UNIVERSITY 🏛 OF MYSORE

Estd. 1916

Vishwavidyanilaya Karyasoudha
Crawford Hall, Mysuru- 570 005

No.AC.2(S)/31/18-19   Dated: 15.06.2018

NOTIFICATION

Sub: Revision of syllabus for Computer Science (UG) as per CBCS pattern from the academic year 2018-19.

Ref: 1. Decision of Board of Studies in Computer Science (UG) meeting held on 28.02.2018.
2. Decision of the Faculty of Science & Technology Meeting held on 21.04.2018.
3. Decision of the Deans Committee meeting held on 22.05.2018.

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The Board of Studies in Computer Science (UG) which met on 28.02.2018 has recommended to revise the syllabus for B.Sc. Computer Science as per CBCS pattern from the academic year 2018-19.

The Faculty of Science and Technology and the Deans committee meetings held on 21-04-2018 and 22-05-2018 respectively have approved the above said proposal with pending ratification of Academic Council and the same is hereby notified.

The CBCS syllabus of B.Sc. Computer Science course is annexed. The contents may be downloaded **from the University Website i.e., www.uni-mysore.ac.in**.

Draft approved by the Registrar

Deputy Registrar(Academic)

To:

1. The Registrar (Evaluation), University of Mysore, Mysore.
2. The Dean, Faculty of Science & Technology, DOS in Physics, Manasagangotri, Mysore.
3. The Chairperson, BOS in Computer Science, DOS in Computer Science, Manasagangotri, Mysore.
4. The Chairperson, Department of Studies in Computer Science, Manasagangotri, Mysore.
5. The Director, College Development Council, Moulya Bhavan, Manasagangotri, Mysore.
6. The Principals of the Affiliated Colleges where UG Program is running in Science stream.
7. The Deputy/Assistant Registrar/Superintendent, AB and EB, UOM, Mysore.
8. The P.A. to the Vice-Chancellor/Registrar/Registrar (Evaluation), UOM, Mysore.
9. Office file.

BCA

Elective: Software Engineering   **(LTP::4:2:0)**   **6 Credits**

UNIT I: SOFTWARE PROCESS:

Introduction –S/W Engineering Paradigm – life cycle models (water fall, incremental, spiral, prototyping, object oriented) - system engineering – computer based system – verification – validation – life cycle process – development process –system engineering hierarchy.

UNIT II: SOFTWARE REQUIREMENTS:

Role of Management in Software Development, Role of Metrics and Measurement, Problem Analysis, Requirement Specification,Validation, Metrics, Monitoring and Control.software prototyping – prototyping in the software process – rapid prototyping techniques – user interface prototyping -S/W document. Analysis and modelling – data, functional and behavioural models – structured analysis and data dictionary.

UNIT III: DESIGN CONCEPTS AND CODING:

System Design, Problem Partitioning, Abstraction, Top-down and bottom-updesign, Structured Approach, Functional v/s Object-Oriented Approach, Design specification & verification, metrics.

Coding: Top-down & Bottom-up, Structured Programming, Information Hiding,Programming Style, Internal Documentation, Verification, Metrics, monitoring &control

UNIT IV: TESTING AND PROJECT MANAGEMENT:

Taxonomy of software testing – levels – test activities – types of s/w test – black box testing – testing boundary conditions- Functional Testing, – structural Testing, Levels of Testing-Structural Testing, Test Plan, TestCases Specification, Reliability assessment . Testing – integration testing – validation testing – system testing and debugging.

Software Project Management, Cost Estimation, Project Scheduling, Staffing. Software Configuration Management, Quality Assurance.

Measures and measurements – S/W complexity measure – size measure – data and logic structure measure – information flow measure. Software cost estimation COCOMO model- Delphi method.- software maintenance

Text Books:

1. Roger S.Pressman, Software engineering- A practitioner's Approach, McGraw-Hill International Edition, 5th edition, 2001.

2. Ian Sommerville, Software engineering, Pearson education Asia, 6th edition, 2000.

3. PankajJalote- An Integrated Approach to Software Engineering, Springer Verlag, 1997.

4. Ali Behforooz and Frederick J Hudson, "Software Engineering Fundamentals", Oxford University Press, New Delhi, 1996

BCA
Elective: .NET Programming   **(LTP::3:1:2)**   **6 Credits**

UNIT-I
Introduction: Overview of OOP, Introduction to C # - Characteristics, application, Difference between c and c#, The .NET strategy, the origins of the .NET technology, the .NET framework, benefits of the .NET approach, C# and .NET, c# program structure, command line argument, math function, Literals, variables and data , constant variables, scope of variables, boxing and unboxing, Operators in C#, expression, Decision making and looping statements in c# Methods in C# : declaring methods, nesting of methods, methods parameters, the output parameters, variable arguments list, method overloading, Arrays - variable size arrays, the system, array class, array list class, String handling

UNIT-II
Inheritance and polymorphism: classical inheritance, containment inheritance, defining a subclass, visibility control, defining subclass constructors, multilevel inheritance, hierarchical inheritance, overriding methods, hiding methods, abstract classes, abstract methods, sealed classes, Preventing inheritance, sealed methods, polymorphism. **Interfaces**: Multiple Inheritance: defining an interface, extending an interface, implementing interface, interface & inheritance, explicit interface implementation, abstract class and interface. **Operator overloading**: over loadable operators, need for operator overloading, defining Operator overloading, overloading unary operators, overloading binary operators, overloading Comparison operators.

UNIT-III
Delegates and Events: Delegate, delegate declaration, delegate methods, delegates instantiation, delegate invocation, using delegates, multicast delegates, events. Managing Console I/O operations: console class, console input, console output, formatted output, numeric formatting, standard numeric format, custom numeric format. **Managing Errors and Exceptions** : Types of errors, exceptions, syntax of exception handling code, multiple catch statement, the exception hierarchy, general catch handler, using final statement, nested try blocks, throwing our own exceptions, checked and unchecked operators, using exceptions for debugging.

UNIT-IV
Introducing windows forms: A tale of three GUI namespaces, overview of the system. windows. Forms Namespaces, Anatomy of a Form, Component class, control class, control. Programming with windows forms controls: Working with button types, check boxes, Radio buttons, Group boxes, list boxes, calendar control, assigning tooltips for controls. **Data access with ADO.NET**: The need for ADO.NET, two faces of ADO.NET, role of ADO.NET data providers, Building a simple test database, selecting a data provider, working with connected layer of ADO.NET & OleDb Data reader, inserting, updating and deleting records using OleDb command.

Text Books :
1. Profession c# - By Karli Watson, Simon Robinson, Christian Nagel, Wiley India Pvt Ltd.
2. C# Unleashed – By Joseph Mayo, Techmedia, First Edition
3. Programming C# - By Jesse Liberty, Shroff Publishers, 4TH Edition
4. Programming In C# - By Barbara Doyle, Cengage \ Delmar Learning India Pvt.

BCA

Elective: Cloud Computing and Big Data Analytics   (LTP::4:1:1)   6 Credits

UNIT – I
Introduction: Essentials, Benefits and need for Cloud Computing - Business and IT Perspective - Cloud and Virtualization - Cloud Services Requirements - Cloud and Dynamic Infrastructure - Cloud Computing Characteristics Cloud Adoption. Cloud Models: Cloud Characteristics - Measured Service - Cloud Models - Security in a Public Cloud Public versus Private Clouds. Cloud Infrastructure Self Service. Cloud as a Service: Gamut of Cloud Solutions - Principal Technologies - Cloud Strategy Cloud Design and Implementation using SOA - Conceptual Cloud Model - Cloud Service Defined.

UNIT – II
 Cloud Solutions: Cloud Ecosystem - Cloud Business Process Management - Cloud Service Management - Cloud Stack - Computing on Demand (CoD) – Cloud sourcing. Cloud Offerings: Information Storage, Retrieval, Archive and Protection - Cloud Analytics Testing under Cloud - Information Security - Virtual Desktop Infrastructure - Storage Cloud. Cloud Management: Resiliency – Provisioning - Asset Management - Cloud Governance - High Availability and Disaster Recovery - Charging Models, Usage Reporting, Billing and Metering.

UNIT III
Introduction to big data acquisition, collection and transmission: Big data framework - fundamental concepts of Big Data management and analytics - Current challenges and trends in Big Data Acquisition. Big data collection- Strategies- Types of Data Sources- Structured Vs Unstructured data- ELT vs ETL - storage infrastructure requirements -Collection methods-Log files- Sensors- Methods for acquiring network data (Libcap-based and zero-copy packet capture technology) -Specialized network monitoring softwares (Wireshark, Smartsniff and Winnetcap) - Mobile equipment's, Transmission methods- Issues.

UNIT IV
 Data Pre-processing and analytics : Data pre-processing overview-Sampling- Missing Values -Outlier Detection and Treatment - Standardizing Data- Categorization - Weights of Evidence Coding -Variable Selection and Segmentation. DATA ANALYTICS: Predictive Analytics (Regression, Decision Tree, Neural Networks) - Descriptive Analytics (Association Rules, Sequence Rules), Social Network Analytics (Social Network Learning Relational Neighbour Classification).

Text Books:
1. Cloud Computing – Insight into New Era Infrastructure, Dr. Kumar Saurabh, Wiley India.
2. Cloud Computing: Implementation, Management, and Security, John W. Rittinghouse and James F.Ransome, CRC Press, 2010.
3. Cloud Computing:Principles and Paradigms, Rajkumar Buyya, James Broberg, Wiley 2011.
4. Cloud Computing for Dummies, Judith Hurwiz, Wiley Publishing, 2009.
5. The Cloud at your service, Rosenberg and Matheos, Manning Publications, 2010.
6. Hadoop: The Definitive Guide, Tom White, Yahoo Press, 2012.
7. Analytics in a Big Data World: The Essential Guide to Data Science and its Applications, Bart Baesens, John Wiley & Sons, 2014

BCA

Elective: Graphics and animation   (LTP::4:0:2)   6 Credits

UNIT-1
Introduction – applications of computer graphics, operations of computer graphics, graphics software packages. Graphical input – output devices- graphical input devices, graphical output devices, raster scan video principles- raster scan monitors, color raster scan systems, plasma panel display, LCD panels, hard copy raster devices. Random scan devices- monitor tube displays, plotters. Scan conversion – scan conversion methods, polynomial method for line, polynomial method for circle, DDA algorithm for line, circle and ellipse, Bresenham's algorithm for drawing line and circle. Midpoint methods for drawing line and circle, problems of scan conversion.

UNIT-2
Scan conversion for solids- solid areas or polygons, inside-outside test – odd even method, winding number method. Solid area filling algorithms- boundary fill algorithm, scan line fill algorithm, scan line seed fill algorithm, ordered edge list algorithm. 2D geometrical transformations – basic transformations- translation, rotation, scaling, homogeneous co-ordinate system – transformations in homogeneous notation, inverse of basic transformations, scaling about a reference point, rotation about an arbitrary point. Other transformations – reflection about any arbitrary line, shearing, combined transformation- computational efficiency, visual reality, inverse of combined transformations. 3D geometrical transformations- basic 3D transformation- 3D translation, 3D scaling. 3D rotation, rotation about an arbitrary axis in space, other 3D transformations- 3D reflection, reflection about any arbitrary plane, 3D shearing.

UNIT-3
Projection – introduction, parallel projection- orthographic projection, axonometric projection, oblique projection, perspective projection – standard perspective projection, vanishing points. Image formation inside a camera. 2D viewing and clipping- windows and viewports, viewing transformation, clipping of lines in 2D- Cohen - Sutherland clipping algorithm, midpoint subdivision method, polygon clipping – Sutherland – Hogman polygon clipping. Curve design – classical techniques for designing curves and object surfaces, modern curve representations.

UNIT – 4
Multimedia : Definition, CD-ROM and the multimedia highway, Uses of Multimedia, Introduction to making multimedia – The stages of Project, the hardware & software requirements to make good multimedia, Multimedia skills . Multimedia building blocks: SOUND: MIDI, Digital audio, audio file formats. Images: still images, color and file formats. ANIMATION: principles of animation, making animation. VIDEO: using video, how video works, and video standards.

Text Books:
1. Computer Graphics, Multimedia and Animation by Malay K Pakhira
2. Computer Graphics, Donald Hearn, M. Pauline Baker, Prentice-Hall
3. Computer Graphics, Roy A. Plastock, Gordon Kalley, Schaum's Outlines, McGraw Hill
4. . Tay Vaughan "Multimedia – making it work", TMH publication.

BCA
(Elective) NETWORK SECURITY   (LTP:4:2:0)   6 Credits

Unit – I
Introduction: Security Goals, Cryptographic Attacks, Services and Mechanism, Techniques. Approaches to information security implementation; The Security System Development Life Cycle; Information Security Terminology. Planning for Security: Introduction; Information Security Policy,Standards, and Practices; The Information Security Blue Print.

Unit – II
Traditional Symmetric-Key Ciphers: Introduction, Substitution Ciphers, Transpositional Ciphers, Stream and Block Ciphers. Data Encryption Standard (DES): Introduction, DES Structure, DES Analysis, Security of DES, Multiple DES, Examples of Block Ciphers influenced by DES. Advanced Encryption Standard: Introduction, Transformations, Key Expansion, The AES Ciphers, Examples, Analysis of AES.

Unit III
Encipherment using Modern Symmetric-Key Ciphers: Use of Modern Block Ciphers, Use of Stream Ciphers, Other Issues. Mathematics of Asymmetric-Key Cryptography: Primes, Primality Testing, Factorization, Chinese Remainder Theorem, Quadratic Congruence, Exponentiation and Logarithm. Asymmetric Key Cryptography: Introduction, RSA Cryptosystem, Rabin Cryptosystem, Elgamal Cryptosystem, Elliptic Curve Cryptosystems.

Unit- IV
Cryptography Hash Functions: Introduction, Description of MD Hash Family, Whirlpool, SHA-512. Digital Signature: Comparison, Process, Services, Attacks on Digital Signature, Digital Signature Schemes, Variations and Applications. Key Management: Symmetric-Key Distribution, Kerberos, Symmetric-Key Agreement, Public-Key Distribution, Hijacking.Security at the Application Layer: PGP and S/MIME: Email, PGP, S/MIME.

Text Book:
1. Behrouz A. Forouzan, Debdeep Mukhopadhyay: Cryptography and Network Security, 2nd Edition, Special Indian Edition, Tata McGraw-Hill, 2011.

Reference Books:

2. Michael E. Whitman and Herbert J. Mattord: Principles of Information Security, 2nd Edition, Thomson, Cengage Delmar Learning India Pvt., 2012.
3. William Stallings: Network Security Essentials: Applications and Standards, 4th Edition, Pearson Education, 2012.

BCA
Elective: SOFTWARE TESTING   (LTP::4:1:1)   6 Credits

UNIT – I
Basics of Software Testing and Examples: Basic definitions, Test cases, Insights from a
Venn diagram, Identifying test cases, Error and fault taxonomies, Levels of testing.
Examples: Generalized pseudo code, The triangle problem, The Next Date function, The
commission problem, The SATM (Simple Automatic Teller Machine) problem.
Decision Table-Based Testing: Decision tables, Test cases for the triangle problem, Test
cases for the Next Date function, Test cases for the commission problem, Guidelines
and observations. Data Flow Testing: Definition-Use testing, Slice-based testing,
Guidelines and observations.

UNIT – II
Levels of Testing: Traditional view of testing levels, Alternative life-cycle models, The
SATM system, Separating integration and system testing. Integration Testing: A closer
look at the SATM system, Decomposition-based, call graph- based, Path-based
integrations, Case study. System Testing: Threads, Basic concepts for requirements
specification, Finding threads, Structural strategies and functional strategies for thread
testing, SATM test threads, System testing guidelines, ASF (Atomic System Functions)
testing example.

UNIT – III
Interaction Testing: Context of interaction, A taxonomy of interactions, Interaction,
composition, and determinism, Client/Server Testing. Issues in Object-Oriented Testing:
Units for object-oriented testing, Implications of composition and encapsulation,
inheritance, and polymorphism, Levels of object-oriented testing, GUI testing, Dataflow
testing for object-oriented software, Examples. Class Testing: Methods as units, Classes
as units.

UNIT – IV
Object-Oriented Integration Testing: UML support for integration testing, MM-paths for
object-oriented software, A framework for object-oriented dataflow integration testing.
GUI Testing: The currency conversion program, Unit testing, Integration Testing and
System testing for the currency conversion program. Object-Oriented System Testing:
Currency converter UML description, UML-based system testing, State chart-based
system testing.

Text Books:
1. Paul C. Jorgensen: Software Testing, A Craftsman's Approach, 3rd Edition, Auerbach
   Publications, 2012.
2. Aditya P Mathur: Foundations of Software Testing, Pearson, 2008.
3. Mauro Pezze, Michal Young: Software Testing and Analysis – Process, Principles and
   Techniques, 1st edition, John Wiley & Sons, 2011.
4. Srinivasan Desikan, Gopalaswamy Ramesh: Software testing Principles and Practices,
   1st Edition, Pearson, 2012.
5. 5. Brian Marrick: The Craft of Software Testing, 1st edition, Pearson, 2012.

BCA
Elective: Web Technology   (LTP::4:1:1)   6 Credits

UNIT I
INTRODUCTION
Internet Principles – Basic Web Concepts – Client/Server model – retrieving data from Internet – HTM and Scripting Languages – Standard Generalized Mark –up languages – Next Generation – Internet –Protocols and Applications.

UNIT II
COMMON GATEWAY INTERFACE PROGRAMMING
HTML forms – CGI Concepts – HTML tags Emulation – Server – Browser Communication – E-mail generation – CGI client-Side applets – CGI server applets – authorization and security.

UNIT III
SCRIPTING LANGUAGES
Dynamic HTML-Cascading style sheets-Object model and Event model- Filters and Transitions-Active X Controls-Multimedia-Client-side script - VB Script programming – Forms – Scripting object.

UNIT IV
SERVER-SIDE PROGRAMMING
XML – Server side includes – communication – DTD – Vocabularies – DOM methods – Firewalls-Proxy Servers.
SERVLETS AND JSP
JSP Technology Introduction-JSP and Servelets- Running JSP Applications Basic JSP-JavaBeans Classes and JSP-Tag Libraries and Files- Support for the Model-View- Controller Paradigm- Case Study- Related Technologies.

TEXT BOOKS
1. Deitel H.M. and Deitel P.J., "*Internet and World Wide Web How to program",* Pearson International, 2012, 4th Edition. (Ch-1,4,5,6,12,14,26,27)
   Gopalan N.P. and Akilandeswari J., "*Web Technology",* Prentice Hall of India, 2011.(Ch- 1 to 11)
2. Paul Dietel and Harvey Deitel," Java *How to Program*", Prentice Hall of India, 8th Edition. (Ch-29)

REFERENCES
1. Mahesh P. Matha, "*Core Java A Comprehensive study*", Prentice Hall of India, 2011.
2. Uttam K.Roy, "*Web Technologies"*, Oxford University Press, 2011.

BCA Programme (CBCS): 2018-19 onwards

Semester	Core DSC	Credits	Elective DSE	Credits	SEC	Credits
I	DSC-1	6				
	DSC-2	6				
	DSC-3	6				
II	DSC-4	6				
	DSC-5	6				
	DSC-6	6				
III	DSC-7	6				
	DSC-8	6				
	DSC-9	6				
IV	DSC-10	6				
	DSC-11	6				
	DSC-12	6				
V			DSE-1	6	SEC-1	2
			DSE-2	6	SEC-2	2
			DSE-3	6		
VI			DSE-4	6	SEC-3	2
			DSE-5	6	SEC-4	2
			DSE-6	6		

Discipline Specific Courses:

DSC-1:   Computer Concepts and C Programming   4:0:2

DSC-2:   Digital Electronics and Computer Organization   4:0:2

DSC-3:   Discrete Transformations   4:2:0

DSC-4:   Data structures and File Processing   4:0:2

DSC-5:   System softwares and Operating Systems   4:0:2

DSC-6:   Fundamentals of Information Technology   4:2:0

DSC-7:   Object Oriented Programming with Java   4:0:2

DSC-8:   Operation research   4:2:0

DSC-9:   Accounting   4:0:2

DSC-10:   Database Management Systems   4:0:2

DSC-11:   Numerical and Statistical Analysis   4:0:2

DSC-12:   Data Communication and Computer Networks   4:2:0

List of Electives for both Vth and VIth semesters:

(Select three of the following electives in   Vth semester and two of the following electives in VIth semester, without repetition.)

Computer Graphics and animation	(L:T:P::4:0:2)
Software Engineering	(L:T:P::4:2:0)
.NET Programming	(L:T:P::4:2:0)
Software Testing	(L:T:P::4:1:1)
Web Technology	(L:T:P::4:0:2)
Digital Image Processing	(L:T:P::4:0:2)
Network Security	(L:T:P::4:2:0)
Cloud Computing and Big Data Analytics	(L:T:P::4:1:1)

Skill Oriented Course

SEC-1 :: DTP (Page Maker and CorelDraw)	(L;T:P::1:0:1)
SEC-2 ::Cyber Security	(L;T:P::1:0:1
SEC-3 ::Accounting Software (Tally)	(L;T:P::1:0:1)
SEC-4 ::Android Programming	(L;T:P::1:0:1)

BCA

DSC-1: Computer Concepts and C Programming (LTP::4:0:2)   6 Credits

UNIT I: Programming Concepts and Introduction to C language:

System software, Application software. Program Translators – Assembler, Compiler, and Interpreter. Programming languages -Machine Level language, Assembly level language, High level language.
Program development life cycle: Problem definition, analysis, Design, Coding, Testing and debugging, Documentation and maintenance . Algorithm- Features, simple examples. Flowchart –Symbols used in a flowchart, suitable examples,
Overview of C: Importance of C, basic structure of C program, executing a C program, sample C program,. Constants, variables and data types. C character set, C tokens, identifiers, constants, variables, declaration of variables, assigning values to variables. Data type conversion.
Operators in C: arithmetic operators, relational operators. Logical operators, assignment operators, increment and decrement operators, conditional operators, bitwise operators, special operators, precedence of arithmetical expression, relational expression, logical expressions.

UNIT II: Input and output operations:

Input and output statements, reading a character: getchar(), writing a character: putchar(), formatted and unformatted i/o statements.

Control structures:
Branching: if, if-else, nested if, else-if ladder, switch.
Looping : while, do-while and for loop. Jump statements, nested loops.

UNIT III: Arrays, Strings and Functions :

Arrays: Introduction, single dimensional array, two-dimensional arrays, initializing 2-d arrays, multidimensional arrays. Operations on arrays: traversal, insertion and deletion. Searching: linear search & binary search. Sorting: bubble sort, selection sort and insertion Sort.

Strings : Declaring and initializing string variables, reading string from terminal, writing string to screen, putting strings together. Comparison of two strings, length of a string, copying a string, string operations using library functions & User defined functions.

Functions: Introduction, types of functions, need for user-defined functions, function call, types of arguments, nesting of functions, a multi function program, recursion, storage classes.

UNIT IV: Structures ,Unions Pointers and   Files

Structures : Definition and declaration of a structure, assigning and accessing the members of a structure, structure initialization, structure elements in memory, comparison of structure variables, structure with in the structure, array within structures.

unions: Definition and declaration, accessing the members of a union. comparison of structure and union.

Pointers : Advantages of pointers, declaration of pointer variable, pointer expressions, pointers and functions: call by value and call by reference, pointers and arrays, array of pointers, pointer to pointer.

Files: Definition, types of files. Creating text file. Modes of opening a file, formatted and unformatted i/o operations, random files.

Texts Books:

1. E. Balaguruswamy : Programming in ANSI C" Tata Mc Graw-Hill

2. Problem Solving with C -PHI(EEE). By - M.T.Somashekara.

3. S. ByronGottfried. : "Programming with C", Tata McGraw-Hill(2000)

4. Yashawant Kanetkar : "Let us C"

5. Brain Verminghan & Dennis M. Ritchie "ANSI C Programming" (PHI)

BCA

DSC-2:   **Digital Electronics and Computer Organization (LTP::4:0:2)   6 Credits**

Unit-I

Number Systems – Introduction- Decimal, Binary, Octal and Hexadecimal. Inter- Conversions, Addition, Subtraction, Multiplication and Division in Binary Number System. 1's and 2's Complement method in Binary Number System. Subtraction using 1's and 2's Compliment, Weighted Number System, Binary Coded Decimal (BCD), Addition of BCD Numbers. Non-Weighted Number System, Applications, Excess-3, Gray code Conversions, Gray and Binary Codes. Fixed point and Floating point representation of numbers.

Unit-II

Boolean Algebra: Basic laws, DeMorgan's theorem, Duality theorem, Sum Of Product method and Products Of Sum method. Karnaugh map (Upto 4 Variables, Don't Care Condition). Fundamentals of Gates: Basic gates, Derived gates and Universal gates (Design).

Unit-III

Combinational and Sequential logic circuits - Half adder, Full adder, Half -subtractor and Full-subtractor. Flip-Flops - SR, D, JK, JK Master Slave, T Flip-flops, Decoders - 3 to 8 lines, Encoders-Octal to Binary. Multiplexer- 4 to 1 line, Counters-3 bits Binary Ripple counter, 3 bits synchronous binary counter. Shift registers- Serial-In-Parallel-Out, Parallel-In-Serial-Out, Serial-In-Serial-Out, Parallel-In-parallel-Out.

Unit-IV

Basic Organization of Computers, Classification Micro, Mini, Mainframe and Super Computer, Von-Neumann M/c. CPU Organization: Fundamental Concepts: Fetching and storing a word in Memory, Register Transfer, Performing an Arithmetic & Logic Operation, Branching. Input / Output Organization: Peripheral Devices, Input – output Interface, I/O Bus, synchronous Data Transfer, Modes of Transfer: Programmed I/O, Interrupt Driven I/O, Direct Memory Access (DMA), DMA Controller, I/O Channel & Processor, Interrupts. Memory Organization: Computers Memory System Overview, Characteristics of Memory System, Semi-Conductor Main Memory types, Organization, Memory cell Operation.

Text Books:

1. Digital fundamentals-Thomas.D.Floyd. Malvino Leach, digital principles and application (4th edition)
2. Computer System Architecture (3rd edition) Morris Mano PHI.
3. Computer Organization – by V.Carl Hamacher, Z.G.Vranesic, and S.G.Zaky, 3rd Edition. McGraw Hill,
4. Computer Organization & Design, (3rd Edition) by – D.A.Patterson & J.L.Hennessy – Morgan Kaufmann Publishers (Elseviers)

BCA
DSC-3 Discrete Transformations (LTP:4:2:0)   **6 Credits**

UNIT – I
Set Theory: Sets and Subsets, Set Operations and the Laws of Set Theory, Counting and Venn Diagrams, Cartesian Products and Relations, Functions–One-to-One, Onto Functions, Function Composition and Inverse Functions; Properties of Relations, Computer Recognition – Zero-One Matrices and Directed Graphs, Partial Orders – Hasse Diagrams, Equivalence Relations and Partitions.

UNIT – II
Fundamentals of Logic: Proposition, Logical Connectives and Truth Tables, Logic Equivalence – The Laws of Logic, Logical Implication – Rules of Inference; The Use of Quantifiers, Quantifiers, Definitions and the Proofs of Theorems

UNIT – III
Mathematical Induction and Recursion: Sequences and summations, Mathematical Induction, The Well Ordering Principle, Recursive Definitions, Structural Induction, Recursive algorithms. Counting: Basics of counting, Pigeonhole Principle, Permutation and Combinations, Binomial coefficients.

UNIT – IV
 Graphs: Introduction, Representing Graphs & Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest path problems, Planar Graphs, Graph colouring. Trees: Introduction, Applications of Trees, Tree Traversal, Spanning Trees, Minimum Spanning Trees.

Text Books:

1. Ralph P. Grimaldi, "Discrete and Combinatorial Mathematics", 5 th Edition, Pearson Education, 2004.
2. Kenneth H. Rosen, "Discrete Mathematics and its Applications", 6 th Edition, McGraw Hill, 2007.
3. Jayant Ganguly, "A Treatise on Discrete Mathematical Structures", SanguinePearson, 2010.
4. D.S. Malik and M.K. Sen, "Discrete Mathematical Structures: Theory and Applications", Thomson, 2004.
5. Thomas Koshy, "Discrete Mathematics with Applications", Elsevier, 2005, Reprint 2008.

BCA
DSC-4 : Data Structures and File Processing (LTP::4:0:2)   6 Credits

Unit-1

Basic data structure : Primitive and non primitive, Abstract data structure, Operations, Data representation, Arrays - Memory representation of one and two dimensional arrays, Stack – Operations, Applications – Recursion, infix to postfix conversion, evaluation of postfix expression, Queues – Operations, Applications, circular queue-Operations, Dequeue, priority queue – uses of priority queues, Linked list - Dynamic memory allocation, Singly linked list – Operations, Circular linked list – Operations, Applications of linked list, doubly linked list – memory representation

Unit-2

Tree – Terminologies, tree properties, binary tree-properties, memory representation – Array and Linked list representation, Binary search tree – Creation through insertion, searching, deletion algorithms, Tree traversal, balanced trees, Applications of binary tree, sets: Dictionary implementation, sets with merge-find operations

Unit-3

Searching and sorting – sequential and binary search, internal and external sorting - bubble, selection, insertion, quick sort and merge sort, heap sort, comparison of different sorting techniques, Memory management : Garbage collection algorithm for equal sized blocks, storage allocation of objects with mixed size, buddy system,

Unit-4

Physical devices : Characteristics of storage devices such as disks, tapes, I/O buffering, basic file system operations – create, open, close, extend, delete, read block and write block, protection mechanism, file organization : sequential, indexed, direct, inverted, multi-list, directory system, indexing using B-tree, B+ tree and their variants, hashing – hash function, collision handling methods, extendible hashing.

Books Recommended

1. M.T. Goodrich, R. Tamassia and D. Mount, *Data Structures and Algorithms in C++,* John Wiley and Sons, Inc., 2004.

2. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, *Introduction to Algorithms*, 2nd Ed. Prentice-Hall of India, 2006.

3. E.Horowiz and S.Sahani, *Fundamentals of Data structures*, Galgotia Book source Pvt. Ltd., 2003

BCA
DSC-5 SYSTEM SOFTWARES AND OPERATING SYSTEMS (L:T:P::4:0:2) 6 Credits

Unit 1: Machine Architecture and Assembler
Introduction, System software and machine architecture, Simplified Instructional Computers (SIC) and its architecture, Instruction Formats of IBM-360, Assembler ,Introduction, General design procedure, design of Assembler, statement of problem, data Structure, Format of Databases, Algorithm for pass 1 and pass 2, look for modularity. Explanation along with flowcharts for both pass 1 and pass 2 (detail flowchart).Table Processing:Searching & Sorting - Linear and binary search , comparison, examples. Interchange sort, shell sort, bucket sort, radix exchange sort, address calculation sort, Random entry searching.

Unit 2: Macro Language and macro processor and Loaders
Introduction, Macro instructions, Features of macro facility-macro instruction arguments, Conditional macro Expansion, Macro calls within macro, Macro instruction defining macro implementation: statement of problem, Specification of databases and specification of database format, Algorithm and flowchart for processing macro definitions and macro expansion Introduction, Loader schemes-compile and go loader scheme, general loader, Absolute loader, Relocating loader, Direct linking loader, overlays, Dynamic loading.

Unit 3: Introduction and process management
Definition of Operating System, Need, Early systems, Simple monitors, Batch Systems, Multiprogramming, Time Sharing, Real time, Parallel and Distributed systems. Special Purpose Systems: Real Time Embedded Systems, Multimedia Systems, Handheld Systems. Computing Environments – Traditional, Client Server, Peer-to-Peer and Web based. Open Source Operating Systems. Process Management: Process concept – meaning of process, sequential and concurrent processes, process state,process control block, threads, Process scheduling – scheduling queues, schedulers, contextswitch. Operations on Processes: creation and termination.

Unit 4: Scheduling and Deadlocks
Processor -CPU I/O burst cycle, CPU Scheduler, Preemptive scheduling, dispatcher. Scheduling criteria, Scheduling algorithms: First-Come-First-Served (FCFS), Shortest Job First (SJF), Priority Scheduling, Round Robin. Multi-level queue scheduling (Concepts only), multi-level feedback queue scheduling (Concepts only). Multiple processor scheduling, Real time scheduling. Deadlocks: Definition with example, System model, Dead lock characterization – Necessary Conditions Resource Allocation Graph, Dead lock prevention, Avoidance and detection, Recovery from dead lock.

Text Books:
1. System programming – John. J. Donovan.
2. System Software – Leland L. Beck, Third edition, Addison Wesley 1997.
3. Operating System Concepts, Abraham Silberschatz and Peter Baer Galvin, Fifth edition, Addison - wesley 1989.
4. Operating System Concepts & Design, Milan Milonkovic, II Edition, McGRaw Hill 1992.
5. Operating Systems, Stallings, Pearson Edition.
6. Operating System Concepts, Tanenbaum, Pearson Education.

BCA

DSC-6 : Fundamentals of Information Technology　　(LTP::4:2:0)　　**6 Creidts**

Unit - I
Introduction- Characteristics of Computers, Evolution of computers, Capabilities and limitations of computers, Generations of computers, Types of computers (micro, mini, main frame, super computers, Laptop, Tablets), Analog, Digital and hybrid computers, Block diagram of computer, computer applications business and scientific. Data organization: Drives, Files, Directories. Basic components of computers: Input devices- Keyboard, mouse, Touch Screens, Joystick, Electronic pen, Trackball, Scanning Devices-Optical Scanners, OCR, OMR, Bar Code Readers, MICR, Digitizer, Electronic card reader, Image Capturing Devices-Digital Cameras.

Unit - II
Output devices- Monitors- CRT, LCD/TFT, Printers- Dot matrix, Inkjet, Laser, Plotters-Drum, Flatbed, Screen image projector. Types of Memory (Primary And Secondary) RAM, ROM, PROM, EPROM, EEPROM Secondary Storage Devices- Magnetic Tape, Magnetic Disks-Internal Hard Disk, External Hard Drives, Floppy Disks, Optical Disks-CD, CD-R, CD-RW, DVD, Solid State Storage-Flash Memory, USB Drives.

Unit- III
Introduction to number system- Decimal, Binary (Addition, subtraction, multiplication, Division, 1‟s and 2‟s complement methods), octal and hexadecimal number system, BCD number system and addition of BCD numbers. Conversion from one number system to another number system Non-weighted number system, Excess-3 code and gray code. Conversion between gray and binary codes. Fixed point and floating point representation of numbers, Computer Software- Software and its Need, Types of software-System software, Application software, System software-operating system, utility program, programming languages, assemblers, compilers and interpreter, introduction to operation system for PCs-DOS, windows, Linux, Types of Programming Languages: Machine Languages, Assembly Languages, High Level Languages, Virus working, feature, types of viruses, virus detection prevention and cure.

Unit - IV
Introduction to computer network, types of computer network: LAN, WAN, MAN, Topologies Computer Security :The Need for Computer Security, Basic Security Concepts, Threats to Users, Threats to Hardware, Threats to Data, Taking protective measures–Protecting Yourself, Protecting your privacy, Keeping your Data Secure. Introduction to GUI, Internet & www, email, browsers, search engines, internet chat, creating static web pages, E commerce basics, EDI, types of Ecommerce, Benefits and limitations of ecommerce, Cyber law ,Cyber banking, E-payment, Security, Cyber act, Legal and ethical issues in ecommerce, Cybercrime.

Text Books:
1. Computer Fundamentals, V Rajaraman.
2. Computer Fundamentals, P.K Sinha
3. Computers Today, Mc Grow Hill publication.

BCA

DSC-7 : Object Oriented Programming Using Java (LTP::3:1:2)   6 Credits

Unit - I
Introduction to JAVA: JAVA Evolution: Java History, Java Features, How Java Differs from C and C++, Java and Internet, Java and World Wide Web, Web Browsers, Hardware and Software Requirements, Java Support Systems, Java Environment. Overview of JAVA Language: Introduction, Simple Java program, More of Java Statements, Implementing a Java Program, Java Virtual Machine, Command Line Arguments, Programming Style. Constants, Variables, and Data Types: Introduction, Constants, Variables, Data Types, Declaration of Variables, Giving Values to Variables, Scope of Variables, Symbolic Constants, Type Casting, Getting Values of Variables, Standard Default Values, Operators and Expressions: Introduction, Arithmetic Operators, Relational Operators Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special Operators, Arithmetic Expressions, Evaluation of Expressions, Procedence of Arithmetic Operators, Type Conversion and Associativity, Mathematical Functions. Decision Making and Branching: Introduction, Decision Making with if Statement, Simple if Statement, The if…..else Statement, Nesting of if..else Statements, The else if Ladder, The Switch Statement, The ? : Operator. Decision Making and Looping: Introduction. The while Statement, The do Statement, The for Statement, Jumps in Loops Labeled Loops.

Unit -II
Classes, Arrays, Strings, Vectors and Interfaces: Classes, Objects and Methods: Introduction, Defining a Class, Adding Variables, Adding Methods, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods, Inheritance: Extending a Class Overriding Methods, Final Variables and Methods, Finalizer methods, Abstract Methods and Classes, Visibility Control. Arrays, Strings and Vectors: Arrays, One-dimensional Arrays, Creating an Array, Two -Dimensional Arrays, Creating an Array, Two – dimensional Arrays, Strings, Vectors, Wrapper Classes. Interfaces: Multiple Inheritance: Introduction, Defining Interfaces, Extending Interfaces, Implementing Interfaces, Accessing Interface Variables.

Unit - III
Packages, and Multithreaded Programming:
Packages: Putting Classes together: Introduction, Java API Packages, Using System Packages, Naming Conventions, Creating Packages, Accessing a Package, Using a Package, Adding a Class to a Package, Hiding Classes. Multithreaded Programming: Introduction, Creating Threads, Extending the Thread Class, Stopping and Blocking a thread, Life Cycle of a thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the 'Runnable' Interface. Managing Errors and Exceptions: Introduction, Types of Exception Handling Code, Multiple Catch Statements, Using Finally Statement, Throwing Our Own Exceptions, Using Exceptions for Debugging.

Unit - IV
Applet Programming, Graphics Programming, Input/Output:: Introduction, How Applets Differ from Applications, Preparing to Write Applets, Building Applet Code, Applet Life Cycle, Creating an Executable applet, Designing a Web Page, Applet Tag, Adding Applet to HTML File, running the Applet, More About HTML Tags, Displaying Numerical Values, Getting Input

from the User. Graphics Programming: Introduction, The Graphics Class, Lines and rectangles, circles, and Ellipses, Drawing Arcs, Drawing Polygons, Lines Graphs, Using Control Loops in Applets, Drawing Bar Charts. Managing Input/Output Files in JAVA: Introduction, Concept of Streams, Stream Classes, Byte Stream Classes, Character Stream Classes, Using Streams, Other Useful I/O Classes, Using the File Class, Input / Output Exceptions, Creation of Files, Reading / Writing Characters, Reading / Writing Bytes, Handling Primitive Data Types, Concatenating and Buffering Files, Interactive Input and output, Other Stream Classes.

Text Books:
1. A.Balaguruswamy, "Programming with JAVA", A Primer, TMH, 1999.

Reference Books:
1. Thomas Boutel, "CGI programming in C and Perl", Addison – Wesley, 1996.
2. Jefry Dwight et al, Using CGI, Second Edition, Prentice Hall, India, 1997.
3. Patrick Naughton & Herbert Schildt, JAVA 2: The Complete Reference, THM, 1999.
4. Schildt, "JAVA The Complete Reference", 7th Edition.

BCA

DSC-8: Operation research   (LTP::4:2:0)   **6 Credits**

UNIT-I:
Definition of the term Operation Research – Nature , Management Application , Modeling , Principles of modeling , features , Different Phases , scope , Advantages and Limitations of O.R. General method for solving O.R models and Role of O.R in decision making. Some important definitions – solutions to LPP, feasible solution, basic solutions, Basic feasible solution, Optimum basic feasible solution, unbounded solution.   Assumptions in LPP, Limitations of LPP, Applications of LPP and advantages of LPP.

UNIT-II
Standard Linear Programming – Formulation of a Linear Programming Solving L.P.P. by Graphical Method. And Simplex Method. Artificial Variable Technique – two phase method and Big M method, Duality – Meaning, definitions of primal problem, General rules for converting any primal problem into its dual. Characteristics of Dual problem, Advantages of Duality, Dual formulation procedure and Problems to obtain the dual of LPP. Fundamental Duality theorems, Primal and Dual correspondence.

Unit - III
Transportation Problems – Method of finding initial basic feasible solution to Transportation problem-North West Corner, Least Cost Method and Vogel's Method. Method of finding initial basic feasible solution to Assignment Problem using Hungarian Method. Sequencing Problems – Definitions, terminology and notations, Principle assumptions, processing n-jobs through two machines. Travelling Salesman (Routing) Problems - Formulations of TSP as an assignment problem

UNIT - IV
Game Theory: Basic definitions, minmax - maxmin principle and optimal strategy solution of games with saddle point, dominance rule for solving a two-person Game, graphical method for solving two person game. Network analysis: Network and basic components, Rules for network construction, basic steps in PERT/CPM techniques and applications. Time estimates and critical path in network analysis.

Text Books:
1. S. D. Sharma – Operations research
2. Hamdy A. Taha, Operation Research – An introduction, 5th edition, PHI.,
3. Kanti Swarup, P. K. Gupta & Manmohan – Operation Research, 1996.
4. S. Kalavathy: Operations Research, Second Edition – Vikas Publications
5. J K Sharma - Operations Research

BCA
DSC-9: Accounting   (LTP::4:0:2)   **6 Credits**

UNIT-I

Principles, concepts and conventions, double entry system of accounting, ledger keeping. Subsidiary books with special reference to simple cash book and three column cash book. Trial balance and final accounts of sole trader: Preparation trial balance, adjusting entries, including revenue for bad debts, revenue for discount on debtors and creditors, preparation of final accounts. Final accounts of joint stock companies.

UNIT-II

Meaning and scope of financial management, functions of the financial manager. Ratio analysis: Meaning of ratio, advantages, limitations, types of ratios and their usefulness, liquidity and ratios, profitability rations, efficiency ratios, solvency ratios, problems including preparation of balance sheet.

UNIT-III

Funds flow statement: Meaning and concepts of funds, preparation of fund flow statement. Unit costing: Preparation of cost sheet and tender price statement. Marginal costing: Concepts, Marginal cost equations, P/V ratio, B.E.P., Margin of safety, Sales to earn a desired profit, Problems on the above.

UNIT-IV

Budgetary Control: Meaning and definition, preparation of flexible budget and cash budget. Standard costing: Meaning of standard cost and standard costing, analysis of variances – material and labour variances only.

Text Books:
1. Accountancy Vol. 1 by B.S. Raman.
2. Accountancy Vol. 2 by B.S. Raman.
3. Management Accounting by R.K. Sharma and Gupta.
4. Financial Management by I.M. Pandey.

BCA

DSC-10: **Database Management Systems** **(LTP::4:0:2)** **6 Credits**

UNIT I
Introduction to Database System Concepts and Architecture
Databases and Database Users, Characteristics of the Database Approach, Actors on the Scene, Advantages of Using a DBMS
Data Models, Schemas and Instances, DBMS Architecture and Data Independence, Database Languages and Interfaces, The Database System Environment
Data Modeling Using the Entity-Relationship Model
Entity Types, Entity Sets, Attributes, and Keys, Relationship Types, Relationship Sets, Roles, and Structural Constraints, Weak Entity Types**,** ER Diagrams, Naming Conventions and Design Aspects

UNIT II
Transaction- Transaction Concepts, States, ACID properties, Concurrent executions, Serializability
Relational Data Model, Relational Constraints, and Relational Algebra
Relational Model Concepts, Relational Model Constraints and Relational Database Schemas, Basic Relational Algebra Operations, Additional Relational Operations, Examples of Queries in Relational Algebra.
Normalization- Functional Dependencies, Transitive and Multivalued dependency, First Normal form, Second Normal Form, Third Normal Form and Boyce Codd Normal Form

UNIT-III
Advantages of RDBMS- Codd's Rules.
SQL-The Relational Database Standard
Data Definition, SQL Data Types and Schemas, Constraints, Basic Queries in SQL, Insert, Delete, and Update Statements in SQL, Set Operations, Aggregate functions, Views (Virtual Tables) in SQL, Joins – Inner, Outer and Self, Additional Features of SQL,DCL-commit, Rollback, Save-point, Grant privileges.

Unit-IV
Storage Strategies – Indices, B-Trees, Hashing.
Transaction Processing, Transaction and System Concepts, Properties of Transactions
Locking Techniques for Concurrency Control, Time-stamp based schedules, Database Recovery Techniques
Introduction – Object-Oriented and Object Relational Databases, Logical Database, Web Databases, Distributed Databases, Data Warehouse and Data Mining.

TEXT BOOKS:

1. Fundamentals of Database Systems by Navathe and Elmasri –Pearson Education, Fifth Edition.

2. Database Systems Concepts, 3rd edition by Abraham Silberschatz, Henry Korth and S. Sudarshan McGraw Hill International Editions.

REFERENCE BOOKS:

1. Introduction to Database systems by CJ Date, Published by Addison-Wesley.

2. Principles of database systems by Ullman, Computer Science press, 1984.

3. Introduction to database systems by Bipin C.Desai, Galgotia.

BCA

DSC-11: Numerical and Statistical Analysis   (LTP::4:0:2)   6 Credits

UNIT-1
Computer Arithmetic: Floating point representation of numbers, arithmetic operations with Normalization, consequences of normalized floating point representation of numbers, Errors in numbers.
Finding the roots of an equation: Iterative method: Introduction, Beginning an iterative method, Bisection method, Newton Raphson method, Regula Falsi method, Secant Method. Comparison of Iterative methods, Order of Convergence of Newton Raphson Method and Secant Method.

UNIT-2
Solving simultaneous linear equations: Introduction, Gauss Elimination method, pivoting, illconditioned equations, Gauss Jordon method, LU Decomposition method and Gauss-Seidel iterative method. Comparison of direct and iterative methods.
Interpolation: Introduction, Lagrange interpolation, Difference Tables- Newton-Gregory Forward and Backward interpolation, Truncation error in interpolation.

UNIT-3
Ordinary differential equations: Euler's method, Taylor series method, Range Kutta II and IV order methods. **Numerical Integration:** Simpson's 1/3 and 3/8 rule, Trapezoidal rule.
Statistical methods: Introduction, definitions, classifications, frequency distribution, mean - arithmetic mean for grouped and ungrouped data, continuous frequency distribution (step deviation method), Geometric mean for grouped and ungrouped data.

UNIT-4
Standard deviation - meaning standard deviation for actual mean method, assumed mean method and step deviation method using discrete series and continuous series. Coefficient of variation – meaning and problems **Median** – meaning, calculations of median for ungrouped, discrete series, continuous series. **Mode** - meaning calculations of mode for discrete series and continuous series. **Correlation** – meaning, types, rank correlations and problems.
Note: Algorithmic approach for all statistical methods.

Text Books:
1. Computer Oriented Numerical Methods by Rajaraman. V.
2. Fundamentals of Mathematical Statistics by Gupta and Kapoor (Sultan Chand).
3. Probability and Statistics for engineers and scientists by Ronald E. Walpole and Raymond H Mayers.
4. Mathematical Statistics by John Freund (Prentice Hall India Pvt. Ltd.)
5. Numerical Methods by Jain M.K., S.R.K. Iyengar and R.K. Jain
6. Numerical methods by K Krishnamurthy and Sen

BCA

DSC-12: Data Communication and Computer Networks (LTP::4:2:0)   **4 Credits**

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).

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

Unit III:

HDLC- frame format, station, states, configuration, access control. LAN Topology – Ethernet (IEEE 802.3), Token Bus (IEEE 802.4), Token Ring (IEEE 802.5)

Switching Technologies – Circuit, Message, and Packet. X.25, X.21, RS-232 C – frame format, channel, packet frames, facilities.

Unit IV:

ISDN- D channel, B-Channel, International Standards, NT1, NT2, TA, TE Devices. Bridging and Routing. Congestion Control – Leaky Bucket & Token Bucket Algorithms. Introduction to data security (private key, public key)

Text Books:

1. Fourauzan B., "Data Communications and Networking", 3rd edition, TataMcGraw-HillPublications, 2004, ISBN 0 – 07 – 058408 – 7
2. Tanenbaum A., "Computer Networks", 4th Edition, PHI, ISBN 81 – 203 –2175 – 8

Reference Books:

1. Keshav S., "An Engineering Approach to Computer Networking", PearsonEducation, ISBN 981 – 235 – 986 – 9
2. Comer D., "Computer Networks and Internet", 2ND Edition, PearsonEducation, ISBN 81– 7808 – 086 – 9
3. S.K.Basandra & S. Jaiswal, "Local Area Networks", Galgotia Publications
4. William Stallings, "Data and Computer Communication"

BCA

Elective: Digital Image Processing   (LTP::4:0:2)   6 Credits

Unit I

Digital image fundamentals:
Light and Electromagnetic spectrum, Components of Image processing system, Image formation and digitization concepts, Neighbours of pixel adjacency connectivity, regions and boundaries, Distance measures, Applications.

Unit II

Image Enhancements:
Image Enhancements: In spatial domain: Basic gray level transformations, Histogram processing, Using arithmetic/Logic operations, smoothing spatial filters, Sharpening spatial filters.
In Frequency domain: Introduction to the Fourier transform and frequency domain concepts, smoothing frequency-domain filters, Sharpening frequency domain filters.

Unit III

Image Restoration and Colour Image processing:
Various noise models, image restoration using spatial domain filtering, image restoration using frequency domain filtering, Estimating the degradation function, Inverse filtering.

Colour fundamentals, Colour models, Colour transformation, Smoothing and Sharpening, Colour segmentation

Unit IV

Image compression and Image segmentation:
Introduction, Image compression model, Error-free compression, Lossy compression.

Detection of discontinuities, Edge linking and boundary detection, thresholding.

Text Books:

1. Principles of digital image processing, by Burger, Wilhelm, Burge, Mark J.
2. Fundamentals of Digital Image Processing, by Anil K Jain.
3. Fundamentals of Digital Image Processing, by Annadurai, R. Shanmugalakshmi.

BCA
SEC-1:: DTP (Pagemaker and CorelDraw) (LTP:1:0:1)   **2 Credits**

PageMaker:
Page layout basics, understanding tools & workspace
Creating: labels, pamphlets, bill books, viz. cards, greetings cards, kankotri, advertisements, etc.
Books & booklets, column style documents.

CorelDRAW:
Understanding Tools & Workspace, Drawing Shapes & Graphics, Logos & Artistic Text
Multicolor Designs: Viz. Cards & Greetings Cards, Book Covers, Brochures, Advertisements, Banner, Web Graphics.

Text Books:
1. Learning PageMaker 7:Ramesh Bangia,Khanna Publishing
2. Training Guide Pagemaker 7:Satish Jain ,Bpb Publications
3. CorelDraw 9 for Windows:Phyllis Davis ,Peachpit Press
4. Mastering CorelDraw 9:Vishwaprakash Dikshit Batuk,Bpb Publications

BCA

SEC-2: Cyber Security   (LTP::1:0:1)   **2 Credits**

Basics of internet, www, http, html, DNS, IP Address, electronic mail, web browsers, search engines, Social Media: Twitter, Facebook, YouTube, WhatsApp, LinkedIn, advantages, disadvantages, privacy issues. E-commerce, advantages of e-commerce, survey on popular e-commerce sites. Introduction to e-governance, stages of e-governance, advantages, challenges, International Status, Indian status. IT Act, 2000 salient features, digital signature, electronic signature, Cyber Appellate Tribunal, Adjudicator, offences, and penalties.

Reference:

1. Information Technology Amended Act, 2008

BCA

SEC-3: Accounting Software (Tally) (LTP::1:0:1) **2 Credits**

Introduction, Types of Accounts, Accounting Principles or concepts, Mode of Accounting, Rules of Accounting , Double entry system of book keeping. Introduction of Tally.ERP 9, History of tally, Versions of tally, Company Features, Configuration, Getting functions with Tally.ERP9, Creation / setting up of Company in Tally.ERP9. Stock Groups, Multiple Stock Groups, Stock Categories, Multiple Stock Categories, Units of Measure, Godowns, Stock Items

BCA
SEC-4: Android Programming (LTP::1:0:1) **2 Credits**

Mobile technology: Overview of Android - An Open Platform for Mobile development, Open Handset Alliance, Use Android for mobile app development, Android Marketplaces, Android Development Environment setup, Android development Framework - Android-SDK, Eclipse Emulators / Android AVD, Creating & setting up custom Android emulator, Android Project Framework and its applications, Linux Kernel, Libraries, Android Runtime, Application Framework, Applications, Android Startup and Zygote, Android Debug bridge, Android Permission model, Android Manifest File, Android application components Intent**,** Activity, Activity Lifecycle, Broadcast receivers, Services and Manifest, Create Application and new Activities, Expressions and Flow control, Android Manifest, Simple UI -Layouts and Layout properties, XML Introduction to GUI objects, Event driven Programming in Android (Text Edit, Button clicked etc.), Creating a splash screen, Android Activity Lifecycle, Introduction to threads in Android, Menu: Custom Vs. System Menus, Creating and Using Handset menu Button (Hardware), Android Themes, Dialog, create an Alter Dialog, Toast in Android, List & Adapters, Android Manifest.xml File, SQLite: Open Helper and create database, Open and close a database.

Text Book:
1. Android - A Programmer's Guide, Jerome (J.F.) DiMarzio, McGraw Hill Education.
2. Professional Android 2 Application Development, Reto Meier, Wiley India Pvt Ltd.

Reference Books:
1. Beginning Android, Mark L Murphy, Wiley India Pvt Ltd
2. Professional Android, Sayed Y Hashimi and Satya Komatineni, Wiley India Pvt Ltd
3. Android Studio Development Essentials by Neil Smyth