2 DEPARTMENT OF COMPUTER SCIENCE

- **M. Sc. in COMPUTER SCIENCE**: **FACULTY OF SCIENCE**
- **FIRST SEMESTER** (ODD SEMESTER)

Eligibility Criteria (Qualifying Exams)	Admission Criteria	Course Code	Course Type	Course (Paper/Subjects)	Credits	Contact Hours Per WeeK			EoSE Duration (Hrs.)	
						L	T	P	Thy	P
Bachelor Degree in the concerned subject/ discipline	**1) Merit List** **2) Entrance Test (written or/and oral) if decided by the University** 3) **Observance of Reservation Policy.**	CMP 101	CCC	DATA STRUCTURE AND ALGORITHM IMPLEMENTATION	5	4	2	00	3	0
		CMP 111	CCC	DATA STRUCTURE AND ALGORITHM IMPLEMENTATION- LABORATORY WORK	2	00	00	3	0	3
		CMP102	CCC	HTML AND WEB DESIGN	5	4	2	00	3	0
		CMP 112	CCC	HTML AND WEB DESIGN - LABORATORY WORK	2	00	00	3	0	3
		CMP 103	CCC	PROGRAMMING IN C : CORE AND ADVANCED	5	4	2	00	3	0
		CMP 113	CCC	PROGRAMMING IN C : CORE AND ADVANCED - LABORATORY WORK	2	00	00	3	0	3
		CMP S01	OSC	RESEARCH METHODOLOGY & COMPUTER APPLICATION: BASICS	6	4	3	00	3	00
		CMP A01	ECC/CB	FUNDAMENTAL OF INFORMATION TECHNOLOGY	6	4	3	00	3	00
		CMP A02	ECC/CB	NUMERICAL ANALYSIS IN COMPUTER APPLICATION						
		CMP A03	ECC/CB	DATABASE DESIGN TECHNIQUES						
		MINIMUM CREDITS IN INDIVIDUAL SUBJECT IS 6 AND IN COMPLETE SEMESTER IT WOULD BE 30			TOTAL= 33					

M.Sc. in COMPUTER SCIENCE (FIRST SEMESTER)		
COURSE CODE: CMP 101	**COURSE TYPE :** CCC	
COURSE TITLE: DATA STRUCTURES		
CREDIT: 07 **THEORY:** 05 **PRACTICAL:** 02		**HOURS:** 135 **THEORY:** 90 **PRACTICAL:** 45
MARKS: 100 **THEORY:** 70 **CCA :** 30 **PRACTICAL:** 33		
OBJECTIVE: Data Structure Provides the Basics of Programming and Logic Implementation.It helps to design and develop Programs . It is also helpful to solve real world problems in a logistic manner.		
UNIT-1 15Hrs	**Basics Terminologies:** Introduction to basic data Structures : Arrays, List, Trees Stack, Queue; Elementary data organization, Data structure operations .	
UNIT-2 20Hrs	**Array :**Terminology, types of Array, Memory organization, operation on Array, Pointer Array; Records and their structures. **List:** Linear list, traversing a linked list, insertion &deletion , Singly Linked list- Operation on it; Doubly linked list- Operation on it; Circular linked list.	
UNIT-3 20 Hrs	**Stacks & Queues:** Stacks; Array representation of stack; Linked representation of stack; Various polish notation's-Prefix, Postfix, infix; Evaluation of a postfix & Prefix expression; Conversion from one another;Application of stack; Queues; Linked representation of queues; Dqueues; Circular queue; Priority queue.	
UNIT-4 20 Hrs	**Trees :**Binary trees; Representation of binary tree in memory; traversing binary tree; Traversing using stack, Binary search trees; Searching and inserting in binary search trees; Deleting in a binary search tree; AVLsearch trees; Insertion and deletion in binary search trees; B trees: searching, insertion, deletion, Heap **Graphs :**Terminology & representation; Warshall algorithm; Shortest path; Minimum spanning tree;Kruskal&Dijkstara algorithm; Operation on graph; Traversing a graph.	
UNIT- 5 15 Hrs	**Searching and Sorting:** Searching algorithm: linear search, binary search; sorting algorithms: Bubble sort,Insertion sort, Selection sort, Quick Sort, Merge sort and Heap sort.	

LABORATORY WORK CMP 111	1. Design a program in C for addition of five numbers using single dimension array. 2. Design a program in C for swapping of two numbers. 3. Design a program in C for addition using two 2X2 matrix . 4. Design a program in C for simple Structure. 5. Design a program in C for generating Fibonacci Series. 6. Design a program in C for generating Even series. 7. Design a program in C for multiplication of two 3X3 Matrix. 8. Design a program in C for Bubble sorting . 9. Design a program in C for Linear Search. 10. Design a program in C for Insertion Sort. 11. Design a program in C for Merge Sort. 12. Design a program in C for Quick Sort. 13. Design a program in C for Binary Search. 14. Design a program in C for Union. 15. Design a program in C for user defined function for addition of two numbers**.**
SUGGESTED READINGS	**1.** Data Structure By Lipshutz, McGraw Hill. **2.** Data Structure By Standish, Addison-Wesley. **3.** Data Structures using C By A. M. Tennenbaum, Y. Langsam and M. J. Augenstein,PHI, 1991

M.Sc. in COMPUTER SCIENCE (FIRST SEMESTER)			
COURSE CODE:	**CMP 102**	**COURSE TYPE :**	**CCC**
COURSE TITLE:	**HTML AND WEB DESIGN**		
CREDIT: 07 **THEORY: 05**	**PRACTICAL: 02**	**HOURS: 135** **THEORY: 90**	**PRACTICAL: 45**
MARKS: 100 **THEORY: 70**	**CCA : 30**	**PRACTICAL: 33**	

OBJECTIVE:

The main objective is to provide basics of Web Page Designing. It also gives knowledge about various web based Languages available for Web Designing.

UNIT-1 15 Hrs.	**Concept of Internet:** Fundamental and History of Web, Web Development Overview, Domain Name System (DNS), Internet service provider (ISP), IP Address, Web Related Protocol, Web Browser and Web Server. Concept of static web pages and dynamic web pages
UNIT-2 20 Hrs	**Html and its Tags:** What is HTML (Markup Language?) Basic Structure of HTML, Basic HTML Tags, Image Tag, HTML Tag for Hyperlink, Various List Tags, Table Creation Tags, Frame Creation Tags, Form Creation Tags.
UNIT-3 20 Hrs	**Cascading Style Sheet:** What is CSS? Role of CSS in Web Designing. Different Types of CSS. Rule of CSS.CSS Box Model.CSS Selectors, Class Selector. ID Selector. Child Selector. Type Selector, CSS Properties, Different Font Properties. Background Properties. Border Properties. Positioning Properties. Display Properties. List Properties. Inside & Outside Spacing Properties.
UNIT-4 15 Hrs	**HTML Editor (MS Expression Web):** Getting Started with Expression Web, Creating a Web Site, Adding Text and Links, Structuring and Styling Text, Working with Images, Enhancing a Design with CSS, Designing Site Navigation, Testing and Publishing Your Web Site, Working with Tables, Creating Forms, Working with Behaviors, Using Code Tools, Advanced Typography Using CSS, Creating a Layout with CSS
UNIT- 5 20 Hrs	**Web Publishing and Hosting:** Concept of Domain Name and Web Server. Different types of Web Server, Domain Name Registration, Web Space allocation, Uploading /Downloading the website- FTP, cute FTP., Web Site Promotion, Search Engines Optimization

LABORATORY WORK CMP 112	1. Design a Html code for creating a simple link. 2. Design a Html code for creating a Hyperlink. 3. Design a Html code for creating an Ordered List. 4. Design a Html code for creating an Unordered List. 5. Design a Html code for creating a Table showing employee details. 6. Design a Html code for creating a Frame. 7. Design a Html code for inserting an Image. 8. Design a Html code for creating a Marque in the web Page. 9. Design a Html code for creating frames in column and rowwise showing details of your department. 10. Design a Html code for creating a form having five textboxes and labels. 11. Design a website for your Department .
SUGGESTED READINGS	1. The complete Reference By Thomos A. Powell ,TMH publication 2. Web Technology :A Developers Perspective ,N.P.Gopalan ,J.Akilandeswani,PHI Publication. 3. Java Script :The definite Guide By Flangam , O'Reilly 4. Java Script :Developers Resource by Kamran Husain and Jason Levitt PTR-PHI publication. 5. "Mastering VB Script" BPB Publication. 6. World Wide Web design with HTML by Xavier Tata McGraw Hill Publication . 7. XML By Example, Sean McGrathPentice Hall Publication. 8. Web Technology : A Developments Perspective , N.P. Gopalan, J. Akilandeswari, PHI Publication.

M.Sc. in COMPUTER SCIENCE (FIRST SEMESTER)	
COURSE CODE: CMP 103	**COURSE TYPE :** CCC
COURSE TITLE: PROGRAMMING IN C : CORE AND ADVANCED	
CREDIT: 07 **THEORY:** 05 **PRACTICAL:** 02	**HOURS:** 135 **THEORY:** 90 **PRACTICAL:** 45
MARKS: 100 **THEORY:** 70 **CCA :** 30 **PRACTICAL:** 34	
OBJECTIVE: The main objective is to practice the programming which is the base of all programminglanguages. To develop their skills and develop their caliber in the world of programming . To know the basic terminology used in C programming language.	
UNIT-1 2 0 Hrs.	**Fundamentals of C Programming:**Overview of C: History of 'C', Basic Structure of 'C' program. C Tokens: Keywords, Data types, Constants, Literals and Variables, Operators and Expressions: Arithmetic,Relational, Logical, Assignment, Increment & Decrement, conditional, Bitwise, Special operators. Expressions, Operator precedence and associativity,Type conversion in expression, Console I/O formatting, Unformatted I/O functions: getch(), getchar, getche(), getc(), putc(),putchar(). **Control Constructs**: Decision making and Branching: If, If-else, Nested if..else, Else if ladder, Switch, Conditional operators, goto and label statement, Decision making and Looping: While, For, do..while, Nested loops, Jumps in loop with break and continue.
UNIT-2 20 Hrs	**Arrays, Strings and Functions**:**Array**:-Array declaration, One, Two and Multi Dimensional numeric and character arrays. **String:-**String declaration, initialization, string manipulation with/without using library function. **Functions**:-Definition, function components: Function arguments, return value, function call statement,function prototype. Type of function arrangement: return and argument, no return and no argument, return and no argument, no return and argument. Scope and lifetime of variable. Call by value and call by reference. Function using arrays, function with command line argument. User defined function: maths and character functions, Recursive function.
UNIT-315 H rs	**Structure, Union &Enum- Structure: B**asics, declaring structure and structure variable, typedef statement,array of structure, array within structure, Nested structure; passing structure to function, function returning structure. **Union**: Basics, declaring union and union variable, **Enum**: declaring enum and enum variable.
UNIT-4 15 Hrs	**Dynamic Data Structures in 'C' - Pointers**: Definition of pointers, pointer declaration, using & and *operators. Void pointer, pointer to pointer, Pointer in math expression, pointer arithmetic, pointer comparison, dynamic memory allocation functions – malloc, calloc, realloc and free, pointers vs. Arrays,Arrays of pointer, pointer to array, pointers to functions, function returning pointer, passing function as argument to function, pointer to structure, dynamic array of structure through pointer to structure.
UNIT- 5 20 Hrs	**File Handling and Miscellaneous Features:**File handling: file pointer, file accessing functions:fopen,fclose, fputc, fgetc, fprintf, fscanf, fread, fwrite,beof, fflush, rewind, fseek, ferror. File handling through command line argument. Introduction to C preprocessor #include, #define, conditional compilation directives: #if, #else, #elif,

LABORATORY WORK CMP 113	1. Design a program in C for addition of five numbers using float data type. 2. Design a program in C for swapping of two numbers using multiplication and division operator. 3. Design a program in C for addition using two 3X2 matrix . 4. Design a program in C using Structure for employee details. 5. Design a program in C for various logical operators. 6. Design a program in C for printing Table of inputed number. 7. Design a program in C for finding the factorial of any number using call by reference method. 8. Design a program in C for multiplication of two 3X3 Matrix. 9. Design a program in C for addition of two numbers using call by value method. 10. Design a program in C for storing 5 books information using Structure. 11. Design a program in C for union for addition of two float numbers. 12. Design a program in C for pointer. 13. Design a program in C for pointer within Structure. 14. Design a program in C for various loops. 15. Design a program in C for various conditional statements. 16. Design a program in C for #if statement. 17. Design a program in C for generating multiplication table of entered number.
SUGGESTED READINGS	1. Programming in C "YashwantKanetkar", BPB Publications,Tenth Edition. 2. Programming with C "Venugopal", TMHOutlineSeries,Third Edition. 3. The C Programming Language "Kemigham and Ritche [Prentice Hall]" 4. Programming in C Language, "DrAmitSaxena" Ananya Publication 5. Programming in C Language "BalaGurusamy" Fourth Edition

M.Sc. in COMPUTER SCIENCE
(FIRST SEMESTER)

COURSE CODE: CMPS01COURSE TYPE:OSC

COURSE TITLE:RESEARCH METHODOLOGY & COMPUTER APPLICATION: BASICS

CREDIT: 06	**HOURS : 90**
THEORY: 06	**THEORY: 90**

MARKS : 100
THEORY: 70 CCA : 30

OBJECTIVE:

- Understands the concept and place of research in concerned subject
- Gets acquainted with various resources for research
- Becomes familiar with various tools of research
- Gets conversant with sampling techniques, methods of research and techniques of analysis of data
- Achieves skills in various research writings
- Gets acquainted with computer Fundamentals and Office Software Package .

UNIT - 1 15 Hrs	**Foundations of Research**: Meaning, Objectives, Motivation, Utility. Concept of theory, empiricism, deductive and inductive theory. Characteristics of scientific method – Understanding the language of research – Concept, Construct, Definition, Variable. Research Process . **Problem Identification & Formulation** – Research Question – Investigation Question – Measurement Issues – Hypothesis – Qualities of a good Hypothesis –Null Hypothesis & Alternative Hypothesis. Hypothesis Testing – Logic & Importance. **Research Design**: Concept and Importance in Research – Features of a good research design – Exploratory Research Design – concept, types and uses, Descriptive Research Designs – concept, types and uses. Experimental Design: Concept of Independent & Dependent variables. **Qualitative and Quantitative Research**: Qualitative research – Quantitative research – Concept of measurement, causality, generalization, replication. Merging the two approaches. Measurement: Concept of measurement– what is measured? Problems in measurement in research – Validity and Reliability. Levels of measurement – Nominal, Ordinal, Interval, Ratio. **Statistics:** Probability & Sampling distribution; Estimation, Hypothesis testing & application; Correlation & regression analysis. Types of study designs/ Experiment design – Orthogonal array, ANOVA, interaction, Signal-to-Noise ratio, replication.
UNIT - 2 15 Hrs	**Sampling**: Concepts of Statistical Population, Sample, Sampling Frame, Sampling Error, Sample Size, Non Response. Characteristics of a good sample. Probability Sample – Simple Random Sample, Systematic Sample, Stratified Random Sample & Multi-stage sampling. Determining size of the sample – Practical considerations in sampling and sample size. Sample size determination; Plan for data collection; Methods of data collection; Plan for data processing and analysis; Ethical considerations. Work Plan; Major components and outline of the different phases in a research process; Summary of the major components of a research proposal; Fieldwork;
UNIT - 3 15 H rs	**Data Analysis**: Data Preparation – Univariate analysis (frequency tables, bar charts, pie charts, percentages), Bivariate analysis – Cross tabulations and Chi-square test including testing hypothesis of association. **Interpretation of Data and Paper Writing** – Layout of a Research Paper, Journals in Computer Science, Impact factor of Journals, When and where to publish ? Ethical issues related to publishing, Plagiarism and Self-Plagiarism.

UNIT - 4 15 Hrs	**Use of tools / techniques for Research**: methods to search required information effectively, Reference Management Software like Zotero/Mendeley, Software for paper formatting like LaTeX/MS Office, Software for detection of Plagiarism. Use of Encyclopedias, Research Guides, Handbook etc., Academic Databases for Computer Science Discipline. **ShodhGanga**:a reservoir of Indian Thesis,**ShodhGangotri**: Repository of Indian Research ,Introduction to Research Journals,ReviewPapers,SPSS,Use of MatLab in Research,Simulation,Embedded Systems.
UNIT - 5 15 Hrs	**Computer Applications**: **Spreadsheet tool**: Introduction to spread-sheet applications, features & functions, using formulae & functions, data storing, features for statistical data analysis, generating charts/graphs & other features. **Tools**: Microsoft Excel, Open office and similar or other advanced tools, **Presentation tool**: Introduction to presentation tool, feartures& functions, creating presentations, customising presentation. **Tools used**: Microsoft Powerpoint, Open Office or any other tool ,**Web Search**: Introduction to internet, Use of Internet & www, using search engines using advanced search tools. **Thesis writing & Scientific editing tools.**
SUGGESTED READINGS	1.. Business Research Methods – Donald Cooper & Pamela Schindler, TMGH, 9th edition 2. Business Research Methods – Alan Bryman& Emma Bell, Oxford University Press. 3. Research Methodology – C.R.Kothari 4. Select references from the Internet*Kerlinger, F. N. (1983)* *5.Fundamental Of Research Methodology And Statistics, Y.K. Singh, New Age* *6.International (P) Limited, Publishers.Practical Research Methods, Dr Catherine Dawson,* *7.The Essence Of Research Methodology, Jan Jonker&BartjanPennink, Springer.*

M.Sc. in COMPUTER SCIENCE (FIRST SEMESTER)	
COURSE CODE: CMP A01	**COURSE TYPE : ECC/CB**
COURSE TITLE: FUNDAMENTAL OF INFORMATION TECHNOLOGY	
CREDIT: 06 **THEORY: 06**	**HOURS : 90** **THEORY: 90**
MARKS : 100 **THEORY: 70**	**CCA : 30**
OBJECTIVE: The main objective is to provide the fundamentals of Computer show that they get the Knowledge about Software , Hardware , Communication Technology and Internet .	

UNIT- 1 20Hrs.	**Introduction–**Basics concept of IT, concept of data and information, History of computer, Generations and classification of Computers, organization of computers, Input and Output devices, storage devices, Data processing and file organization.
UNIT-2 20Hrs	**Software and Computer language** -Software and its need, Types of Software: System software,application software, utility software, Firm ware. Operating system :Types ,Job and objective. Language translator .Introduction and evolution of Programming Languages, Types of Programming Languages, Generations of Programming Languages, Programming Paradigms: procedural oriented and object oriented programming
UNIT-3 20 H rs	**Communication and network technology :**Communication process, Communication and system elements ,Analog and digital signal, mode of communication , communication media: Wired and Wireless. Computer Network: Types ,criteria, advantages and disadvantages, Topology, LAN and other network related protocols, OSI reference model and TCP/IP model.
UNIT-4 15 Hrs	***Internet****-Technical foundation of Internet, history of Internet, Internet Service Provider (ASP), ARPANET, Services Available on Internet; Internet Applications : E-mail, WWW and file transfer .Internet* addressing ,Client server computing, Domain name system (DNS), Internet Security – Fire walls, Encryptions etc.
UNIT- 5 15 Hrs	**Application of IT and Latest IT Trends :**IT in business, Industry, home, education entertainment, science and engineering and medicine. E-commerce, M-Commerce. **Latest IT Trends :**Artificial Intelligence ,Data Mining, Overview of Geographic Information System(GIS),Cloud computing ,Information communication Technology (ICT)
SUGGESTED READINGS	1. Fundamental of Computer 5th Edition By V.Rajaraman,PHI Publication. 2. Introduction to Information Technology by V.Rajaraman ,PHI Publication. 3. Information technology today By S.Jaiswal 4. Fundamental of IT :Leon and Leon ,Leon Tec World 5. Introduction to Information Technology by Aksoy and DeNardis ,Cengage Learning.

M.Sc. in COMPUTER SCIENCE (FIRST SEMESTER)	
COURSE CODE: CMP A02 **COURSE TYPE** : ECC/CB	
COURSE TITLE: NUMERICAL ANALYSIS IN COMPUTER APPLICATION	
CREDIT: 06 **THEORY:** 06	**HOURS :** 90 **THEORY:** 90
MARKS : 100 **THEORY:** 70 **CCA :** 30	
OBJECTIVE: The main objective to know about algebraic Equations , Simultaneous algebraic equations ,Interpolations , Differentiation and Integration and Differential equations .	
UNIT-1 20Hrs.	**Algebraic Equation :**Computer Arithmetic – Floating point Numbers- Operations Normalization and their consequences. Iterative Methods – Roots of a Single transcendental equations and roots of Polynomials using Bisection Method , False position Method , Newton Raphson Method.
UNIT-2 20Hrs	**Simultaneous Algebraic Equation :**Gauss Elimination Method, Gauss-Jordan Method, FactorizationMethod, Jacobi's Iteration Method, Gauss- seidal Iteration Method. **Matrix Inversion & Eigen Value:** Gauss Jordan Method, Factorization Method and Eigen Vectors.
UNIT-3 20 H rs	**Interpolations:** Polynomials interpolation, Newton Method. Lagrange's Interpolation Formula anddifference tables. Least Square Approximations- Linear regression only.
UNIT-4 15 Hrs	**Differentiation and Integration**- Formula for Numerical Differentiation and Numerical integration byTrapezoidal Rule and Simpson's rule only.
UNIT-5 15 Hrs	**Numerical Solution of Differential Equation** :- Euler's Method, Taylor series Method, Runge-Kutta Method.
SUGGESTED READINGS	1. Numerical Methods By V. Rajaraman, 3rd Edition, Prentice-Hall India Pvt. Ltd. 2. Numerical Methods By S.S. Shastri, 4th edition, 2005,PHI publications. 3. Numerical Methods in Engineering and Science, 36th Edition, Khanna Publishers, Delhi. 4. Computer Based Numerical and Statistical techniques, P.K.Mittal and Mukesh B.,Galgotia Publication.

M.Sc. in COMPUTER SCIENCE (FIRST SEMESTER)			
COURSE CODE:	**CMP A03**	**COURSE TYPE :**	**ECC/CB**
COURSE TITLE:	**DATABASE DESIGN TECHNIQUES**		
CREDIT: 06 **THEORY: 06**		**HOURS : 90** **THEORY: 90**	
MARKS : 100 **THEORY: 70**	**CCA : 30**		

OBJECTIVE: The main objectiveis to introduce Database System,relational database model ,querying and transaction management. .

UNIT-1 20 Hrs.	**INTODUCTION TO DATABASE SYSTEM** Introduction, Purpose and Applications of Database Systems, View Of Data, Characteristics of Database Approach, Architecture DBMS, Advantages and Disadvantages Of DBMS, Database Users and Administrator, Database Design using ER Model , Data Model Classification.
UNIT-2 20 Hrs	**RELATIONAL DATABASE CONCEPT** Structure of Relational Database, Database Schema, Key, Relational Operations Formal Relational Query Languages . Relational Algebra: Basic Operations selection and projection, Set Theoretic Operations, Join Operations
UNIT-3 20 H rs	**RELATIONAL DATABASE DESIGN** Relational Database design: Functional dependencies, Universal Relation, Anomalies in A Database, Normalization Normal forms based on primary keys (1 NF, 2 NF, 3 NF, BCNF, 4 NF, 5 NF) Loss less joins and dependency preserving decomposition
UNIT-4 15 Hrs	**DATABASE STORAGEAND QUERYING** Basic Concepts Of Indexing and Hashing Query Processing , Measures Of Query Cost , Query Processing for Select, Sort Join Operations. Basics of Query Optimization, Transformation of Relational Expression Estimating Statistics of Expression, Choice of Evaluation Plan. Query Resource Utilization, Query Execution Statistics, Query Execution Plan, Sample Index Access, Fill Factor, Multiple Index Access, Methods for Joining Tables (Nested Loop, Merge Join, Hybrid Join, Multiple Join) Structure of a Query Optimizer
UNIT-5 15 Hrs	**TRANSACTION MANAGEMENT AND CONCURRENCY CONTROL** Transaction Processing & Concurrency Control: Concept and definition of transaction, ACID properties, serializibility, Prioritization, states of transaction, Types of failure, levels of transaction consistency, deadlocks, long duration transactions, transaction performance, Concurrency Control, locking techniques, techniques based on time-stamp ordering, multiple granularity. Crash Recovery: failure classification, recovery concepts, database backup, recovery concepts based on deferred update and on immediate update. Shadow paging, check points, on-line backup during database updates, crash recovery techniques.

SUGGESTED READINGS	
	• *SilverschatzKorth And Sudarshan-Database System Concepts, 6th ed. Tata Mc-Graw Hill.* • *Raghu Rama Krishnan-Database Management Systems, 2nd ed. Tata Mc-Graw Hill* • *Rajesh Narang – Database Management System,2nd Ed.Phi* • *R. Elmasri Et. Al "Fundamentals Of Database Systems". 3rd Edition – Addison Wesley, (Indian Reprint), New Delhi.* • *C.J.Date, Data Base Systems,* Vol I & Ii