E.G.S. PILLAY ENGINEERING COLLEGE

(Autonomous)

Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai|

Accredited by NAAC with 'A' Grade |Accredited by NBA

(CSE, EEE, MECH, CIVIL, ECE, IT)

NAGAPATTINAM – 611 002

MASTER OF COMPUTER APPLICATIONS

Curriculum and Syllabi

First Year – First Semester

SEMESTER I									
Course Code	**Course Name**	**L**	**T**	**P**	**C**	**Maximum Marks**			**Category**
						CIA	**ES**	**Total**	
Theory Course									
2001CA101	Linear Algebra, Probability and Statistics	2	2	-	3	40	60	100	FC
2002CA102	Advanced Data structures and Algorithms	3	-	-	3	40	60	100	PC
2002CA103	Computer Communications and Networks	3	-	-	3	40	60	100	PC
2002CA104	Advanced Databases	3	-	-	3	40	60	100	PC
2002CA105	Python Programming	3	-	-	3	40	60	100	PC
2002CA106	Software Engineering and Project Management	3	-	-	3	40	60	100	PC
	Audit Course I*	2	-	-	-	100	-	100	AC
Laboratory Course									
2002CA107	Advanced Data structures and Algorithms Laboratory	-	-	4	2	50	50	100	PC
2002CA108	Python Programming Laboratory	-	-	4	2	50	50	100	PC
2004CA109	Life Skill I –Verbal Ability	-	-	2	1	100	-	100	EEC
Total		**19**	**2**	**10**	**23**	**540**	**460**	**1000**	

2001CA101	LINEAR ALGEBRA, PROBABILITY AND STATISTICS	L	T	P	C
		2	2	0	3

PREREQUISITE:

1. Basic Multivariable Calculus & Elementary Linear Algebra

COURSE OBJECTIVES:

1. To find the basis and dimension of vector space
2. To obtain the matrix of linear transformations and its eigenvalues and eigenvectors
3. To provide foundation on Applied probability
4. To use various statistical techniques in Application Problems
5. To introduce the concept of Design of Experiments for data analysis

COURSE OUTCOMES:

On the successful completion of the course, students will be able to CO1: Test the consistency and solve system of linear equations.

CO1:	Find the basis and dimension of vector space.
CO2:	Apply the Probability axioms as well as rules and the distribution of discrete and continuous also the random variable ideas in solving real world problems.
CO3:	Use statistical techniques in testing hypothesis on data analysis.
CO4:	Use the appropriate statistical technique of design of experiments in data analysis.
CO5:	Find the basis and dimension of vector space.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	2	-	-	3	-	-	-	-	-
CO2	3	3	-	2	-	-	3	-	-	-	-	-
CO3	3	3	-	2	-	-	3	-	-	-	-	-
CO4	3	3	-	2	-	-	3	-	-	-	-	-
CO5	3	3	-	2	-	-	3	-	-	-	-	-

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1	-	-	-
CO2	-	-	-
CO3	-	-	-
CO4	-	-	-
CO5	-	-	-

COURSE CONTENTS:

MODULE I	VECTOR SPACES	8 Hours

Real and Complex fields - Vector spaces over Real and Complex fields - Sub space - Linear space- Linear independence and dependence - Basis and dimension.

MODULE II	LINEAR TRANSFORMATION	9 Hours

Linear transformation - Rank space and null space - Rank and nullity - Dimension theorem - Matrix representation of linear transformation - Eigenvalues and Eigenvectors of linear transformation.

MODULE III	PROBABILITY AND RANDOM VARIABLES	8 Hours

Probability - Axioms of Probability - Conditional Probability - Addition and multiplication laws of

Probability - Baye's theorem - Random Variables - Discrete and continuous random variables - Probability mass function and Probability density functions - Cumulative distribution function - Moments and variance of random variables - Properties - Binomial, Poisson, Geometric, Uniform,Exponential, Normal distributions and their properties.		
MODULE IV	**TESTING OF HYPOTHESIS**	**12 Hours**
Sampling distributions - Tests based on small and large samples - Normal, Student's t, Chi-square and F distributions for testing of mean, variance and proportion and testing of difference of means variances and proportions - Tests for independence of attributes and goodness of fit.		
MODULE V	**DESIGN OF EXPERIMENTS**	**8 Hours**
Analysis of variance - Completely randomized design - Random block design (One-way and Twoway classifications) - Latin square design -2^2 Factorial design.		
		TOTAL: 45 HOURS

REFERENCES:

1. *1Friedberg A.H, Insel A.J. and Spence L, Linear Algebra, Prentice Hall of India, New Delhi, 2 004.*
2. *Faires J.D. and Burden R., Numerical Methods, Brooks/Cole (Thomson Publications),New Delhi, 2002.*
3. *Devore, J.L, Probability and Statistics for Engineering and Sciences, Cengage Learning, Eighth Edition, New Delhi, 2014.*
4. *I. Miller and M. Miller, Mathematical Statistics, Pearson Education Inc., Asia Seventh Edition, New Delhi, 2011.*
5. *Richard Johnson, Miller and Freund's Probability and Statistics for Engineer, Prentice Hall of India Private Ltd., Eighth Edition, New Delhi, 2011.*
6. *https://nptel.ac.in/*

2002CA102	ADVANCED DATA STRUCTURES AND ALGORITHMS	L	T	P	C
		3	0	0	3

PREREQUISITE:

1. Problem Solving And Programming

COURSE OBJECTIVES:

1. To understand the linear and non linear data structures available in solving problems
2. To know about the sorting and searching techniques and its efficiencies
3. Using the Graph data structures and algorithms in real time applications
4. To use algorithm design paradigms for algorithm design

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	To select and apply the data structure to suit any given problem.
CO2:	Design and Implement Tree data structures and Sets
CO3:	Implement a variety of algorithms for sorting
CO4:	To apply the algorithm design techniques to any of the real world problem.
CO5:	Design algorithms using dynamic programming and Greedy approaches and graph structure to solve real-life problems.
CO6:	Analyze problems in terms of polynomial time.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	2	-	-	-	-	-	-	-	-
CO2	3	3	-	2	-	-	-	-	-	-	-	-
CO3	3	3	-	2	-	-	-	-	-	-	-	-
CO4	3	3	-	2	-	-	-	-	-	-	-	-
CO5	3	3	-	2	-	-	-	-	-	-	-	-

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1	-	3	2
CO2	-	3	2
CO3	-	3	2
CO4	-	3	2
CO5	-	3	2

COURSE CONTENTS:

MODULE I	LINEAR DATA STRUCTURES	9 Hours

Introduction – Arrays – Structures- Abstract Data Types (ADT)- Stack- Representing Stacks- Applications of stack – Infix to postfix conversion – evaluation of expression- Queue- Representing Queue- Applications of Queue- Linked Lists –singly Linked list- Doubly Linked lists.

MODULE II	TREE STRUCTURES	9 Hours

Binary Trees – Operations on Binary trees – Binary Tree Representations – Node representation – Internal and External nodes- Binary tree Traversals - Binary search tree -Huffman Algorithm-

MODULE III	**BALANCED SEARCH TREES, SORTING AND INDEXING**	**9 Hours**
Red-Black trees –B-Trees - Sorting – Bubble sort - Quick Sort - Insertion Sort – Heap sort – Hashing Hashing functions - Collision Resolution Techniques - Separate chaining - Open addressing - Multiple Hashing.		
MODULE IV	**GRAPHS**	**9 Hours**
Definitions – Representation of graph - Graph Traversals - Depth-first traversal – breadth-first traversal - applications of graphs - Topological sort – shortest-path algorithms – minimum spanning tree – Prim's and Kruskal's algorithms – Single Source Shortest Path -Dijkstra‟s Algorithm - biconnectivity – Euler circuits.		
MODULE V	**ALGORITHM DESIGN AND ANALYSIS**	**9 Hours**
Algorithm Analysis – Asymptotic Notations - Divide and Conquer – Merge Sort – Binary Search -Greedy Algorithms – Activity Selection Problem – Dynamic Programming – Matrix Chain Multiplication – Longest Common Subsequence- Backtracking – Sum of Subset Problem-NP Problems -Polynomial Time – Polynomial-time Verification -Vertex Cover Problem-Clique .		
		TOTAL: 45 HOURS

REFERENCES:

1. Y. Langsam, M. J. Augenstein and A. M. Tenenbaum, “Data Structures using C”, Pearson Education Asia, 2004.

2. T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein, "Introduction to algorithms", Second

3. Edition 3.Anany Levitin “Introduction to the Design and Analysis of Algorithms” Pearson Education 2003.

4. M. A. Weiss, “Data Structures and Algorithm Analysis in C++”, Pearson Education Asia, 2013.

5. https://www.tutorialspoint.com/data_structures_algorithms/algorithms_basics.htm

2002CA103	COMPUTER COMMUNICATIONS AND NETWORKS	L	T	P	C
		3	0	0	3

PREREQUISITE:

1. Computer Organization and Architecture

COURSE OBJECTIVES:

1. To explore various data communication techniques.
2. To know network fundamentals and protocols.
3. To understand network addressing and routing concepts.
4. To understand the requirement of reliable and unreliable communication
5. To understand the functionality and concepts of various application layer protocols

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Analyze the Communication Model and Data encoding techniques used in Computer Communications
CO2:	CO2: Create simple networks by applying networking Protocols
CO3:	CO3: Establish Data communication layer in simple networks using Data Link Protocols.
CO4:	CO4: Categorize IP addresses using classes of IP and create subnets.
CO5:	CO5: Establish Transport layer and application layer in simple networks using protocols.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	2	-	-	-	-	-	-	-	-
CO3	3	3	-	2	-	-	-	-	-	-	-	-
CO4	3	3	3	2	-	-	-	-	-	-	-	-
CO5	3	3	3	2	-	-	-	-	-	-	-	-

COs Vs PSOs MAPPING:

COs	PSO1	PSO2	PSO3
CO1	-	-	-
CO2	-	2	-
CO3	-	2	-
CO4	-	2	-
CO5	-	2	-

COURSE CONTENTS:

MODULE I	DATA COMMUNICATIONS	8 Hours

Data communications and Networking: Communication model, Data transmission concepts and terminology, Transmission media, Data encoding techniques – Digital data communication techniques: Error detection and correction, Line configurations – Multiplexing: FDM, TDM, Statistical TDM.

MODULE II	NETWORK FUNDAMENTALS	8 Hours

Network Architecture: The OSI model, TCP/IP model – Network interface layer: Framing – Reliable transmission: stop and wait protocol, sliding window protocols.

MODULE III	**DATA LINK LAYER**	**10 Hours**
Data link control - Flow Control – Error Detection and Error Correction - MAC – Ethernet, Token ring, Wireless LAN MAC – Blue Tooth – Bridges – Spanning Tree Algorithm.		
MODULE IV	**NETWORK LAYER**	**9 Hours**
Network layer functions – circuit switching – packet switching – IP datagram – IPv4 – Sub netting and classless addressing – IPv6 – ARP – Routing protocols: distance vector, link state – ICMP – ICMPv6 – Case study on Network Design.		
MODULE V	**TRANSPORT LAYER AND APPLICATION LAYER**	**10 Hours**
Transport Layer**:** Duties of transport layer– User Datagram Protocol – Transmission Control Protocol – Congestion – Congestion control. Application Layer: Application layer Protocols – World Wide Web and HTTP – FTP – Domain name system– Telnet –Electronic mail protocols –SNMP – Case study on Software Defined Networks.		
		TOTAL: 45 HOURS

REFERENCES:

1. Larry L. Peterson and Bruce S. Davie, “Computer Networks: A Systems Approach”, Fifth Edition, Morgan Kaufmann Publishers, 2012.
2. William Stallings, “Data and Computer Communications”, Tenth Edition, Pearson, 2013
3. James F. Kurose, Keith W. Ross, “Computer Networking: A Top-Down Approach”, Fifth Edition, PearsonEducation, 2012.
4. Forouzan, “Data Communication and Networking”, Fifth Edition, TMH, 2012.
5. Andrew S.Tannenbaum and David J. Wetherall, “Computer Networks”, Fifth Edition, Pearson Education, 2011.
6. https://www.javatpoint.com/computer-network-tutorial
7. https://www.tutorialspoint.com/data_communication_computer_network/index.htm
8. https://www.geeksforgeeks.org/computer-network-tutorials/
9. https://www.tutorialsweb.com/ns2/NS2-1.htm

2002CA104	ADVANCED DATABASES	L	T	P	C
		3	0	0	3

PREREQUISITE:

1. Basic Data Structures
2. Database management system

COURSE OBJECTIVES:

1. To learn the fundamentals of Parallel and Distributed Databases
2. To make a study on Object Oriented Databases
3. To explore the concepts of XML Databases and Mobile Databases
4. To gain knowledge on the intelligent Databases.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Develop transaction processing systems with concurrency control.
CO2:	Design Object oriented databases for real time applications. CO3: Develop XML databases for web applications.
CO3:	Design Mobile databases for mobile devices.
CO4:	Apply intelligent rules in database developement
CO5:	Develop transaction processing systems with concurrency control.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	-	-	2	-	-	2	-	-	-	-
CO2	2	3	-	2	2	-	-	2	-	-	-	-
CO3	2	3	3	2	2	-	-	2	-	-	2	-
CO4	2	3	3	2	2	-	-	2	-	-	2	-
CO5	2	3	3	2	2	-	-	2	-	-	-	-

COs Vs PSOs MAPPING:

COs	PSO1	PSO2
CO1	2	-
CO2	2	-
CO3	2	-
CO4	2	-
CO5	2	-

COURSE CONTENTS:

MODULE I	PARALLEL AND DISTRIBUTED DATABASES	9 Hours

Database System Architectures: Centralized and Client-Server Architectures – Server System Architectures – Parallel Systems- Distributed Systems – Parallel Databases: I/O Parallelism – Inter and Intra Query Parallelism – Inter and Intra operation Parallelism – Distributed Database Concepts - Distributed Data Storage – Distributed Transactions – Commit Protocols – Concurrency Control – Distributed Query Processing – Three Tier Client Server Architecture- Case Studies.

MODULE II	OBJECT AND OBJECT RELATIONAL DATABASES	9 Hours

Concepts for Object Databases: Object Identity – Object structure – Type Constructors – Encapsulation of Operations – Methods – Persistence – Type and Class Hierarchies – Inheritance – Complex Objects – Object Database Standards, Languages and Design: ODMG Model – ODL – OQL – Object Relational and Extended – Relational Systems : Object Relational features in SQL / Oracle – Case Studies.		
MODULE III	**XML DATABASES**	**9 Hours**
XML Databases: XML Data Model – DTD - XML Schema - XML Querying – Web Databases – JDBC– Information Retrieval – Data Warehousing – Data Mining.		
MODULE IV	**MOBILE DATABASES**	**9 Hours**
Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management - Location Dependent Data Distribution - Mobile Transaction Models - Concurrency Control - Transaction Commit Protocols- Mobile Database Recovery Schemes.		
MODULE V	**INTELLIGENT DATABASES**	**9 Hours**
Active databases – Deductive Databases – Knowledge bases – Multimedia Databases- Multidimensional Data Structures – Image Databases – Text/Document Databases- Video Databases– Audio Databases – Multimedia Database Design –Spatial Databases.		
		TOTAL: 45 HOURS

REFERENCES:

1. *Henry F Korth, Abraham Silberschatz and S. Sudharshan, "Database System Concepts", Sixth Edition, McGraw Hill, 2011.*
2. *C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.*
3. *R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Fifth Edition, Pearson Education/Addison Wesley, 2007.*
4. *Thomas Cannolly and Carolyn Begg, "Database Systems, A Practical Approach to Design, Implementation and Management", Third Edition, Pearson Education, 2007.*
5. *Subramaniam, " Multimedia Databases", Morgan Kauffman Publishers, 2008.*
6. *Frank. P. Coyle, "XML, Web Services And The Data Revolution", Pearson Education, 2012.*
7. *https://www.geeksforgeeks.org/introduction-of-dbms-database-management-system-set-1/*
8. *https://www.javatpoint.com/dbms-tutorial*
9. *https://www.tutorialspoint.com/dbms/index.htm*

2002CA105	PYTHON PROGRAMMING	L	T	P	C
		3	0	0	3

PREREQUISITE:

1. Programming Basics

COURSE OBJECTIVES:

1. To introduce the basics of Python .
2. To implement python programs with conditionals and loops
3. Demonstrate the use of Python lists and dictionaries
4. Describe and apply object-oriented programming methodology.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Describe the basics of python programming
CO2:	Develop the python programs using Conditional Statements.
CO3:	Develop the python program using Lists, Tuples, Dictionaries
CO4:	Develop the real time application using NumPy array concepts,
CO5:	Develop the python programs using files and packages.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	-	3	-	3	-	-	-	-	-
CO2	3	3	3	-	3	-	3	-	-	-	-	-
CO3	3	3	3	-	3	-	3	-	-	-	-	-
CO4	3	3	3	3	3	-	3	-	-	-	-	-
CO5	3	3	3	-	3	-	3	-	-	-	-	-

COs Vs PSOs MAPPING:

COs	PSO1	PSO2
CO1	3	-
CO2	3	3
CO3	3	3
CO4	3	3
CO5	3	-

COURSE CONTENTS:

MODULE I	INTRODUCTION PYTHON	9 Hours

Introduction –Python –Interpreter-keywords and identifier-Data types-Variables-operators-Expression-Comments-list—statements-tuple assignment- operators-module--illustrative programs..

MODULE II	CONTROL FLOW AND FUNCTION	9 Hours

Conditionals- Boolean values and operators- conditional (if)-alternative (if-else),-chained conditional (if-elif-else); Iteration: state-while-for-break- continue- pass- functions- return values-parameters-local and global scope-function composition- recursion-Strings-string slices- immutability- string functions and methods- string module- Lists as arrays.

MODULE III	**LISTS,TUPLES,DICTIONARIES**	**9 Hours**
Lists: list operations-list slices- list methods-list loop- mutability-aliasing-cloning lists-list parameters- Tuples: tuple assignment- tuple as return valued-Dictionaries-operations and methods-advanced list processing - list comprehension- Illustrative programs-selection sort- insertion sort,-Mergesort-histogram.		
MODULE IV	**NumPy**	**9 Hours**
NumPy- NumPy Array-NumPy Side Effects-Subsetting NumPy Arrays-2D NumPy Arrays-2D Arithmetic - Basic Statistics		
MODULE V	**FILES,MODULES AND PACKAGES**	**9 Hours**
Files and exception-text files- reading and writing files-format operator-command line arguments-errors and exceptions-handling modules-packages- Represent compound data using Python lists, tuples, dictionaries - word count- copy file.		
		TOTAL: 45 HOURS

REFERENCES:

1. *Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python*
2. *Guido van Rossum and Fred L. Drake Jr, ―An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.*
3. *John V Guttag, ―Introduction to Computation and Programming Using Python‘‘, Revised and expanded Edition, MIT Press , 2013*
4. *Robert Sedgewick, Kevin Wayne, Robert Dondero, ―Introduction to Programming in Python: An Inter disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.*
5. *Timothy A. Budd, ―Exploring Python‖, Mc-Graw Hill Education (India) Private Ltd.,, 2015.*

2002CA106	SOFTWARE ENGINEERING AND PROJECT MANAGEMENT	L	T	P	C
		3	0	0	3

PREREQUISITE:

1. Principles of Software Engineering

COURSE OBJECTIVES:

1. To introduce the basics of Python .
2. To implement python programs with conditionals and loops
3. Demonstrate the use of Python lists and dictionaries
4. Describe and apply object-oriented programming methodology.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Describe the different types of Software requirements and their techniques.
CO2:	Transfer the requirement model into the design model. CO3:Develop Project Planning for a given Project.
CO3:	Develop Project Scheduling for a given Project
CO4:	Develop the Object Oriented design and modeling activity in a CASE environment
CO5:	Describe the different types of Software requirements and their techniques.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	3	-	-	-	-	3	-	-	3	-
CO2	3	-	3	-	-	-	-	3	-	-	3	-
CO3	3	-	3	-	-	-	-	3	-	-	3	-
CO4	3	-	3	-	-	-	-	3	-	-	3	-
CO5	3	-	3	-	-	-	-	3	-	-	3	-
CO6	3	-	3	-	-	-	-	3	-	-	3	-

COs Vs PSOs MAPPING:

COs	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-
CO6	-	-

COURSE CONTENTS:

MODULE I	REQUIREMENT ANALYSIS	9 Hours

Introduction: Software Engineering – Product and process – process models - Waterfall Life cycle model – Spiral Model – Prototype Model – fourth Generation Techniques – Agile methods. Requirement Analysis: Software Requirements Analysis and Specification – Software Requirements – Problem Analysis – Requirements Specification – Validation – Metrics – Summary.

MODULE II	**SOFTWARE DESIGN AND TESTING**	**9 Hours**
Abstraction – Modularity – Software Architecture – Cohesion – Coupling – Various Design Concepts and notations – Real time and Distributed System Design – Coding – Programming Practice – Top-down and Bottom-up - Internal Documentation Verification – Code Reading –Code Inspection or Reviews – Unit Testing – Fundamentals –Functional Testing versus structural Testing Coding – Software Metrics Overview		
MODULE III	**SOFTWARE PROJECT PLANNING**	**9 Hours**
Business Case – Project selection and Approval – Project charter – Project Scope management: Scope definition and Project Scope management – Creating the Work Breakdown Structures – Scope Verification – Scope Control.		
MODULE IV	**PROJECT SCHEDULING AND PROCUREMENT MANAGEMENT**	**9 Hours**
Relationship between people and Effort: Staffing Level – Estimation, Effect of schedule Change on Cost – Degree of Rigor & Task set selector – Project Schedule – Schedule Control – CPM (Numericals) – Basic Planning Purchases and Acquisitions, Planning Contracting – Requesting Seller – Responses – Selecting Sellers – Out Sourcing: The Beginning of the outsourcing phenomenon – Types of outsourcing relationship – The realities of outsourcing – Managing the outsourcing relationship.		
MODULE V	**OBJECT ORIENTED SOFTWARE ENGINEERING**	**9 Hours**
Introduction-Defining Models-Requirement Process-Use Cases-Object Oriented Development Cycle-Overview of the Unified Modeling Language: UML Fundamentals and Notation-Object Oriented Analysis-Design-Implementation.		
		TOTAL: 45 HOURS

REFERENCES:

1. *Pankaj Jalote, "An Integrated Approach to Software Engineering", Third Edition, Narosa Publications, 2011.*
2. *Ian Sommerville, "Software engineering", Ninth Edition, Pearson Education Asia, 2010.*
3. *Roger S. Pressman, "Software Engineering – A Practitioner"s Approach", Seventh Edition, Tata McGrawHill International Edition, 2009.*
4. *Jacobson I., Object Oriented Software Engineering – A Use Case Driven Approach, Addison- Wesely, 2009.*
5. *Software Engineering Project Management, Richard H. Thayer (Editor), Edward Yourdon, 2001, Wiley Publications*
6. *https://www.tutorialspoint.com/software_engineering/index.htm*

2002CA107	ADVANCED DATA STRUCTURES AND ALGORITHMS LABORATORY	L	T	P	C
		0	0	4	2

PREREQUISITE:

1. C Programming

COURSE OBJECTIVES:

1. Todevelopskillsindesignandimplementationofdatastructuresandtheirapplications.
2. To learn and implement linear, nonlinear and tree data structures.
3. To learn Set ADT and Graph data structures and its applications
4. To study, implement and analyze the different sorting techniques.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Workwithbasicdatastructuresthataresuitablefortheproblemstobesolvedefficiently.
CO2:	Design and implement linear, tree, and graph structures and its applications.
CO3:	Design various sorting techniques, its algorithm design and analysis.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-
CO5	3	3	-	-	-	-	-	-	-	-	-	-

COs Vs PSOs MAPPING:

COS	PSO1	PSO2
CO1	2	-
CO2	2	-
CO3	2	-
CO4	2	-
CO5	2	-

LIST OF EXPERIMENTS:

1. Create the sales report for M sales person and N products using arrays.
2. Generate Student mark sheets using structures
3. Stack ADT implementation with arrays and linked lists.
4. Queue ADT implementation with arrays and linked lists
5. List ADT implementation with arrays and linked lists.
6. BST implementation,
7. Implementation of Quick sort algorithm.
8. Hashing implementation.
9. Implementation of Shortest path algorithm.
10. Sum of subset problem using backtracking

REFERENCES:

1. *Y. Langsam, M. J. Augenstein and A. M. Tenenbaum, "Data Structures using C", Pearson Education Asia, 2004.*
2. *Anany Levitin "Introduction to the Design and Analysis of Algorithms" Pearson Education2003.*
3. *M. A. Weiss, "Data Structures and Algorithm Analysis in C++", Pearson Education Asia, 2013.*

2002CA108	PYTHON PROGRAMMING LABORATORY	L	T	P	C
		0	0	4	2

PREREQUISITE:

1. C Programming

COURSE OBJECTIVES:

1. To write, test, and debug simple Python programs
2. To implement Python programs with conditionals and loops.
3. Use functions for structuring Python programs
4. Represent compound data using Python lists, tuples, dictionaries
5. Read and write data from/to files in Python.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1:	Write, test, and debug simple Python programs
CO2:	Develop the python programs using Conditional Statements.
CO3:	Develop the python programs using sorting.
CO4:	Develop the python program using Lists
CO5:	Develop the python programs using files.
CO6:	Develop the python progam for regression and probability problems.

COs Vs POs MAPPING:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	-	3	-	-	-	-	-	-	-
CO2	3	3	3	-	3	-	-	-	-	-	-	-
CO3	3	3	3	-	3	-	-	-	-	-	-	-
CO4	3	3	3	-	3	-	-	-	-	-	-	-
CO5	3	3	3	-	3	-	-	-	-	-	-	-

COs Vs PSOs MAPPING:

COs	PSO1	PSO2
CO1	3	-
CO2	3	3
CO3	3	3
CO4	3	3
CO5	3	-

LIST OF EXPERIMENTS:

11. Compute the GCD of two numbers
12. Find the square root of a number (Newton,,s method)
13. Exponentiation (power of a number)
14. Find the maximum of a list of numbers
15. Linear search and Binary search
16. Selection sort, Insertion sort
17. Merge sort

18. First n prime numbers
19. Multiply matrices
20. Programs that take command line arguments (word count)
21. Find the most frequent words in a text read from a file 12. Implementation of linear regression and probability concepts.

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