

2002CA102

**ADVANCED DATA STRUCTURES AND ALGORITHMS**

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**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

**EMPLOYABILITY**

**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](https://www.tutorialspoint.com/data_structures_algorithms/algorithms_basics.htm)

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2002CA103

**COMPUTER COMMUNICATIONS AND NETWORKS**

**L T P C**  
**3 0 0 3**

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

**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

**EMPLOYABILIT**

**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](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>

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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

**EMPLOYABILITY**

**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>

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2002CA105

**PYTHON PROGRAMMING**

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**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

**EMPLOYABILIT**

**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.

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2002CA106

**SOFTWARE ENGINEERING AND PROJECT MANAGEMENT**      **L**   **T**   **P**   **C**  
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**COURSE OBJECTIVES:**

1. To provide an insight into the processes of software development.
2. To understand and practice the various fields such as analysis, design, development, testing of Software Engineering.
3. To develop skills to construct software of high quality with high reliability.
4. To apply metrics and testing techniques to evaluate the software.

**UNIT 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.

**UNIT 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

**UNIT 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.

**UNIT 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.

**UNIT 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**

**FURTHER READING:**

Case Study for Project Plan and SRS, Design of any Application Project, Testing Techniques, COCOMO model, Web Engineering

**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.
- CO4:Develop Project Scheduling for a given Project
- CO5:Develop the Object Oriented design and modeling activity in a CASE environment

**EMPLOYABILITY**

**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 McGraw-Hill 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](https://www.tutorialspoint.com/software_engineering/index.htm)

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2002CA107

**ADVANCED DATA STRUCTURES AND ALGORITHMS  
LABORATORY**

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**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:**

**SKILL DEVELOPMENT**

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. Langsum, 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.

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2002CA108

**PYTHON PROGRAMMING LABORATORY**

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**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.

**SKILL DEVELOPMENT**

**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 Python!, Mc-Graw Hill Education (India) Private Ltd., 2015.
6. <http://greenteapress.com/wp/think-python.html>

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**2004CA109 LIFE SKILL I : Verbal Ability**

**L T P C**  
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**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,

**SKILL DEVELOPMENT**

- |  |    |
|--|----|
| 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 |

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**E.G.S. PILLAY ENGINEERING COLLEGE**  
**(Autonomous)**

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Accredited by NBA (CSE, EEE, MECH, CIVIL, ECE, IT)

**NAGAPATTINAM – 611 002**



**MASTER OF COMPUTER APPLICATIONS**

**Curriculum and Syllabi**

**First Year – Second Semester**

SEMESTER II									
Course Code	Course Name	L	T	P	C	Maximum Marks			Category
						CIA	ES	Total	
<b>Theory Course</b>									
2002CA201	Advanced Java Programming	3	-	-	3	40	60	100	PC
2002CA202	Mobile Technologies	3	-	-	3	40	60	100	PC
2002CA203	Data Mining Techniques	2	-	2	3	50	50	100	PC
2002CA204	Internet of Things	2	-	2	3	50	50	100	PC
2002CA205	Professional Practice and Ethics	3	-	-	3	40	60	100	PC
	Elective – I	3	-	-	3	40	60	100	PE
	Audit Course II*	2	-	-	-	100	0	100	AC
2002CA206	Java and Web Programming Laboratory	-	-	4	2	50	50	100	PC
2002CA207	Mobile Application Development Lab	-	-	4	2	50	50	100	PC
2004CA208	Life Skill II- Aptitude I	-	-	2	1	100	-	100	EEC
<b>Total</b>		<b>18</b>	<b>0</b>	<b>14</b>	<b>23</b>	<b>560</b>	<b>440</b>	<b>1000</b>	

\*Audit course is optional

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2002CA201

**ADVANCED JAVA PROGRAMMING**

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**PREREQUISITE :**

1. Programming Concepts using C and C++

**COURSE OBJECTIVES:**

1. To understand and apply the fundamentals core java, packages, database connectivity for computing
2. To enhance the knowledge to server-side programming
3. To provide knowledge on advanced features like Swing , Sockets and MVC architecture.

**UNIT I JAVA FUNDAMENTAL**

**08 Hours**

Java features – Java Platform – Expressions, Operators, and Control Structures – Classes, Methods and Inheritance- Packages and Interfaces – Exception Handling - Garbage Collection – Multithreading

**UNIT II GUI and I/O PROGRAMMING**

**09 Hours**

**AWT package** – Layouts – Event Package – Event Model – Painting- Swing Fundamentals- Swing Classes- Working with Text Fields, Buttons, List and Scroll panes - Input Output Package

**UNIT III JDBC AND WEB APPLICATION DEVELOPMENT**

**12 Hours**

Accessing Database with JDBC – Basics – Manipulating Databases with JDBC – Overview of Servlets – Servlet API – Servlet Life Cycle – **Servlet Configuration** – Running Servlet with Database Connectivity – Session Tracking – **Basics of JSP** – Java Server Faces – Multitier Application Architecture – MVC Architecture of JSF Apps – Common JSF Components – **Session Tracking.**

**UNIT IV DISTRIBUTED APPLICATION AND NETWORKING BASICS**

**07 Hours**

Remote Method Invocation-Java and the Net – Inet Address – TCP/IP Client Sockets – URL –URL Connection – TCP/IP Server Sockets –Datagrams.

**UNIT V ADVANCED FRAMEWORKS**

**09 Hours**

Understanding Struts – MVC framework – Struts Control Flow –Building Model View Controller Component – Hibernate – Architecture – Understanding O/R mapping – Query language – Spring Framework – Architecture – Case Studies.

**TOTAL: 45 HOURS**

**FURTHER READING:**

1. Enterprise Java Beans

**EMPLOYABILIT**

**COURSE OUTCOMES:**


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

- CO1: Develop programs using Java Classes, Interfaces and Exception Handling (K3)
- CO2: Create GUI application using AWT packages and Swing (K6)
- CO3: Create dynamic web applications with database connectivity using server-side technologies(K6)
- CO4: Design and Implement applications using RMI, TCP and UDP sockets(K3)
- CO5: Design and development of applications using advanced frameworks(K3)

**REFERENCES:**

1. “Core and Advanced Java, Black Book”, Dreamtech Press, 2018.
2. Paul J. Deitel, Harvey Deitel, “Java How to Program”, Eleventh Edition, Pearson,2017.
3. Cay S. Horstmann, “Core Java Volume I & II”, Pearson Education, 2018.
4. Herbert Schildt , “Java The Complete Reference”, Eighth Edition, Tata McGraw Hill,2011.
5. Paul Dietel, Harvey Dietel, Abbey Dietel, “Internet and World Wide Web”, Fifth Edition, Pearson Education, 2012.
7. <https://www.oracle.com/corporate/pressrelease/Java-10-032018.html>

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2002CA202

**MOBILE TECHNOLOGIES**

L T P C  
3 0 0 3

**PREREQUISITE :**

1. Computer Networks

**COURSE OBJECTIVES:**

1. To understand the basics of wireless voice and data communication technologies.
2. To learn the basic concepts, aware of the GSM, Routing and GPRS Architecture.
3. To study the working principles of wireless LAN and its standards
4. To build knowledge on various Mobile Computing algorithms
5. To Know the Network, Transport Functionalities of Mobile communication
6. To understand the concepts of Adhoc and wireless sensor networks.

**UNIT I WIRELESS COMMUNICATION FUNDAMENTALS 9 Hours**

Introduction – **Wireless transmission** – Frequencies for radio transmission – Signals – Antennas – Signal Propagation – Multiplexing – Modulations – Spread spectrum – MAC– SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks- Comparison of 2G and 3 G .

**UNIT II TELECOMMUNICATION SYSTEMS 9 Hours**

**GSM** – Mobile services -System Architecture – Protocols – Localization and calling – Handover – Security – GPRS– System Architecture –Protocols- SMS Architecture- Value Added Service through SMS.

**UNIT III MOBILE WIRELESS NETWORK SHORT RANGE NETWORKS 8 Hours**

Introduction-WLAN Equipment-WLAN Topologies-WLAN Technologies-IEEE 802.11 Architecture- Protocol architecture- WAP Architecture- Bluetooth- Bluetooth Protocol- Security in Bluetooth- IrDA- ZigBee.

**UNIT IV MOBILE NETWORK LAYER,TRANSPORT LAYER 9 Hours**

Mobile IP– Mobile IP- **Mobile IP** – Goals – Assumptions and Requirement – Entities – IP packet Delivery –Agent Advertisement and Discovery – Registration – Tunneling and Encapsulation- IPv6 – DHCP – Ad hoc Networks- DSDV – DSR.- Traditional TCP – Indirect TCP – Snooping TCP – Mobile TCP – Fast Retransmit/ Fast Recovery – Transmission/ Timeout Freezing – Selective Retransmission .

**UNIT V PLATFORMS AND RECENT TRENDS 10 Hours**

Mobile Applications Development- **Android Application** Architecture- The Android Application Life Cycle- Creating User Interfaces- Appcelerator Architecture-types mobile os- Geo services- creating mobile applications like game, Clock, calendar, Converter, phone book, Text Editor

**TOTAL: 45 HOURS**

**FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR: \***

I. Mobile Adhoc Networks(MANET)

**COURSE OUTCOMES:**

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

- CO1: Analyze the terminals signal separation and cell capacity of SDMA, FDMA and CDMA in wireless communication. (K4)
- CO2: Categorize the GSM and GPRS system architecture in Telecommunication system. (K2)
- CO3: Categorize the System architectures and protocols of Wireless LAN. (K2)
- CO4: Analyze the performance of fast transmit and fast recovery for a given Mobile Network.
- CO5: Develop the game application using Android Controls. (K3)
- CO6: Develop the mobile application for location tracking system using GPRS.(K3)

**EMPLOYABILITY**

**REFERENCES:**

1. Kaveh Pahlavan, Prasanth Krishnamoorthy, "Principles of Wireless Networks", Pearson Education, 2003.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, New York, 2003.
3. C.K.Toh, "AdHoc Mobile Wireless Networks", Prentice Hall Inc., 2002.
4. Jochen Schiller, "Mobile Communications", Second Edition, Prentice Hall of India, Pearson Education, 2003.
5. William Stallings, "Wireless Communications and Networks", Second Edition, Prentice Hall of India, Pearson Education, 2004.
6. [https://www.tutorialspoint.com/mobile\\_computing/mobile\\_computing\\_pdf\\_version.html](https://www.tutorialspoint.com/mobile_computing/mobile_computing_pdf_version.html)
7. <https://www.tutorialspoint.com/android/>

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2002CA203

**DATA MINING TECHNIQUES**

**L T P C**  
**2 0 2 3**

**PREREQUISITE :**

1. Database Management Techniques

**COURSE OBJECTIVES:**

1. To Understand Data mining principles and techniques and Introduce DM as a cutting edge Business intelligence
2. To expose the students to the concepts of Data warehousing Architecture and Implementation.
3. To know the data mining techniques, in details for better organization and retrieval of data
4. To learn to use association rule mining for handling large data
5. To identify Business applications and Trends of Data mining.

**UNIT I DATA MINING & DATA PREPROCESSING 12 Hours**

Introduction to KDD process – Knowledge Discovery from Databases - Need for Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction.

**UNIT II ASSOCIATION RULE MINING 12 Hours**

Introduction - Data Mining Functionalities - Association Rule Mining –Market Basket Analysis – Mining Frequent Itemsets with Candidate Generation –Mining Frequent Itemsets without Candidate Generation Mining Various Kinds of Association Rules

**UNIT III CLASSIFICATION AND PREDICTION 12 Hours**

Classification vs Prediction – Data preparation for Classification and Prediction –Naïve Bayes Classifier– Classification by Decision Tree Introduction –Associative Classification – Support Vector Machines – Prediction: Introduction –Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Model Section

**UNIT IV CLUSTERING AND CLUSTER ANALYSIS IN PYTHON 12 Hours**

Cluster Analysis - Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods– Grid-Based Methods –Clustering High- Dimensional Data – Constraint-Based Cluster Analysis – Outlier Analysis.- K means clustering in python-DBSCAN-HAC.

**UNIT V OPEN SOURCE DATA MINING TOOLS 12 Hours**

Introduction –Rapid Miner-Attributes-Modeling-Design and Analysis process-Visualization

**TOTAL: 60 HOURS**

**FURTHER READING:**

1. Bootstrap **EMPLOYABILIT**

**COURSE OUTCOMES:**

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

- CO1: Preprocess the data for mining applications
- CO2: Apply the association rules for mining the data
- CO3: Design and deploy appropriate classification techniques
- CO4: Cluster the high dimensional data for better organization of the data
- CO5: Able to understand the Open Source Mining tools

**REFERENCES:**

1. Jiawei Han and MichelineKamber, “Data Mining Concepts and Techniques”, Second Edition, Elsevier, Reprinted 2011.
2. K.P. Soman, ShyamDiwakar and V. Ajay, “Insight into Data mining Theory and Practice”, Easter Economy Edition, Prentice Hall of India, 2006.
3. G. K. Gupta, “Introduction to Data Mining with Case Studies”, Easter Economy Edition  
BERSON, ALEX & SMITH, STEPHEN J, Data Warehousing, Data Mining, and OLAP, TMH Pub..
4. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, “Introduction to Data Mining”, Pearson Education, 2007
5. MARAKAS, GEORGE M, Modern Data Mining, and Visualization, Pearson Education, 2011
6. George Seif’s article, “The 5 Clustering Algorithms Data Scientists Need to Know.”
7. [www.wideskills.com/data-mining-tutorial/data-mining-techniques](http://www.wideskills.com/data-mining-tutorial/data-mining-techniques)

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**Lab Modules:**


**Module 1**

1. Explore visualization features of the tool for analysis and WEKA.
2. Perform data preprocessing tasks
3. Demonstrate performing association rule mining on data sets.
4. Demonstrate performing classification on data sets.
5. Demonstrate performing clustering on data sets.

**Module 2**

6. Navigate the options available in the WEKA(ex.select attributes panel, preprocess panel, classify panel, cluster panel, associate panel and visualize)
7. Explore the available data sets in WEKA.
8. List attribute names and types of Dataset in SuperMarket.
9. Plot Histogram of Different Datasets in the SuperMarket using WEKA Tool.
10. Load each dataset into Weka and run Apriori algorithm with different support and confidence values. Study the rules generated.

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2002CA204

INTERNET OF THINGS

L	T	P	C
2	0	2	3

PREREQUISITE:

1. Computer Organization and Design
2. Computer Communications and Networks

COURSE OBJECTIVES:

1. To understand the fundamentals of Internet of Things.
2. To build a small low cost IoT application using Raspberry Pi and Arduino.
3. To apply the concept of Internet of Things in the real world scenario.

UNIT I FUNDAMENTALS OF IoT

12 Hours

Internet of Things – Physical Design – Logical Design – IoT Enabling Technologies – IoT Levels & Deployment Templates – Domain Specific IoTs – IoT and M2M – IoT System Management with NETCONF – YANG – IoT Platforms Design Methodology.

UNIT II IoT ARCHITECTURE

12 Hours

M2M high-level ETSI architecture – IETF architecture for IoT – OGC architecture – IoT reference model – Domain model – Information model – functional model – communication model – IoT reference architecture.

UNIT III IoT PROTOCOLS

12 Hours

Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Unified Data Standards – Protocols – IEEE 802.15.4 – BACNet Protocol – Modbus – Zigbee Architecture – Network layer – 6LowPAN – CoAP – Security.

UNIT IV BUILDING IoT WITH RASPBERRY PI AND ARDUINO

12 Hours

Building IOT with Raspberry Pi – IoT Systems – Logical Design using Python – IoT Physical Devices & Endpoints – IoT Device – Building blocks – Raspberry Pi Board – Linux on Raspberry Pi – Raspberry Pi Interfaces – Programming Raspberry Pi with Python – Other IoT Platforms – Arduino Basics – Arduino Software IDE – Arduino Boards – Arduino Programming Language – Developing IoT Applications using Arduino – Case study Applications.

UNIT V CASE STUDIES AND ADVANCED TOPICS

12 Hours

Real world design constraints – Applications – Asset management, Industrial automation, Smart grid, Commercial building automation, Smart cities – Participatory sensing – Data Analytics for IoT – Software & Management Tools for IoT – Cloud Storage Models & Communication APIs – Cloud for IoT – Amazon Web Services for IoT.

TOTAL: 60 HOURS

FURTHER READING:

FOG Computing

EMPLOYABILIT


COURSE OUTCOMES:

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

- CO1: Explain the fundamentals of IoT. (K2)
- CO2: Describe the Architecture of IoT.(K2)
- CO3: Categorize the Protocols of IoT.(K2)
- CO4: Develop IoT applications using Raspberry Pi. (K3)
- CO5: Develop IoT applications using Arduino.(K3)
- CO6: Make use of Cloud to deploy real time IoT Applications.(K3)

REFERENCES:

1. ArshdeepBahga, VijayMadiseti, "InternetofThings–A hands–on approach", Universities Press, 2015.
2. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), "Architecting the Internet of Things", Springer, 2011.
3. Honbo Zhou, "The Internet of Things in the Cloud: A Middleware Perspective", CRC Press, 2012.
4. Olivier Hersent, David Boswarthick, Omar Elloumi, "The Internet of Things – Key applications and Protocols", Wiley, 2012.
5. ManoelCarlosRamon, "Intel@Galileo and Intel@GalileoGen2:API Features and ArduinoProjects for Linux Programmers", Apress, 2014.
6. MarcoSchwartz, "Internetof Things with the ArduinoYun", PacktPublishing, 2014.
7. "Internet of Things: Science Fiction or Business Fact?" (PDF). *Harvard Business Review*. November 2014. Retrieved 23 October 2016.
8. Kyriazis, D.; Varvarigou, T.; Rossi, A.; White, D.; Cooper, J. (4–7 June 2013). "Sustainable smart city IoT applications: Heat and electricity management & Eco–conscious cruise control for public transportation"
9. [https://www.tutorialspoint.com/internet\\_of\\_things/](https://www.tutorialspoint.com/internet_of_things/)
10. <https://www.edureka.co/blog/iot-tutorial/>

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**Lab Modules:**

**Module 1:**

1. Exploring IoT Platforms and Tools
2. Demonstration of IoT Protocols in any IoT Toolkit
3. Exploring the Components of Arduino Board
4. Practical study of Raspberry Pi Board
5. Introduction to IoT Programming

**Module 2:**

6. Implementing Turning LED On or Off program using push button using IoT toolkit
7. Implementing Bluetooth interface with Arduino/Raspberry to send sensor data to Mobile Phone.
8. Implementing Temperature and Humidity printing using sensors
9. Implementing Object Distance calculation with IoT Toolkit
10. Demonstration of interfacing IoT with Cloud environment.

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2002CA205

**PROFESSIONAL PRACTICE AND ETHICS**

**L T P C**  
**3 0 0 3**

**PREREQUISITE :**

Software Quality Assurance

**COURSE OBJECTIVES:**

1. To explore the basic software development ethics.
2. To make understand the essentials of the Project Management.
3. To provide knowledge on the various software architectures.
4. To expose the principles to be followed in OOAD.
5. To understand the ethics of software testing.

**UNIT I INTRODUCTION**

**09 Hours**

What We're Doing-How to Develop Software-A Model That's not a Model At All: Code and Fix-Cruising over the Waterfall-Evolving the Incremental Model-eXtreme Programming (XP)

**UNIT II PROJECT MANAGEMENT ESSENTIALS**

**09 Hours**

Project Planning- Project Organization-Risk Analysis-Resource Requirements-Work Breakdown and Task Estimates-Project Schedule-Project Oversight-Requirements: Types of Requirements-Requirements Digging.

**UNIT III SOFTWARE ARCHITECTURE**

**09 Hours**

General Architectural Patterns-Pipe-and-filter Architecture-An Object-Oriented Architectural Pattern-Design Process-Desirable Design Characteristics-Designers and Creativity

**UNIT IV OBJECT-ORIENTED ANALYSIS AND DESIGN—AN OVERVIEW**

**09 Hours**

An Object-Oriented Analysis and Design Process-Doing the Process-List of Fundamental Object-Oriented Design Principles-The Open-Closed Principle (OCP)- Don't Repeat Yourself Principle (DRY)- The Single Responsibility Principle (SRP).- Liskov Substitution Principle (LSP)- The Dependency Inversion Principle (DIP)- The Interface Segregation Principle (ISP)

**UNIT V DESIGN PATTERNS**

**09 Hours**

Approach to Debugging-Source Code Control-Unit Testing: The Problem with Testing-Characteristics of Tests-Walkthroughs-Code Reviews-Code Inspections

**TOTAL: 45 HOURS**

**FURTHER READING:**

Code of Ethics for Software Development

**EMPLOYABILIT**

**COURSE OUTCOMES:**

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

- CO1: Analyze the architectures of the software development.
- CO2: Develop Project Plan using Project management principles.
- CO3: Compare different software architectural patterns used in software development.
- CO4: Apply object-oriented design principles for developing software applications.
- CO5: Adapt testing principles in software testing.

**REFERENCES:**

1. Software Development and Professional Practice by John Dooley Printed and bound in the United States of America
2. Mike Martin and Roland Schinzinger, Ethics in Engineering, McGraw Hill, 4th Edition, 2005
3. Charles E Harris, Micheal S. Pritchard, Micheal Rabins, "Engineering Ethics - Concepts and Cases", Thompson Learning, 5th Edition, 2013
4. Charles D Fledderman, Engineering Ethics, Prentice Hall, New Mexico, 4th Edition, 2007
5. [https://www.tutorialspoint.com/professional\\_ethics/professional\\_ethics\\_tutorial.pdf](https://www.tutorialspoint.com/professional_ethics/professional_ethics_tutorial.pdf)
6. <https://data.conferenceworld.in/25FebEMSSH/21.pdf>

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2002CA206

**JAVA AND WEB PROGRAMMING LABORATORY**

L	T	P	C
0	0	4	2

**Course Objectives:** The student should be able to

1. To understand and apply the fundamentals of core Java
2. To implement inheritance, polymorphism, interfaces, multithreading, streaming, networking and RMI.
3. To develop web applications using client side and server-side programming.
4. To learn and use MVC architecture for application development.

**List of Experiments:**

1. Design and Implement java programs that deals with the following
  - a. Classes and Objects, Interfaces and User defined Packages
  - b. Exception Handling with user defined Exceptions.
  - c. Implementation of Thread Synchronization using any application.
2. Create applet application for Calculator, Fahrenheit to Centigrade conversion.
3. Create a Personal Information System using Swing
4. Reading and writing text files in Java
5. Create student information system using JDBC and servlet
6. Writing an RMI application to access a remote method
7. Reading websites using URL class.
8. FTP Using Sockets.
9. Development of Hibernate framework based application for O/R mapping
10. Web application development using Struts framework & Spring framework

**TOTAL: 60 HOURS**

**ADDITIONAL EXPERIMENTS / INNOVATIVE EXPERIMENTS :**

1. Creation and usage of Enterprise Java bean

**EMPLOYABILIT**

**Course Outcomes:**

After completion of the course, Student will be

1. Design Java applications using classes, objects, interfaces, packages and Multithreading. (K3)
2. Develop programs for reading and writing text files using Java Streams.(K3)
3. Develop file transfer applications using sockets.(K3)
4. Create student information system using Servlet and JDBC. (K6)
5. Create Calculator application, Fahrenheit to Centigrade conversion using applets (K6)
6. Develop programs using Event Handling in Swing(K3)
7. Develop Java RMI application to access remote methods(K3)
8. Create Mini Projects using Java. (K6)

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2002CA207

**MOBILE APPLICATION DEVELOPMENT LABORATORY**

L	T	P	C
0	0	4	2

**Course Objectives:**

1. To know about various platforms and tools available for developing mobile applications
2. To create a simple Android Application using Eclipse IDE.
3. To demonstrate the basic application using UI in android
4. To design android application using linear layout

List of Experiments: The following experiments to be practiced

1. Develop an application that uses GUI components. Font and Colours
2. Develop an application that uses Layout Managers and event listeners.
3. Develop a tip calculator application.
4. Graphical and Multimedia applications
5. Developing an android application using Relative layout to display Date and time.
6. Develop an application that makes use of RSS Feed.
7. Develop a native application that uses GPS location information.
8. Implement an application that writes data to the SD card.)
9. Develop an application that makes use of database.
10. Mobile Chatting Application using TCP with mobile client
11. Mobile Chatting Application using UDP with Mobile Client
12. M-Commerce Applications
13. M-service Applications

Total:

60 Hours

**ADDITIONAL EXPERIMENTS / INNOVATIVE EXPERIMENTS :**

1. Create a mobile Application Development Tools
2. Develop the gaming Applications by use of Forms, Controls, Graphical and multimedia, Data retrieval Applications.

**Course Outcomes:**

After completion of the course, Student will be

1. Be able to develop useful mobile applications for the current scenario in mobile computing and pervasive computing

EMPLOYABILIT

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2004CA208 LIFE SKILL II - APTITUDE – I

L T P C  
0 0 2 1

Course Objective (s):

- To brush up problem solving skill and to improve intellectual skill of the students
- To be able to critically evaluate various real life situations by resorting to Analysis Of key issues and factors
- To be able to demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.
- To enhance analytical ability of students
- To augment logical and critical thinking of Student

**Unit 1 Introduction to Number System, Basic Shortcuts of addition, Multiplication, Division** 6 Hours  
Classification of numbers – Types of Numbers - Divisibility rules - Finding the units digit - Finding remainders in divisions involving higher powers - LCM and HCF Models - Fractions and Digits – Square, Square roots – Cube, Cube roots – Shortcuts of addition, multiplication, Division.

**Unit 2 Ratio and proportion, Averages** 6 Hours  
Definition of Ratio - Properties of Ratios - Comparison of Ratios - Problems on Ratios - Compound Ratio - Problems on Proportion, Mean proportional and Continued Proportion Definition of Average - Rules of Average - Problems on Average - Problems on Weighted Average - Finding average using assumed mean method.

**Unit 3 Percentages, Profit And Loss** 6 Hours  
Introduction Percentage – Converting a percentage into decimals - Converting a Decimal into a percentage - Percentage equivalent of fractions - Problems on percentages - Problems on Profit and Loss percentage- Relation between Cost Price and Selling price - Discount and Marked Price - Two different articles sold at same Cost Price - Two different articles sold at same Selling Price - Gain% / Loss% on Selling Price.

**Unit 4 Coding and decoding, Direction sense** 6 Hours  
Coding using same set of letters - Coding using different set of letters - Coding into a number - Problems on R-model - Solving problems by drawing the paths - Finding the net distance travelled - Finding the direction - Problems on clocks - Problems on shadows - Problems on direction sense using symbols and notations.

**Unit 5 Number and letter series Number and Letter Analogies, Odd man out** 6 Hours  
Difference series - Product series - Squares series - Cubes series - Alternate series - Combination series - Miscellaneous series - Place values of letters - Definition of Analogy - Problems on number analogy - Problems on letter analogy - Problems on verbal analogy - Problems on number Odd man out - Problems on letter Odd man out - Problems on verbal Odd man out

Total 30 Hours

SKILL DEVELOPMENT

COURSE OUTCOMES:

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

CO1: Learners should be able to understand number and solving problems least time using various shortcut

CO2: Solve problems on averages; compare two quantities using ratio and proportion.

CO3: Calculate concept of percentages, implement business transactions using profit and loss. CO4: Workout concepts of Coding and Decoding, ability to visualize directions and understand the logic behind a sequence.

CO5: Learners should be able to find a series the logic behind a sequence.

References:

1. Arun Sharma, 'How to Prepare for Quantitative Aptitude for the CAT', 7<sup>th</sup> edition, McGraw Hills publication, 2016.
2. Arun Sharma, 'How to Prepare for Logical Reasoning for CAT', 4<sup>th</sup> edition, McGraw Hills publication, 2017.
3. R S Agarwal, 'A modern approach to Logical reasoning', revised edition, S.Chand publication, 2017.
4. R S Agarwal, 'Quantitative Aptitude for Competitive Examinations', revised edition, S.Chand publication, 2017.
5. Rajesh Verma, "Fast Track Objective Arithmetic", 3<sup>rd</sup> edition, Arihant publication, 2018.
6. B.S. Sijwalii and Indu Sijwali, "A New Approach to REASONING Verbal & Non-Verbal", 2<sup>nd</sup> edition, Arihant publication, 2014.

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**LIST OF ELECTIVES**

**ELECTIVE I**

Course Code	Course Name	L	T	P	C	Category
2003CA001	Research Methodology and IPR	3	0	0	3	PE
2003CA002	Software Quality Assurance	3	0	0	3	PE
2003CA003	Digital Image Processing	3	0	0	3	PE
2003CA004	Computer Graphics and Animation	3	0	0	3	PE
2003CA005	Software Testing	3	0	0	3	PE

**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 Name	L	T	P	C	Category	
<b>SEMESTER II</b>						
2001CA020	Computer Organizations and Architecture	3	0	0	3	PC
2001CA021	Operating Systems	3	0	0	3	PC
2001CA020	Database Management Systems	3	0	0	3	PC
2001CA021	Database Management System Laboratory	0	0	4	2	PC
<b>TOTAL</b>		<b>9</b>	<b>0</b>	<b>4</b>	<b>11</b>	

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Accredited by NBA (CSE, EEE, MECH, CIVIL, ECE, IT)

**NAGAPATTINAM – 611 002**



**MASTER OF COMPUTER APPLICATIONS**

**Curriculum and Syllabi**

**Second Year – Third Semester**

SEMESTER III									
Course Code	Course Name	L	T	P	C	Maximum Marks			Category
						CIA	ES	Total	
<b>Theory Course</b>									
2002CA301	Cryptography and Network Security	2	-	2	3	50	50	100	PC
2002CA302	Distributed Systems and Cloud Computing	3	-	-	3	40	60	100	PC
2002CA303	Human Resource Management	3	-	-	3	40	60	100	PC
2002CA304	Data Analytics	3	-	-	3	40	60	100	PC
	Elective – II	3	-	-	3	40	60	100	PE
	Elective – III	2	-	2	3	50	50	100	PE
<b>Laboratory Course</b>									
2002CA305	Data Analytics Laboratory	-	-	4	2	50	50	100	PC
2002CA306	Distributed System and Cloud Laboratory	-	-	4	2	50	50	100	PC
2004CA307	Technical Seminar and Report Writing	-	-	2	1	50	50	100	EEC
2004CA308	Life Skill III-Aptitude II	-	-	2	1	100	-	100	EEC
<b>Total</b>		<b>16</b>	<b>0</b>	<b>16</b>	<b>24</b>	<b>510</b>	<b>490</b>	<b>1000</b>	

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2002CA301	<b>CRYPTOGRAPHY AND NETWORK SECURITY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>PREREQUISITE :</b>		<b>2</b>	<b>0</b>	<b>2</b>	<b>3</b>

Data Communications and Network Security

**COURSE OBJECTIVES:**

1. To understand the basics of cryptography
2. To learn to find the vulnerabilities in programs and to overcome them
3. To know the different kinds of security threats in networks and its solution
4. To know the different kinds of security threats in databases and solutions available
5. To learn about the models and standards for security.

**UNIT I                      ELEMENTARY CRYPTOGRAPHY                      12 Hours**

Terminology and Background – Substitution Ciphers – Transpositions – Making Good Encryption Algorithms- Data Encryption Standard- AES Encryption Algorithm – Public Key Encryption –Cryptographic Hash Functions – Key Exchange – Digital Signatures – Certificates

**UNIT II                      PROGRAM SECURITY                      12 Hours**

Secure programs – Non-malicious Program Errors – **Viruses** – Targeted Malicious code – Controls Against Program Threat – Control of Access to General Objects – User Authentication – Good Coding Practices – Open Web Application Security Project Flaws – Common Weakness Enumeration Most Dangerous Software Errors

**UNIT III                      SECURITY IN NETWORKS                      12 Hours**

Threats in networks – Encryption – Virtual Private Networks – PKI – SSH – SSL – IPsec – Content Integrity – Access Controls – Wireless Security – Honeypots – Traffic Flow Security – Firewalls –Intrusion Detection Systems – Secure e-mail.

**UNIT IV                      SECURITY IN DATABASES                      12 Hours**

Security requirements of database systems – Reliability and Integrity in databases –Redundancy –Recovery – Concurrency/ Consistency – Monitors – Sensitive Data – Types of disclosures – Inference-finding and confirming sql injection

**UNIT V                      SECURITY MODELS AND STANDARDS                      12 Hours**

Secure SDLC – Secure Application Testing – Security architecture models – Trusted Computing Base– Bell-LaPadula Confidentiality Model – Biba Integrity Model – Graham-Denning Access Control Model – Harrison-Ruzzo-Ulman Model – Secure Frameworks – COSO – CobiT – Compliances – PCI DSS – Security Standards - ISO 27000 family of standards – NIST.

**TOTAL: 60 HOURS**

**FURTHER READING:**

*Employability* 1. Challenge –Handshake Authentication Protocol (CHAP)

**COURSE OUTCOMES:**

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

- CO1: Apply cryptographic algorithms for encrypting and decryption for secure data transmission
- CO2: Understand the importance of Digital signature for secure e-documents exchange
- CO3: Understand the program threats and apply good programming practice
- CO4: Get the knowledge about the security services available for internet and web applications
- CO5: Gain the knowledge of security models and published standards

**REFERENCES:**

1. Charles P. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Fourth Edition, Pearson Education, 2007
2. William Stallings, "Cryptography and Network Security : Principles and Practices", Fifth Edition, Prentice Hall, 2010.
3. Michael Howard, David LeBlanc, John Viega, "24 Deadly Sins of Software Security: Programming Flaws and How to Fix Them", First Edition, McGrawHill Osborne Media, 2009.
4. Michael Whitman, Herbert J. Mattord, "Management of Information Security", Third Edition, Course Technology, 2010.
5. Matt Bishop, "Computer Security: Art and Science", First Edition, Addison-Wesley, 2002
6. <https://www.tutorialspoint.com/cryptography/index.htm>
7. <https://nptel.ac.in/courses/106/105/106105031/>

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2002CA302

**DISTRIBUTED SYSTEMS AND CLOUD COMPUTING**

L	T	P	C
3	0	0	3

**PREREQUISITE:**

1. Computer Networks
2. Operating Systems

**COURSE OBJECTIVES:**

1. To understand the basic concepts of distributed systems
2. To expose the usage of cluster computing and virtualization.
3. To enable development of cloud programs.

**UNIT I DISTRIBUTED SYSTEM MODELS AND ENABLING TECHNOLOGIES 09 Hours**

Introduction – Scalable computing over the Internet – Technologies for Network-Based systems – System Models for Distributed and Cloud Computing – Software Environments for Distributed Systems and Cloud – Performance, Security and Energy Efficiency.

**UNIT II COMPUTER CLUSTERS FOR SCALABLE PARALLEL COMPUTING 09 Hours**

Clustering for Massive Parallelism – Computer clusters and MPP Architectures – Design Principles of Computer Clusters – Cluster Job and Resource Management – Case studies of Top Supercomputer Systems

**UNIT III VIRTUAL MACHINES AND VIRTUALIZATION OF CLUSTERS AND DATA CENTERS 09 Hours**

Virtualization Basics – Implementation levels of Virtualization – Virtualization Structures, Tools and Mechanisms – Virtualization of CPU, Memory and I/O Devices – Virtual Clusters and Resource Management – Virtualization for Data Center Automation.

**UNIT IV COMPUTING CLOUDS, SERVICE ORIENTED ARCHITECTURE AND PROGRAMMING 09 Hours**

Cloud computing and service models - Data-center Design and Interconnection Networks – Architectural Design of Compute and Storage clouds - Public Cloud Platforms: GAE, AWS and Azure – Inter cloud Resource Management – Cloud Security and Trust Management.

**UNIT V CLOUD PROGRAMMING AND SOFTWARE ENVIRONMENTS 09 Hours**

Features of Cloud and Grid Platforms – Parallel and Distributed Programming Paradigms – Programming support of Google App Engine – Programming on Amazon AWS and Microsoft Azure – Emerging Cloud Software Environments – Case Study on Popular cloud Market Applications.

**TOTAL: 45 HOURS**

**FURTHER READING:**

Fog Computing

*Employability*

**COURSE OUTCOMES:**

- On the successful completion of the course, students will be able to
- CO1: Explain the core concepts of distributed systems – K2
  - CO2: Describe Cluster computing and its uses – K2
  - CO3: Discuss system virtualization and its role in cloud computing – K2
  - CO4: Categorize different service models and business applications of cloud – K4
  - CO5: Analyze various cloud programming models and apply them to solve problems on the cloud - K4

**REFERENCES:**

1. Distributed and Cloud Computing: From Parallel Processing to the Internet of Things, 2012 by Kai Hwang, Jack Dongarra and Geoffrey C. Fox, Morgan Kaufmann Publishers Inc.
2. Mastering Cloud Computing Foundations and Applications Programming, Rajkumar Buyya, Christian Vecchiola and S. ThamaraiSelvi, 2013, Morgan Kaufmann Publishers Inc.
3. Rajkumar Buyya, Cloud Computing: Principles and Paradigms, John Wiley & Sons, First Edition
4. Cloud Computing Bible. Barrie Sosinsky. John Wiley & Sons. ISBN-13: 978-0470903568.
5. [https://www.tutorialspoint.com/cloud\\_computing/index.htm](https://www.tutorialspoint.com/cloud_computing/index.htm)
6. <https://www.javatpoint.com/cloud-computing-tutorial>

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2002CA303

**HUMAN RESOURCES MANAGEMENT**

**L T P C**  
**3 0 0 3**

**PREREQUISITE:**

1. Software Quality Management
2. Software Project Management

**COURSE OBJECTIVES:**

1. To enable the students to understand the various HR functions in-depth.
2. To familiarize students with contemporary practices.
3. To enable the students to understand the challenges in domestic and HRM

**UNIT I PERSPECTIVES IN HUMAN RESOURCE MANAGEMENT 08 Hours**

Evolution of human resource management – The importance of the human factor – Challenges – HR functions - Role of human resource manager – Human resource policies – Computer applications in human resource management – Human resource accounting and audit – environment of HRM.

**UNIT II THE CONCEPT OF BEST FIT EMPLOYEE 08 Hours**

Importance of Human Resource Planning – Forecasting human resource requirement –matching supply and demand - Internal and External sources. Recruitment - Selection – induction – Socialization benefits.

**UNIT III TRAINING AND EXECUTIVE DEVELOPMENT 10 Hours**

Types of training methods –purpose- benefits- resistance. Executive Development Programme – Common practices - Benefits – Self development – Knowledge management.

**UNIT IV SUSTAINING EMPLOYEE INTEREST 09 Hours**

Compensation plan – Reward, remuneration, incentives and benefits – Career management – Development of mentor – Protégé relationships.

**UNIT V PERFORMANCE EVALUATION AND IHRM 10 Hours**

Method of performance evaluation–Feedback–Promotion–Demotion- Transfer and Separation – Implication of job change - The control process – Importance– Methods–grievances–Causes–Implications – Redressal methods.

**TOTAL: 45 HOURS**

**FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :**

1. HRIS, Social networking, e-learning, Recent trends in compensation
2. Changing roles of HR during the transition from Local to Global

*Employability*

**COURSE OUTCOMES:**

- On the successful completion of the course, students will be able to
- CO1: Explain the importance of human resource and their effective management in organization.
  - CO2: Describe the procedures and practices using recruitment and selection
  - CO3: Summarize how to implement the successful training program using types of training methods.
  - CO4: Classify the employee benefit packages with compensation plans.
  - CO5: Associate the activities involved in Performance Appraisal by discussing challenges and implications in grievance redressal methods.

**REFERENCES:**

1. Anne-Wil Harzing, Ashly Pinnington, Human Resource Management, Sage Publication 4<sup>th</sup>edition,2017.
2. Dessler & Varkkey, Human Resource Management, 14th edition, Pearson Education Limited,2016
3. K.Asathappa, Human Resource and Personnel Management- Text & Cases, Tata McGraw Hill,2013
4. LuisR.Gomez-Mejia,DavidB.Balkin,RobertLCardy.ManagingHumanResource.PHILearning, 2012
5. Ivancevich, Human Resource Management, McGraw Hill2012
6. Bernadin , Human Resource Management ,Tata McGraw Hill ,8th edition2012
7. Uday Kumar Haldar, Juthika Sarkar. Human Resource management. Oxford.2012.
8. Decenzo and Robbins, Human Resource Management, Wiley, 8th Edition, 2007.
9. Biswajeet Pattanayak, Human Resource Management, PHI, Third Edition, 2005
10. Dr.V.P.Michael, Human Resource Management & Human Relations, Himalaya Publishing House, 2005
11. <https://www.inc.com/encyclopedia/human-resource-management.html>

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2002CA304

**DATA ANALYTICS**

**L T P C**  
**3 0 0 3**

**PREREQUISITE :**

Data Mining

**COURSE OBJECTIVES:**

1. To understand the competitive advantages of big data analytics.
2. To understand the big data frameworks
3. To learn data analysis methods
4. To learn stream computing
5. To gain knowledge on Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data analytics

**UNIT I INTRODUCTION TO BIG DATA 9 Hours**

Big Data – Definition, Characteristic Features – Big Data Applications - Big Data vs Traditional Data - Risks of Big Data - Structure of Big Data - Challenges of Conventional Systems - Web Data – Evolution of Analytic Scalability - Evolution of Analytic Processes, Tools and methods - Analysis vs Reporting - Modern Data Analytic Tools.

**UNIT II HADOOP FRAMEWORK 9 Hours**

Distributed File Systems - Large-Scale File System Organization – HDFS concepts - MapReduce Execution, Algorithms using MapReduce, Matrix-Vector Multiplication – Hadoop YARN

**UNIT III DATA ANALYTIC METHODS USING R 8 Hours**

Introduction to R - R Graphical User Interfaces- Data Import and Export - Attribute and Data Types - Descriptive Statistics- Visualization Before Analysis- Decision Trees in R - Naïve Bayes in R

**UNIT IV MINING DATA STREAMS 9 Hours**

Streams: Concepts – Stream Data Model and Architecture - Sampling data in a stream - Mining Data Streams and Mining Time-series data - Real Time Analytics Platform (RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.

**UNIT V BIG DATA FRAMEWORKS 10 Hours**

Introduction to NoSQL – Aggregate Data Models – Hbase: Data Model and Implementations – Hbase Clients – Examples – .Cassandra: Data Model – Examples – Cassandra Clients – Hadoop Integration. Pig – Grunt – Pig Data Model – Pig Latin – developing and testing Pig Latin scripts. Hive – Data Types and File Formats – HiveQL Data Definition – HiveQL Data Manipulation – HiveQL Queries

**TOTAL: 45 HOURS**

**FURTHER READING:**

Logical data warehouses and federation technology, like data lake, APIs

**COURSE OUTCOMES:**

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

- CO1: Understand how to leverage the insights from big data analytics
- CO2: Analyze the HADOOP and Map Reduce technologies associated with big data analytics
- CO3: Analyze data by utilizing various statistical and data mining approaches
- CO4: Perform analytics on real-time streaming data
- CO5: Understand the various NoSQL alternative database models
- CO6: Explore on Big Data applications Using Pig and Hive

**REFERENCES:**

1. Bill Franks, —Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams Advanced Analytics, Wiley and SAS Business Series, 2012
2. David Loshin, "Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph", 2013
3. Michael Berthold, David J. Hand, —Intelligent Data Analysis, Springer, Second Edition, 2007
4. Michael Minelli, Michelle Chambers, and Ambiga Dhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley, 2013.
5. P. J. Sadalage and M. Fowler, "NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence", Addison-Wesley Professional, 2012
6. Richard Cotton, "Learning R – A Step-by-step Function Guide to Data Analysis", O'Reilly Media, 2013.
7. [https://www.sas.com/en\\_us/insights/analytics/big-data-analytics.html](https://www.sas.com/en_us/insights/analytics/big-data-analytics.html)

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Employability

2002CA305

**DATA ANALYTICS LABORATORY**

L	T	P	C
0	0	4	2

**COURSE OBJECTIVES:**

1. To analyze big data using linear models
  2. To analyze big data using machine learning techniques such as SVM / Decision tree classification and clustering
  3. Discover the use of external modules in creating excel files and navigating the File systems.
  4. Learn to use in-built data structures in python
1. Write a R program to take input from the user (name and age) and display the values
  2. Write a R program to create a sequence of numbers from 20 to 50 and find the mean of numbers from 20 to 60 and sum of numbers from 51 to 91
  3. Write a R program to create a vector which contains 10 random integer values between -50 and +50
  4. Write a R program to create a Data Frames which contain details of 5 employees and display summary of the data
  5. Write a R program to create the system's idea of the current date with and without time
  6. Implement Linear and logistic Regression
  7. Implement SVM / Decision tree classification techniques
  8. Implement clustering techniques
  9. Visualize data using any plotting framework
  10. Write a Python program to find all prime numbers
  11. Write a Python program to print 'n terms of Fibonacci series using iteration
  12. Write a program to check that a given year is Leap Year or not.
  13. Write a Python Program to read a word and prints the number of letters, vowels and percentage of vowels in the word using dictionary
  14. Write a Python Event driven Program for file operations Press 1: to open file in read mode 2: open the file in write mode 3: current position of the file pointer 4: Reposition the pointer at the beginning 5: exit.
  15. Write a Python program to create a small GUI application for insert, update and delete in a table using Oracle as backend and front end fo creating form

**TOTAL: 60 HOURS**

**FURTHER READING:**

- 1 Implement word count / frequency programs using MapReduce
2. Implement an MR program that processes a weather dataset

*Employability*

**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, code, and test small Python programs with a basic understanding of top-down design.
  - CO3: Learn how to create GUI and solve real-world problem using language idioms, data structures and standard library
  - CO4: Build and apply linear and logistic regression
  - CO5: Perform data analysis with machine learning methods
  - CO6: Perform graphical data analysis

**REFERENCES:**

1. Alan Gates and Daniel Dai, "Programming Pig – Dataflow scripting with Hadoop", O'Reilley, 2nd Edition, 2016
2. Hadley Wickham, ggplot2 – Elegant Graphics for Data Analysis, Springer Publications, 2nd Edition, 2016
3. Kristina Chodorow, "MongoDB: The Definitive Guide – Powerful and Scalable Data Storage", O'Reilley, 2nd Edition, 2013.
4. Lars George, "HBase: The Definitive Guide", O'Reilley, 2015.
5. Tom White, —Hadoop: The Definitive Guide – Storage and Analysis at Internet Scale, O'Reilley, 4th Edition, 2015

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2002CA306

**DISTRIBUTED SYSTEM AND CLOUD LABORATORY**

L	T	P	C
0	0	4	2

**COURSE OBJECTIVES:**

1. To understand the working model of distributed system.
2. To explore the concept of virtualiation in distributed computing.
3. To learn creation of simple cloud applications
4. To use tools related with cloud computing applications.
1. Develop a C Program for implementing non token based algorithm for distributed mutual exclusion
2. Develop a C Program to implement Lamports logical clock
3. Develop a Java Program to implement chat server
4. Install Virtualbox/VMware Workstation with different flavours of linux or windows OS on top of windows7 or 8.
5. Install a C compiler in the virtual machine created using virtual box and execute Simple Programs
6. Install Google App Engine. Create hello world app and other simple web applications using python/java.
7. Use GAE launcher to launch the web applications.
8. Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim.
9. Find a procedure to transfer the files from one virtual machine to another virtual machine.
10. Find a procedure to launch virtual machine using trystack (Online Openstack Demo Version)
11. Install Hadoop single node cluster and run simple applications like wordcount.

**TOTAL: 60 HOURS**

**FURTHER READING:**

1. Open source tools for distributed and cloud computing


**COURSE OUTCOMES:**

- On the successful completion of the course, students will be able to
- CO1: Design simple real time applications for distributed systems.
  - CO2: Apply virtualization in computer systems
  - CO3: Develop cloud applications in public cloud.
  - CO4: Make use of simulation tools to demonstrate the cloud scheduling models.
  - CO5: Develop virtual cluster for handling Big Data.

**REFERENCES:**

1. Dr. P. Arunkumar, Distributed and Cloud Computing Lab Manual, 2020.
2. Mastering Cloud Computing Foundations and Applications Programming, Rajkumar Buyya, Christian Vecchiola and S. ThamaraiSelvi, 2013, Morgan Kaufmann Publishers Inc.
3. Distributed and Cloud Computing: From Parallel Processing to the Internet of Things, 2012 by Kai Hwang, Jack Dongarra and Geoffrey C. Fox, Morgan Kaufmann Publishers Inc..
4. <https://www.virtualbox.org/>
5. <http://www.cloudbus.org/>

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2004CA308 LIFE SKILL III - APTITUDE – II

L T P C  
0 0 2 1

Course Objective (s):

- To brush up problem solving skill and to improve intellectual skill of the students
- To be able to critically evaluate various real life situations by resorting to Analysis Of key issues and factors
- To be able to demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.
- To enhance analytical ability of students
- To augment logical and critical thinking of Student

**Unit 1 Partnership, Mixtures and Allegations, Problem on Ages, Simple Interest, Compound Interest** 6 Hours

Introduction Partnership - Relation between capitals, Period of investments and Shares- Problems on mixtures - Allegation rule - Problems on Allegation – Problems on ages - Definitions Simple Interest - Problems on interest and amount - Problems when rate of interest and time period are numerically equal - Definition and formula for amount in compound interest - Difference between simple interest and compound interest for 2 years on the same principle and time period.

**Unit 2 Blood relations, , Clocks, Calendars** 6 Hours

Defining the various relations among the members of a family - Solving Blood Relation puzzles - Solving the problems on Blood Relations using symbols and notations - Finding the angle when the time is given - Finding the time when the angle is known - Relation between Angle, Minutes and Hours - Exceptional cases in clocks - Definition of a Leap Year - Finding the number of Odd days - Framing the year code for centuries - Finding the day of any random calendar date .

**Unit 3 Time and Distance, Time and Work** 6 Hours

Relation between speed, distance and time - Converting kmph into m/s and vice versa - Problems on average speed - Problems on relative speed - Problems on trains - Problems on boats and streams - Problems on circular tracks - Problems on races - Problems on Unitary method - Relation between Men, Days, Hours and Work - Problems on Man-Day-Hours method - Problems on alternate days - Problems on Pipes and Cisterns.

**Unit 4 Data Interpretation and Data Sufficiency** 6 Hours

Problems on tabular form - Problems on Line Graphs - Problems on Bar Graphs - Problems on Pie Charts - Different models in Data Sufficiency - Problems on data redundancy

**Unit 5 Analytical and Critical Reasoning** 6 Hours

Problems on Linear arrangement - Problems on Circular arrangement - Problems on Double line-up - Problems on Selections - Problems on Comparisons - Finding the Implications for compound statements - Finding the Negations for compound statements- Problems on assumption - Problems on conclusions - Problems on inferences - Problems on strengthening and weakening of arguments .

**Total 30 Hours**

Course Outcomes:

**SKILL DEVELOPMENT**

- Solve problems on Partnership, Mixture & Allegation and ages least time using shortcuts and apply real life situations.
- Workout family relationships concepts, ability to visualize clocks & calendar and understand the logic behind a Sequence.
- Calculate concepts of speed, time and distance, understand timely completion using time and work.
- Learners should be able to understand various charts and interpreted data least time.
- Workout puzzles, ability to arrange things in an orderly fashion

References :

1. Arun Sharma, 'How to Prepare for Quantitative Aptitude for the CAT', 7<sup>th</sup> edition, McGraw Hills publication, 2016.
2. Arun Sharma, 'How to Prepare for Logical Reasoning for CAT', 4<sup>th</sup> edition, McGraw Hills publication, 2017.
3. R S Agarwal, 'A modern approach to Logical reasoning', revised edition, S.Chand publication, 2017.
4. R S Agarwal, 'Quantitative Aptitude for Competitive Examinations', revised edition, S.Chand publication, 2017.
5. Rajesh Verma, "Fast Track Objective Arithmetic", 3<sup>rd</sup> edition, Arihant publication, 2018.
6. B.S. Sijwalii and Indu Sijwali, "A New Approach to REASONING Verbal & Non-Verbal", 2<sup>nd</sup> edition, Arihant publication, 2014.

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2004CA307

**TECHNICAL SEMINAR AND REPORT WRITING**

L	T	P	C
0	0	2	1

**Course Objectives:**

1. To help students develop listening skills for academic and professional purposes.
2. To help students acquire the ability to speak effectively in English in real-life situations
3. To inculcate reading habit and to develop effective reading skills.
4. To learn and use client server architecture based applications.
5. To explore server side functionalities of an application.

**List of Experiments:**

The goal of this course is to train the students to critically evaluate a well-defined set of research subjects and to summarize the findings concisely in a paper of scientific quality. The paper will be evaluated based on the ability to understand a topic, communicate it and identify the issues. Results from this term paper will be presented to fellow students and a committee of faculty members:

1. Every student selects a topic related to current trends and the same should be approved by the respective committee. This selection should have at least 5 distinct primary sources.
2. Every student must write a short review of the topic and present it to fellow students and faculty (discuss the topic – expose the flaws – analyze the issues) every week.

The faculty should evaluate the short review and award marks with respect to the following.

3. Has the student analyzed – not merely quoted – the most significant portions of the primary sources employed?
4. Has the student offered original and convincing insights?
5. Plagiarism to be checked.
6. Every student should re-submit and present the review article including issues/ comments/conclusions which had arisen during the previous discussion.
7. Every student should submit a final paper as per project specifications along with all short review reports (at least 4 internal reviews) and corresponding evaluation comments.
8. Every student should appear for a final external review exam to defend themselves.

**Total: 30 Hours**

**Course Outcomes:**

**EMPLOYABILITY**

After completion of the course, Student will be

1. Gain confidence in facing the placement interview.
2. Develop effective communication skills (spoken and written).
3. Interact with each other and face a wide variety of issues, topics, and situations that they are likely to come across as entry level professionals

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ELECTIVE II

2003CA006

MACHINE LEARNING TECHNIQUES

L	T	P	C
3	0	0	3

PREREQUISITE :

Data Analytics

COURSE OBJECTIVES:

1. To introduce students to the basic concepts and techniques of Machine Learning
2. To have a thorough understanding of the Supervised and Unsupervised learning techniques
3. To study the various probability based learning techniques
4. To understand graphical models of machine learning algorithms

UNIT I INTRODUCTION

9 Hours

Learning – Types of Machine Learning – Supervised Learning – The Brain and the Neuron – Design a Learning System – Perspectives and Issues in Machine Learning – Concept Learning Task – Concept Learning as Search – Finding a Maximally Specific Hypothesis – Version Spaces and the Candidate Elimination Algorithm – Linear Discriminants – Perceptron – Linear Separability – Linear Regression.

UNIT II LINEAR MODELS

9 Hours

Multi-layer Perceptron – Going Forwards – Going Backwards: Back Propagation Error – Multilayer Perceptron in Practice – Examples of using the MLP – Overview – Deriving BackPropagation – Radial Basis Functions and Splines – Concepts – RBF Network – Curse of Dimensionality – Interpolations and Basis Functions – Support Vector Machines.

UNIT III TREE AND PROBABILISTIC MODELS

8 Hours

Learning with Trees – Decision Trees – Constructing Decision Trees – Classification and Regression Trees – Ensemble Learning – Boosting – Bagging – Different ways to Combine Classifiers – Probability and Learning – Data into Probabilities – Basic Statistics – Gaussian Mixture Models – Nearest Neighbor Methods – Unsupervised Learning – K means Algorithms – Vector Quantization – Self Organizing Feature Map.

UNIT IV DIMENSIONALITY REDUCTION AND EVOLUTIONARY MODELS

9 Hours

Dimensionality Reduction – Linear Discriminant Analysis – Principal Component Analysis – Factor Analysis – Independent Component Analysis – Locally Linear Embedding – Isomap – Least Squares Optimization – Evolutionary Learning – Genetic algorithms – Genetic Offspring: - Genetic Operators – Using Genetic Algorithms – Reinforcement Learning – Overview – Getting Lost Example – Markov Decision Process.

UNIT V GRAPHICAL MODELS

10 Hours

Markov Chain Monte Carlo Methods – Sampling – Proposal Distribution – Markov Chain Monte Carlo – Graphical Models – Bayesian Networks – Markov Random Fields – Hidden Markov Models – Tracking Methods

TOTAL: 45 HOURS

FURTHER READING:

Mobile Adhoc Networks(MANET)

COURSE OUTCOMES: EMPLOYABILITY

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

- CO1: Distinguish between, supervised, unsupervised and semi-supervised learning
- CO2: Apply the appropriate machine learning strategy for any given problem
- CO3: Suggest supervised, unsupervised or semi-supervised learning algorithms for any given problem
- CO4: Design systems that uses the appropriate graph models of machine learning
- CO5: Modify existing machine learning algorithms to improve classification efficiency

REFERENCES:

1. Ethem Alpaydin, —Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series)l, Third Edition, MIT Press, 2014.
- 2.. Jason Bell, —Machine learning – Hands on for Developers and Technical Professionalsl, First Edition, Wiley, 2014
3. Peter Flach, —Machine Learning: The Art and Science of Algorithms that Make Sense of Datal, First Edition, Cambridge University Press, 2012.

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**PREREQUISITE :**

Problem Solving and Programming

**COURSE OBJECTIVES:**

5. To explore the concepts of Dynamic web
6. To introduce the fundamentals of PHP
7. To make understand the usage of functions and objects
8. To explore the basic concepts of MYSQL database
9. To provide the knowledge of connecting PHP with MYSQL database

**UNIT I Introduction to Dynamic Web Content****12 Hours**

HTTP and HTML: Berners-Lee's Basics, the Benefits of PHP, MySQL, and JavaScript, The Apache Web Server Setting up a Development Server : What is a WAMP, MAMP, or LAMP?, Installing a WAMP on Windows, Installing a LAMP on Linux, Working Remotely, Using a Program Editor, Using an IDE

**UNIT II Introduction to PHP****12 Hours**

Incorporating PHP within HTML, The Structure of PHP, Expressions and Control Flow in PHP, Expressions, Operators, Conditionals, Looping, Implicit and Explicit Casting, PHP Dynamic Linking

**UNIT III PHP Functions and Objects****12 Hours**

PHP Functions, Including and Requiring Files, PHP Version Compatibility, PHP Objects, PHP Arrays : Basic Access, The foreach...as Loop, Multidimensional Arrays, Using Array Functions

**UNIT IV Practical PHP****12 Hours**

Using printf, Date and Time Functions, File Handling, Introduction to MySQL: MySQL Basics, Summary of Database Terms, Accessing MySQL via the Command Line, Indexes

**UNIT V DATA INTERACTION****12 Hours**

Accessing MySQL Using PHP Querying a MySQL Database with PHP, Practical MySQL- Form Handling Building Forms, Retrieving Submitted Data

**TOTAL: 60 HOURS****FURTHER READING:**

2. Plant UML

**COURSE OUTCOMES: EMPLOYABILITY**

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

- CO1: Explain the basic concepts of Dynamic Web
- CO2: Develop PHP programs using control structures
- CO3: Construct PHP programs using functions and objects
- CO4: Create MYSQL Databases using Command line
- CO5: Create PHP applications using MYSQL as backend

**REFERENCES:**

7. Learning PHP, MySQL, and JavaScript By Robin Nixon (Published by O'Reilly Media, Inc.,)
8. PHP Cookbook 2nd Edition By Adam Trachtenberg and David Sklar
9. PHP: The Good Parts By Peter B. MacIntyre
10. Visual Quickpro Guide PHP 6 And MySQL 5 By Larry Ullman
11. PHP Solutions Dynamic Web Design Made Easy (2006) By David Powers
12. <https://www.w3schools.com/php/>

**Lab Modules:****ATTESTED**

  
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Accredited by NBA (CSE, EEE, MECH, CIVIL, ECE, IT)

**NAGAPATTINAM – 611 002**



**MASTER OF COMPUTER APPLICATIONS**

**Curriculum and Syllabi**

**Second Year – Fourth Semester**

SEMESTER IV										
Course Code	Course Name	L	T	P	C	Maximum Marks			Category	
						CIA	ES	Total		
2004CA401	Project Work	-	-	24	12	100	100	200	EEC	
Total		0	0	24	12	100	100	200		

**ATTESTED**  
  
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## MASTER OF COMPUTER APPLICATIONS

### Full Time Curriculum and Syllabus

#### First Year – First Semester

Course Code	Course Name	L	T	P	C	Maximum Marks		
						CA	ES	Total
<b>Theory Course</b>								
1701CA101	Mathematical Foundations of Computer Applications	2	2	0	3	40	60	100
1702CA102	Problem Solving and C Programming	3	0	0	3	40	60	100
1702CA103	Database Management Systems	3	0	0	3	40	60	100
1702CA104	Data Structures	2	2	0	3	40	60	100
1702CA105	Computer Organization and Design	3	0	0	3	40	60	100
<b>Laboratory Course</b>								
1702CA106	Data structures and Programming Laboratory	0	0	4	2	50	50	100
1702CA107	Database Management Systems Laboratory	0	0	4	2	50	50	100
1704CA108	Life Skill I - Business English	0	0	2	1	100	-	100

L – Lecture | T – Tutorial | P – Practical | CA – Continuous Assessment | ES – End Semester

**ATTESTED**  
  
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1704CA108

**LIFE SKILL I – BUSINESS ENGLISH**

L	T	P	C
0	0	2	1

**COURSE OBJECTIVES:**

1. To help students understand and develop the necessary skills to equip them for whatever career path they choose.
2. To guide students in making responsible decisions, to create a desire and to fulfill individual goals by improving their soft skill.
3. To get better students reading, listening, writing and speaking skills by breaking their barriers.
4. To help students improve their problem solving skills by ignite their minds through aptitude sessions.

**UNIT I**

**4 HOURS**

Career Opportunities  
Industry Expectations

**UNIT II SOFT SKILL TRAINING**

**6 HOURS**

Introduction to Soft Skill – motivational programming – personality development – self confidentiality – inner confidence beauty.

**UNIT III GOAL SETTING**

**4 HOURS**

Environmental awareness – Genetic Engineering – people management – time management - domain management – communication skills – trait attitude skills & videos

**UNIT IV**

**8 HOURS**

Communication skills – ICE breaking and activity sheets.

**UNIT V APTITUDE**

**8 HOURS**

Numbers: basics – H.C.F & L.C.M of numbers- Decimal fractions and problems on numbers.

**TOTAL: 30 HOURS**

**COURSE OUTCOMES:**

- Skill Development*
- On the successful completion of the course, students will be able to
- CO1: Understand how to make out opportunities in their career path.
  - CO2: Apply their soft skills in making decision in order to solve issues in their everyday life.
  - CO3: To some extent improvement in their reading, writing and speaking skills
  - CO4: Started to solve problems in a swift way.

**REFERENCES:**

1. You Can Win – Shiv Khera.
2. Soft Skills Training: A Workbook to Develop Skills for Employment Paperback – Large Print, May 2012 by Frederick H. Wentz .
3. Steven Covey – 7 Habits of Effective people 67.
4. How to Prepare for Quantitative Aptitude for the CAT Paperback – Jun 2016 by, Arun Sharma

**ATTESTED**  
*[Signature]*  
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