

EXPLANATION OF COURSE CODE

- A Course offered in Computer Applications is coded as **CA** followed by a **two digit integer**.
- A Lab / Practical offered in Computer Applications is coded as **CA-L** followed by a **two digit integer**.
- A Course offered in Computer Science is coded as **CS** followed by a **two digit integer**.
- A Lab / Practical offered in Computer Science is coded as **CS-L** followed by a **two digit integer**.
- The Courses offered in both Computer Applications and Computer Science are coded as **CB** followed by a **two digit integer**.
- A Lab / Practical offered in both Computer Applications and Computer Science is coded as **CB-L** followed by a **two digit integer**.
- **CB-S** followed by two digit integer is the code given to Seminars in computer Applications and Computer Science
- **CB – PRJ1** is code given for Project work in both Computer Applications and Computer Science
- **EE** followed by two digit integer is the code given to External Elective courses and **SS** followed by two digit integer is the code given Soft Skills courses offered to other departments' students under Open Elective Courses
- A course code is preceded by **PC** / **IE** / **OE** indicating whether it is offered as Professional Core Course or Internal Elective or External Elective

Course Structure for MCA Programme

MCA – I Semester		
Course Code	Course Title	Credits
PC-CA01	Problem solving and programming through C & C++	05
PC-CA02	Data structures	05
PC-CA03	Probability & Statistics for computer Applications	05
PC-CB04	Computer Organizations	05
PC-CA05	Accounting & Financial Management	05
PC-CA-L01	C & C++ programming Lab	02
PC-CA-L02	Data Structures Lab	02
PC-CB-S01	Seminar-1	02
Total Credits		31

MCA – II Semester		
Course Code	Course Title	Credits
PC-CA06	Oops through Java	05
PC-CA07	DBMS	05
PC-CB08	Operating Systems	05
PC-CA09	Optimization Techniques	05
	Open Elective from other Department	05
PC-CA-L03	Java Programming Lab	02
PC-CA-L04	DBMS Lab	02

PC-CB-L05	Operating Systems Lab	02
Total Credits		31

MCA – III Semester		
Course Code	Course Title	Credits
PC-CB10	Java Technologies	05
PC-CB11	Computer Networks	05
PC-CB12	Mathematical foundations of Computer Science	05
PC-CB13	Design and Analysis of Algorithms	05
	Open Elective from other Departments	05
PC-CB-L06	Python & Java Technology Lab	02
PC-CB-L07	Computer Networks Lab	02
PC-CA-L08	Foreign (German) Language	02
Total Credits		31

MCA – IV Semester		
Course Code	Course Title	Credits
PC-CB14	Web Technologies	05
PC-CB15	Software Engineering	05
PC-CB16	Artificial Intelligence	05
IE-CA17	Data Analytics	05 (Any one Course from the four)
IE-CA18	Bio-Informatics	
IE-CA19	Computer Graphics	
IE-CA20	Soft Computing	
IE-CA21	Machine Learning	05 (Any one Course from the four)
IE-CB22	Data Mining	
IE-CB23	Internet of Things	
IE-CA24	Cryptography & Network Security	
PC-CB-L09	Web Technologies Lab	02

PC-CB-L10	SE Tools (Agile & Devops)	02
PC-CA-S02	Seminar-2 (To be given from respective internal electives)	02
Total Credits		31

MCA – V Semester		
Course Code	Course Title	Credits
PC-CB25	Cloud Computing	05
PC-CB26	Mobile Computing	05
PC-CA27	Business Intelligence	05
IE-CA28	Information Retrieval	05 (Any one Course from the four)
IE-CA29	Multi-Media Systems	
IE-CA30	Image Processing	
IE-CA31	Distributed Systems	
IE-CA32	Neural Networks & Deep Learning	05 (Any one Course from the four)
IE-CA33	Web Mining	
IE-CA34	Block Chain Technology	
IE-CA35	Cloud Security	
PC-CA-L11	Cloud Computing Lab	02
PC-CA-L12	Business Intelligence & Analytics Lab	02
PC-CA-L13	Mini project on Mobile Applications Development	02
Total Credits		31

MCA – V1 Semester

Course Code	Course Title	Credits
PC-CB – PRJ1	Major Project	25

MCA Programme total Credits: 180

Course Structure for M.Sc. Programme

M.Sc. – I Semester		
Course Code	Course Title	Credits
PC-CB04	Computers Organization	05
PC-CB10	Java Technologies	05
PC-CB12	Mathematical Foundations of Computer Science	05
PC-CB13	Design and Analysis of Algorithms	05
PC-CS36	Advanced Data Structures	05
PC-CB-L06	Python & Java Technology Lab	02
PC-CS-L14	Advanced Data Structures Lab	02
PC-CB-S01	Seminar-1	02
Total Credits		31

M.Sc. – II Semester		
Course Code	Course Title	Credits
PC-CB08	Operating System	05
PC-CB11	Computer Networks	05
PC-CB14	Web Technologies	05
PC-CS37	Formal Languages & Automata theory	05
	Open Electives from other Depts.	05
PC-CB-L05	Operating System Lab	02
PC-CB-L07	Computer Networks Lab	02
PC-CB-L09	Web Technologies Lab	02

Total Credits**31**

M.Sc. – III Semester		
Course Code	Course Title	Credits
PC-CB15	Software Engineering	05
PC-CB16	Artificial Intelligence	05
PC-CS38	Compiler Design	05
IE-CB22	Data Mining	05 (Any one Course from the four)
IE-CB23	Internet of Things	
IE-CB25	Cloud Computing	
IE-CB26	Mobile Computing	
	Open Electives from other Depts.	05
PC-CB-L10	SE Tools (Agile & Devops)	02
PC-CS-L15	Artificial Intelligence Lab	02
PC-CS-L16	Compiler Design Lab	02
Total Credits		31

M.Sc. – IV Semester		
Course Code	Course Title	Credits
PC-CB – PRJ1	Major Project	25

M.Sc (CS) Programme total Credits: 118

The department of Computer Science is offering the following external elective courses and soft skills courses under open electives.

Open Electives		
Course Code	Course Title	Credits
OE-EE-01	Web Designing	3
OE-EE-02	Programming in C	3
OE-SS-01	Office Automation tools	2
OE-SS-02	Blogging	2

Dravidian University
Department of Computer Science
3-year Master of Computer Applications

MCA- I semester

PC-CA01: Problem Solving & Computer Programming Through C, C++

Unit-1

Meaning of Problem Solving – Polya’s 4 Steps: Understanding the problem, Devising a plan, Carrying out the Plan, Looking back – Examples.

Introduction to programming, Algorithms and Flowcharts. Basics of C Language. Input and Output. Elementary problems and program writing.

Control Statements in C: Conditional Execution and Selection, Iterative and Repetitive Execution, Termination. Nested Loops.

Arrays and Strings: Working with One-Dimensional Arrays, String Manipulation. Working with Multidimensional Arrays, Manipulating String Arrays.

Functions: Prototypes and Definition, Working with Functions, Passing Parameters to Functions. Introduction to Recursion.

Scope and Storage Classes.

Unit-2

Pointers in C: Preliminary Concepts – One-Dimensional Arrays and Pointers, Pointers and Strings, Pointer Arithmetic, Pointers to Pointers, Arrays of Pointers, Pointers to an Array, Multidimensional Arrays and Pointers, Pointers to Functions, Arrays of Function Pointers, Dynamic Memory Handling and Problems.

User Defined Data Types and Variables. Structures, Unions, Enumeration Types, Bitwise Operators, Command-Line Arguments, C Preprocessor, Memory Models and Pointers.

Unit-3

Files In C: Using Files in C, Working with Text Files, Working with Binary Files, Direct File Input and Output. Files of Records, Random Access into Files of Records – File Management Functions.

C++ Class Overview - Class Definition, Objects, Class Members, Access Control, Class Scope, Constructors and destructors, parameter passing methods, Inline functions, static class members, this pointer, friend functions, dynamic memory allocation and deallocation (new and delete), exception handling.

Unit-4

Function Overloading, Operator Overloading, Generic Programming - Function and class templates, Inheritance, base and derived classes, inheritance types, base class access control, runtime polymorphism using virtual functions, abstract classes, streams I/O.

Text Books

1. Programming in C, Pradip Dey & Manas Ghosh, 2nd Ed., Oxford University Press, 2013 (Chapters 1, 2, 3, 4, 5 excluding 5.2.6, 6.1 to 6.8, 6.10.1, 7, 8, 9, 11)
2. The C++ Programming Language, Bjarne Stroustrup, 4th Edition,

Reference Books:

1. How to Solve it - A New Aspect of Mathematical Method - G.Polya, 1945, Princeton University Press, (Pages 1-29)
2. How to Solve it by Computer – R.G. Dromey, Prentice Hall of India, 1999, (Pages 1-39)
3. Computer Programming, E. Balaguruswamy, McGraw Hill India (Pvt Ltd), 2014 (Pages 1.1 to 6.19)
4. Problem Solving and Program Design in C, Jeri R. Hanly, Elliot B. Koffman, 7th Edition, Pearson Education, 2013.
5. C Programming – A Modern Approach, K. N. King, 2nd Edition, W. W. Norton & Company; New York, 2008.
6. Programming in C – A Complete Introduction To The C Programming Language, Stephen G. Kochan 3rd Ed., Sams Publishing, 2005.
7. C++ Primer, Josee Lajoie and Stanley B Lippman

PC-CA02: Data Structures

UNIT-1

Introduction and Overview of Data Structures, Analysis of Algorithms, Arrays; Linked Lists: Single Linked Lists, Circular Linked Lists, Double Linked Lists, Circular Double Linked Lists, Applications of Linked Lists.

UNIT-2

Stacks: Representation of Stacks, Operations on Stacks, Applications of Stacks; Queues: Representation of Queues, Operations, Various Queue Structures, and Applications of Queues; Tables: Rectangular Tables, Jagged Tables, Inverted Tables, Hash Tables.

UNIT-3

Sets: Definition, Representation, Operations and Applications; Trees: Basic Terminologies, Definitions and concepts, Trees and Forests, Representation of Binary Trees, Operations on a Binary Tree, Types of Binary Trees, Expression Tree, Binary Search Tree,.

UNIT-4

Graphs: Introduction, Graph Terminologies, Representation of Graphs, Operations on Graphs, Application of Graph Structures,

Sorting: Insertion, Selection, Bubble, Shell, Quick, Radix, Bucket, Merge Sort; Searching Techniques: Linear, Binary Fibonacci and Interpolation Search.

Text Books:

1. Debasis Samanta, "Classic Data Structures", 2nd Edition, PHI Learning, 2018.
2. E. Horowitz, S. Sahani, Anderson-Freed, "Fundamentals of Data Structures in C", Second Edition, Universities Press, 2014.

Reference Book:

1. J.P. Tremblay, P.G. Sorensen, "An Introduction to Data Structures with Applications", 2nd Edition, Tata McGraw-Hill, 2001.
2. Sartaj Sahani, "Data Structures, Algorithms and Applications in C++", 2nd Edition, Tata Mc Graw- Hill, 2005.

PC-CA03: Probability & Statistics for Computer Applications

Unit-I: Probability, Random Variables Probability distributions and Joint Probability Concepts (9 Hours)

Sample space and events – Probability – The axioms of probability – Some Elementary theorems – Conditional probability – Baye's theorem, Random variables – Discrete and continuous.

Random variables – Discrete and continuous. Probability distributions, mass function/ density function of a probability distribution. Mathematical Expectation.

Binomial, Poisson & normal distributions and their properties. Moment generating functions of the above three distributions. and hence finding the mean and variance. Joint probability distributions- Joint probability mass / density function, Marginal probability mass / density functions,

Unit-II: Correlation & Regression and Concepts of Sampling (10 Hours)

Covariance of two random variables, Correlation - Coefficient of Correlation, Rank Correlation. Regression- Regression Coefficient, The lines of regression and multiple correlation & regression.

Sampling: Definitions of population, sampling, statistic, parameter. Types of sampling, Expected values of Sample mean and variance, sampling distribution, Standard error, Sampling distribution of means and sampling distribution of variance.

Unit-III: Introduction to Estimation, Testing of Hypothesis in Large and Small Samples (9 Hours)

Likelihood estimate, interval estimations. Null hypothesis, Alternate hypothesis, type I, & type II errors, critical region, confidence interval, Level of significance. One sided and two sided test. Large sample tests related to significance of sample's means; population versus sample means – significance of samples' standard deviations; population versus sample standard deviations – significance of samples' proportions; population versus sample proportions. Small sample tests based on t-distribution for testing of various means, F-distribution for testing of variances, χ^2 distribution for testing of goodness of fitting of Binomial and Poisson distributions.

Unit- IV: Queuing Theory & Stochastic Processes (12 Hours)

Arrival Theorem – Pure Birth process and Death process M/M/1 Model. Introduction to Stochastic Processes – Markov process classification of states – Examples and Problems on Markov Chains, Stochastic Matrix, limiting probabilities.

Text Books:

- Fundamentals Of Mathematical Statistics By S C Gupta and V.K.Kapoor, Sultan Chand Publishers
- Probability And Statistics For Engineers And Scientists By Sheldon M.Ross, Academic Press
- Probability And Statistics For Engineering And The Sciences By Jay L.Devore.

References:

- Mathematics For Engineers Series – Probability Statistics And Stochastic Process By K.B.Datta And M.A S.Srinivas, Cengage Publications
- Probability, Statistics And Stochastic Process By Prof.A R K Prasad., Wiley India
- Probability And Statistics By T.K.V.Iyengar&B.Krishna Gandhi et al
- A Text Book Of Probability And Statistics, Shahnaz Bathul, Cengage Learning

PC-CB04: Computer Organization

Unit-I: Digital Lock Circuits and Memory

Introduction to computer organization and architecture, structure and functions of a computer, a brief history of computers, designing for performance, the evolution of the Intel x86 Architecture, computer components, interconnection structures, Bus interconnections, PCI 95.

Number system-Binary, Octal, Hexadecimal, Boolean algebra, Map Simplification-Logic Gates-Combinational Circuits – Adder, Subtractor, Multiplexer, Decoders, Sequential circuits- Flip Flops, Registers, Counters. (Chapters 1, 2, 3, online chapters 19, 20 from WilliamStallings.com/COA/COA8e.html)

Unit-II: Memory and Peripherals:

Internal Memory- RAM and ROM chips, External Memory-Magnetic disk, RAID, Optical memory, CD-ROM, Magnetic Tape, Memory Organization- Associative memory, Virtual memory, Cache memory.

Peripherals: External devices, I/O Modules, Programmed I/O, Interrupt driven I/O, Direct memory Access, I/O Channels and processors, and External Interface- Asynchronous data transfer. (Chapters 4, 5, 6 & 7)

Unit-III: Central Processing Unit

Computer Arithmetic: Arithmetic and Logic Unit, Integer Representation, Integer Arithmetic, Floating-point representation, Floating-point Arithmetic. Instruction sets & Characteristics and functions: machine instruction characteristics, Types of operands, Types of operations. Instruction sets & Addressing modes and formats: Addressing, X86 addressing modes, Instruction formats, x86 instruction formats. Processor Structure and Functions: Processor organization, Register organization, Instruction cycle, instruction pipelining, the x86 processor family (Chapters 9, 10, 11, 12)

Unit-IV: RISCs and Parallel organization (10)

Reduced Instruction set Computers: Instruction execution characteristics, the use of a large register file, compiler-based register optimization, reduced instruction set architecture, RISC pipelining, The RISC versus CISC controversy. Instruction-level parallelism and Super Scalar processor- Design issues, Pentium 4 – superscalar implementation. Parallel processing: multiple processors organizations, symmetric multiprocessors, cache coherence and the MESI protocol, multi threading and chip multiprocessors, clusters, vector computation. (13, 14, 17)

Text Book

1. William Stallings, “Computer Organization and Architecture “ 8th Edn, PHI (Appendix A,B, & Chapter 4 through 13 & 18)

References

1. Hayes J.P. “Computer Organization and Architecture” 2nd Ed.1998 McGraw-Hill.
2. Hennessy J and Patterson D, “Computer Architecture- A Quantitative Approach”, 1990 Morgan Kaufmann.
3. Carl Hamacher,” Computer Organization”, 3rd Ed.
4. Morris Mano”Computer System and Architecture”, 3rd Ed. McGraw-Hill.
5. David A Person & John L.Hennessy, “Computer Organization and Design-The H/W & S/W Interface”

PC-CA05: Accounting and Financial Management

Unit-I

Introduction to Accounting: Principles, concepts and conventions, double entry system of accounting, Introduction to basic books of accounts, Journal, ledger- Trial Balance - Preparation of Final accounts: Trading Account, Profit and Loss Account and Balance Sheet.

Unit-II

Financial Management - Meaning and scope, role of Financial Manager, Objectives of time value of money - Goals of Financial Management, Leverages: Operating, Financial Leverage and Combined Leverage Cost of Capital: Cost of Equity, Preference Shares, Bonds-

Weighted Average Cost of Capital – Capital Gearing- Overcapitalization and Undercapitalization, Sources of Finance. Tools and Techniques for Financial Statement Analysis: Ratio Analysis – Classification of Ratios –Short term solvency and long term solvency – Profitability ratios - Analysis and Interpretation of Financial Statements through ratios of Liquidity, Solvency and Profitability ratios.

Unit-III

Fund Flow Statement - Meaning, Importance, Statement of changes in working capital and statement of Sources and application of funds. Cash flow Analysis: cash flow Statements: Preparation, Analysis and interpretation. Break-even Analysis: Concept of Break Even Point, Cost-Volume-Profit Analysis, Determination of Break Even Point, Margin of Safety and PV ratio, Impact of changes in Cost or selling price on BEP, Practical applications of Break-even Analysis. Budgeting: Budgeting–cash budget, sales budget – flexible Budgets and master budgets.

Unit-IV

Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital.. Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

Text books:

1. Aryasri: Accounting And Financial Management,, TMH, 2009
2. Van Horne, James, C: Financial Management and Policy, Pearson, 2009

Reference books:

1. Dr. G. Vidyanath G. Lakshmi Accounting and Financial Management.
2. Prasanna Chandra, Financial Management, TMH, 2009
3. S.N.Maheshwari, Financial Accounting, Sultan Chand, 2009.
4. Tulsian, Financial Accounting, S Chand, 2009.
5. Khan and Jain: Financial Management, TMH, 2009
6. Gokul Sinha: Financial Statement Analysis, PHI, 2009
7. Bhat Sundhindra: Financial Management, Excel:2009
8. Jawaharlal: Accounting for Management, Himalaya, 2009
9. Paresh Shah : Basic Financial Accounting for Management, Oxford 2010.

A List of programmes to implement C and C++ features

PC-CA-L02: Data Structures Lab

A list of programmes to implement creation of lists, stacks, queues, binary trees and graphs and to perform corresponding operations on them and to implement some of their applications.

PC-CB-S01: Seminar-1

Fifteen to thirty minutes seminar by each student on any topic of his/her interest preferably on latest areas of computer science

MCA-III Semester

PC-CB10: Java Technologies

Unit - I

Working with JDBC: Introducing JDBC - Exploring JDBC Drivers - Exploring the Features of JDBC - Describing JDBC APIs- Exploring Major Classes and Interfaces - Exploring JDBC Processes with the java.sql Package- Working with Transactions

Unit – II

Working with Servlets : Exploring the Features of Java Servlet - Exploring New Features in Servlet 3.0 -Exploring the Servlet API - Explaining the Servlet Life Cycle - Understanding Servlet Configuration- Creating a Sample Servlet - Creating a Servlet by using Annotation - Working with ServletConfig and ServletContext Objects - Working with the HttpServletRequest and HttpServletResponse Interfaces - Exploring Request Delegation and Request Scope - Describing a Session - Introducing Session Tracking - Exploring the Session Tracking Mechanisms - Using the Java Servlet API for Session Tracking

Unit - III

Working with JavaServer Pages (JSP) : Introducing JSP Technology - Exploring New Features of JSP 2.1 - Listing Advantages of JSP over Java Servlet - Exploring the Architecture of a JSP Page - Describing the Life Cycle of a JSP Page - Working with JSP Basic Tags and Implicit Objects - Working with Action Tags in JSP - · Exploring the JSP Unified EL - Using Functions with EL

Unit - IV

Introduction to smart Phone application development: Introduction to android platform, Creating application template, adding activity, intent, services to application, using Google map API

Text Book:

1. “Advanced Java 2 Platform HOW TO PROGRAM” by H. M.Deitel, P. J. Deitel, S. E. Santry – PrenticeHall
2. “Beginning Java™ EE 6 Platform with GlassFish 3 From Novice to Professional” by Antonio Goncalves

PC-CB11

PC-CB11: Computer Networks

UNIT – I :

Computer Networks and The Internet

Concept of Internet and Protocols. Network Edge, Network Core, Access Networks and Physical Media, Delay and Loss in Packet-Switched Networks, Protocol Layers and Their Service Models, Internet Backbones, NAPs and ISPs, A Brief History of Computer Networking and the Internet.

Application Layer

Principles of Application Layer Protocols, The World Wide Web: HTTP, File Transfer: FTP, Electronic Mail in the Internet, DNS-The internet’s Directory Service.(Chapter 1 and 2.1 to 2.5).

UNIT-II:

Transport Layer

Transport Layer Services and Principles, Multiplexing and Demultiplexing Applications, Connectionless Transport : DDP, Principles of Reliable Data Transfer, Connection-Oriented Transport : TCP, Principles of Congestion Control.

(Chapter 3.1 to 3.6).

UNIT-III

Network Layer and Routing

Introduction and Network Service Models, Routing Principles, Hierarchical Routing, Inter Protocol, Routing in the Internet, Structure of a Router in the Internet, Structure of a Router, (Chapter 4.1 to 4.6).

UNIT-IV :

Link Layer and Local Area Networks

The Data Link Layer : Introduction, Services, Error Detection and Correction Techniques, Multiple Access Protocols and LAN's, LAN Addresses and ARP, Ethernet, Hubs, Bridges, and Switches, IEEE 802.11 LANs, PPP: The Point-to-Point Protocol, Asynchronous Transfer Mode (ATN), X.25 and Frame Relay. (Chapter 5.1 to 5.10)

Text Book

1. James F. Kurose and Keith W. Ross : "COMPUTER NETWORKING A Top-Down Approach Featuring the Internet"., Pearson Education.

Reference

1. Business Data Communication & Networks ,Fitz Gerald :, Jhon Wiley
2. : Computer Networks ,Forouzan 2nd Edition, TMH
3. Computer Networks : Tanenbaum 3rd Edition, PHI.
4. Data Communications, William Stallings, 6th Edition, PHI.

PC-CB12: Mathematical Foundations of Computer Science

UNIT-I

Foundations: Basics-sets and Operations of Sets-Relations and Functions-Some methods of Proof and Problem-solving Strategies-Fundamentals of Logic-Logical Inferences-Methods of Proof of an Implication-First Order Logic and Other Methods of Proof-Rules of Inference for Quantified Propositions-Mathematical Induction

UNIT-II

Elementary Combinatorics: Basics of Counting-Combinations and Permutations-Enumeration of Combinations and Permutations-Enumerating Combinations and Permutations with Repetitions-Enumerating Permutations with Constrained Repetitions-Binomial Coefficients-The Binomial and Multinomial Theorems-The Principle of Inclusion-Exclusion

UNIT-III

Recurrence Relations: Generating Functions of Sequences-Calculating Coefficients of generating Functions- Recurrence relations- solving recurrence relations by substitution and Generating Functions-The Method of Characteristic roots-solutions of Inhomogeneous Recurrence Relations.

Relations and Digraphs: Relations and Directed Graphs-Special Properties of Binary Relations-Equivalence Relations-Ordering Relations, Lattices ,and Enumerations-Operations on Relations-Paths and Closures-Directed Graphs and Adjacency Matrices-Application: Sorting and Searching-Application: Topological Sorting.

UNIT-IV

Graphs: Basic Concepts-Isomorphisms and Subgraphs-Trees and Their Properties-Spanning Trees-Directed Trees-Binary Trees-Planar Graphs-Euler's Formula-Multigraph and Euler Circuits-Hamiltonian Graphs-Chromatic Numbers-The Four Color Problem.

TEXT BOOKS:

1. Discrete Mathematics, R.K.Bisht, H.S.Dhami, Oxford University Press 1st Edition 2015.
2. Discrete Mathematics for Computer Scientists & Mathematicians- Joe.L. Mott, Abraham Kandel Theodore P.Baker.
3. Elements of DISCRETE MATHEMATICS-A Computer Oriented Approach – C L Liu, D P Mohapatra.Third Edition, Tata McGraw Hill.

REFERENCE BOOKS:

1. Discrete Mathematics and its Applications, Kenneth H. Rosen, Fifth Edition.TMH.
2. Discrete Mathematical structures Theory and application-Malik & Sen., Cengage.
3. Discrete Mathematics with Applications, Thomas Koshy, Elsevier.
4. Logic and Discrete Mathematics, Grass Man & Trembley, Pearson Education
- 5.

PC-CB13: Design and Analysis of Algorithms**Unit – 1:** The Role of Algorithms in Computing

Algorithms as a technology – Example Analysis of Insertion Sort –Designing Algorithms – Growth of Functions – Notations and common functions — Divide-and-Conquer - Probabilistic Analysis and Randomized Algorithms – Indicator random variables – Randomized algorithms – (Chapters 1 to 5 excluding 4.6 and 5.4)

Unit – 2: Sorting and Order Statistics

Heapsort Analysis –Quicksort Analysis –Sorting in Linear Time (Lower bounds for sorting, Counting sort, Radix sort, Bucket sort) – Medians and Order Statistics – Implementing pointers and objects – Representing rooted trees. Hash Tables: Direct-address tables –Hash functions – Open addressing. Binary Search Trees – Red-Black Trees – Augmenting Data Structures. (Chapters 6 to 14 excluding 10.1, 10.2, 11.5 and 12.4 from Text Book)

Unit -3: Advanced Design and Analysis Techniques

Dynamic Programming – Greedy Algorithms – (An activity-selection problem – Elements of the greedy strategy – Huffman code)– Amortized Analysis– B-Trees –Fibonacci Heaps – van Emde Boas Tree -Data Structures for Disjoint Sets — (Chapters 15 to 21 excluding 16.4,16.5 and 21.4 from Text Book)

Unit -4: Graphs and NP-Completeness

Elementary Graph Algorithms – Minimum Spanning trees – Single-Source Shortest Paths — All-Pairs Shortest Paths –Maximum Flow (Flow networks – The Ford-Fulkerson method – Maximum bipartite matching) – NP-Completeness (Chapters 22 to 26 and chapter 34 excluding 26.4, 26.5 from Text Book)

Text Book:

Introduction to Algorithms by Thomas H Cormen, Charles E Leiserson, Ronald L Rivest and Clifford Stein, Third Edition, The MIT Press

References:

1. Data structures and Algorithm Analysis in C++ by Allen Weiss, Second edition, Pearson education
2. Fundamentals of Computer Algorithms by Ellis Horowitz, Satraj Sahni and Rajasekharam, Galgotia publications pvt. Ltd.
3. Algorithm Design: Foundations, Analysis and Internet examples by M.T.Goodrich and R.Tomassia, John wiley and sons.
4. Introduction to Design and Analysis of Algorithms A strategic approach by R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, Mc Graw Hill.
5. Design and Analysis of algorithms by Aho, Ullman and Hopcroft, Pearson education.

PC-CB-L06: Python & Java Technologies Lab

Lab assignments to write, test, and debug simple Python programs.

Python programs to implement conditions and loops.

Python programs to implement functions

Python programmes to represent compound data using Python lists, tuples, dictionaries.

To read and write data from/to files in Python.

Programmes to connect to back-end databases using JDBC, Java.sql packages

Implementation of server side program in client/server applications

Assignments to design & develop web applications with dynamic web pages using JSP etc

PC-CB-L07: Computer Networks Lab**Course Outcomes:**

Lab assignments to Describe and analyze the hardware, software, components of a network and the interrelations.

Lab assignments to understand the basic concepts of application layer protocol design; including client/server models, peer to peer models, and network naming.

Lab assignments to understand local area wireless network technologies (802.11, Bluetooth, RFID), and their security weaknesses;

Assignments to analyze, specify and design the topological and routing strategies for an IP based networking infrastructure.

PC-CA-L08: Foreign (German) Language

German Language: Character set, word and sentences

Open Electives:

OE-EE-02: Programming in C (External Elective)

UNIT- I

Introduction to C: Introduction – Structure of C Program – Writing the first C Program – File used in C Program – Compiling and Executing C Programs – Using Comments – Keywords – Identifiers – Basic Data Types in C – Variables – Constants – I/O Statements in C- Operators in C- Programming Examples – Type Conversion and Type Casting.

UNIT- II

Decision Control and Looping Statements: Introduction to Decision Control Statements – Conditional Branching Statements – Iterative Statements – Nested Loops – Break and Continue Statement – Goto Statement Functions: Introduction – using functions – Function declaration/ prototype – Function definition – function call – return statement – Passing parameters – Scope of variables – Storage Classes – Recursive function

UNIT-III

Arrays: Introduction – Declaration of Arrays – Accessing elements of the Array – Storing Values in Array – Calculating the length of the Array – Operations on Array – one dimensional array for inter-function communication – Two dimensional Arrays –Operations on Two Dimensional Arrays Strings: Introduction String and Character functions

Text Books:

1. Programming in C by Balaguruswamy
2. C and Data Structures by Ashok N. Kamthane
3. Let us C by Yashwant Kanetkar

OE-SS-02: Blogging (Soft Skills)

Unit-I: The Blogosphere

The spectrum of blogs. Types of blogs—diary, opinion, news/updates, reviews/advice, other. Reasons to blog—money, platform, express/share/be heard. Blog concept. Finding your concept. Blog names.

Setting Up A Blog

Hosted platforms. Self-hosted platforms—software, web hosts, domain registration. Names—blog, domain, platform. Design. Posts. About page. Widgets/plugin-ins. Labeling—categories, tags, favorites, recents, permalinks, archives. Links—internal and external, pingbacks, cited sources. Blogroll. Images, video, audio. Comments. Subscriptions—email, RSS.

Unit-II: Creating Content

Frequency. Length. Focus. Good blog writing. Ideas. Voice. Snark. Spicing up your posts. Mixing it up—images/video/audio/cited sources. Professionalism. Legal issues. Dangers of blogging.

Connecting to the World

Search engines. Keywords and tags. Links—direct, internal, from other blogs, enticements. Tracking traffic. Interacting with visitors. Social media—networks, micro blogs, bookmarking, sharing sites. Making money—advertisements, merchandising, contributions. Freelance blogging.

Textbooks:

1. Blogging All-in-One for Dummies (2nd Edition) by Susan Gunelius
2. The Art of Freelance Blogging by Kevin Muldoon