques.

Suggested Readings:

1.Niklaus Wirth: Algorithm and data structure program, Prentice Hall; 1St Edition edition
2.C Robert Kruse: Data structures, Prentice Hall; 2 edition
3.Drozdek Data Structure with C++, Course Technology; 3 edition

Practical Exercise

1. Store records of 100 students using array.
2. Representation of upper triangular and lower triangular sparse matrix in linear array.
3. Push and Pop operation on stack using array.
4. Insertion and deletion operation on queue using array.
5. Insertion and deletion operation on circular queue using array.
6. Program for Bubble sort.
7. Program for Quick sort.
8. Program for Selection sort.
9. Program for Linear search.
10. Program for Binary search.
11. Program for Exchanging the value of two variables using pointes.
12. Linked List creation, insertion and deletion.
13. Count no of elements in linked list.
14. Sort a Linked List.
15. Doubly Linked List creation, insertion and deletion.
16. Creation of Binary search tree.
17. Insertion and deletion of Binary Search tree.
18. Traversal of Binary search tree(inorder, preorder, postorder).
19. Complete program for Binary search tree.
20. Representation of Polynomial in Linked List.

BCA-306 Communication Skills

Level of Knowledge: Expert Knowledge

Course Objective: The objective of this course is to introduce the concept of Communication Skills

Scheme of Examination
Total marks 100.
Internal marks 40.
External marks 60.

The question paper will contain questions equally distributed in all units. The papers may contain the combination of Numerical/Objective/ Conceptual /Analytical/ Theoretical in each question.

Unit 1 Introduction

Defining Communication, Process of Communication, Communication Situation, Communication Models, Objectives of Communication, Principles of Communication Importance of Business Communication

Unit 2 Factors affecting Communication

Barriers to Communication (Wrong Choice of Medium, Physical Barriers, Different Comprehension of Reality, Socio-Psychological Barriers)

Unit 3 Effective Listening

Steps of Listening, Importance of Listening, Blocks to Effective Listening, Improving Listening Skills

Unit 4 Types, Forms and Channels of Communication

Formal and Informal Communication, Upward Communication (Objectives, Merits, Demerits), Downward Communication (Objectives, Merits, Demerits), Horizontal Communication, Grapevine, Consensus (Process, Advantages and Disadvantages) Verbal Communication, Non Verbal Communication

Unit 5 Employment Messages

Application Letters, Writing a Perfect Resume

Text Readings

1. Pal Rajendra & Korlahalli J.S., Essentials of Business Communication, Sultan Chand and Sons, 2009
2. Rai Urmila & Rai S.M., Business Communication, Himalaya Publishing House III/e 2001
3. Chaturvedi P.D. and Chaturvedi Mukesh, Business Communication: Concepts, Cases and Applications, Pearson Education 2004