School of Engineering and Technology
Programme Structure & Syllabus

Bachelor of Computer Application (BCA)

2022-23

K.K. University
Bihar Sharif, Nalanda – 803115

Pro Vice Chancellor
KK University
Berauti, Nepura, Bihar Sharif
Nalanda - 803115 (Bihar)

FIRST SEMESTER

S.NO	CODE	COURSE TITLE	CREDIT	L	T	P	Hours per week	Internal Marks	External Marks
1	BCA1101	Mathematics -I	4	3	1	0	4	30	70
2	BCA1102	Introduction to Computer Science	4	3	1	0	4	30	70
3	BCA1103	Programming in C	3	3	0	0	3	30	70
4	BCA1104	Environmental Science	1	3	1	0	1	30	70
5	BCA1105	Communication Skill	4	3	1	0	4	30	70
6	BCA1103P	Programming in C Lab	2	0	0	2	4	30	70
7	BCA1105P	Communication Skill Lab	2	0	1	2	4	30	70
TOTAL			**20**	**15**	**5**	**4**	**24**	**210**	**490**

SECOND SEMESTER

S.NO	CODE	COURSE TITLE	CREDIT	L	T	P	Hours per week	Internal Marks	External Marks
1	BCA1201	Mathematics -II	4	3	1	0	4	30	70
2	BCA1202	Data structure Using C	4	4	0	0	4	30	70
3	BCA1203	Database Management System	3	4	0	0	3	30	70
4	BCA1204	Physics	4	3	1	0	4	30	70
5	BCA1205	Chemistry	4	3	1	0	4	30	70
6	BCA1202P	Data structure Using C Lab	2	0	0	2	4	30	70
7	BCA1203P	Database Management System Lab	2	0	0	2	4	30	70
TOTAL			**23**	**17**	**3**	**4**	**27**	**210**	**490**

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K.K. UNIVERSITY BCA COURSE CURRICULUM-2022-23

THIRD SEMESTER

S.NO	CODE	COURSE TITLE	CREDIT	L	T	P	Hours per week	Internal Marks	External Marks
1	BCA2101	Cloud Computing	4	3	1	0	4	30	70
2	BCA2102	Operating System	4	4	0	0	4	30	70
3	BCA2103	Electronic Commerce & Application	4	3	1	0	4	30	70
4	BCA2104	Object Oriented Programming	3	3	1	0	3	30	70
5	BCA2105	Dot Net Technology	3	3	0	0	3	30	70
6	BCA2104P	Object Oriented Programming Lab	3	0	1	2	6	30	70
7	BCA2105P	Dot Net Technology Lab	3	0	0	2	6	30	70
TOTAL			**24**	**16**	**4**	**4**	**30**	**210**	**490**

FOURTH SEMESTER

S.NO	CODE	COURSE TITLE	CREDIT	L	T	P	Hours per week	Internal Marks	External Marks
1	BCA2201	Artificial Intelligence	4	3	1	0	4	30	70
2	BCA2202	Software Engineering	3	4	0	0	3	30	70
3	BCA2203	Computer Architecture	4	4	0	0	4	30	70
4	BCA2204	Basic Electronic	3	3	0	0	3	30	70
5	BCA2205	Managerial Economics	4	3	1	0	4	30	70
6	BCA2202P	Software Engineering Lab	2	0	0	2	4	30	70
7	BCA2204P	Basic Electronic Lab	2	0	0	2	4	30	70
TOTAL			**22**	**17**	**2**	**4**	**26**	**210**	**490**

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FIFTH SEMESTER

S.NO	CODE	COURSE TITLE	CREDIT	L	T	P	Hours per week	Internal Marks	External Marks
1	BCA3101	Internet & Web Technology	3	3	1	3	3	30	70
2	BCA3102	Java Programming	4	4	0	3	4	30	70
3	BCA3103	Fundamental of Computer Algorithm	4	4	0	0	4	30	70
4	BCA3104	Fuzzy Logic	4	4	0	0	4	30	70
5	BCA3105	Management Information System	3	3	1	0	3	30	70
6	BCA3101P	Internet & Web Technology Lab	2	0	1	2	4	30	70
7	BCA3102P	Java Programming Lab	2	0	0	2	4	30	70
		TOTAL	**22**	**18**	**3**	**10**	**26**	**210**	**490**

SIXTH SEMESTER

S.NO	CODE	COURSE TITLE	CREDIT	L	T	P	Hours per week	Internal Marks	External Marks
1	BCA3201	Data Communication & Network	4	3	1	0	4	30	70
2	BCA3202	Distributed Computing	4	4	0	0	4	30	70
3	BCA3203	Optimization Theory	4	4	0	0	4	30	70
4	BCA3204	Accounting and Financial Management	3	3	0	0	3	30	70
5	BCA3205A BCA3205B BCA3205C BCA3205D	Elective: (1) Intelligence System (2) Advance network and Communication (3) Image Processing (4) Advance Unix Programing	4	4	0	0	4	30	70
6	BCA3206P	Project	4	0	0	3	4	30	70
TOTAL			**23**	**18**	**1**	**3**	**23**	**180**	**420**

SEMESTER-I

Mathematics-I

BCA1101 **L-T-P(3-1-0)** **Credit-4**

UNIT -I

Differential Calculus: Successive differentiation, Leibritiz Theorem, Taylors theorem with Lagranges forms of remainders, Expansion of a function of one variable in Taylors and Meclanrin's infinite series. Maxima and Minima of one variable, partial Derivatives.

UNIT -II

Euler's theorem, change of variables, total differentiation, Errors and approximation. Taylors seriesin two variables. Maxima and Minima of two or more variables.

UNIT -III

Integral Calculus Definite integral and its application for area, length and volume. Multiple integrals. Change of order of integration. Transformation of integral from Cartesian to polar. Applications in areas, volume and surfaces.

UNIT -IV

Differential Equation First degree and first order Differential equation : Higher order differential equation with constant coefficients. Linear partial differential equation of first order P.D.E. of higher with constant coefficients.

Suggested Reading:

1. Das BC and Mukherjee, Differential Calculus, Calcutta, U.N. Dhar Publishers.
2. Das BC and Mukherjee, Integral Calculus, Calcutta, U.N. Dhar Publishers.
3. Grewal B.S., Higher Engineering Mathematics, Delhi Khanna Publishers.
4. Advance engineering mathematics by E. Kreyszig, 8 th Edition, John Wiley & Sons, New York
5. Advance engineering mathematics by Wiley & Barratt- Tata McGraw Hill
6. Linear Algebra by K. Hoffman and R Kunze-Prentice Hall

Introduction to Computer Science

BCA1102 **L-T-P (3-1-0)** **Credit-4**

UNIT -I

Introduction To Computers, Characteristics of computers, Evolution of computers, Generation of Computers, Classification of Computers, The Computer System, Applications of Computers. Number Systems And Logic Gates Introduction, Number Systems, Conversion between Number Bases, Arithmetic System,Signed and Unsigned Numbers, Concept of Overflow, Binary Coding, Logic Gates, BooleanAlgebra, Combination of Logic Gates.Computer Architecture Introduction, Central Processing Unit (CPU) Memory, Communication between Various Units of a Computer System, The Instruction Format, Instruction Set, Processor Speed, Multiprocessor Systems.

UNIT -II

Primary Memory Introduction, Memory Hierarchy, Random Access Memory (RAM), Types of RAM, Read Only Memory (ROM), Types of ROM. Secondary Storage Introduction, Classification of Secondary Storage Devices, Magnetic Tape, Magnetic Disk, Optical Disk, Magneto Optical disk. Input Devices Introduction, Keyboard, Pointing Devices, Speech Recognition, Digital Camera, Scanners,Optical Scanners.

UNIT -III

Output Devices Introduction, Classification of Output, Hard Copy Output Devices, Printers, Plotters, Computer Output Microfilm (COM), Soft Copy Output Devices, Monitors, Audio Output, Projectors, Terminals. Computer Program Introduction, Developing a Program, Algorithm, Flowchart, Psedocode (P-Code).Computer Languages Introduction, Evolution of Programming Languages, Classification of ProgrammingLanguages, Generations of Programming Languages, Features of a Good Programmin Language, Selection of a Programming Language.

UNIT -IV

Computer Software , Definition, Relationship between Software and Hardware, Software Categories, System Software, Application Software, Software Terminology. Operating System Introduction, Operating System, Evolution of Operating System, Types of Operating System, Functions of an Operating System, Modern Operating Systems. Data Communication And Computer NetworkIntroduction, Data Communication, Transmission Media, Multiplexing, Switching, Computer Network, Network Topologies, Communication Protocols, Network devices.

Suggested reading :

1. Introduction to computer Science, ITL Education solution Limited, R&D Wing, PEARSON Education, Edition 2004.
2. Rajaraman V. – Fundamental of Computers, Prentice Hall of India Pvt. Ltd., New Delhi – 2 nd edition, 1996.

Programming in C

BCA1103 **L-T-P (3-0-2)** **Credit-3**

UNIT –I

Overview of C, Constants, variables & data types Operators and expressions Managing input and output operators, Decision Making and Branching Decision Making and Looping. One – dimensional Arrays and their declaration and Initialisations, Two-dimensional Arrays and their initialisations, Multidimensional Arrays, Dynamic Arrays, String Variables, Reading and Writing Strings, Arithmetic Operations on characters, Putting Strings together, Comparison of Two Strings, String – handling functions, Table and other features of Strings.

UNIT -II

Need and Elements for user –defined Functions, Definition of Functions, Return values and their types, Function calls and Declaration, Arguments and corresponding return values, Functions that return multiple values, Nesting of functions, Recursion, Passing arrays and strings to functions, The Scope, Visibility and Life time of variables.

UNIT -III

Defining Structure, Declaring Structure Variable and Accessing Structure Members, Initialisation of Structure, Comparing Structure Variables, Operation on Individual Members, Arrays of Structures, Structures within structures, Structures and Functions, Unions, Size of Structures, Bit Fields.

UNIT -IV

Understanding Pointers, Accessing the Address of a Variable, Declaration and Initialization of Pointer Variables, Accessing a Variable through its Pointer, Chain of Pointers, Pointer Expressions, Pointer Increments and Scale Factor, Pointers and Arrays, Pointers and Character Strings, Arrays of Pointers, Pointers and Function Arguments, Functions Returning Pointers, Pointers to Functions, Pointers andStructures, File Management in C.

Suggested reading :

1. E. Balagurusamy – Programming in ANSI C, 3 rd Edn. , TMH, New Delhi ; 2004
1. Programming with C, B.S.Gottfried (TMH)
2. Y. Kanetkar – Let us C, 4 th Edition, BPB Publication , New Delhi; 2002

List of Experiment:

1. Write a C program to find the sum of individual digits of a positive integer.
2. Write a C program to generate Fibonacci series.
3. Write a C program to generate all the prime numbers between 1 and n is a value supplied by the user.

4 Write a C program to find the roots of a quadratic equation.
5 Two integer operands and one operator form user, performs the operation and then prints the result.
6 Write a C program to find the factorial of a given integer by using recursive and non-recursive functions.
7 A C program to find both the largest and smallest number in list of integers
8 Write A C- Program To Determine If The Given String Is A Palindrome Or Not 17
9 Example of Array In C programming to find out the average of 4 integers
10 Write a program in c to Addition of two matrix in C
11 Write a C program to Implement the following searching method.
i) linear search ii) Binary search
12 Write C programs that implement the following sorting methods to sort a given listof integers in ascending order by using Bubble sort

Environmental Science

BCA1104 **L-T-P (3-1-0)** **Credit-1**

UNIT -I

Multidisciplinary nature of environmental science, Definition, scope, importance and need for public awareness. Concept of an ecosystem, structure and function of anecosystem, producer, consumer anddecomposer, energy and nutrient flow biogeochemical cycles, food chain, food web, ecological pyramid.

UNIT -II

Segments of environment, sources, pathways and fate of environmental pollutants, causes of environmental pollution, physical, chemical and biologicaltransformation of pollutants, population explosion, environment and human health, human rights, value education, women and child welfare.

UNIT -III

Various segments of atmosphere and their significance, classification of air pollutions, toxic effects,sampling and analysis, stationary and mobile emission, sources and their control, photochemical

smog, sulphurous smog, green house effect, global warning, ozone depletion, Air (prevention and control of pollution) Act. Water resources sources of water pollution, various pollutants, their toxic effect, portability of water, municipal water supply, disinfection, characteristics of waste water, primary and secondary waste water treatment, BOD and COD measurement and their significance, rain water harvesting, water shed management, Water (pollution and control) Act.

UNIT -IV

Renewable and non renewable resources, Forest resource, consequences of deforestation, floods and draughts, equitable use of resources for sustainable development, Dams benefits and problems, Biodiversity: ecosystem diversity, theans to biodiversity, conservation of biodiversity.

Suggested reading :

1. De A. K., Environmental Chemistry, Wiley Eastern Ltd.
2. Miller T.G.Jr., Environmental Science, Wadswarth Pulishing Co. (TB)
3. Sharma B.K., 2001, Environmental Chemistry, Goel Publishing House, Meerut
4. Odem, E.P., 1971, Fundamentals of Ecology, W.B.Sannders Co. U.S.A.

Communication Skill / Technical English

BCA1105 **L-T-P (3-1-2)** **Credit-4**

UNIT -I

Definition, Objectives, Stages of Communication, Essentials of Good/Effective Communication, Benefits of Good Communication, Gaps in Communication, Communication and Information Technology.

UNIT -II

Structure of a Letter, Inquiry Letter, Sales Letter, Order Letter, Complaints, Complaint Handling, Telemarketing. Noting, Routine Letter, Demi-Official Letter Memorandum, Circular, Telegrams, Newsletter.

UNIT -III

Report Writing, Scientific Paper Writing, Writing Small Paragraphs & Essays, Composition. Sentence Structure, Idiomatic Usage of Language, Tenses, Direct & Indirect Parts of Speech, Active & Passive Voice, Vocabulary.

UNIT -IV

2-3 classic short stories, 2-3 great short stories by Indian writers. Writing Applications for Jobs, Preparing Curriculum Vitae, Preparing for Interviews, Preparing for Group Discussions.

Suggested Reading:

1. Organizations - Structures, Processes and Outcomes; Richard h Hall; Prentice Hall India.
2. English for the Secretary; Yvonne Hoban; Tata McGraw Hill.
3. Technical Communication: M. Raman & S. Sharma; Oxford University Press.
4. Business Communication Process and Product: M.E. Guffey; Thomson Learning.
5. Human Behavior at Work; John W New storm & Keith Davis; Tata McGraw Hill.
6. The Most Common Mistakes in English Usage; Thomas Elliot Berry, Tata McGraw Hill
7. Business Communication: R.K. Madhukar; Vikas Publication

SEMESTER-II

Mathematics-II

BCA1201 **L-T-P (3-1-0)** **Credit-4**

UNIT -I

Sets, Logic, Direct Proof and Proof by Contra positive, Proof by Contradiction, Prove or Disprove, Equivalence Relations, Functions, Mathematical Induction, Cardinalities of Sets.

UNIT -II

Understanding of the basic ideas of sets and functions, including Boolean combination of sets, and be able to manipulate such expressions, understanding of the standard propositional logic connectivesand be able to convert logical expressions into conjunctive and disjunctive normal form

UNIT -III

Understanding of the universal and existential quantifiers, familiar with the general concept of binary relation, equivalence and order relations and methods of combining relations, standard graphical representations of relations, principle of mathematical induction

UNIT –IV

Inclusion-exclusion principle in simple counting examples, basic ideas of probability. Calculate probilities in simple experiments.

Suggested Reading :

1. TRUSS, J.K. Discrete Mathematics for Computer Scientists. (ISBN 0-201-175-649) 2nd Edition, Addison Wesley 1998.
R.K.Bisht, and H.S.Dhami, Discrete Mathematics, Oxford University Press, First Edition, 2015
2. Kenneth H. Rosen, Discrete Mathematics and its Applications, Tata McGraw Hill, 5thed, 2003.
3. J. P. Tremblay and R. Manohar, Discrete Mathematical Structures with Applications, to Computer Science, TataMc-Graw Hill, 2001.
4. Joe L. Mott, A. Kandel, and T. P. Baker, Discrete Mathematics for Computer Scientists & Mathematics, Prentice Hall of India, 2nd Edition, 2006.
5. N. Deo, Graph Theory with applications to Engineering & Computer Science, Prentice Hall of India, 2006.
6. S. Lipschutz, Discrete Mathematics, Tata McGraw Hill, 2005

Data Structure Using C

BCA1202 **L-T-P (4-0-2)** **Credit-4**

UNIT -I

A First look at a C Program, Variables and Constants, Arithmetic Expressions, Arrays, Logical Expressions and if-else Statements, Iterative Statements, The switch Statement, Pointers, Suggested Reading :, Dynamic Memory Allocation, Strings, Structures.

UNIT -II

Data Structures and Abstract Data Types, Linked List Data structure, Linked List Traversal, The Insert Function, Remove Function, Linked Lists vs. Arrays, Linked Lists with a Tail and Doubly Linked Lists. Introduction, Array Implementation of Stack.

UNIT -III

Introduction, Binary Search Trees, The Destroy, Find, and Insert Functions for Binary Search Trees, The Remove Function for the Binary Search Tree, Binary Tree Traversals.

UNIT -IV

Introduction, Examples of Recursive Functions, Base Case and Recursive Case, When Not to Use Recursion, Understanding and Debugging Recursive Functions. Introduction of queue , Ring Buffer and Linked List Queue Implementations.

Suggested Reading :

1. M.Litvin & G.Litvin- Programs with C++ and Datastructures-Vikas Publishing Home, New Delhi, 2005.
2. C and Data Structure,Radhaganesan,Scitech
3. Data Structure Using C & C++, Tannenbaum, PHI
4. Mastering Algorithms with C,Loudon,SPD/O'REILLY

List of Experiment:

1 Array Implementation of List ADTs
2 Linked List Implementation of List ADTs 0
3 Array Implementation of Stack ADTs
4 Linked List Implementation of Stack ADTs
5 Array Implementation of Queue ADTs
6 Linked List Implementation of Queue ADTs
7 Linear Search
8 Binary Search
9 Bubble Sort
10 Insertion Sort

Data Base Management System

BCA1203 **L-T-P (4-0-2)** **Credit-3**

UNIT -I

Introduction to DBMS, architecture, administration roles, data dictionary Traditional models, three- level architecture, hierarchical model, network model and relational model, File organization , Security.

UNIT -II

Relational model – definitions and properties, keys , integrity rules, relational algebra, joins, set operations, Tuple relational calculus. SQL constructs, embedded SQL, Query & Query Optimisation Techniques.

UNIT –III

Database design, conceptual, logical and physical models, ER diagram and model, Functional Dependency (Armstrong's Axioms), Normal forms(1NF, 2NF, 3NF, BCNF).

UNIT -IV

Indexing- Primary, Secondary, Multilevel.

Suggested Reading :

1.Data Base System Concepts, Korth, TMH
2.Fundamentals of DBMS,Vig & Walia, ISTE/EXCEL
3. Data Base Management System, A.K. Pujari, ISTE/EXCEL
4. Data Base Management System, Leon, VIKAS
5.Data Base Concepts, Kroenke,PHI
6. Oracle PL/SQL Programming, Feuerstein, SPD/O'REILLY
7. Data Base Management System, V.K. Jain, Wiley Dreamtech
8.SQL PL/SQL for Oracle 8 & 8i,P.S. Deshpande, Wiley Dreamtech

List of Experiment:

1 Concept design with E-R Model
2 Relational Model
3 Normalization
4 Practicing DDL commands
5 Practicing DML commands
6 Querying (using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.)
7 Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
8 Triggers (Creation of insert trigger, delete trigger, update trigger)
9 Procedures
10 Usage of Cursor

Physics

BCA1204 **L-T-P (3-1-0)** **Credit-4**

UNIT -I

Wave motion : Longitudinal and transvers waves, wave equation, plane waves, phase velocity, wave packets and group velocity, superposition of waves, equation of motion of simple harmonic oscillator and solution, damped harmonic motion, forced oscillations. Vector and scalar fields, gradient, divergence and curl (Cartesian coordinates only), Gauss's theorem and Stokes' theorem (Statementsonly).

UNIT -II

Gauss's law in integral and differential form, electric potential and relation with E (SS* - capacitance and electric energy density), dielectrics, three electric vectors, dielectric susceptibility boundary conditions and E and D. Amper's law in integral and differential form, applications, Hall effect, Three magnetic vectors, magnetic permeability and susceptibility, Boundary conditions on B and H. Faraday's law in integral and differential form, (SS – Inductance, Magnetic energy density, continuity equation for charge), Displacement current, Maxwell's equations in free space, electromagnetic wave equation for place waves in a conducting medium, relation between E,B and K, Pointing vector.

UNIT -III

Two – Beam Interference, Interference in Thin Films and Wedge- Shaped Layers, Reflection and Anti-Reflection Coatings, Applications of Interferometry :Newton's rings, Michelson's Interferometer.

UNIT -IV

Fraunhofer Diffraction by Single Slit, Double Slit and Grating, Limit of Resolution, Rayleigh Criterion and Fresnel Diffraction (Qualitative), Polarization: Polarization of light, Malus's law, polarization by reflection, Brewster's low, Double refraction, Analysis of linearly and circularly polarized light, Fresnel's equations and their applications.

Suggested Reading :

1. Mathew N.O. Sadiku, Elements of Electromagnetics, Oxford Univ. Press. (2001)
2. A. Ghatak, Optics, TMH (1992).
3. Resnick, Halliday and Krane, Physics Part-I & II, John Wuley, 5th Ed. (2002)
4. M.R. Srinivasan, Physics for Engineers, New Age International, 1996
5. H.J. Pain, The Physics Vibrations and Waves.

Chemistry

BCA1205 **L-T-P (3-1-0)** **Credit-4**

UNIT -I

Trends in periodic properties (ionization energy, electron affinity, electro negativity), VBT, VSEPR theory, MOT for diatomic molecules and polyatomic molecules, coordination complexes & ligands, CFT, colour and magnetism of coordination complexes, spectro chemical series.

UNIT -II

Kinetics of chain reactions, co-parallel reactions, side reactions, fast reactions in solutions, flash photolysis, kinetics of catalytic action (acid base catalysis, biological catalysis), application of catalyst in industrially important processes (Haber's processes, Ostwald process, Bergius process)

UNIT -III

Hess's law, entropy, enthalpy and combustion calculations, characterization and application of fossilfuels, solid fuel (carbonization & gasification), liquid fuels (refining, reforming, petrol & diesel, knocking characteristics, octane and cetane number) and gaseous fuels (water gas, producer gas, coalgas and biogas), lubricants and its properties.

UNIT -IV

Redox process cell, potential and free energy, galvanic cells, electrolysis and Nernst's equation, Fuel cells, and its applications, chemical and electrochemical corrosion, general methods of corrosion prevention (with brief introduction to chemistry of paints, varnishes and enamel). Basicprinciples of vibrational, rotational and Mossbauer spectroscopy.

Suggested Reading :

1. Applied chemistry a text book for engineers and technologist, H.D. Gesser, PlenumPulishers.
2. Physical Chemistry: P.W. Atkins
3. Inorganic Chemistry : J.D. Lee
4. Fundamentals of molecular spectroscopy : C.N. Banwell, TMH publication
5. Computational Chemistry : E. Lewars, Kluwer publication
6. Engneering Chemistry : Sashi Chawla

SEMESTER-III

Cloud Computing

BCA2101 **L-T-P (3-1-0)** **Credit-4**

Objective, scope and outcome of the course.

UNIT -I

Introduction: Objective, scope and outcome of the course. Introduction Cloud Computing: Nutshell ofcloud computing, Enabling Technology, Historical development, Vision, feature Characteristics and components of Cloud Computing. Challenges, Risks and Approaches of Migration into Cloud. Ethical Issue in Cloud Computing, Evaluating the Cloud's Business Impact and economics, Future of the cloud. Networking Support for Cloud
Computing. Ubiquitous Cloud and the Internet of Things

UNIT -II

Cloud Computing Architecture: Cloud Reference Model, Layer and Types of Clouds, Services models, Data centre Design and interconnection Network, Architectural design of Compute and Storage Clouds. Cloud Programming and Software: Fractures of cloud programming, Parallel and distributed programming paradigms-Map Reduce, Hadoop, High level Language for Cloud. Programming of Google App engine.

UNIT -III

Virtualization Technology: Definition, Understanding and Benefits of Virtualization. Implementation Level of Virtualization, Virtualization Structure/Tools and Mechanisms, Hypervisor VMware, KVM, Xen. Virtualization: of CPU, Memory, I/O Devices, Virtual Cluster and Resources Management, Virtualization of
Server, Desktop, Network, and Virtualization of data-centre.

UNIT -IV

Securing the Cloud: Cloud Information security fundamentals, Cloud security services, Design principles, Policy Implementation, Cloud Computing Security Challenges, Cloud Computing Security Architecture . Legal issues in cloud Computing. Data Security in Cloud: Business Continuity and Disaster Recovery , Risk Mitigation
, Understanding and Identification of Threats in Cloud, SLA-Service
Level Agreements, Trust Management

UNIT -V

Cloud Platforms in Industry: Amazon web services , Google AppEngine, Microsoft Azure Design, Aneka: Cloud Application Platform -Integration of Private and Public Clouds Cloud applications: Protein structure prediction, Data Analysis, Satellite

Image Processing, CRM

Operating System

BCA2102 **L-T-P (4-0-0)** **Credit-4**

UNIT -I

Importance of OS, Basic concepts and terminology, types of OS, different views, journey of a command execution, design and implementation of O,S Process: Concept and views, OS view of processes, OS services for process management, scheduling algorithms, performance evaluation.

UNIT –II

Inter process communication and synchronization, mutual exclusion, semaphores, hardware supportfor mutual exclusion, queuing implementation of semaphores, classical problem of concurrent programming, critical region and conditional critical region, monitors, deadlocks.

UNIT -III

Resource manager, Memory management, files management, processor management, device management Security and protection, authentication, protection.

UNIT -IV

Multiprocessor system, classification and types, OS functions and requirements, Introduction toparallel computing, multiprocessor interconnection synchronization.

Suggested Reading:

1. Operating Systems, Galvin, John Wiley
2. Operating Systems , Milankovic, TMH
3. An Introduction to Operating System, Bhatt,PHI
4. Modern Operating System, Tannenbaum,PHI
5. Guide to Operating Systems, Palmer, VIKAS
6. Operating Systems,Prasad,Scitech

Electronic Commerce & Application

BCA2103 **L-T-P (3-1-0)** **Credit-4**

UNIT -I

E-commerce: The revolution is just beginning, The visions and forces behind E-commerce, Understanding E-commerce. E-commerce business models, Major business-to-consumer (B2C) business models, Major business-to-business (B2B) business models, Business models in emerging E-commerce areas, How the internet and the Web change business.

UNIT -II

The Internet, Technology background, The internet today, The world wide web. A systematic approach, choosing server software, choosing the hardware for an E-commerce site, other E-commerce site tools. The E-commerce security environment, Security threats in the E-commerce environment, Technology solutions, Policies, Procedures and Laws.

UNIT -III

Payment systems, Credit card E-commerce transactions,E-commerce digital payment systems in theB2C arena, B2B payment systems.

UNIT -IV

Understanding ethical, social, and political issues in E-commerce, Privacy and information rights, Intellectual property rights, Governance, Public safety and welfare.

Suggested Reading :

1. K.C. Laudon & C.G. Traver, E-commerce, Pearson Education, 2003
2. R. Kalakota & A.B.Whiilston-' Frontiers of Electronic Commerce, Pearson Education- 2006.
3. K.K.Bajaj & D.Nag- E-Commerce, Tata McGraw Hill, New Delhi, Second Edition.

Object Oriented Programming

BCA2104 **L-T-P (3-1-3)** **Credit-3**

Objective: The main objective is to introduce object oriented programming language in a simple language to undergraduate students, Computer Science. It will help them to pursue specialized programs leading to technical and professional careers and certifications in the IT industry.

UNIT-I

Introduction: Basic concepts of OOP Benefits of OOP, Object Oriented Language , Structure of C++ Program ,Compiling & Linking, Operators & Expressions Concepts, Arrays & Structures, functions.

UNIT-II

Classes & Object: Specifying a class, Define member function Define member function Scope of class and its member, Nested Class Data hiding & encapsulation Friend function Array within a Classarray of object as function argument Function returning object, static member.

UNIT-III

Constructors and Destructors : Constructor function Parameterized multiple constructor, Default constructor, copy constructor, Data conversion between objects of different classes Destructor function, Polymorphism, function, Overloading, Operator overloading.

UNIT-IV

Inheritance, Pointer & Virtual function : Define derived classes, single inheritance, multilevel inheritance, Hierarchical inheritance, Hybrid Inheritance Pointers to objects, this pointer Pointerstoderived class, Virtual function, Pure Virtual function, Abstract classes.

UNIT-V

File I/O & Templates :Files streams, Opening & closing a file Read () & write() functions, Detectingend-of-file Seekp(), seekg(), tellg(), tellp() function introduction to Templates & Exception, Creating and handling Templates and Exception in OOP, Standard template Library.

Suggested Reading :

1. Object Oriented Programming in C++ : StroutStrups.
2. Programming with C++ : Venugopal .
3. Programming with C++ : D Ravichandran
4. Let us C++ : Yashwant Kanetkar.
5. C++ and OOPs Paradigm by Debasish Jana (PHI)
6. OOP-P Sengupta & B.B. Choudhari (PHI)
7. OOP with C++ by M.P. Bhave & S. A. Patekar (Pearson Education)
8. OOP with C++ : Poonamchanda Sarang (PHI)

List of Experiment:

1 Write a C++ program to find the sum of the given variables using function with default arguments.
2 Write a C++ program to find the value of a number raised to its power using call by value.
3 Write a C++ program to implement the concept of Call by Address.
4 Write a program in C++ to implement the concept of call by reference.
5 Write C++ program to implement inline function.
6 Write a program in C++ to display product detail using classes with array as data members.
7 Write a program in C++ implements the concept of class with constant data member.
8 Write a program in C++ to implement the concept of class with static member functions.
9 Write a C++ program to implement the friend function concept.
10 a) Write a C++ program to implement the concept of unary operator overloading using c++.
b) Write a C++ program to implement the concept of Binary operator overloading.
11 Write a C++ program to implement the concept of Function Overloading.
12 a) To implement single inheritance using c++.
b) To write a C++ program to implement multiple inheritance.
c) To write a C++ program to implement multilevel inheritance.
13 a) Write a C++ program to implement the concept of class template.
b) Write a C++ program for swapping two values using function templates

Dot Net Technology

BCA2105 **L-T-P (3-0-3)** **Credit-3**

UNIT-I

Introduction to .Net, .Net Framework Features & Architecture, CL, Common Type System, MSIL, Assemblies: Types of Assemblies, Class Libraries. Event Drive Programming, Methods and Events Related with Mouse and Keyboard. Programming into Visual Studio, Types of Project in .Net, IDE of VB.Net- Menu Bar, Toolbar, Project Explorer, Toolbox, Properties Window, Form Designer, Form Layout, Immediate Window, ASP& HTML Forms

UNIT- II

the VB.Net Language- Variables, Declaring Variables, Data Types, Scope & Lifetime of a Variable, Arrays, Types of Array, Control Array, Subroutine, Functions, Passing Argument to Functions, Optional Argument, Returning Value from Function. Control Flow Statements: Conditional Statement, Loop Statement. Forms: Loading, Showing and Hiding Forms, Working with Multiple Forms, Controlling one Form within Another, Overview of C#, Structure of C# Program, C# in .Net.

UNIT- III

GUI Programing with Windows Form with Properties, Methods and Events: Text Box Control, Label Control, Button Control, List box, Combo Box, Checked Box, Picture Box, Radio Button, Pannel, Scroll Bar, Timer Control, Adding Controls At Runtime, Common Dialog Control: File, Save, Print, Help. Designing Menus, MDI Forms, Overview of Dynamic Web Page, Asp.Net Controls, Applications, Web Servers, Web Form Controls, Server Controls, Client Controls Adding Controls to a Web Form, Form Validation Controls: Client Side Validation, Server Side Validation

UNIT- IV

ADO, .Net Architecture, Create Connection, Accessing Data Using Data Adapters and Datasets, Using Command & Data Reader, Data Bind Controls, Displaying Data in Data Grid. Data Form Wizard, Processing SQL& Access Database Using Ado.Net Object Model, Connection Object, Command Object, Add, Delete, Move & Update Records to Dataset, Executing Queries

UNIT- V

XML in .Net, XML Basics, Attributes, Fundamental Xml Classes: Document, Textwriter ,Textreader, XML Validations, XML in ADO, .Net, the XML data document. Web Services: State Management- View State, Session State, Application State, Web Service Description Language, Building & Consuming a Web Service. Web Application Deployment,
Caching

Reference Books:

1. Steven HolznerVB.Net Programming-Black Book-Dreamtech Publications
2. Evangelos Petroutsos Mastering VB.Net - BPB Publications
3. Mathew Macdonald-The Complete Reference Asp.Net-TMH
4. Professional ASP.Net- Wrox Publication
5. Stephen Walther Active Server Pages 2.0 (Unleashed) -Techmedia
6. Eric a. Smith Asp 3 Programming Bible: IDG Books

7. C# Programming-Wrox Publication
8. Matt Telles-C# Programming Black Book-Dreamtech Publication

List of Experiment:

1 Program to display the addition, subtraction, multiplication and division of two number using console application.
2 Program to display the first 10 natural numbers and their sum using console application.
3 Program to display the addition using the windows application.
4 Write a program to convert input string from lower to upper and upper to lower case.
5 Write a program to simple calculator using windows application.
6 Write a program working with Page using ASP.Net.
7 Write a program working with forms using ASP.NET.
8 Write a program to connectivity with Oracle database.
9 Write a program to access data source through ADO.NET.
10 Write a program to manage the session.

SEMESTER-IV

Artificial Intelligence

BCA2201 **L-T-P (3-1-0)** **Credit-4**

Introduction:
Objective, scope and outcome of the course.

UNIT -I
Introduction to AI and Intelligent agent: Different Approach of AI, Problem Solving : Solving Problems by Searching, Uninformed search, BFS, DFS, Iterative deepening, Bi directional search, Hill climbing, Informed search techniques: heuristic, Greedy search,A* search, AO* search, constraint satisfaction problems.

UNIT -II
Game Playing: Minimax, alpha-beta pruning, jug problem, chess problem, tiles problem

UNIT -III
Knowledge and Reasoning: Building a Knowledge Base: Propositional logic, first orderlogic, situation calculus. Theorem Proving in First Order Logic. Planning, partial order planning. Uncertain Knowledge and Reasoning, Probabilities, Bayesian Networks.

UNIT -IV
Learning: Overview of different forms of learning, Supervised base learning: LearningDecision Trees, SVM, Unsupervised based learning, Market Basket Analysis, Neural Networks.

UNIT -V
Introduction to Natural Language Processing: Different issue involved in NLP, ExpertSystem, Robotics.

Software Engineering

BCA2202 **L-T-P (4-0-2)** **Credit-3**

UNIT -I

Characteristics, Emergence Engineering, Software Metrics & Models, Process & Product Metrics. Software Life Cycle Models:Waterfall, Prototype and Spiral Models and their of Software Comparison.

UNIT -II

Size Estimation- LOC and FP Metrics, Cost Estimation- Delphi and Basic COCOMO, Introduction to Halstead's Software Science, Staffing Level Estimation- Putnam's Model. SRS Documents, their Characteristics and Organization.

UNIT -III

Classification, Software Design Approaches, Function Oriented Software Design, Structured Analysis- Data flow Diagrams and Structured Design, Introduction to Object Oriented Design. Testing.

UNIT -IV

Unit Testing, Block Box Testing, White Box Testing, Debugging, Program Analysis Tools, System Testing.

Suggested Reading:

1. Rajib Mall -Fundamentals of Software Engineering, Prentice Hall of India, New Delhi,2005
2. Pankaj Jalote- An Integrated Approach to Software Engineering, 3 rd Edition, Narosaublishing House, New Delhi,2005
3. Richard Fairley- Software Engineering Concepts, Tata McGraw Hill, New Delhi, 2006

Computer Architecture

BCA2203 **L-T-P (4-0-0)** **Credit-4**

UNIT –I

Microprocessors (8085 features), bus structure, Data representation, Register transfer and micro-operations, Central processing Unit, Pipeline and vector processing.

UNIT -II

Computer arithmetic, Input-output organisation, Memory organisation, CPU architecture,instruction format, addressing mode, stacks and handling of interrupts.

UNIT -III

Basic computer organisation and design, programming the computer with assembly language (samebasic applications), Micro-programmed control.

UNIT -IV

Memory Hierarchy, Associative Memory, Cache Memory.

Suggested Reading :

1.Computer Organization, Hamacher, TMH
2.0000 to 8085 : Introduction to Microprocessors for Engineers & Scientists,Ghosh & Sridhar,PHI
3.Computer Organization & System Software, EXCEL BOOKS
4.System Architecture, Burd, VIKAS

Basic Electronics

BCA2204 **L-T-P (3-0-2)** **Credit-3**

UNIT -I

The Three Kind of Formulas, Approximations, Voltage Sources, Current Sources, Thevenin's Theorem, Norton's Theorem, Troubleshooting.

UNIT -II

Conductors, Semiconductors, Silicon Crystals, Intrinsic Semiconductors, Two Types of Flow, Doping a Semiconductor, Two Types of Extrinsic Semiconductors, TheUnbiased Diode, Forward Bias, Reverse Bias.

UNIT -III

Basic Ideals, the Ideal Diode, The Second Approximation, The Third Approximation. The Half- Wave Rectifier, The Transfer, The Full-Wave Rectifier, The Bridge Rectifier. The Unbiased Transistor, The Biased Transistor, Transistor currents, The CE Connection.

UNIT -IV

Variations in Current Gain, The Load Line, The Operating Point, Recognizing Saturation, The Transistor Switch, Emitter Bias. Base-Biased Amplifier, Emitter-Biased Amplifier, Small-Signal Operation. Voltage Gain, The Loading Effect of Input Impedance.

Suggested Reading:

1. Albert Paul Malvino- Malvino Electron Principles, TMH, Sixth Edition – 1999.
2. B.P. Singh & R. Singh – Electronic Devices and Integrated Circuits, Pearson Education-2006.
3. Electronic devices and circuit theory by Boylestad and Nashelsky, Pearson
4. Electronic principle by Albert Malvino & Davis J Bates, TMH
5. Art of electronics by Paul H Horowitz, Oxford

Managerial Economics

BCA2205 **L-T-P (3-1-0)** **Credit-4**

UNIT -I

Meaning, nature, scope and significance of economics Consumer Behaviour. Utility approach, Law of diminishing marginal utility. Law of equip marginal utility.

UNIT -II

Indifference curve approach, Consumer equilibrium income, prices & substitution effects. Revealed preference theory of law of Demand, Elasticity of demand and its measurements, methods of Demandforecasting.

UNIT -III

Concepts of cost and revenue, Short run and long run cost curves, Concept of total, average and marginal revenues. Relationship between average revenue, marginal revenue and elasticity of demand.

UNIT -IV

Price determination under perfect, oligopoly, duopoly, monopoly, monopolistic competition price descrimination. Investment decision – capital building, public investment decision, risk and uncertainty.

Suggested Reading :

1. Elements of Economics – Dewett & Dewett
2. Managerial Economics – Vartshney & Maheswari
3. Managerial Economics – J.G.Verma
4. Economical Analysis for Management Decisions – T.W.Elliot
5. Business Economics – V.G.Mankar
6. Managerial Economics – N.F. Dufty

SEMESTER-V

Internet & Web Technology

BCA3101 **L-T-P (3-1-2)** **Credit-3**

UNIT -I

Basic concepts, Communication on the Internet, Internet Domains, Internet Server Identities, Establishing Connectivity on the Internet, Client IP Address, A Brief Overview of TCP/IP and its Services, Transmission Control Protocol, Web Server , Web Client, Domain Registration.

UNIT -II

HTML, HTML Tags, Commonly Used HTML Commands, Title and Footers, Text Formatting, Text Style, Lists, Adding Graphics to HTML Documents, Tables,Linking Documents, Frames.

UNIT -III

Java Script in Web Pages, Advantages of Java Script, Advantages of Java Script, Data Types and Literals, Type Casting , Java Script Array, Operators and Expression, Conditional Checking , Function, User Defined Function.

UNIT -IV

SGML, XML, XML and HTML, Modeling XML Data, Styling XML with XSL, XHTML.

Suggested Reading :

1. Ivan Bay Ross- Web Enable Commercial Application Using HTML, DHTML, BPB Publication
2. Michel Morrison -HTML and XML for Beginners, PHI, New Delhi- 2001
3. H.M Dietal and P.J Dietal -Java How to Program, PHI, New Delhi- 2005
   Java Server Side Programming -WROX Publication

List of Experiment :

1 Home page Development static pages (using Only HTML) of an online Book store.
2 Validate the Registration, user login and payment by credit card pages using JavaScript.
3 To write a program, which takes user id as input and displays the user details by taking the user information from the XML document.
4 To create a JavaBean so that it converts value of INR (Indian Rupees) into equivalent American/Canadian/Australian Dollar value.
5 To create a simple Bean with a label - which is the count of number of clicks and a Bean Info class such that only the “count” property is visible in the Property Window.
6 To create two Beans Traffic Light which implemented as a Label with only three background colours- Red, Green, Yellow and Automobile which is implemented as a Textbox which states its state/movement with above stated conditions.
7 To convert the static web pages online library into dynamic web pages using servlets and cookies

Java Programming

BCA3102 **L-T-P (4-0-2)** **Credit-4**

UNIT-I

Basics of Java : History and Basics of Java, Java Environment, JDK Tools, Java Virtual Machine, Java Program Structure, Java Language- Tokens, Keywords, Constants, Variables, and Data Types. Operators and Expressions, Statements - Decision Making, Branching and Looping, Labeled Loops Statement, Jump Statements: Break, Continue, and Return, Command Line Argument.

UNIT-II

Classes and Objects: Classes, Objects, Defining a Class, Adding Variables and Methods, Creating Objects, Accessing Class Members, Constructors, Static Members, Nesting of Methods, Inheritance and Polymorphism: Basics Types, Extending a Class, Using Super, Method Overloading, Method Overriding, Final Variables and Methods, Final Classes, Finalize Method, Abstract Methods and Classes, Visibility Control.

UNIT-III

One and Two Dimension Arrays, String Array, String and String Buffer Classes, Vectors, Wrapper Classes. Interfaces: Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface Variables, Packages: System Packages, Naming Conventions, Creating Packages, Accessing a Package, Using Package, Adding a Class to a Package, Hiding Classes. Exception Handling:Introduction to Exception Handling, Try-Catch, Finally, Throws, Java Thread Model: Life Cycle of a Thread, Thread Class, Runnable Interface

UNIT-IV

Applet Programming : Creating and Executing Java Applets, Inserting Applets in a Web Page, Applet Tag, Local and Remote Applets, Applets Vs. Applications, Applets Life Cycle. AWT Classes, Swing Classes, Event Handling, AWT Programming: Working with Windows, Graphics and Text, Using AWT Controls, Layout Managers and Menus, Handling Image, Animation, Sound and Video. Java Swing: Japplet, Icons and Labels, Text Fields, Buttons, Radio Buttons, Check Boxes, Combo Boxes, List Boxes, Tabbed and Scroll Panes, Tables. Event Handling:

UNIT-V

I/O Stream: Introduction of I/O Stream, Types of Streams, Stream Class Hierarchy, Using File Class, Byte Streams Vs Character Streams, Textfile Vs. Binary File, Standard I/O Streams, and Random Access File, Serialization. Database Programming Using JDBC:-Introduction to JDBC, JDBC Drivers, Types of JDBC Drivers, Connecting with Database. J2EE: Introduction ofJ2EE, Web Application Basics, Architecture and Challenges of Web Application, Servlet, Servlet Life Cycle, Developing and Deploying Servlets.

Reference Books:

1. E. Balagurusamy, "Programming with Java, a Primer", TMH, ISBN-13: 978-0-07-061713-1.
2. Patrick Naughton and Herbert Schildt, "Java: the Complete Reference", TMH Publication.
3. Yashavant kanetkar, "Let us Java", BPB Publications.
5. Cay Horstmann, "Big Java", Wiley Publication
6. Peter Norton, "Java Programming", Techmedia Publications.
7. Joseph Weber, "Using Java 1.2", PHI

List of Experiment :

1 Write a java program to find the Fibonacci series using recursive and non recursive functions.
2 Write a java program to multiply two given matrices.
3 Write a java program for Method overloading and Constructor overloading.
4 Write a java program to display the employee details using Scanner class.
5 Write a java program that checks whether a given string is palindrome or not.
6 Write a java program to represent Abstract class with example.
7 Write a java program to implement Interface using extends keyword.
8 Write a java program to create inner classes.
9 Write a java program for creating multiple catch blocks.
10 Write a Java program that implements a multi-thread application that has three threads.
11 Write an applet program that displays a simple message.
12 Write a Java program compute factorial value using Applet.
13 Write a program for passing parameters using Applet.
14 Write a java program for handling Mouse events and Key events
15 Write a java program that connects to a database using JDBC
16 Write a java program that works as a simple calculator. Use a Grid Layout to arrange Buttons for digits and for the + - * % operations. Add a text field to display the result.

Fundamental of Computer Algorithm

BCA3103 **L-T-P (4-0-0)** **Credit-4**

UNIT -I

Introduction of Algorithm and their Complexity, Randomized Algorithm.

UNIT -II

Data Structure, Set Representation, Graphs, Trees, Recursion, Divide and Conquer, Balancing, Dynamic Programming.

UNIT -III

Depth First Search, Bi connectivity, Depth First Search of a Directed Graph and application, Breath First Search, Breath First Search of a Directed Graph and applications.

UNIT -IV

Introduction of Greedy Algorithm, Generate Method, Binary Search, Finding Maximum and Minimum, Merge Sort, Quick Sort and Other Applications.

Suggested Reading:

1. Introduction to Algorithm, 2e, by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein,PHI.
2. Beginning Algorithms by Simen Harris, James Ross, Wiley India.
3. Fundamentals of Computer Algorithms by E. Horowitz and S. Sahni, Galgotia.
4. Algorithms by Richard Johansonbaugh and Marcus Schaefer, Pearson Algorithm.

Fuzzy Logic

BCA3104 **L-T-P (4-0-0)** **Credit-4**

UNIT -I

Introduction to Fuzzy set, Relation between Fuzzy Set, Operations on Fuzzy Sets, Properties of the Standard Operations, Certain Numbers Associated with a Fuzzy Set.

UNIT -II

Certain Crisp Sets Associated with Fuzzy Set, Extension Principle, Fuzzy Set of Type-K and Level-K, Generation of Membership Functions.

UNIT -III

Fuzzy Relations, Operations on Fuzzy Relations, α-Cuts of a Fuzzy Relations, Composition of Fuzzy Relations, Cylindric Closure, Fuzzy Relation on a Domain.

UNIT -IV

Introduction, Three-valued Logics, N-valued Logics for N>=4, Infinite-valued Logic, Fuzzy Logics, Fuzzy Propositions and Their Interpretations in Terms of Fuzzy Sets, Fuzzy Rules and Their Interpretations in Terms of Fuzzy Relations, Fuzzy Inference or Approximate Reasoning, Generalizations of Fuzzy Logics.

Suggested Reading:

1. M. Ganesh- Introduction to Fuzzy Sets and Fuzzy Logic, PHI, 2004
2. Klir G.J. and Yuan B. - Fuzzy Sets and Fuzzy Logic, PHI, 2001.
3. Pedryes W. and Gomide F. - An Introduction to Fuzzy Sets: Analysis and Design, PHI.

Management Information System

BCA3105 **L-T-P (3-1-0)** **Credit-3**

Unit -I

Introduction to MIS , The Technical and Business Perspective, Organization Structure, Evaluation of MIS through Information System, MIS Organization within the Company.

Unit -II

Information Systems for Decision Making: Evolution of an Information System, Basic Information Systems, Decision Making and MIS, Decision Assisting Information System, Concepts of Balanced MIS Effectiveness and Efficiency Criteria.

Unit -III

Development of MIS, Methodology and Tools/Techniques for Systematic Identification, Evaluation and Modification of MIS. Advanced MIS,Concepts, Needs and Problems in Achieving Advanced MIS, DSS.

Unit -IV

Fundamental Weakness, Soft Spots in Planning and Design Problems.

Suggested Reading:

1. Murdic, Rose and Clagett- Information Systems for Modern Management, PHI, New Delhi.
2. Laudon-Laudon- Management Information Systems, Pearson Education, New Delhi.

SEMESTER-VI

Data Communication and Computer Network

BCA3201 **L-T-P (3-1-0)** **Credit-4**

UNIT -I

Data Transmission Basic Concepts and Terminology , Data Communication Model, Communication Tasks, Parallel & Serial Transmission, Transmission Models, Transmission Channel, Data Rate, Bandwidth Signal Encoding Schemes, Data Compression, Transmission Impairments, Layering and Design Issues, OSI Model, Services and Standards.

UNIT -II

Computer Network: Network Topology, Performance of Network, Network Classification ,Advantages & Disadvantages of Network, Transmission Media (guided and unguided), Network Architecture, OSI Reference Model, TCP/IP, SNA and DNA.

UNIT -III

Physical Layer: Function and interface, physical layer standard, null modem. Local Area Network: Definition of LAN, LAN topologies, Layered architecture of MAC, IEEE standard. Ethernet LAN, CSMA, CSMA/ CD, Token passing LAN.

UNIT -IV

Data Line Devices, Modems, Techniques: (FDM, TDM). DSL, ADSL, Multiplexer and Different Multiplexing, Data Link Layer: Need for Data Link Control, Frame Design Consideration, Flow Control & Error Control (Flow control mechanism, Error Detection and Correction techniques) Data Link Layer Protocol, HDLC.

Suggested Reading:

1. Data Communication & Networking by Forouzan, Tata McGraw Hill.
2. Computer Network, 4e, by Andrew S. Tenenbaum, Pearson Education/ PHI.
3. Data Communication and Computer Networks, by Prakash C.Gupta, PHI.
4. Networking Ali-in-one Desk Reference by Doug Lowe, Wiley Dreamtech

Distributed Computing

BCA3202 **L-T-P (4-0-0)** **Credit-4**

UNIT -I

An Introduction of Distributed Computing: Definitions, The History of Distributed Computing, Different Forms of Computing, The Strengths and Weaknesses of Distributed Computing, Basics of Operating Systems, Network Basics, Software Engineering Basics.

UNIT -II

An Archetypal IPC Program Interface, Event Synchronization, Timeouts and Threading, Deadlocks and Timeouts, Data Representation, Data Encoding, Text-Based Protocols, Request-Response Protocols, Event Diagram and Sequence Diagram, Connection-Oriented versus Connectionless IPC.

UNIT -III

Distributed Computing Paradigms: Distributed Applications, Trade-offs. Paradigms and Abstraction,Paradigms for The Socket API: Background, The Socket Metaphor in IPC, The Datagram Socket API, The Stream- Mode Socket API, Sockets with Nonblocking I/O Operations, Secure Socket API.

UNIT -IV

The Client-Server Paradigm: Background, Client-Server Paradigm Issues, Software Engineering fora Network Service, Connection-Oriented and Connectionless Servers, Iterative Server and Concurrent Server, Stateful Servers.

Suggested Reading:

1. M.L.Liu- Distributed Computing: Principles and Applications, 1 st Indian Reprint, Pearson Education, 2004.
2. Distributed Computing by Liu. Pearson Education.
3. Distributed Computing by Hagit Attiya and Jennifer Welch, Wiley India.3.
4. Distributed Operating Systems : Concept and Design by P.K. Sinha, PHI
5. Distributed Operating System by Tenenbaum. Pearson Education

Optimization Theory

BCA3203 **L-T-P (4-0-0)** **Credit-4**

UNIT -I

An Introduction of Optimization Theory, Definitions Characteristics of Operations Research Approach.

UNIT -II

Linear Programming- Applications and Model Formulation: Introduction, Structure of Linear Programming Model, Advantages of Using Linear Programming, Limitations of Linear Programming, Applications Areas of Linear Programming, General Mathematical Model of Linear Programming Model, Guidelines on Linear Programming Model Formulation, Examples of LP Model Formulation.

UNIT -III

Linear Programming- The Graphical Method: Introduction, Important Definitions, Graphical Solution Methods of LP Problem. Linear Programming- The Simplex Method: Introduction, Standard Form of an LP Problem, Simplex Algorithm (Maximization Case), Simplex Algorithm (Minimization Case).

UNIT -IV

Duality in Linear Programming: Introduction, Formulation of Dual Linear Programming Problem, Standard Results on Duality, Managerial Significance of Duality, Advantages of Duality. Introduction, Types of Integer Programming Problems, Enumeration and Cutting Plane Solution

Concept, Gomory's All Integer Cutting Plane Method, Gomory's Mixed- Integer Cutting Plane Method, Branch and Bound Method, Applications of Zero-One Integer Programming.

Suggested Reading :

1. Operation Research, Kanti Swaroop
2. Operation Research,V.K. Kapoor
3. Operation Research,Paneer Selvam,PHI
4. Operations Research, Hillier & Lieberman, TMH
5. Operations Research, Kalavati,VIKAS
6. Operation Research,Humdy Taha,PHI
7. Statistics,Random Process & Queuing Theory, Prabha, Scitech
8. Operations Research, Vijayakumar, Scitech
9. Quantitative Techniques,Vol.1 & II ,L.C. Jhamb,EPH

Accounting and Finance Management

BCA3204 **L-T-P (3-0-0)** **Credit-3**

UNIT -I

Basic of Accounting, Accounting Mechanics- Double Entry System, Classification, Rules for Debit and Credit Concepts & Conventions, Indian Accounting Standards.

UNIT -II

Journal: Meaning of Journal, Advantages, Subdivision. Ledger : Meaning, subdivision, Mechanics of Posting, balancing of Ledger accounts .Trial Balance: Objectives, Defects of trial balance, Errors disclosed by trial balance, preparation and locating errors.

UNIT –III

Cash Book and Subsidiary books of Accounting: Kinds of cashbook, Purchase daybook, Sales daybook, Bills receivable book, Bills payable book. Finance Accounts: Trading account,, Profit & Loss account, Adjustments, Balance Sheet, Forms of balance Sheet, Assets and their classification, liabilities and their classification, uses and limitations.

UNIT -IV

Capital & Revenue Expenditure & Receipts: Rules for determining capital expenditure, Deferred Revenue expenditure, Capital & Revenue receipts, Capital & Revenue Profits, Capital & Revenue Loss. Nature of Financial Management: Scope of financial functions, finance functions and job of finance manager, organization of finance function.

Suggested Reading:

1. Management Accounting – Manmohan Singh and Goel
2. Financial management- Pandey I. M.
3. Hanif & Mukherjee-Modern Accountancy, TMH, New Delhi.
4. Maheshwari & Maheshwari- An Introduction to Accountancy, Vikas Publishing House Pvt.Ltd., New Delhi.

ELECTIVE

Intelligence System

BCA3205A **L-T-P (4-0-0)** **Credit-4**

UNIT -I

Scope of Artificial Intelligence, games, theorem proving, natural language processing, vision and speech processing, robotics, expert systems. AI techniques in search and knowledge abstraction.

UNIT -II

Problem solving; state space search, search space control, heuristic search, hill climbing, branch and bound Knowledge representation; predicate logic, rule-based system, structured knowledge representation

UNIT -III

Semantic net Handling uncertainty, Fuzzy sets, probabilistic reasoning Learning, learning automation.

UNIT -IV

Learning by induction, Neural Networks, Genetic Algorithms Emerging technologies and devices.

Suggested Reading :

1. Artificial Intelligence, Rich & Knight, TMH
2. Introduction to AI & Expert Systems,Patterson,PHI
3. Neural Networks, Fuzzy Logic & Genetic Algorithms,Rajsekharan,PHI
4. Expert Systems, Giaranto, VIKAS

Advanced Networking & Communication

BCA3205B **L-T-P (4-0-0)** **Credit-4**

UNIT -I

Introduction to computer network- Topology; Base Band & Broad Band Topology; Guided & Unguided Media.Overview of Data & Signal Bits. Baud & Bit Rate. Modulation (AM, PM, FM); Multiplexing (TDM, FDM, STDM). Encoding (RZ, NRZ, BIPLOAR, MANCHESTER, DIFF. MANCHESTER).

UNIT -II

Digital To Analog – ASK, PSK, FSK, QPSK. Transmission methods – Synchronous & Asynchronous, Flow Control, Error Control, Error Detection methods. Goals of Layered protocols- Introduction to OSI, TCP/IP, IBM, SNA, ATM. Bit oriented (BSC) & Character oriented Protocol (SDLC, LAPB, LAPD, LLC) HDLC- frame format, station, states, configuration, access control.

UNIT -III

LAN Topology – Ethernet (IEEE 802.3), Token Bus (IEEE 802.4), Token Ring (IEEE 802.5) Introduction to WAN – DQDB (IEEE 802.6) & FDDI. Switching Technologies – Circuit, Message, and Packet. X.25, X.21, RS-232 C – frame format, channel, packet frames, facilities (In brief Only).ISDN- D channel, B-Channel, International Standards, NT1, NT2, TA, TE Devices.

UNIT -IV

Introduction to leased lines, DSL, Digital Carriers. Bridging & Routing – Static & Dynamic (In Brief).IP, IP addressing, ICMP, ARP.RARP. Congestion Control, TCP, UDP. HTTP,FTP,Telnet,SMTP. Introduction to data security (private key, public key, ISO standards)

Suggested Reading:

1.Data Communication & Networking, Forouzan, TMH
2.Computer networks,Tannenbaum,PHI
3.Computer Communication Networks,Shanmugam & Rajeev, ISTE/EXCEL4.Data & Computer Communication,Stallings,PHI
5. Data & Network Communication, Miller, VIKAS
6. Data Communication & Network, Dr. Prasad, Wiley Dreamtech
7.Computer Network Theory, Prasad, Scitech

Image Processing

BCA3205C **L-T-P (4-0-0)** **Credit-4**

UNIT -I

Digital image fundamentals - Introduction – Image Representation – Steps in Image Processing –Elements of Image Processing – Sampling and Quantization – Relationships between pixels – Imaging Geometry.

UNIT -II

Image transforms - Fourier, Discrete Fourier, Fast Fourier, Walsh, Hadamard, Discrete Cosine and Haar Transforms - Image enhancement and restoration.

UNIT -III

Domain methods – Point processing – Filtering – Color Image Processing – Degradation Model – Circulant and Block Circulant matrices – Restoration – Inverse Filtering- Image compression and coding. Redundancy – Compression models – Coding Theorems – Different types of Coding – Lossy and Lossless compression - Compression Standards - Image segmentation.

UNIT -IV

Detection of Discontinuities – Boundary Detection – Edge linking – Thresholding – Segmentation – Image representation – Morphology – Interpretation.

Suggested Reading :

1. R. Gonzalez and R. E. Wood, Digital Image Processing, Prentice Hall of India, 1992.
2. K.Pratt, Digital Image Processing, McGraw Hill, 1981.

Advanced Unix Programming

BCA3205D **L-T-P (4-0-0)** **Credit-4**

UNIT -I

Introduction to System, Administration Essential Administrative Tools, Starting andshutdown.

UNIT -II

User Accounts, Security, TCP / IP Network Management.

UNIT -III

Getting started in LINUX, Linux Data Management, POSIX Threads.

UNIT -IV

Pipes, Semaphores, Message Queues, Shared Memory, Sockets, Tool CommandLanguage, PERL & CGI.

Suggested Reading :

1. Linux Administration : A Beginner's Guide, Shah, TMH
2. LINUX: The Complete Reference, Petersen, TMH
3. Guide to LINUX installations & administration, Wealls,VIKAS
4. Red Hat LINUX-Administrator's Guide,Cox, PHI
5. LINUX Network Administrator's Guide, Kirch,SPD/O'REILLY
6. Essentials System Administration, Frisch,SPD/O'REILLY
7. Installing & administering LINUX, Linda, McKinnon, Wiley Dreamtech
8. CGI Programming with PERL,Gundavaram,SPD/O'REILLY