

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	

*Audit course is optional

2001CA101

LINEAR ALGEBRA, PROBABILITY AND STATISTICS

L	T	P	C
2	2	0	3

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

UNIT I VECTOR SPACES

12 Hours

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

UNIT II LINEAR TRANSFORMATION

12 Hours

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

UNIT III PROBABILITY AND RANDOM VARIABLES

12 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.

UNIT 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.

UNIT V DESIGN OF EXPERIMENTS

12 Hours

Analysis of variance - Completely randomized design - Random block design (One-way and Twoway classifications) - Latin square design -² Factorial design.

TOTAL: 60 HOURS

COURSE OUTCOMES:

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

- CO1: Test the consistency and solve system of linear equations.
- CO2: Find the basis and dimension of vector space.
- CO3: 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.
- CO4: Use statistical techniques in testing hypothesis on data analysis.
- CO5: Use the appropriate statistical technique of design of experiments in data analysis.

REFERENCES:

- 1.Friedberg A.H, Insel A.J. and Spence L, Linear Algebra, Prentice Hall of India, New Delhi, 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 :

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

UNIT 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.

UNIT 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-

UNIT 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.

UNIT 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.

UNIT 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

FURTHER READING:

Geometric Algorithms

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.

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 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
	Computer Organization and Architecture	3	0	0	3

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

UNIT I DATA COMMUNICATIONS 08 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.

UNIT II NETWORK FUNDAMENTALS 08 Hours

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

UNIT 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.

UNIT IV NETWORK LAYER 09 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.

UNIT 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

FURTHER READING :

Network Simulation 3 Tool

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: Create simple networks by applying networking Protocols
 - CO3: Establish Data communication layer in simple networks using Data Link Protocols.
 - CO4: Categorize IP addresses using classes of IP and create subnets.
 - CO5: Establish Transport layer and application layer in simple networks using protocols.

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, Pearson Education, 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.tutorialsworld.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.

UNIT I PARALLEL AND DISTRIBUTED DATABASES

09 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.

UNIT II OBJECT AND OBJECT RELATIONAL DATABASES

09 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.

UNIT III XML DATABASES

09 Hours

XML Databases: XML Data Model – DTD - XML Schema - XML Querying – Web Databases – JDBC– Information Retrieval – Data Warehousing – Data Mining.

UNIT IV MOBILE DATABASES

09 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.

UNIT V INTELLIGENT DATABASES

09 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

FURTHER READING:

Data mining and Warehousing, Big Data

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.
- CO4: Design Mobile databases for mobile devices.
- CO5: Apply intelligent rules in database development

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. Objected Oriented Programming
2. Advanced Java Programming

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

UNIT 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..

UNIT 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.

UNIT 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.

UNIT IV NumPy

9 Hours

NumPy- NumPy Array-NumPy Side Effects-Subsetting NumPy Arrays-2D NumPy Arrays-2D Arithmetic - Basic Statistics

UNIT 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

FURTHER READING:

1. Intermediate Python Resources

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.

REFERENCES:

1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist``, 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016
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.

2002CA107

**ADVANCED DATA STRUCTURES AND ALGORITHMS
LABORATORY**

L	T	P	C
0	0	4	2

COURSE OBJECTIVES:

1. To develop skills in design and implementation of data structures and their applications.
2. To learn and implement linear, non linear 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.
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

TOTAL: 60 HOURS

FURTHER READING:

1. Algorithm Design: Dynamic Programming and Heuristics
2. Algorithm Design: Greedy and Backtrack

COURSE OUTCOMES:

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

- CO1: Work with basic data structures that are suitable for the problems to be solved efficiently
CO2: Design and implement linear, tree, and graph structures and its applications.
CO3: Design various sorting techniques, its algorithm design and analysis.

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 Education 2003.
3. M. A. Weiss, "Data Structures and Algorithm Analysis in C++", Pearson Education Asia, 2013.

2002CA108

PYTHON PROGRAMMING LABORATORY

]	T	P	C
(0	4	2

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.

LIST OF EXPERIMENTS:

1. Compute the GCD of two numbers
2. Find the square root of a number (Newton,,s method)
3. Exponentiation (power of a number)
4. Find the maximum of a list of numbers
5. Linear search and Binary search
6. Selection sort, Insertion sort
7. Merge sort
8. First n prime numbers
9. Multiply matrices
10. Programs that take command line arguments (word count)
11. Find the most frequent words in a text read from a file
12. Implementation of linear regression and probability concepts.

TOTAL : 60 HOURS

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 program for regression and probability problems.

REFERENCES:

1. Prof.A.Hema, “Python Programming Laboratory Manual”
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 Pythonl, Mc-Graw Hill Education (India) Private Ltd., 2015.
6. <http://greenteapress.com/wp/think-python.html>

2004CA109 LIFE SKILL I : Verbal Ability

L T P C
0 0 2 1

Course Objectives:

1. To help students comprehend and use vocabulary words in their day to day communication.
2. To apply appropriate reading strategies for interpreting technical and non-technical documents used in job-related settings.
3. To ensure students will be able to use targeted grammatical structures meaningfully and appropriately in oral and written production.
4. To enable the students to arrange the sentences in meaningful unit and to determine whether constructions rely on active or passive voice
5. To Apply the principles of effective business writing to hone communication skills
6. To apply the principles of business etiquettes and Market surveying.

Unit 1 VOCABULARY USAGE

6 hours

Introduction - Synonyms and Antonyms based on Technical terms – Single word Substitution – Newspaper, Audio and video listening activity.

Unit 2 COMPREHENSION ABILITY

6 hours

Skimming and Scanning – Social Science passages – Business and Economics passages – latest political and current event based passages – Theme detection – Deriving conclusion from passages

Unit 3 BASIC GRAMMAR AND ERROR DETECTION

6 hours

Parallelism – Redundancy – Ambiguity – Concord - Common Errors – Spotting Errors – Sentence improvement – Error Detection FAQ in Competitive exams.

Unit 4 REARRANGEMENT AND GENERAL USAGE

6 hours

Jumble Sentences – Cloze Test - Idioms and Phrases – Active and passive voice – Spelling test.

Unit 5 APPLICATION OF VERBAL ABILITY

6 hours

Business Writing - Business Vocabulary - Delivering Good / Bad News - Media Communication - Email Etiquette – Report Writing - Proposal writing – Essay writing– Indexing –Market surveying.

Course Outcomes:

After the completion of this course, the Students will be able to,

1. Construct new words in their day to day communication. K2
2. Predict the information swiftly while reading passages. K2
3. Elaborate their oral and written communication. K2
4. Rephrase the sentences and able to identify the voice of the sentence. K2
5. Summarize their knowledge of the best practices to craft effective business documents K2
6. Make use of the etiquettes in business. K3

REFERENCES

1. Arun Sharma and Meenakshi Upadhyav, How to Prepare for Verbal Ability and Reading Comprehension for CAT, McGrawHill Publication, Seventh Edition 2017
2. R S Aggarwal and Vikas Aggarwal , Quick Learning Objective General English ,S.Chand Publishing House, 2017
3. Dr.K.Alex , Soft Skills, S.Chand Publishing House, Third Revise Edition, 2014
4. Raymond Murphy, Essential English Grammar in Use, Cambridge University press, New Delhi, Third Edition , 2007

ASSESSMENT PATTERN :

Two tests will be conducted (25 * 2) - 50 marks

five assignments will be conducted (5*10) - 50 Marks

LIST OF AUDIT COURSES (AC)
Registration for any of these courses is optional to students

Course Code	Course Name	L	T	P	C	Category
	English for Research Paper Writing	2	0	0	0	AC
	Disaster Management	2	0	0	0	AC
	Value Education	2	0	0	0	AC
	Constitution of India	2	0	0	0	AC

Bridge Courses

Course Code	Course Name	L	T	P	C	Category
SEMESTER I						
2001CA016	Mathematical Foundations of Computer Science	3	0	0	3	FC
2001CA017	Programming Concepts using C and C++	3	0	0	3	PC
2001CA018	Basic Data Structures	3	0	0	3	PC
2001CA019	C Programming and Data Structures Laboratory	0	0	4	2	PC
TOTAL		9	0	4	11	