

| BCA - SEMESTER-III | | | | | | | | | | | | | |
|--------------------|---------------|---|---------|---|---|-------------------|----|-------|----|--------------|----|-------|--------|
| Sl. No. | Subject Codes | Subject | Periods | | | Evaluation Scheme | | | | End Semester | | Total | Credit |
| | | | L | T | P | CT | TA | Total | PS | TE | PE | | |
| 1 | BCA-301 | Object Oriented Programming Using C++ | 3 | 0 | 0 | 20 | 10 | 30 | | 70 | | 100 | 3 |
| 2 | BCA-302 | Data Structure Using C & C++ | 3 | 0 | 0 | 20 | 10 | 30 | | 70 | | 100 | 3 |
| 3 | BCA-303 | Computer Architecture & Assembly Language | 3 | 1 | 0 | 20 | 10 | 30 | | 70 | | 100 | 4 |
| 4 | BCA-304 | Business Economics | 3 | 1 | 0 | 20 | 10 | 30 | | 70 | | 100 | 4 |
| 5 | BCA-305 | Mathematics III | 3 | 1 | 0 | 20 | 10 | 30 | | 70 | | 100 | 4 |
| 6 | BCA-306 | Discrete Structure & Graph Theory | 3 | 1 | 0 | 20 | 10 | 30 | | 70 | | 100 | 4 |
| 7 | BCA-311 | Object Oriented Programming Using C++ Lab | 0 | 0 | 1 | | | | 25 | | 25 | 50 | 1 |
| 8 | BCA-312 | Data Structure Using C & C++ Lab | 0 | 0 | 1 | | | | 25 | | 25 | 50 | 1 |
| | | Total | | | | | | | | | | 700 | 24 |

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|--------------------|---------------------------------------|----------------------|----------|
| Course Code | BCA -301 | Year/Semester | II / III |
| Course Name | Object Oriented Programming Using C++ | | |
| Credits | 3 | | |

UNIT-I
Introduction

Introducing Object – Oriented Approach, Relating to other paradigms {Functional, Data decomposition}.

Basic terms and ideas

Abstraction, Encapsulation, Inheritance, Polymorphism, Review of C, Difference between C and C++ - cin, cout, new, delete, operators.

UNIT-II

Classes and Objects

Encapsulation, information hiding, abstract data types, Object & classes, attributes, methods, C++ class declaration, State identity and behaviour of an object, Constructors and destructors, instantiation of objects, Default parameter value, object types, C++ garbage collection, dynamic memory allocation, Metaclass / abstract classes.

UNIT-III

Inheritance and Polymorphism

Inheritance, Class hierarchy, derivation – public, private & protected, Aggregation, composition vs classification hierarchies, Polymorphism, Categorization of polymorphism techniques, Method polymorphism, Polymorphism by parameter, Operator overloading, Parameteric Polymorphism

UNIT-IV

Generic function

Template function, function name overloading, overriding inheritance methods, Run time polymorphism, Multiple Inheritance.

UNIT-V

Files and Exception Handling

Streams and files, Namespaces, Exception handling, Generic Classes

Referential Books:

1. A.R.Venugopal, Rajkumar, T. Ravishanker “Mastering C++”, TMH, 1997.
2. S.B.Lippman & J.Lajoie, “ C++ Primer”, 3rd Edition, Addison Wesley, 2000.The C programming Lang., Person Ecl – Dennis Ritchie
3. R.Lafore,“Object Oriented Programming using C++”,Galgotia Publications, 2004
4. D.Parasons, “Object Oriented Programming using C++”, BPB Publication.

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| Course Code | BCA-302 | Year/Semester | II / III |
| Course Name | Data Structure Using C & C++ | | |
| Credits | 3 | | |

UNIT-I

Introduction to Data Structure and its Characteristics Array

Representation of single and multidimensional arrays; Sparse arrays – lower and upper triangular matrices and Tridiagonal matrices with Vector Representation also.

UNIT-II

Stacks and Queues

Introduction and primitive operations on stack; Stack application; Infix, postfix, prefix expressions; Evaluation of postfix expression; Conversion between prefix, infix and postfix, introduction and primitive operation on queues, D- queues and priority queues.

UNIT-III

Lists

Introduction to linked lists; Sequential and linked lists, operations such as traversal, insertion, deletion searching, Two way lists and Use of headers

UNIT-IV

Trees

Introduction and terminology; Traversal of binary trees; Recursive algorithms for tree operations such as traversal, insertion, deletion; Binary Search Tree

UNIT-V

B-Trees

Introduction, The invention of B-Tree; Statement of the problem; Indexing with binary search trees; a better approach to tree indexes; B-Trees; working up from the bottom; Example for creating a B-Tree.

UNIT-VI

Sorting and searching

Sorting Techniques; Insertion sort, selection sort, merge sort, heap sort, searching Techniques: linear search, binary search and hashing.

Referential Books:

1. E.Horowitz and S.Sahani, " Fundamentals of Data structures", Galgotia Book source Pvt. Ltd., 2003
2. R.S.Salaria, " Data Structures & Algorithms" , Khanna Book Publishing Co. (P) Ltd.,2002

3. Y.Langsam et. Al., “ Data Structures using C and C++” , PHI, 1999

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| Course Code | BCA-303 | Year/Semester | II / III |
| Course Name | Computer Architecture & Assembly Language | | |
| Credits | 4 | | |

UNIT-I

Basic computer Architecture

Basic computer organization and design, Instructions and instruction codes, Timing

and control/ instruction cycle, Register/ Types of register/ general purpose & special purpose registers/ index registers, Register transfer and micro operations/ register transfer instructions, Memory and memory function, Bus/ Data transfer instructions, Arithmetic logic micro-operations/ shift micro-operations, Input/ Output and interrupts, Memory reference instructions, Memory interfacing memory/ Cache memory.

UNIT-II

Central Processing Unit

General Register Organization/ stacks organizations instruction formats, addressing modes, Data transfer and manipulation. Program control reduced computer, pipeline/ RISC/ CISC pipeline vector processing/ array processing.

Arithmetic Algorithms: Integer multiplication using shift and add, Booth's algorithm, Integer division, Floating-point representations.

UNIT-III

Computer Arithmetic

Addition, subtraction and multiplication algorithms, divisor algorithms. Floating point, arithmetic operations, decimal arithmetic operations, and decimal arithmetic operations.

UNIT-IV

Input – Output Organization

Peripheral devices, Input/output interface, ALU Asynchronous Data transfer, mode of transfer, priority interrupts, Direct memory Address (DMA), Input/ Output processor (IOP), serial communication.

UNIT-V

Evaluation of Microprocessor

Overview of Intel 8085 to Intel Pentium processors Basic microprocessors, architecture and interface, internal architecture, external architecture memory and input/ output interface.

UNIT-VI

Assembly language, Assembler, Assembly level instructions, macro, use of macros in I/C instructions, program loops, programming arithmetic and logic subroutines, Input-Output programming.

Referential Books:

1. Leventhal, L.A, "Introduction to Microprocessors", Prentice Hall of India
2. Mathur, A.P., "Introduction to Microprocessors" , Tata McGraw Hill
3. Rao,P.V.S., "Prospective in Computer Architechture" , Prentice Hall of India

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| Course Code | BCA-304 | Year/Semester | II / III |
| Course Name | BUSINESS ECONOMICS | | |
| Credits | 4 | | |

UNIT-I

The Scope and Method of Economics, the Economic Problem: Scarcity & Choice, The Price Mechanism, Demand & Supply Equilibrium: The Concept of Elasticity and it's Applications.

The Production Process: output decisions – Revenues Costs and Profit Maximization

Laws of returns & Returns to Scale: Economics and Diseconomies of scale.

UNIT-II

Market Structure: Equilibrium of a firm and Price, Output Determination under Perfect Competition Monopoly, Monoplastic Competition & Oligopoly

UNIT-III

Macro Economic Concerns: Inflation, Unemployment, Trade-Cycles, Circular Flow upto Four Sector Economy, Government in the Macro Economy: Fiscal Policy, Monetary Policy, Measuring national Income and Output

UNIT-IV

The World Economy – WTO, Globalisation, MNC's, Outsourcing, Foreign Capital in India, Trips, Groups of Twenty (G-20), Issues of dumping, Export-Import Policy 2004-2009

Referential Books:

1. Ahuja H.L., "Business Economics", S.Chand & Co., New Delhi, 2001
2. Ferfuson P.R., Rothchild, R and Ferguson G.J."Business Economics" Macmillan, Hampshire, 1993
3. Karl E.Case & Ray C. fair , "Principles of Economics" , Pearson Education , Asia, 2000
4. Nellis, Joseph, Parker David, " The Essence of Business Economics", Prentice Hall, New Delhi, 1992.

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|--------------------|-----------------|----------------------|----------|
| Course Code | BCA- 305 | Year/Semester | II / III |
| Course Name | MATHEMATICS III | | |
| Credits | 4 | | |

UNIT -1

Complex Variables: Complex Number System, Algebra of Complex Numbers, Polar Form, Powers and Roots, Functions of Complex Variables, Elementary Functions, Inverse Trigonometric Function.

UNIT-II

Sequence, Series And Convergence: Sequence, Finite and Infinite Sequences, Monotonic Sequence, Bounded Sequence, Limit of a Sequence, Convergence of a Sequence, Series, Partial Sums, Convergent Series, Theorems on Convergence of Series (statement, alternating series, conditional convergent), Leibnitz Test, Limit Comparison Test, Ratio Test, Cauchy's Root Test, Convergence of Binomial and Logarithmic Series, Raabe's Test, Logarithmic Test, Cauchy's Integral Test (without proof)

UNIT-III

Vector Calculus: Differentiation of Vectors, Scalar and Vector Fields, Gradient, Directional Derivatives, Divergence and Curl and their Physical Meaning.

UNIT-IV

Fourier Series: Periodic Functions, Fourier series, Fourier Series of Even and Odd Functions, Half Range Series.

UNIT-V

Ordinary Differential Equations Of First Order: Variable - Separable Method, Homogeneous Differential Equations, Exact Differential Equations, Linear Differential Equations, Bernoulli's Differential Equations, Differential Equations of First Order and First Degree by Integrating Factor.

UNIT-VI

Ordinary Differential Equations Of Second Order: Homogenous Differential Equations with Constant Coefficients, Cases of Complex Roots and Repeated. Roots, Differential Operator, Solutions by Methods of Direct Formulae for Particular Integrals, Solution by Undetermined Coefficients, Cauchy Differential Equations, (only Real and Distinct Roots) Operator Method for Finding Particular Integrals, (Direct Formulae).

Referential Books:

1. A.B. Mathur and V.P. Jaggi, "Advanced Engineering Mathematics", Khanna Publishers, 1999.
2. H.K. Dass, "Advanced Engineering Mathematics", S. Chand & Co., 9th Revised Ed.

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|--------------------|-----------------------------------|----------------------|----------|
| Course Code | BCA -306 | Year/Semester | II / III |
| Course Name | Discrete Structure & Graph Theory | | |
| Credits | | | |

Unit- I

Propositions, Sets, Probability: Propositions, compound proposition, basic logical operations, truth tables, tautology, contradiction. Quantifiers: universal and existential quantifiers. Theory: Set, Combinations of Sets, Mathematical Induction Principle. Cardinality of finite Sets, Rule of sum, Rule of product. Permutations, Combinations. Discrete Probability.

Unit- II

Relations and Functions: Definitions, properties of Binary relations. Equivalence Relations and partitions, Partial ordering relations. Lattice, chains and antichains. Transitive Closure and Warshall's Algorithm. Functions Definitions, Composition of Functions, Types of Function. Recursive Functions, Pigeonhole principle.

Unit- III

Graphs and Trees: Basic terminology, multigraphs and weighted graph, paths and circuits. Dijkstra's shortest path algorithms. Euler and Hamiltonian Paths and circuits. factors of a graph, Planner graph. Trees, rooted trees, path length in rooted trees. prefix code, binary search trees. Spanning trees and cut set, minimum spanning trees. Kruskal's and prim's algorithms for minimum spanning tree.

Unit- IV

Algebraic system Boolean algebra: Semigroup, Subsemigroup, Monoid, Submonoid. Abelian Group, Subgroups. Isomorphism, Automorphism, Homomorphism. Ring, Integral domain, field. Lattice and Algebraic systems, Principle of duality. Basic properties of lattice defined by lattices, distributive and complemented lattices. Boolean lattices and Boolean algebras, Boolean functions and Boolean Expressions. Number system and Interconversion of number systems.

Text Books:

1. Seymour Lipschutz, Marc Lipson, "Discrete Mathematics", Second edition, TMH.

Reference Books:

1. Kenneth H. Rosen, Discrete Mathematics and its Application, Fifth edition, TMH.
2. V. K. Balakrishnan, "Graph Theory", TMH.