E.G.S. PILLAY ENGINEERING COLLEGE

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

Accredited by NAAC with 'A' Grade | Accredited by NBA (CSE, EEE, MECH)

NAGAPATTINAM – 611 002

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
Theory Course								
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
Laboratory Course								
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

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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

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1702CA102	PROBLEM SOLVING AND C PROGRAMMING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1. To understand the various problem solving techniques.
2. To understand the usage of top down design technique in problem solving.
3. To learn the syntax of C.
4. To get exposed to the file processing techniques of C.
5. To get familiarized with the pre-processor directives.

UNIT I PROBLEM SOLVING **9 Hours**

Introduction – The Problem–Solving Aspect – Top-Down Design – Implementation of Algorithms – Program Verification – The Efficiency of Algorithms – The Analysis of Algorithms.

UNIT II BASICS OF C PROGRAMMING **9 Hours**

Introduction– Keywords – Identifiers – Basic Data Types in C – Variables – Constants – Input / Output Statements in C – Operators in C – Conditional Branching Statements – Iterative Statements – Nested Loops – The Break and Continue Statements - Goto Statement.

UNIT III FUNCTIONS, ARRAYS AND STRINGS **9 Hours**

Functions-Definitions - Prototypes – Passing Parameters to the Function – Scope of Variables – Storage Classes – Recursive Functions - Arrays – Declaration – Usage – Passing Arrays to Functions – Reading and Writing Strings – String Operations.

UNIT IV POINTERS AND AGGREGATE DATA TYPES **9 Hours**

Pointer Variable Declarations and Initialization – Operators – Uses - Pointer Expressions and Pointer Arithmetic – Relationship between Pointers and Arrays – Arrays of Pointers – Pointers to Functions - Structures-Definition – Initialization – Unions – Bitwise Operators – Enumeration Constants.

UNIT V FILES AND PREPROCESSOR DIRECTIVES **9 Hours**

Introduction to Files – Using Files in C – Read and Write Data with Files - Random Access Files – Types of Pre-processor Directives –#define - # include- Conditional Directives.

TOTAL: 45 HOURS

FURTHER READING:

1. Apply Graphics commands in C language.
2. Demonstration of Test Data on programs.

COURSE OUTCOMES: Employability

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

CO1: Design and implement C programs for a given problem.
CO2: Work with existing programs and modify it as per the requirements.
CO3: Identify the errors in a C program.
CO4: Identify the output of a C program without actually executing it.

REFERENCES:

1. R.G.Dromey, "How to Solve it by Computer", Pearson Education, 2007.
2. Dr.Micheal Arock," Fundamentals of Programming with C", Yes Dee Publication, 2014.
3. ReemaThareja, "Programming in C", OXFORD Higher Education, 2011.
4. Kernigan Brian W., and Dennis M. Ritchie, "The C Programming Language", Second Edition, Prentice Hall, 1988.
5. Brian W. Kernighan and Rob Pike, "The UNIX Programming Environment", Prentice Hall, 1984.

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1702CA103	DATABASE MANAGEMENT SYSTEMS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1. To learn the fundamentals of data models and to conceptualize and depict a database system using ER diagram.
2. To make a study of SQL and relational database design.
3. To understand the internal storage structures using different file and indexing techniques which will help in physical DB design.
4. To know the fundamental concepts of transaction processing - concurrency control techniques and recovery procedure.
5. To have an introductory knowledge about the Storage and Query processing Techniques.

UNIT I RELATIONAL DATABASES **9 Hours**

Purpose of Database System – Views of data – Data Models – Database System Architecture – Entity Relationship model – E-R Diagrams - Introduction to relational databases - The relational Model – Keys - Relational Algebra – Relational Calculus – SQL fundamentals - Advanced SQL features – Embedded SQL – Dynamic SQL.

UNIT II DATABASE DESIGN **9 Hours**

Functional Dependencies – Non-loss Decomposition – Functional Dependencies – First – Second - Third Normal Forms - Dependency Preservation – Boyce/Codd Normal Form - Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form.

UNIT III DATA STORAGE AND QUERYING **9 Hours**

Overview of Physical Storage Media – RAID – File Organization – Organization of Records in Files – Indexing and Hashing –Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing – Query Processing Overview – Measures of Query Cost- Selection Operation, Sorting, Join peration.

UNIT IV TRANSACTION MANAGEMENT **9 Hours**

Transaction Concepts - Transaction State – Implementation of Atomicity and Durability – Concurrent Executions- Serializability- Recoverability- Implementation of Isolation- Testing for Serializability- Lock Based Protocols- Time-Stamp based Protocols- Deadlock Handling-Failure Classification- Storage Structure-Recovery and Atomicity-Log-Based Recovery-Recovery with Concurrent Transactions.

UNIT V ADVANCED TOPICS **9 Hours**

OODBMS- Object-Based Databases - OO Data Model - OO Languages – Persistence – Object Relational Databases - XML – Structure of XML - Temporal Databases – Mobile Databases – Spatial Databases – Case Study for Design and Manage the Database for any Project.

TOTAL: 45 HOURS

FURTHER READING:

1. Data mining and Warehousing
2. Big Data

COURSE OUTCOMES: Empolyability

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

CO1: Design and create tables in relational database and query them.
CO2: Know how transaction processing and concurrency control is done.
CO3: Compare different types of databases.

REFERENCES:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", Sixth Edition, Tata McGraw Hill, 2011
2. C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.
3. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Fifth Edition, Pearson, 2008
4. Raghu Ramakrishnan, "Database Management Systems", Fourth Edition, Tata McGraw Hill, 2010.
5. G.K.Gupta,"Database Management Systems", Tata McGraw Hill, 2011.
6. Frank. P. Coyle, "XML, Web Services And The Data Revolution", Pearson Education, 2012.

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1702CA104	DATA STRUCTURES	L	T	P	C
		2	2	0	3

COURSE OBJECTIVES:

1. To gain comprehensive introduction of common data structures
2. To master the linear and hierarchical data structures and its applications
3. To learn about sorting techniques and disjoint set ADT

UNIT I LINEAR DATA STRUCTURES – LIST, STACK AND QUEUE **12 Hours**

Abstract Data Types (ADTs) – List ADT – Array-Based Implementation – Linked List Implementation – Doubly-Linked Lists – Circular Linked Lists – Applications – Cursor-Based Implementation of Linked Lists – Stack ADT: Implementation of Stacks – Applications - Queue ADT: Implementation of Queues – Applications of Queues-Priority Queues.

UNIT II HIERARCHICAL DATA STRUCTURES **12 Hours**

Trees: Preliminaries – Implementation of Trees – Tree Traversals with an Application – Binary Trees: Implementation – Expression Trees – Search Tree ADT: Binary Search Trees.

UNIT III SORTING AND HASHING **12 Hours**

Sorting – Bubble sort - Quick Sort - Insertion Sort – Heap sort – Hashing -Hashing functions - Collision Resolution Techniques - Separate chaining - Open addressing – Multiple hashing.

UNIT IV GRAPHS **12 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 – Biconnectivity – Euler circuits.

UNIT V ADVANCED DATA STRUCTURES **12 Hours**

AVL Trees – B-Tree – R-B Tree - Binary Heap - D Heaps – Leftist Heaps – Skew Heaps – Binomial Heap

TOTAL: 60 HOURS

FURTHER READING:

1. Implementation of the data structures in different language platforms

COURSE OUTCOMES: Employability

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

CO1: Describe, explain and use abstract data types including stacks, queues and lists
CO2: Design and Implement Tree data structures and Sets
CO3: Implement hashing techniques and heaps for applications
CO4: Implement a variety of algorithms for sorting

REFERENCES:

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 2nd edition, Pearson Education, 1997.
2. Y. Langsam, M. J. Augenstein and A. M. Tenenbaum, "Data Structures using C", Pearson Education Asia, 2004.
3. Aho, J. E. Hopcroft and J. D. Ullman, "Data Structures and Algorithms", Pearson education Asia, 1983.
4. Robert Kruse & Bruce Leung: Data Structures & Program Design in C, Pearson Education, 2007.

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1704CA208 **Life Skill II- Verbal Ability** **L T P C**
0 0 2 0

Course Objective (s):

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

Course Outcomes:

1. Students are enabled to use new words in their day to day communication. SKILL DEVELOPMENT
2. Students are capable to gather information swiftly while reading passages.
3. Students are proficient during their oral and written communication.
4. Students are equipped to rearrange the sentences and able to identify the voice of the sentence.
5. Students use their knowledge of the best practices to craft effective business documents

Unit 1 VOCABULARY USAGE 6

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

Unit 2 COMPREHENSION ABILITY 6

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

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

Unit 4 REARRANGEMENT AND GENERAL USAGE 6

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

Unit 5 APPLICATION OF VERBAL ABILITY 6

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

TOTAL HOURS 30

REFERENCES

1. Arun Sharma and MeenakshiUpadhyav, How to Prepare for Verbal Ability and Reading Comprehension for CAT, McGrawHill Publication, Seventh Edition 2017
2. R S Aggarwal and VikasAggarwal , 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 :

1. Two tests will be conducted (25 * 2) - 50 marks
2. five assignments will be conducted (5*10) - 50 Marks

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MASTER OF COMPUTER APPLICATIONS

Full Time Curriculum and Syllabus

First Year – Second Semester

Course Code	Course Name	L	T	P	C	Maximum Marks		
						CA	ES	Total
Theory Course								
1702CA201	Computer Communication and Networks	3	0	0	3	40	60	100
1702CA202	Operating Systems	3	0	0	3	40	60	100
1702CA203	Software Engineering Methodologies	3	0	0	3	40	60	100
1702CA204	Design and Analysis of Algorithms	3	0	0	3	40	60	100
1702CA205	Object Oriented Programming	3	0	0	3	40	60	100
Laboratory Course								
1702CA206	OOP and Algorithms Laboratory	0	0	4	2	50	50	100
1702CA207	OS and Network Programming Laboratory	0	0	4	2	50	50	100
1704CA208	Life Skill II – Verbal Ability	0	0	2	1	100	-	100

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

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1702CA201	COMPUTER COMMUNICATION AND NETWORKS	L	T	P	C
		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 **9 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 **9 Hours**

Network Architecture: The OSI model, TCP/IP model – Network interface layer: Framing – Reliable transmission: stop and wait protocol, sliding window protocols – MAC: Ethernet, Token ring, Wireless LAN, Blue Tooth – Bridges.

UNIT III DATA LINK LAYER **9 Hours**

Data link control - Flow Control – Error Detection and Error Correction - MAC – Ethernet, Token ring, Wireless LAN MAC – Blue Tooth - Bridges.

UNIT IV NETWORK LAYER **9 Hours**

Network layer functions – circuit switching – packet switching – IP datagram – IPv4 – Sub netting and classless addressing – IPv6 – ARP – Routing protocols: distance vector, link state – ICMP – ICMPv6.

UNIT V TRANSPORT LAYER AND APPLICATION LAYER **9 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

TOTAL: 45 HOURS

FURTHER READING:

Multimedia in the Internet – real-time interactive protocols – Session Initialization Protocol (SIP) – Peer-to-Peer Paradigm: Chord, Pastry – Transport layer security – Application layer security.

COURSE OUTCOMES:

Employability

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

CO1: Explain how communication works in data networks and the Internet
CO2: Explain the role of protocols in data networks
CO3: Describe the importance of addressing and naming schemes at various layers of data networks.
CO4: Describe the protocols and services provided by the application layer in the OSI model and describe how this layer operates in sample networks.

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.

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1702CA202	OPERATING SYSTEMS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1. To Learn the Operating System basics.
2. To Study the process management of Operating system .
3. To Gain knowledge in storage management and I/O systems of Operating system
4. To Explore the case studies with various operating systems

UNIT I OPERATING SYSTEMS OVERVIEW **9 Hours**

Operating system -Types of Computer Systems - Computer-system operation – I/O structure –Hardware Protection - System components – System calls – System programs – System structure– Process concept – Process scheduling – Operations on processes – Cooperating processes – Inter-process communication – Communication in client-server systems - Threads-Multithreading Models-Thread Libraries-Threading Issues.

UNIT II PROCESS MANAGEMENT **9 Hours**

Scheduling criteria – Scheduling algorithms – Multiple-processor scheduling – Real time scheduling –Thread Scheduling– Process Scheduling Models - The critical- section problem – Synchronization hardware – Semaphores – Classic problems of Synchronization – Critical regions – Monitors-Usage-Dining philosopher solution using monitor -Deadlock – Deadlock characterization – Methods for handling deadlocks – Recovery from deadlock

UNIT III STORAGE MANAGEMENT **9 Hours**

Memory Management – Swapping – Contiguous memory allocation – Paging – Segmentation – Segmentation with paging- Virtual Memory - Background – Demand paging – Process creation – Page replacement – Allocation of frames – Thrashing.

UNIT IV FILE AND I/O SYSTEMS **9 Hours**

File concept – Access methods – Directory structure – File-system mounting – Protection - Directory implementation – Allocation methods – Free-space management -Secondary Storage Structure-Mass Storage-Disk Storage and Attachment- Disk scheduling – Disk management – Swap-space management

UNIT V CASE STUDY **9 Hours**

The Linux System - History – Design Principles – Kernel Modules – Process Management – Scheduling – Memory management – File systems – Input and Output – Inter-process Communication – Network Structure – Security – Windows 7 - History – Design Principles – System Components – Environmental subsystems – File system – Networking.

TOTAL: 45 HOURS

FURTHER READING:

The course doesn't cover the modern operating system like Mobile and Embedded OS and hence it will be provided us additional content.

COURSE OUTCOMES: Employability

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

CO1: Explain the basics of OS.
CO2: Able to demonstrate the mapping between the physical memory and virtual memory
CO3: Able to understand the operating system components and services with the recent OS
CO4: Able to understand file handling concepts in OS perspective

REFERENCES:

1. Abraham Silberschatz, Peter B. Galvin and Greg Gagne, "Operating System Concepts", Ninth Edition, John Wiley and Sons Inc, 2012.
2. Andrew S. Tanenbaum, "Modern Operating Systems", Second Edition, Addison Wesley, 2001..
3. Gary Nutt, "Operating Systems", Second Edition, Addison Wesley, 2001.
4. H M Deital, P J Deital and D R Choffnes, "Operating Systems", Pearson Education, 2004.
5. Andrew S.Tanenbaum "Operating Systems Design and implementation"Third edition Prentice hall, 2006
6. William Stallings "Operating Systems: Internals and Design Principles" 7th Edition, Prentice

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1702CA203	SOFTWARE ENGINEERING METHODOLOGIES	L	T	P	C
		3	0	0	3

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 INTRODUCTION **9 Hours**

Software Engineering – Product and process – process models - Waterfall Life cycle model – Spiral Model – Prototype Model – fourth Generation Techniques – Agile methods.

UNIT II REQUIREMENT ANALYSIS **9 Hours**

Software Requirements Analysis and Specification – Software Requirements – Problem Analysis – Requirements Specification – Validation – Metrics – Summary.

UNIT III SOFTWARE DESIGN **9 Hours**

Abstraction – Modularity – Software Architecture – Cohesion – Coupling – Various Design Concepts and notations – Real time and Distributed System Design – Documentation – Dataflow Oriented design – Designing for reuse – Programming standards.

UNIT IV SOFTWARE TESTING **9 Hours**

Coding – Programming Practice – Top-down and Bottom-up - structured programming – Information Hiding – Programming style – Internal Documentation Verification – Code Reading – Static Analysis – Symbolic Execution – Code Inspection or Reviews – Unit Testing – Fundamentals – Functional Testing versus structural Testing Coding.

UNIT V SOFTWARE MAINTENANCE AND SOFTWARE METRICS **9 Hours**

Need for Software maintenance – Maintenance models - SCM – Version Control – SCM process – Software Configuration Items – Taxonomy – Basics of Case tools - Scope of Software Metrics – Classification of metrics – Measuring Process and Product attributes – Direct and Indirect measures – Reliability – Software Quality Assurance – Standards.

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: Understand the basic concepts of various models in software engineering.
CO2: Model the software projects into high level design using DFD,UML diagrams.
CO3: Evaluate the system with various testing techniques and strategies
CO4: Apply various software metrics on software quality products.

EMPLOYABILIT

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
4. McGraw-Hill International Edition, 2009.

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1702CA204	DESIGN AND ANALYSIS OF ALGORITHMS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1. To understand the problem solving process and writing algorithms
2. To use algorithm design paradigms for algorithm design
3. To analyze the algorithms for time/space complexity

UNIT I ALGORITHM ANALYSIS **9 Hours**

The Role of Algorithms in Computing – Insertion sort – Analyzing algorithms – Designing Algorithms – Growth of Functions – Asymptotic Notation – Standard Notations and Common Functions

UNIT II HEAP SORT AND QUICK SORT **9 Hours**

Heap Sort: Heaps – Maintaining the Heap Property – Building a Heap – Heap Sort Algorithm –Priority Queues – Quick Sort: Description – Performance – Randomized Version – Analysis

UNIT III DESIGN AND ANALYSIS TECHNIQUES **9 Hours**

Introduction to Dynamic Programming – Matrix Chain Multiplication – Longest Common Subsequence – Greedy Algorithms – Activity Selection Problem – Huffman Codes

UNIT IV GRAPH ALGORITHMS **9 Hours**

Representation of Graphs – Representing Attributes – Breadth-First Search – Breadth-First Trees – Depth-First Search – Topological Sort – Strongly Connected Components – Minimum Spanning Trees: Growing a Minimum Spanning Trees – Algorithms of Kruskal and Prim – Single Source Shortest Path – Bellman-Ford Algorithm – Single Source Shortest Path in Directed Acyclic Graphs – Dijkstra"s Algorithm

UNIT V NP PROBLEMS **9 Hours**

Polynomial Time – Polynomial-time Verification – NP - completeness and Reducibility – NP- Completeness Proofs – NP-complete Problems – Approximation Algorithms – Vertex Cover Problem-Clique decision problem-Node Cover-Chromatic number decision Problem.

TOTAL: 45 HOURS

FURTHER READING:

Backtracking, Branch and Bound Method

COURSE OUTCOMES:

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

CO1: Analyze the algorithms for time/space complexity. EMPLOYABILIT

CO2: Implement heap sort and quick sort.

CO3: Design algorithms using dynamic programming and Greedy approaches and graph structure to solve real-life problems.

CO4: Analyze problems in terms of polynomial time.

REFERENCES:

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, "Introduction to Algorithms", Third Edition, PHI Learning, 2002.
2. Aho, Hopcroft and Ullman, "Data Structures and Algorithms", Pearson Education, 1983.
3. Anany Levitin, "Introduction to Design and Analysis of Algorithms", Third, Pearson Education, 2012.
4. Robert Sedgewick and Kevin Wayne, "Algorithms", Fourth Edition, Pearson Education, 2011.
5. S.Sridhar, "Design and Analysis of Algorithms", First Edition, Oxford University Press, 2014.

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MASTER OF COMPUTER APPLICATIONS

Full Time Curriculum and Syllabus

Second Year – Third Semester

Course Code	Course Name	L	T	P	C	Maximum Marks		
						CA	ES	Total
Theory Course								
1701CA301	Resource Management Techniques	2	2	0	3	40	60	100
1702CA302	Data Mining Techniques	3	0	0	3	40	60	100
1702CA303	Object Oriented Analysis and Design	3	0	0	3	40	60	100
1702CA304	Web Programming	3	0	0	3	40	60	100
1703CA001	Service Oriented Architecture	3	0	0	3	40	60	100
Laboratory Course								
1702CA305	Web Programming Laboratory	0	0	4	2	50	50	100
1702CA306	CASE Tools Laboratory	0	0	4	2	50	50	100
1704CA307	Technical Seminar and Report Writing	0	0	2	1	50	50	100
1704CA308	Life Skill III-Aptitude I	0	0	2	1	100	0	100

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

1702CA302	DATA MINING TECHNIQUES	L	T	P	C
		3	0	0	3

PREREQUISITE :

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 **8 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 **10 Hours**

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

UNIT III CLASSIFICATION & PREDICTION **10 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 **9 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.

UNIT V OPEN SOURCE DATA MINING TOOLS **8 Hours**

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

TOTAL: 45 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :

Bootstrap

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

EMPLOYABILIT

REFERENCES:

1. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", Second Edition, Elsevier, Reprinted 2011.
2. K.P. Soman, Shyam Diwakar 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
4. BERSON, ALEX & SMITH, STEPHEN J, Data Warehousing, Data Mining, and OLAP, TMH Pub..
5. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, "Introduction to Data Mining", Pearson Education, 2007
6. Marakas George M, "Modern Data Mining, and Visualization", Pearson Education, 2011
7. www.wideskills.com/data-mining-tutorial/data-mining-techniques

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1702CA303	OBJECT ORIENTED ANALYSIS AND DESIGN	L	T	P	C
		3	0	0	3

PREREQUISITE :

Software Engineering Methodologies

COURSE OBJECTIVES:

1. To provide a brief, hands-on overview of object-oriented analysis in software process
2. To discuss Case studies based project specifications to develop object-oriented models
3. To identify implementation strategies.
4. To demonstrate and apply basic object oriented techniques to create and modify object oriented analysis and design models.
5. To understand and apply testing techniques for object oriented software

UNIT I INTRODUCTION **9 Hours**

An overview – Object basics – Object state and properties – Behavior – Methods –Messages – Information hiding – Class hierarchy – Relationships – Associations –Aggregations- Identity – Dynamic binding – Persistence – Meta classes – Object oriented system development life cycle.

UNIT II METHODOLOGY AND UML **9 Hours**

Introduction – Survey – Rumbugh, Booch, Jacobson methods – Patterns – Frameworks– Unified approach – Unified modeling language – Static and Dynamic models – UML diagrams – Class diagram – Use case diagrams – Dynamic modeling – Model organization – Extensibility.

UNIT III OBJECT ORIENTED ANALYSIS **9 Hours**

Identifying Use case – Business object analysis – Use case driven object oriented analysis – Use case model – Documentation – Classification – Identifying object, relationships, attributes, methods – Super-sub class – A part of relationships Identifying attributes and methods – Object responsibility

UNIT IV OBJECT ORIENTED DESIGN **9 Hours**

Design process – Axions – Corollaries – Designing classes – Class visibility – Refining attributes – Methods and protocols – Object storage and object interoperability –Databases – Object relational systems – Designing interface objects – Macro and Micro level processes – The purpose of a view layer interface

UNIT V SOFTWARE QUALITY **9 Hours**

Quality assurance – Testing strategies – Object orientation testing – Test cases – Test Plan – Debugging principles – Usability – Satisfaction – Usability testing – Satisfaction testing

TOTAL: 45 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :

Plant UML

COURSE OUTCOMES: EMPLOYABILIT

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

CO1: Understand the basic concepts to identify state & behavior of real world objects

CO2: Learn the various object oriented methodologies and choose the appropriate one for solving the problem with the help of various case studies

CO3: Understand the concept of analysis, design & testing to develop a document for the project

CO4: Implement analysis, design & testing phases in developing a software project

CO5: Understand the testing strategies and know about automated testing tools

REFERENCES:

1. Craig Larman, Applying UML and Patterns, 2nd Edition, Pearson, 2002.
2. Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modeling, LanguageUser Guide", Addison Wesley Long man, 1999.
3. Bernd Bruegge, Allen H. Dutoit, Object Oriented Software Engineering using UML, Patterns and Java, Pearson 2004.
4. Ali Bahrami, "Object Oriented System Development", McGraw Hill International Edition, 1999.
5. https://www.pdfdrive.net/download-ooad-tutorial-pdf-version-tutorialspoint-e14526601.html

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1702CA304	WEB PROGRAMMING	L	T	P	C
		3	0	0	3

PREREQUISITE:

1. Problem Solving and C Programming
2. Object Oriented Programming

COURSE OBJECTIVES:

1. To understand the concepts and architecture of the World Wide Web.
2. To understand and practice Markup languages
3. To understand and practice embedded dynamic scripting on client side Internet Programming
4. To understand and practice web development techniques on client-side

UNIT I INTRODUCTION TO WWW **9 Hours**

Internet Standards – Introduction to WWW – WWW Architecture – SMTP – POP3 – File Transfer Protocol - Overview of HTTP, HTTP request – response — Generation of dynamic web pages.

UNIT II DESIGN MARKUP LANGUAGE (HTML): **9 Hours**

Introduction to HTML and HTML5 - Formatting and Fonts –Commenting Code – Anchors – Backgrounds – Images – Hyperlinks – Lists – Tables – Frames - HTML Forms. Cascading Style Sheet (CSS): The need for CSS, Introduction to CSS – Basic syntax and structure -Inline Styles – Embedding Style Sheets - Linking External Style Sheets – Backgrounds – Manipulating text - Margins and Padding - Positioning using CSS.

UNIT III INTRODUCTION TO JAVASCRIPT **9 Hours**

Introduction - Core features - Data types and Variables - Operators, Expressions, and Statements -Functions - Objects - Array, Date and Math related Objects - Document Object Model - Event Handling - Controlling Windows & Frames and Documents - Form handling and validations.

UNIT IV ADVANCED JAVASCRIPT **9 Hours**

Browser Management and Media Management – Classes – Constructors – Object-Oriented Techniques in JavaScript – Object constructor and Prototyping - Sub classes and Super classes –JSON - jQuery and AJAX.

UNIT V PHP **9 Hours**

Introduction - Setting up the environment (LAMP server) - Programming basics -Print/echo - Variables and constants – Strings and Arrays – Operators, Control structures and looping structures – Functions – Establishing connectivity with MySQL database.

TOTAL: 45 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :

1. Angular JS
2. Node JS

EMPLOYABILITY

COURSE OUTCOMES:

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

CO1: Acquire knowledge about functionalities of world wide web
CO2: Explore markup languages features and create interactive web pages using them
CO3: Learn and design Client side validation using scripting languages
CO4: Acquire knowledge about Open source JavaScript libraries
CO5: Able to design front end web page and connect to the back end databases.

REFERENCES:

1. Harvey & Paul Deitel& Associates, Harvey Deitel and Abbey Deitel, "Internet and World Wide Web - How To Program", Fifth Edition, Pearson Education, 2011.
2. Achyut S Godbole and AtulKahate, "Web Technologies", Second Edition, Tata McGraw Hill, 2012.
3. Thomas A Powell, Fritz Schneider, "JavaScript: The Complete Reference", Third Edition, Tata McGraw Hill, 2013.
4. David Flanagan, "JavaScript: The Definitive Guide, Sixth Edition", O'Reilly Media, 2011
5. Steven Holzner, "The Complete Reference - PHP", Tata McGraw Hill, 2008
6. Mike Mcgrath, "PHP & MySQL in easy Steps", Tata McGraw Hill, 2012.
7. https://www.cs.uct.ac.za/mit_notes/web_programming.html

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1703CA001	SERVICE ORIENTED ARCHITECTURE	L	T	P	C
		3	0	0	3

PREREQUISITE:

1. Computer Communication and Networks
2. Cryptography and Network Security

COURSE OBJECTIVES:

1. To learn SOA fundamentals
2. To understand SOAD Design
3. To gain knowledge about SOAP, UDDI and XML to create web services.
4. To study about service composition and to explore Restful services and SOA security
5. To know about the Cloud Computing architecture and services.

UNIT I SOA BASICS **9 Hours**

Roots of SOA – Characteristics of SOA - Comparing SOA to client server and distributed internet architectures – Anatomy of SOA - How components in an SOA interrelate -Principles of service Orientation – Service Layers.

UNIT II XML AND WEB SERVICES **9 Hours**

XML structure – Elements – Creating Well-formed XML - Name Spaces – Schema Elements, Types, Attributes – XSL Transformations – Parser – Web Services Overview – Architecture.

UNIT III WSDL, SOAP and UDDI **9 Hours**

WSDL - Overview Of SOAP – HTTP – XML-RPC – SOAP: Protocol – Message Structure – Intermediaries – Actors – Design Patterns And Faults – SOAP With Attachments – UDDI.

UNIT IV SOA IN J2EE AND .NET **9 Hours**

SOA platform basics – SOA support in J2EE – Java API for XML-based web services (JAX-WS) - Java architecture for XML binding (JAXB) – Java API for XML Registries (JAXR) - Java API for XML based RPC (JAX-RPC) – JAX-RS SOA support in .NET – ASP.NET web services

UNIT V CLOUD COMPUTING **9 Hours**

Vision of Cloud computing – Cloud Definition – Characteristics and Benefits – Virtualization – Cloud computing Architecture – Cloud Reference Model, Types of Clouds – Cloud Platforms in Industry

TOTAL: 45 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :

SOAML Diagrams and tools

COURSE OUTCOMES:

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

CO1: Known about the basic principles of service oriented architecture , its components and techniques
CO2: Understand the architecture of web service
CO3: Design and develop web services using protocol
CO4: Understand technology underlying the service design
CO5: Acquire the fundamental knowledge of cloud computing

REFERENCES:

1. Thomas Erl, "Service-Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2006.
2. Heather Williamson, "XML, The Complete Reference", McGraw Hill Education, 2012.
3. Frank. P. Coyle, "XML, Web Services And The Data Revolution", Pearson Education, 2002.
4. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services. An Architect's Guide", Pearson Education, 2005.
5. Newcomer, Lomow, "Understanding SOA with Web Services", Pearson Education, 2005.
6. Dan woods and Thomas Mattern, "Enterprise SOA designing IT for Business Innovation", O'REILLY, First Edition, 2006.
7. www.soa-manifesto.org.

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1702CA305	WEB PROGRAMMING LABORATORY	L	T	P	C
		0	0	4	2

PREREQUISITE :

Problem Solving and Programming

COURSE OBJECTIVES:

1. To learn web page creation.
2. To understand CSS concepts
3. To understand and practice markup languages
4. To understand and practice embedded dynamic scripting on client side Internet Programming

LIST OF EXPERIMENTS:

1. Create a web page with the following using HTML5
   (i) To embed an image map in a web page
   (ii) To fix the hot spots
   (iii)Show all the related information when the hot spots are clicked
2. Create a web page with all types of Cascading style sheets.
3. Creation of web pages having dynamic contents and validation using Java script
4. Write a JavaScript for Loan Calculation.
5. Develop PHP program using Arrays, control structures, looping structures and Form Handling
6. Using PHP and MySQL, develop a program to accept book information viz. Accession number, title, authors, edition and publisher from a web page and store the information in a database and to search for a book with the title specified by the user and to display the search results with proper headings.
7. Develop and demonstrate a HTML file that includes JavaScript that uses functions for the following problems:
   (a) Parameter: A string
   Output: The position in the string of the left-most vowel
   (b) Parameter: A number
   Output: The number with its digits in the reverse order
8. Designing Quiz Application Personal Information System/ Using JavaScript

TOTAL: 60 HOURS

ADDITIONAL EXPERIMENTS / INNOVATIVE EXPERIMENTS :

1. Application involving applet based GUI, JDBC, Servlet, JSP/PHP, cookies and session tracking.
2. Develop PHP program using Arrays, control structures, looping structures and Form Handling

COURSE OUTCOMES :

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

CO1: Make Web site creation and validation.
CO2: Explore markup languages features and create interactive web pages using them
CO3: Acquire knowledge about Open source JavaScript libraries
CO4: Learn and design Client side validation using scripting languages

EMPLOYABILIT

REFERENCES :

1. www.W3Schools.com
2. www.tutorialspoint.com
3. http://nptel.ac.in
4. Web programming Lab Manual by EGSPEC

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1702CA306	CASE TOOLS LABORATORY	L	T	P	C
		0	0	4	2

PREREQUISITE :

Software Engineering

COURSE OBJECTIVES:

1. To understand the software engineering methodologies for project development.
2. To gain knowledge about open source tools for Computer Aided Software Engineering.
3. To develop an efficient software using case tools

LIST OF EXPERIMENTS:

1. Practicing the different types of case tools such as Rational Rose / other Open Source be used for all the phases of Software development life cycle.
2. Data modeling
3. Source code generators
4. Apply the following to typical application problems:
   (a) Project Planning
   (b) Software Requirement Analysis
   (c) Software Design
   (d) Data Modeling & Implementation
   (e) Software Estimation
   (f) Software Testing

   A possible set of applications may be the following:
   (a) Library System
   (b) Student Marks Analyzing System
   (c) Text Editor.
   (d) Create a dictionary.
   (e) Telephone directory.
   (f) Inventory System.

EMPLOYABILIT

TOTAL : 60 HOURS

ADDITIONAL EXPERIMENTS / INNOVATIVE EXPERIMENTS :

1. To develop the application by use of different types of case tools such as Rational Rose/other source
2. To develop the School Management System application by use of different types of case tools such as Rational Rose/other source

COURSE OUTCOMES:

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

CO1: Use open source CASE tools to develop software.

CO2: Analyze and design software requirements in an efficient manner.

REFERENCES :

1. http://nptel.ac.in
2. http://Coursera.ac.in
3. www.W3Schools.com
4. Web programming Lab Manual by EGSPEC

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1704CA307	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.

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.

1. Has the student analyzed – not merely quoted – the most significant portions of the primary sources employed?
2. Has the student offered original and convincing insights?
3. Plagiarism to be checked.
4. Every student should re-submit and present the review article including issues/ comments/conclusions which had arisen during the previous discussion.
5. 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.
6. Every student should appear for a final external review exam to defend themselves.

TOTAL : 30 HOURS

Employability

COURSE OUTCOMES:

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

CO1: Gain confidence in facing the placement interview.

CO2: Develop effective communication skills (spoken and written).

CO3: 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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1704CA308	LIFE SKILL III - APTITUDE – I	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

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

UNIT I 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 II 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 III 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 IV 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 V 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

SKILL DEVELOPMENT **TOTAL: 30 HOURS**

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', 7th edition, McGraw Hills publication, 2016.
2. Arun Sharma, 'How to Prepare for Logical Reasoning for CAT', 4th 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", 3rd edition, Arihant publication, 2018
6. B.S. Sijwalii and InduSijwali, "A New Approach to REASONING Verbal & Non-Verbal", 2nd edition, Arihnat publication, 2014

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NAGAPATTINAM – 611 002

MASTER OF COMPUTER APPLICATIONS

Full Time Curriculum and Syllabus

Second Year – Fourth Semester

Course Code	Course Name	L	T	P	C	Maximum Marks		
						CA	ES	Total
Theory Course								
1702CA401	Advanced Java Programming	3	0	0	3	40	60	100
1702CA402	Cryptography and Network Security	3	0	0	3	40	60	100
1702CA403	Mobile Computing	3	0	0	3	40	60	100
1703CA011	Internet of Things	3	0	0	3	40	60	100
1703CA016	Big Data Analytics	3	0	0	3	40	60	100
Laboratory Course								
1702CA404	Advanced Java Programming Laboratory	0	0	4	2	50	50	100
1702CA405	Mobile Application Development Laboratory	0	0	4	2	50	50	100
1704CA406	Soft Skills Development Laboratory	0	0	2	1	50	50	100
1704CA407	Life Skill IV-Aptitude II	0	0	2	1	100	-	100

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

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1702CA402	CRYPTOGRAPHY AND NETWORK SECURITY	L	T	P	C
		3	0	0	3

PREREQUISITE :

1. Computer Networks

COURSE OBJECTIVES:

1. To understand the fundamentals of Cryptography.
2. To acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity.
3. To understand the various key distribution and management schemes.
4. To understand how to deploy encryption techniques to secure data in transit across data networks.
5. To design security applications in the field of Information technology.

UNIT I INTRODUCTION **9 Hours**

An Overview of Computer Security - Security Services - Security Mechanisms - Security Attacks - Access Control Matrix, Policy - Security policies, Confidentiality policies, Integrity policies and Hybrid policies.

UNIT II CRYPTOSYSTEMS & AUTHENTICATION **10 Hours**

Classical Cryptography - Substitution Ciphers - permutation Ciphers - Block Ciphers -DES - Modes of Operation - Linear Cryptanalysis, Differential Cryptanalysis - Hash Function - SHA 512 - Message Authentication Codes - HMAC.

UNIT III PUBLIC KEY CRYPTOSYSTEMS **10 Hours**

Introduction to Public Key Cryptography - Number theory - The RSA Cryptosystem and Factoring Integer - Attacks on RSA - The ELGamal Cryptosystem - Digital Signature Algorithm - Key management - Session and Interchange keys, Key exchange and generation - PKI.

UNIT IV SYSTEM IMPLEMENTATION **8 Hours**

Design Principles, Representing Identity, Access Control Mechanisms. Secure Software Development: Secured Coding - OWASP/SANS Top Vulnerabilities - Buffer Overflows - Incomplete mediation - XSS - Anti Cross Site Scripting Libraries - Canonical Data Format - Command Injection - Redirection – Inference - Application Controls.

UNIT V NETWORK SECURITY **8 Hours**

Secret Sharing Schemes-Kerberos- Pretty Good Privacy (PGP)-Secure Socket Layer (SSL)-Intruders – HIDS- NIDS - Firewalls – Viruses.

TOTAL: 45 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR:

AES - Finite Fields - Elliptic Curves Cryptography- Authentication Protocols

Empolyability

COURSE OUTCOMES:

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

- CO1: Explain the fundamentals of networks security, security architecture and security policies. (K2)
- CO2: Apply different symmetric cryptographic algorithms in network communication. (K3)
- CO3: Apply RSA and Digital Signature and public key cryptographic algorithms in network communication. (K3)
- CO4: Apply different key management techniques in network communication.(K3)
- CO5: Discuss the design principles of system implementation and application controls. (K2)
- CO6: Explain the various network security practices and counter measures for system level security. (K2)

REFERENCES:

1. William Stallings, "Cryptography and Network Security: Principles and Practices", seventh edition, Pearson Education, 2017.
2. Behrouz A. Ferouzan, "Cryptography & Network Security", 3rd edition, Tata McGraw Hill, 2015.
3. Matt Bishop ,"Computer Security art and science ", Second Edition, Pearson Education,2002
4. Wade Trappe and Lawrence C. Washington, "Introduction to Cryptography with Coding Theory" Second Edition, Pearson Education, 2007.
5. OWASP top ten security vulnerabilities: http://xml.coverpages.org/OWASP-TopTen.pdf
6. http://nptel.ac.in

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1702CA403	MOBILE COMPUTING	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.

UNIT II TELECOMMUNICATION SYSTEMS **9 Hours**

GSM – System Architecture – Protocols – Routing – Handover – Security – GPRS–System Architecture – Protocols

UNIT III MOBILE WIRELESS NETWORK **8 Hours**

Wireless LAN – IEEE 802.11– System Architecture–Protocol Architecture –Blue Tooth – Architecture

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

Mobile IP– DSDV – DSR – AODV – ZRP – ODMR-Traditional TCP – Indirect TCP – Snooping TCP – Mobile TCP – Fast transmit/ Fast Recovery – Transmission/ Timeout Freezing – Selective Retransmission – Transaction Oriented TCP.

UNIT V MOBILE APPLICATION DEVELOPMENT USING ANDROID **10 Hours**

Introduction – Android architecture –Application Components – Android layouts – Android Controls – Android Event Handling – Android Styles and themes–Android Custom components – Android Advanced Concepts.

TOTAL: 45 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR:

1.Mobile Adhoc Networks(MANET)

Empolyability

COURSE OUTCOMES:

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

CO1: Describe the fundamentals of Wireless Communication. (K2)
CO2: Explain the architectures and protocols of Telecommunication Systems. (K2)
CO3: Explain the architectures and protocols of Wireless LAN. (K2)
CO4: Categorize the various algorithms in Mobile Network Layer and Transport Layer.(K2)
CO5: Develop an application using Application Components, Fonts and Colors in Android (K3)
CO6: Develop an application using Layout Managers and Event Listeners in Android.(K3)

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
7. https://www.tutorialspoint.com/android/

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1703CA011	INTERNET OF THINGS	L	T	P	C
		3	0	0	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 **9 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 IoTARCHITECTURE **8 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 **8 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 **11 Hours**

Building IOT with Rasperry 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.

UNIT V CASE STUDIES AND ADVANCED TOPICS **9 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: 45 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR:

Webinars, Security in IOT

COURSE OUTCOMES: Employability

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. Arshdeep Bahga, Vijay Madisetti, "Internet of Things-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. Manoel Carlos Ramon, "Intel® Galileo and Intel® Galileo Gen2: API Features and Arduino Projects for Linux Programmers", A press, 2014.
6. Marco Schwartz,"Internetof Things with the ArduinoYun", Packt Publishing, 2014.
7. https://www.tutorialspoint.com/internet_of_things
8. https://www.edureka.co/blog/iot-tutorial

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1703CA016	BIG DATA ANALYTICS	L	T	P	C
		3	0	0	3

PREREQUISITE :

1. Database Management Systems

COURSE OBJECTIVES:

1. To explore the fundamental concepts of big data analytics.
2. Learn to analyze the big data using intelligent techniques.
3. To learn to use various techniques for mining data stream.
4. To understand the applications of Hadoop and Map Reduce Concepts.
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**

Introduction to Big Data Platform Characteristic Features –Big Data Applications -Big Data vs Traditional Data– Challenges of Conventional Systems -Intelligent data analysis – Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions - Re-Sampling - Statistical Inference - Prediction Error.

UNIT II MINING DATA STREAMS **9 Hours**

Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP) – Applications- Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.

UNIT III HADOOP FRAMEWORK **9 Hours**

History of Hadoop- The Hadoop Distributed File System – Components of Hadoop- Analyzing the Data with Hadoop- Scaling Out- Hadoop Streaming- Design of HDFS-Java interfaces to HDFS-Basics-Setting up a Hadoop Cluster - Cluster specification - Cluster Setup and Installation - Hadoop Configuration-Security in Hadoop - Administering Hadoop – HDFS - Monitoring-Maintenance-Hadoop benchmarks-Hadoop in the cloud

UNIT IV MAPREDUCE FRAMEWORK **9 Hours**

Developing a Map Reduce Application-How Map Reduce Works-Anatomy of a Map Reduce Job run-Failures-Job Scheduling-Shuffle and Sort – Task execution - Map Reduce Types and Formats- Map Reduce Features-YARN- Architecture

UNIT V BIG DATA FRAMEWORKS **9 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 / CONTENT BEYOND SYLLABUS / SEMINAR:

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: Describe the fundamentals of big data. (K2)
CO2: Apply various statistical techniques used in big data analytics.(K3)
CO3: Explain the basics of Data stream Mining.(K2)
CO4: Demonstrate the process of installation, configuration and execution of Hadoop.(K2)
CO5: Explore the Map Reduce techniques in Big Data applications.(K2)
CO6: Develop Big data applications using Big data frameworks. (K3)

REFERENCES:

1. Michael Berthold, David J.Hand, "Intelligent Data Analysis", Springer, 2007.
2. Anand Rajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", Cambridge University Press, 2012.
3. Bill Franks,"Taming the Big Data Tidal Wave: Finding Opportunities.
4. Jiawei Han, Micheline Kamber "Data Mining Concepts and Techniques" ,Second Edition, Elsevier, Reprinted 2008
5. David Loshin, "Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques.
6. P. J. Sadalage and M. Fowler, "NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence", Addison-Wesley Professional, 2012.
7. https://www.sas.com/en_us/insights/analytics/big-data-analytics.html.

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1702CA404	ADVANCED JAVA PROGRAMMING LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

1. To learn Java and Enterprise Java intensively.
2. To understand many advanced technologies of Java such as Multithreading, Streaming, Networking, Generic collections, RMI.
3. To understand and apply the fundamentals core java, packages, database connectivity for computing.
4. To enhance the knowledge to server side programming.

LIST OF EXPERIMENTS:

1. Writing Java programs by making use of class, interface, package, etc for the following different types of inheritance study
   I. Uses of 'this' keyword
   II. Polymorphism
2. Writing Java programs by making use of class, interface, package, etc for the following different types of inheritance study.
   I. Creation of user specific packages
   II. Creation of jar files and using them
3. Writing Java programs by making use of class, interface, package, etc for the following different types of inheritance study.
   I. User specific exception handling.
4. Writing window based GUI applications using frames and applets such as Calculator application, Fahrenheit to Centigrade conversion etc.,
5. Application of threads examples.
6. Reading and writing text files.
7. Writing an RMI application to access a remote method.
8. Create a Personal Information System using Swing.
9. Create student information system using JDBC and servlet.
10. FTP Using Sockets.

TOTAL: 60 HOURS

ADDITIONAL EXPERIMENTS / INNOVATIVE EXPERIMENTS :

1. Writing a Servlet program with database connectivity for a web based application such as students result status checking, PNR number enquiry etc.
2. Creation and usage of Java bean.

COURSE OUTCOMES:

Empolyability

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

CO1: Design Java applications using classes, objects, interfaces, packages and Multithreading. (K3)
CO2: Develop programs for reading and writing text files using Java Streams.(K3)
CO3: Develop file transfer applications using sockets.(K3)
CO4: Design student information system using Servlet and JDBC. (K3)
CO5: Design and Develop Calculator application, Fahrenheit to Centigrade conversion using frames and applets (K3)
CO6: Develop programs using Event Handling in Swing(K3)
CO7: Develop Java RMI application to access remote methods(K3)
CO8: Create Mini Projects using Java. (K6)

REFERENCES:

1. Prof. J .Vanitha, "Advanced Java Programming Laboratory Manual"
2. Herbert Schildt, "The Complete Reference – Java 2", 4th Edition, Tata McGraw Hill, 2001.
3. C. Xavier, "Java Programming: A Practical Approach", Tata McGraw Hill, 2011.
4. www.javatpoint.com
5. www.w3schools.com
6. www.tutorialpoint.com

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1702CA405	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 realize the differences between the development of conventional applications and mobile applications.
3. To learn programming skills in J2ME and Android SDK.
4. To study about micro browser based applications to access the Internet using Sun Java Toolkit.

LIST OF EXPERIMENTS:

1. Survey of Mobile Application Development Tools.
2. Form design for mobile applications using layout manager.
3. Develop mobile Applications using GUI controls.
4. Graphical and Multimedia applications.
5. Data retrieval applications.
6. Networking applications.
7. Develop a native application that uses GPS location information.
8. Gaming applications. (Perform the experiments from 2 to 7 in J2ME and Android SDK framework)
9. Micro browser based applications using WAP, WML and WML scripts. (Perform experiments in 8 using Sun Java Wireless toolkit)

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:

Employability

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

CO1: Develop simple Mobile Application using eclipse .(K3)
CO2: Design and implement Mobile Applications using layout manager in Android. (K3)
CO3: Build graphical and Multimedia application using eclipse. (K3)
CO4: Design data retrieval application using android SDK. (K3)
CO5: Develop Mobile Application for hand held device. (K3)
CO6: Develop Game and GPS application using J2ME. (K3)

REFERENCES:

1. Prof. C.Mallika, "Mobile Application Development Laboratory Manual"
2. Reto Meier "Professional Android 4 Application Development" , 3rd Edition
3. ZigurdMennieks "Programming Android Java Programming for the New Generation of Mobile Devices"
4. https://developer.android.com/guide/
5. https://www.tutorialspoint.com/android/
6. Dept. lab manual

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1704CA406	SOFT SKILLS DEVELOPMENT LABORATORY	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

1. To provide opportunities to learners to practice their communicative skills to make them become proficient users of English.
2. To enable learners to fine-tune their linguistic skills (LSRW) with the help of technology to communicate globally.
3. To enhance the performance of learners at placement interviews and group discussions and other recruitment procedures.

LIST OF EXPERIMENTS:

1. **PC based session (Weightage40%)**
   - **A. English Language Lab:** **(15 Hours)**
     1. **Listening Comprehension: (5)** Listening and typing – Listening and sequencing of sentences – Filling in the blanks - Listening and answering questions.
     2. **Reading Comprehension: (5)** Filling in the blanks - Cloze exercises – Vocabulary building - Reading and answering questions.
     3. **Speaking: (5)** Phonetics: Intonation – Ear training - Correct Pronunciation – Sound recognition exercises – Common Errors in English. Conversations: Face to Face Conversation – Telephone conversation– Role play activities
2. **B. Audio-visual materials based session (Samples to learn and practice)** **(06 Hours)**
   1. **Resume / Report Preparation / Letter Writing (1)** Structuring the resume / report - Letter writing / Email Communication - Samples.
   2. **Presentation skills: (1)** Elements of effective presentation – Structure of presentation - Presentation tools – Voice Modulation – Audience analysis - Body language – Video samples
   3. **Soft Skills: (2)** Time management – Articulateness – Assertiveness – Psychometrics – Innovation and Creativity - Stress Management & Poise - Video Samples
   4. **Group Discussion: (1)** Why is GD part of selection process? - Structure of GD – Moderator – led and other GDs Strategies in GD – Team work - Body Language - Mock GD –Video samples
   5. **Interview Skills: (1)** Kinds of interviews – Required Key Skills – Corporate culture – Mock interviews- Video samples.
3. **Practice Session (Weightage – 60%)**
   1. **RESUME / REPORT PREPARATION /LETTERWRITING:** **(06 Hours)**
   2. **SOFTSKILLS** **(08 Hours)**

   Hard skills & soft skills – soft skills: self-management skills & people skills - training in soft skills persuasive skills – sociability skills –interpersonal skills – team building skills – leadership skills – problem solving skills – adaptability - stress management – motivation techniques – life skills
   3. **GROUPDISCUSSIONSKILLS** **(05 Hours)**

   Participating in group discussions – understanding group dynamics - brainstorming the topic – questioning and clarifying –GD strategies (expressing opinions, accepting or refusing others' opinions, turn taking) – activities to improve GD skills – viewing recorded GD - mock GD.
   4. **INTERVIEWSKILLS** **(05 Hours)**

   Interview etiquette – dress code – body language – mock interview –attending job interviews – answering questions confidently – technical interview – telephone/Skype interview-practiceindifferenttypesofquestions–onetooneinterview&panelinterview– FAQs related to job interview-Emotional and cultural intelligence

TOTAL: 45 HOURS

ADDITIONAL EXPERIMENTS / INNOVATIVE EXPERIMENTS :

Word building

Skill Development

COURSE OUTCOMES:

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

CO1: Practice the presentations and participate in group discussions with high level of self-confidence.

CO2: Perform well in the interviews.

CO3: Practice reading and writing skills needed for workplace situations.

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REFERENCES:

1. Business English Certificate Materials, Cambridge University Press.
2. Graded Examinations In Spoken English And Spoken English For Work Downloadable. Materials From Trinity College, London.
3. International English Language Testing System Practice Tests, Cambridge University Press.
4. Robert M Sherfield And Et Al. "Developing Soft Skills" 4th Edition, New Delhi: Pearson Education, 2009.
5. http:// www.Slideshare.Net/Rohitjsh/Presentation-On-Group-Discussion

1704CA407	LIFE SKILL III APTITUDE – II	L	T	P	C
		0	0	2	1

PREREQUISITE :

Life Skill III-Aptitude I

COURSE OBJECTIVES:

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

UNIT I **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 II **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 III **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 IV **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 V **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

Skill Development

COURSE OUTCOMES:

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

CO1: Solve problems on Partnership, Mixture & Allegation and ages least time using shortcuts and apply real life situations.
CO2: Workout family relationships concepts, ability to visualize clocks & calendar and understand the logic behind a Sequence
CO3: Calculate concepts of speed, time and distance, understand timely completion using time and work.
CO4: Learners should be able to understand various charts and interpreted data least time.
CO5: Workout puzzles, ability to arrange things in an orderly fashion.
CO6: Solve problems on Partnership, Mixture & Allegation and ages least time using shortcuts and apply real life situations.

REFERENCES:

1. Arun Sharma, 'How to Prepare for Quantitative Aptitude for the CAT', 7th edition, McGraw Hills publication, 2016.
2. Arun Sharma, 'How to Prepare for Logical Reasoning for CAT', 4th edition, MGH 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", 3rd edition, Arihant publication, 2018.
6. B.S. Sijwalii and InduSijwali, "A New Approach to REASONING Verbal & Non-Verbal", 2nd edition, Arihnat publication, 2014.

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NAGAPATTINAM – 611 002

MASTER OF COMPUTER APPLICATIONS

Full Time Curriculum and Syllabus

Third Year – Fifth Semester

Course Code	Course Name	L	T	P	C	Maximum Marks		
						CA	ES	Total
Theory Course								
1702CA501	Software Testing	3	0	0	3	40	60	100
1702CA502	Virtualization and Cloud Computing	2	0	2	3	40	60	100
1702CA503	Python Programming	4	0	0	4	40	60	100
1703CA024	Intelligent Data Analysis	3	0	0	3	40	60	100
1703CA026	Human Resources Management	3	0	0	3	40	60	100
Laboratory Course								
1702CA504	Software Testing Laboratory	0	0	4	2	50	50	100
1702CA505	Python Programming Laboratory	0	0	4	2	50	50	100
1704CA506	Mini Project Using .Net	0	0	4	2	50	50	100
1704CA507	Life Skill V- Competitive Exam Preparation	0	0	2	1	100	-	100

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

1702CA501	SOFTWARE TESTING	L	T	P	C
		3	0	0	3

PREREQUISITE :

1. Software Engineering Methodologies
2. Object Oriented Analysis and Design

COURSE OBJECTIVES:

1. To provide an insight into software life cycle and various software process models
2. To estimate the resources for developing the application and to prepare the schedule
3. To know the various designing concepts and notations for modeling the software
4. To prepare the test cases for the project, apply various testing techniques, strategies and metrics to evaluate the software.
5. To construct software with high quality and reliability.

UNIT I INTRODUCTION TO TESTING AND FUNDAMENTALS **9 Hours**

Introduction: Evolving Profession of Software Engineering – Role of Process in Software Quality – Testing as a process – Testing Maturity Model. Fundamentals: Software Testing Principals – Tester Role in Software Development Organization. Software Development Life Cycle Model: Phases of Software Project – Quality – Quality Assurance – Quality Control – Life Cycle Model.

UNIT II DEFECTS, HYPOTHESES AND TEST **9 Hours**

Origin of Defects –Defect Classes: Requirement and Specification Defects Classes – Design Defect Classes –Coding Defect Classes – Defect Repository – Testing Defect – Tester Support for Developing a Defect Repository.

UNIT III SOFTWARE TESTING STRATEGIES AND TECHNIQUES **9 Hours**

Introduction to Testing Design Strategies – Test Case Specification –Test Case Design Techniques - Functional: Equivalence Partitioning – Boundary Value Analysis – Extreme Input Testing – State Transition Testing – Cause Effect Graphing. Test Case Design Techniques - Structural: Statement Testing – Branch/Decision Testing –Dynamic and Static Analysis.

UNIT IV LEVELS OF TESTING **9 Hours**

Unit Testing – Integration Test : Goals – Integration Strategies for Procedures and functions – Integration Strategies for Classes – Designing Integration Test – Integration Test Planning – System Test: Functional Testing – Performance Testing – Stress Testing – Configuration Testing – Security Testing – Recovery Testing . Regression Test – Alpha beta and Acceptance Test

UNIT V TESTING GOALS, POLICIES, PLANS AND DOCUMENTATION **9 Hours**

Introduction – Testing, Debugging Goals and Policies – Test Planning – Test Plan Components – Test plan Attachments –Locating Test Items – Reporting test Results – Role of three Critical Groups in Testing, Planning and Test Policy Development.

TOTAL: 45 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR:

1. Software Testing Tools: Selenium
2. Apache Master

Employability

COURSE OUTCOMES:

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

CO1: Describe the fundamentals of Software Testing.
CO2: Perform automated testing using test tools.
CO3: Evaluate the system with various testing techniques and strategies.
CO4: Explain the various levels of testing.
CO5: Describe the Concepts of Document testing procedures.

REFERENCES:

1. Illene Burnstein, "Practical Software Testing", Springer International Edition, Chennai, 2003.
2. Naresh Chauhan , "Software Testing Principles and Practices ", Oxford University Press , New Delhi, 2010.
3. Ron Patton,"Software Testing", Second Edition, Pearson Education, 2009.
4. Adithya P. Mathur, "Foundations of Software Testing – Fundamentals algorithms and techniques", Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008.
5. Boris Beizer, "Software Testing Techniques", Dream Tech Press, 2009.
6. Renu Rajani, Pradeep Oak, "Software Testing – Effective Methods, Tools and Techniques", Tata McGraw Hill, 2004.
7. Srinivasan Desikan and Gopalaswamy Ramesh, "Software Testing – Principles and Practices", Pearson Education, 2009.
8. https://www.tutorialspoint.com/software_testing/index.html

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1702CA502 VIRTUALIZATION AND CLOUD COMPUTING

L	T	P	C
2	0	2	3

PREREQUISITE :

1. Database management system

COURSE OBJECTIVES:

1. To introduce the broad perceptive of cloud architecture and model
2. To understand the concept of Virtualization and design of cloud Services
3. To understand the concept of cloud and utility computing and its various issues
4. To appreciate the emergence of cloud as the next generation computing paradigm
5. To be able to set up a private cloud

UNIT I VIRTUALIZATION **6 Hours**

Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization -Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices -Virtual Clusters and Resource management – Virtualization for Data-center Automation.

UNIT II SERVER CONSOLIDATION **6 Hours**

Hardware Virtualization – Virtual Hardware Overview - Sever Virtualization – Physical and Logical Partitioning - Types of Server Virtualization – Business cases for Sever Virtualization – Uses of Virtual server Consolidation – Planning for Development –Selecting server Virtualization Platform.

UNIT III CLOUD ARCHITECTURE AND MODEL **6 Hours**

Technologies for Network-Based System – System Models for Distributed and Cloud Computing –NIST Cloud Computing Reference Architecture. Cloud Models:- Characteristics – Cloud Services – Cloud models (IAAS, PAAS, SAAS – Lab Experiment using VMWare) – Public vs Private Cloud –Cloud Solutions - Cloud ecosystem – Service management – Computing on demand.

UNIT IV CLOUD INFRASTRUCTURE **6 Hours**

Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development –Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources.

UNIT V VIRTUALIZATION AND CLOUD SECURITY **6 Hours**

Guest hopping, attacks on the VM (delete the VM, attack on the control of the VM, code or file injection into the virtualized file structure), VM migration attack, hyperjacking-Cloud Security and Trust Management– Cloud Security Challenges – Cloud Security Defense Strategies– Distributed Intrusion/Anomaly Detection – Data and Software Protection Techniques.

TOTAL: 30+30 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR:

1. Network Virtualization
2. Software Defined Network

Employability

COURSE OUTCOMES:

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

CO1: Identify the architecture sand delivery models of cloud computing
CO2: Apply suitable virtualization concept
CO3: Explain the main concepts, key technologies, strengths and limitations of cloud computing
CO4: Describe the architecture, infrastructure and delivery models of cloud computing
CO5: Explain the core issues of cloud computing such as security, privacy and interoperability

REFERENCES:

1. Kai Hwang, Geofrey C. Fox and Jack J. Dongarra, Distributed and Cloud Computing, Morgan Kaufmann, 2012.
2. Cloud Computing: A Practical Approach, Anthony T.Velte, Toby J. Velte, Robert Elsenpeter, Tata-McGraw-Hill, New Delhi – 2010.
3. George Coulouris, Jean Dollimore, Tim Kindberg, Distributed Systems Concepts and Design, Fifth Edition, Pearson Education Asia, 2012.
4. John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010.
5. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach", TMH, 2009.
6. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud" O'Reilly.
7. www.cse.iitd.ernet.in/~sbansal/csl862-virt/2010/lec/lec01.pdf

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1702CA503	PYTHON PROGRAMMING	L	T	P	C
		4	0	0	4

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 12 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 12 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 12 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 12 Hours

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

UNIT V FILES,MODULES AND PACKAGES 12 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: 60 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR:

1. Intermediate Python Resources

COURSE OUTCOMES:

Employability

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.
6. http://greenteapress.com/wp/think-python.html

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1702CA504	SOFTWARE TESTING LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

1. To apply various testing techniques and to detect the errors in the software.
2. To generate and apply the test cases using the automated testing tool.
3. To learn the functionality of automated testing tools to apply in the specialized environment
4. To get insight into the levels of testing in the user environment.

LIST OF EXPERIMENTS:

The following experiments should be practiced:

1. Study of software testing tools such as Rational Rose Test Suite, Selenium Tool
2. Implementation of testing techniques using Automation Tools.
3. Mini-project: Developing automated test case generation.

TOTAL: 60 HOURS

ADDITIONAL EXPERIMENTS / INNOVATIVE EXPERIMENTS:

1. Using Selenium IDE, Write a test suite containing minimum 4 test cases.
2. Write and test a program to update 10 student records into table into Excel file.

COURSE OUTCOMES: Employability

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

CO1: Test the software by applying various testing techniques.
CO2: Debug the project and to test the entire computer based systems at all levels.
CO3: Test the applications in the specialized environment using various automation tools.
CO4: Design and develop automated test case generation tools.

REFERENCES:

1. Prof.N.Ilakkiya, "Software Testing Laboratory Manual"
2. Illene Burnstein, "Practical Software Testing", Springer International Edition, Chennai, 2003.
3. Naresh Chauhan ,"Software Testing Principles and Practices " Oxford University Press , New Delhi , 2010.
4. Ron Patton, "Software Testing", Second Edition, Pearson Education, 2009.
5. Adithya P. Mathur, " Foundations of Software Testing – Fundamentals algorithms and techniques", Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008
6. Boris Beizer, " Software Testing Techniques" , Dream Tech Press, 2009
7. RenuRajani, Pradeep Oak, "Software Testing – Effective Methods, Tools and Techniques", Tata McGraw Hill,2004
8. SrinivasanDesikan and Gopalaswamy Ramesh, "Software Testing – Principles and Practices", Pearson Education, 2009.
9. https://www.tutorialspoint.com/software_testing/index.html

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1702CA505	PYTHON PROGRAMMING LABORATORY	L	T	P	C
		0	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
    1. Simulate elliptical orbits in Pygame
    2. Simulate bouncing ball using Pygame

COURSE OUTCOMES:

employability

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.

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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1703CA024	INTELLIGENT DATA ANALYSIS	L	T	P	C
		3	0	0	3

PREREQUISITE :

1. Data Base Management System
2. Data mining Techniques

COURSE OBJECTIVES:

1. To understand data mining principles and techniques.
2. To expose the students to the concepts of Big Data.
3. To understand various data analysis tasks.

UNIT I INTRODUCTION TO BIG DATA **8 Hours**

Introduction to Big Data Platform–Challenges of conventional systems-Web data–Evolution of Analytic scalability –analytic processes and tools –Analysis vs reporting-Modern data analytic tools -Statistical concepts-Sampling distributions-re-sampling -statistical inference-prediction error.

UNIT II DATA PREPROCESSING &ASSOCIATION RULE MINING **8 Hours**

Need for Data Preprocessing–Data Cleaning–Data Integration and Transformation– Data Reduction –Data Discretization and Concept Hierarchy Generation-Association Rule Mining - Mining Frequent Item sets with and without Candidate Generation-Mining Various Kinds of Association Rules.

UNIT III DATA ANALYSIS **10 Hours**

Regression modeling - Multivariate analysis - Bayesian modeling - inference and Bayesian networks-Support vector and kernel methods-Analysis of time series-linear systems analysis-nonlinear dynamics-Rule induction-Neural networks-learning and generalization – competitive learning-principal component analysis and neural networks-Fuzzy logic-extracting fuzzy Models from data- fuzzy decision trees – Stochastic search methods.

UNIT IV CLUSTERING **9 Hours**

Cluster Analysis-Types of Data in Cluster Analysis –A Categorization of Major Clustering Methods–Partitioning Methods–Hierarchical methods– Density-Based Methods– Grid-Based Methods–Model-Based Clustering Methods–Clustering High-Dimensional Data–Constraint.

UNIT V CLASSIFICATION &PREDICTION **10 Hours**

Classification VS Prediction–Data preparation for Classification and Prediction–Classification by Decision Tree Introduction–Bayesian Classification–Rule Based Classification–Classification by Back propagation–Support Vector Machines–Associative Classification– Other Classification Methods–Prediction–Accuracy and Error Measures–Evaluating the Accuracy of a Classifier or Predictor –Ensemble Methods–Model Section.

TOTAL: 45 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR:

Machine Learning, Deep Learning, R tool.

COURSE OUTCOMES:

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

CO1: Explain the fundamental concepts of Big Data Analytics.
CO2: Apply Data mining techniques for Big Data Analysis.
CO3: Employ Statistical models in Data Analytics.
CO4: Perform Clustering of data using clustering methods.
CO5: Perform Classification and Prediction of data.

REFERENCES:

1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
2. Jiawei Han, Micheline Kamber, "Data Mining Concepts and Techniques", Second Edition, Elsevier, reprinted 2008.
3. Anand Rajaraman and Jeffrey David Ullman,"Mining of Massive Datasets", Cambridge University Press, 2012.
4. Pete Warden, "Big Data Glossary", O'Reilly, 2011.
5. FrankJ Ohlhorst,"Big Data Analytics:Turning Big Data into Big Money", Wiley and SAS Business Series, 2012.
6. https://www.tutorialspoint.com/big_data_analytics/
7. https://intellipaat.com/blog/big-data-tutorial-for-beginners/
8. https://data-flair.training/blogs/data-analytics-tutorial/

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1703CA026	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 IHRM

UNIT I PERSPECTIVES IN HUMAN RESOURCE MANAGEMENT 8 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 8 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 9 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

COURSE OUTCOMES:

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

CO1: Design policies and methods for all HR sub-functions.
CO2: Deal with multi-cultural workforce.
CO3: Forecast human resource requirement.
CO4: Apply techniques in recruitment, career management and compensation planning.
CO5: Identify and explain how to best implement a performance management system.

REFERENCES:

1. Anne-WilHarzing, Ashly Pinnington, Human Resource Management, Sage Publication 4th edition,2017.
2. Dessler &Varkkey, Human Resource Management, 14th edition, Pearson Education Limited,2016
3. K.Aswathappa, 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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1704CA506	MINI PROJECT USING .NET	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

1. To enable students to understand the Phases involved in Software development.
2. To prepare the students to develop socially relevant projects.
3. To explore the latest tools and technologies in software development.

LIST OF EXPERIMENTS:

1. Students are required to develop Mini Project that is socially relevant using latest technologies.
2. Project Phases: Requirement Analysis – System Design – Application Development – Testing.
3. Suggested Applications: Management Systems – Mobile Applications – Web Applications – Gaming Applications – System Software.
4. Assessment Pattern: Review I - Review II - Project Presentation - Report - Viva Voce.
5. User Based Testing and feedback from the benefited society required.

TOTAL: 60 HOURS

COURSE OUTCOMES: Employability

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

CO1: Apply the fundamentals of software engineering principles.
CO2: Apply the Software Development Phases involved in Software applications.
CO3: Develop software applications using latest technologies.
CO4: Apply the database connectivity concepts.
CO5: Create Project Report and Presentation

REFERENCES:

1. Prof. P. Arunkumar, "Mini Project Using .NET Manual"
2. Jesse Liberty , 'Programming C#, " , 4th Edition, O'Reilly Media
3. James Lee, Brent Ware , "Open Source Development with LAMP: Using Linux, Apache, MySQL, Perl, and PHP" Addison Wesley, Pearson 2009
4. www.angleritech.com/services/web-application-development/

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1704CA507	LIFE SKILL V- COMPETITIVE EXAM PREPARATION	L	T	P	C
		0	0	2	1

PREREQUISITE :

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

COURSE OBJECTIVES:

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

SKILL DEVELOPMENT

UNIT I Programming in C and C++ 10 Hours

Programming in C and C++ Programming in C: Elements of C–Tokens, identifiers, data types in C. Control structures in C. Sequence, selection and iteration(s). Structured data types in C–arrays, struct, union, string, and point- C++ Programming: Elements of C++ –Tokens, identifiers. Variables and constants, Data types, Operators, Control statements. Functions parameter passing. Class and objects. Constructors and destructors. Overloading, Inheritance, Templates, Exception handling.

UNIT II Relational Database Design and SQL 10 Hours

E-R diagrams and their transformation to relational design-normalization– 1NF, 2NF, 3NF, BCNF and 4NF–Limitations of 4NF and BCNF–SQL : Data Definition Language (DDL) –Data Manipulation Language (DML) –Data Control Language (DCL) commands–Database objects like Views, indexes, sequences, synonyms, data dictionary.

UNIT III Data and File structures 10 Hours

Data, Information–Definition of data structure Arrays, stacks, queues, linked lists, trees, graphs, priority queues and heaps– File Structures : Fields, records and files– Sequential, direct, index-sequential and relative files–Hashing, inverted lists and multilists–B trees and B+ trees.

TOTAL: 30 HOURS

COURSE OUTCOMES:

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

CO1: Learners should be able to crack both analytical and logical problems in an active manner
CO2: Able to work challenging and Critical work place
CO3: Learners know about various competitive exams

REFERENCES:

1. R. K. Ahuja and J. B. Orlin. Distance directed augmenting path algorithms for maximum flow and parametric maximum flow problems. Naval Research Logistics, 38(3):413–430, 1991.
2. M. Andrew. Another efficient algorithm for convex hulls in two dimensions. Information Processing Letters, 9(5):216–219, 1979.
3. Aspvall, M. F. Plass and R. E. Tarjan. A linear-time algorithm for testing the truth of certain quantified boolean formulas. Information Processing Letters, 8(3):121–123, 1979.
4. V. Aho, J. E. Hopcroft and J. Ullman. Data Structures and Algorithms, Addison-Wesley, 1983.

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NAGAPATTINAM – 611 002

MASTER OF COMPUTER APPLICATIONS

Full Time Curriculum and Syllabus

Third Year – Sixth Semester

Course Code	Course Name	L	T	P	C	Maximum Marks		
						CA	ES	Total
1704CA601	Project Viva Voce	0	0	24	12	200	200	400

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

ANNA UNIVERSITY, CHENNAI

AFFILIATED INSTITUTIONS

REGULATIONS - 2013

CURRICULUM I TO VI SEMESTERS (FULL TIME)

MASTER OF COMPUTER APPLICATION

SEMESTER I

SL. NO	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	MA7151	Mathematical Foundation for Computer Applications	3	1	0	4
2.	MC7101	Computer Organization	3	0	0	3
3.	MC7102	Problem Solving and Programming	3	0	0	3
4.	MC7103	Database Management Systems	3	0	0	3
5.	MC7104	Data Structures and Algorithms	3	1	0	4
PRACTICAL						
6.	MC7111	DBMS Laboratory	0	0	3	2
7.	MC7112	Data Structures and Algorithms Laboratory	0	0	3	2
8.	MC7113	Communication Skill Laboratory	1	0	2	2
		TOTAL	**16**	**2**	**8**	**23**

SEMESTER II

SL. NO	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	MC7201	Object Oriented Programming	3	0	0	3
2.	MC7202	Web Programming Essentials	3	0	0	3
3.	MC7203	System Software	3	0	0	3
4.	MC7204	Operating Systems	3	0	0	3
5.	MC7205	Computer Graphics and Multimedia	3	0	0	3
PRACTICAL						
6.	MC7211	Object Oriented Programming Laboratory	0	0	3	2
7.	MC7212	Web Programming Laboratory	0	0	3	2
8.	MC7213	Graphics and Multimedia Laboratory	0	0	3	2
		TOTAL	**15**	**0**	**9**	**21**

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SEMESTER III

SL. NO	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	MC7301	Computer Networks	3	0	0	3
2.	MC7302	Embedded Systems	3	0	0	3
3.	MC7303	Software Engineering	3	0	0	3
4.	MC7304	Professional Ethics	3	0	0	3
5.	MC7305	Internet Programming	3	0	0	3
PRACTICAL						
6.	MC7311	Embedded Systems Laboratory	0	0	3	2
7.	MC7312	Internet Programming Laboratory	0	0	3	2
8.	MC7313	Visual Programming Laboratory	1	0	3	2
		TOTAL	**16**	**0**	**9**	**21**

SEMESTER IV

SL. NO	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	MC7401	Resource Management Techniques	3	0	0	3
2.	MC7402	Object Oriented Analysis and Design	3	0	0	3
3.	MC7403	Data Warehousing and Data Mining	3	0	0	3
4.	MC7404	Network Programming	3	0	0	3
5.		Elective I	3	0	0	3
PRACTICAL						
6.	MC7411	Software Development- Case Tools Laboratory	0	0	3	2
7.	MC7412	Network Programming Laboratory	0	0	3	2
8.	MC7413	Technical Seminar and Report Writing	0	0	3	2
		TOTAL	**15**	**0**	**9**	**21**

SEMESTER V

SL. NO	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	MC7501	Web Application Development	3	0	0	3
2.	MC7502	Service Oriented Architecture	3	0	0	3
3.	MC7503	Mobile computing	3	0	0	3
4.		Elective II	3	0	0	3
5.		Elective III	3	0	0	3
PRACTICAL						
6.	MC7511	Advanced Internet Programming Laboratory	0	0	3	2
7.	MC7512	XML and Web Services Laboratory	0	0	3	2
8.	MC7513	Mini Project(Socially Relevant)	0	0	3	2
		TOTAL	**15**	**0**	**9**	**21**

SEMESTER VI

SL. NO	COURSE CODE	COURSE TITLE	L	T	P	C
1.	MC7611	Project Work	0	0	24	12
		TOTAL	**0**	**0**	**24**	**12**

TOTAL NO OF CREDITS:119

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MC7301	COMPUTER NETWORKS	L T P C 3 0 0 3

COURSE OBJECTIVES:

- To understand networking concepts and basic communication model
- To understand network architectures and components required for data communication.
- To analyze the function and design strategy of physical, data link, network layer and transport layer
- To Acquire knowledge of various application protocol standard developed for internet

UNIT I NETWORK FUNDAMENTALS **9**

Uses of Networks - Categories of Networks -Communication model -Data transmission concepts and terminology - Protocol architecture - Protocols - OSI - TCP/IP - LAN Topology - Transmission media

UNIT II DATA LINK LAYER **9**

Data link control - Flow Control - Error Detection and Error Correction - MAC - Ethernet, Token ring, Wireless LAN MAC – Blue Tooth - Bridges.

UNIT III NETWORK LAYER **9**

Network layer – Switching concepts – Circuit switching – Packet switching -IP — Datagrams – IP addresses- IPV6- ICMP - Routing Protocols - Distance Vector - Link State- BGP.

UNIT IV TRANSPORT LAYER **9**

Transport layer -service -Connection establishment - Flow control - Transmission control protocol - Congestion control and avoidance - User datagram protocol. -Transport for Real Time Applications (RTP).

UNIT V APPLICATIONS **9**

Applications - DNS- SMTP – WWW -SNMP- Security -threats and services - DES- RSA- web security -SSL

TOTAL : 45 PERIODS

COURSE OUTCOMES:

Employability

- Able to trace the flow of information from one node to another node in the network
- Able to Identify the components required to build different types of networks
- Able to understand the functionalities needed for data communication into layers
- Able to choose the required functionality at each layer for given application
- Able to understand the working principles of various application protocols
- Acquire knowledge about security issues and services available

REFERENCES:

1. Larry L. Peterson & Bruce S. Davie, "Computer Networks - A systems Approach", Fourth Edition, Harcourt Asia / Morgan Kaufmann, 2007.
2. William Stallings, "Data and Computer Communications", Nineth Edition, Prentice Hall , 2011.
3. Forouzan, " Data Communication and Networking", Fifth Edition , TMH 2012
4. Andrew S.Tannenbaum David J. Wetherall, "Computer Networks" Fifth Edition , Pearson Education 2011
5. James F. Kurose, Keith W. Ross, "Computer Networking: A Top-down Approach, Pearson Education, Limited, sixth edition,2012
6. John Cowley, "Communications and Networking : An Introduction", Springer Indian Reprint, 2010.
7. Achyut S Godbole,Atul Hahate, " Data Communications and Networks"second edition 2011
8. Wayne Tomasi, " Introduction to Data communications and Networking" , Pearson 2011

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MC7302 **EMBEDDED SYSTEMS** **L T P C**
3 0 0 3

COURSE OBJECTIVES:

- To understand the architecture and functions of 8085 processor
- To Learn Assembly language programming
- To understand the Basic concepts of Embedded systems and 8051 microcontroller
- To gain knowledge about how the I/O devices are interfaced with 8051 microcontroller
- To understand the basics of RTOS and to learn the method of designing a real time systems

UNIT I INTRODUCTION TO MICROPROCESSORS **9**

Evolution Of Microprocessors - 8-Bit Processor - 8085 Architecture - Register Organization - Instruction Set - Timing Diagram- Addressing Modes - Interrupts- Interrupt Service Routines- Assembly Language Programming Using 8085

UNIT II INTRODUCTION TO EMBEDDED SYSTEMS **9**

Embedded Systems- Processor Embedded Into A System-Embedded Hardware And Software Units- Applications-Design Process – Intel 8051 Architecture- Processor And Memory Organization- Interrupts Of 8051 - Assembly Language Programming Using 8051

UNIT III INTERFACING WITH 8051 **9**

Input-Output Interfacing - Bus Standards - PCI - ISA - Timing And Control - Input Output Devices - Serial And Parallel Communication - Motor Control-Programming Display Devices - ARM Architecture

UNIT IV REAL – TIME OPERATING SYSTEM **9**

Inter Process Communication - Signal Functions - Socket Programming - Mailbox - Pipes - RTOS - OS Services - Process Management - Timer Function -Event Function - Memory Management - Device, Files And I/O Subsystem - Basic Design Of RTOS.

UNIT V RTOS PROGRAMMING **9**

Basic Functions – Types Of RTOS – RTOS µCOS – RTLinux – Real Time Linux Functions- Programming With RTLinux – Case Study

TOTAL : 45 PERIODS

COURSE OUTCOMES: Skill Development

- Able to understand the functionality of 8085 microprocessor
- Able to design and control real time control systems
- Able incorporate enhanced features in the embedded systems through software
- Able to rectify minor problems by troubleshooting
- Acquire the knowledge of real time operating system and implement real time functions

REFERENCE BOOKS:

1. Rajkamal, "Embedded System: Architecture, Programming And Design" Tata Mcgraw-Hill Education, Second Edition, 2008.
2. B.Kanth Rao, "Embedded Systems" PHI Learning Private Limited, 2011.
3. Marilyn Wolf, "Computers As A Components" Third Edition, Morgan Kaufmann Series, 2012.
4. A.P.Godse & A.O.Mulani "Embedded Systems" Third Edition, Technical publications 2009.
5. Mohamed Rafiquzzaman, "Microprocessors and Micro computer-based system design", CRC Press, Second Edition, 2013.

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MC7303 **SOFTWARE ENGINEERING** L T P C
3 0 0 3

COURSE OBJECTIVES:

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

UNIT I INTRODUCTION 9

Software Engineering paradigms - Waterfall Life cycle model - Spiral Model - Prototype Model - fourth Generation Techniques - Planning - Software Project Scheduling, - Risk analysis and management - Requirements and Specification - Case Study for Project Plan and SRS

UNIT II SOFTWARE DESIGN 9

Abstraction - Modularity - Software Architecture - Cohesion - Coupling - Various Design Concepts and notations - Real time and Distributed System Design - Documentation - Dataflow Oriented design - Jackson System development - Designing for reuse - Programming standards - Case Study for Design of any Application Project.

UNIT III SOFTWARE TESTING AND MAINTENANCE 9

Software Testing Fundamentals - Software testing strategies - Black Box Testing - White Box Testing - System Testing - Object Orientation Testing - State based Testing - Testing Tools - Test Case Management - Software Maintenance Organization - Maintenance Report - Types of Maintenance - Case Study for Testing Techniques

UNIT IV SOFTWARE METRICS 9

Scope - Classification of metrics - Measuring Process and Product attributes - Direct and Indirect measures - Cost Estimation - Reliability - Software Quality Assurance - Standards - Case Study for COCOMO model

UNIT V SCM & WEB ENGINEERING 9

Need for SCM - Version Control - SCM process - Software Configuration Items - Taxonomy - CASE Repository – Features – Web Engineering

TOTAL: 45 PERIODS

COURSE OUTCOMES:

Employability

- Get an insight into the processes of software development
- Able to understand the problem domain for developing SRS and various models of software engineering
- Able to Model software projects into high level design using DFD,UML diagrams
- Able to Measure the product and process performance using various metrics
- Able to Evaluate the system with various testing techniques and strategies

REFERENCE BOOKS:

1. Roger S. Pressman, "Software Engineering: A Practitioner Approach", Seventh edition, McGrawHill, 2010.
2. Richard Fairley, " Software Engineering Concepts", Tata McGraw Hill Edition, 2008.
3. Ali Behforroz, Frederick J.Hudson, "Software Engineering Fundamentals", Oxford Indian Reprint,

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MC7304 **PROFESSIONAL ETHICS** L T P C 3 0 0 3

COURSE OBJECTIVES

- To understand the concepts of computer ethics in work environment.
- To understand the threats in computing environment
- To understand the intricacies of accessibility issues
- To ensure safe exits when designing the software projects

UNIT I COMPUTER ETHICS INTRODCUTION AND COMPUTER HACKING 9

A general Introduction - Computer ethics: an overview - Identifying an ethical issue - Ethics and law – Ethical theories - Professional Code of conduct - An ethical dilemma - A framework for ethical decision making - Computer hacking - Introduction - definition of hacking - Destructive programs - hacker ethics - Professional constraints - BCS code of conduct - To hack or not to hack? - Ethical positions on hacking

UNIT II ASPECTS OF COMPUTER CRIME AND INTELLECTUAL PROPERTY RIGHTS 9

Aspects of computer crime - Introduction - What is computer crime - computer security measures - Professional duties and obligations - Intellectual Property Rights - The nature of Intellectual property – Intellectual Property - Patents, Trademarks, Trade Secrets, Software Issues, Copyright - The extent and nature of software piracy - Ethical and professional issues - free software and open source code

UNIT III REGULATING INTERNET CONTENT, TECHNOLOGY AND SAFETY 9

Introduction - In defence of freedom expression - censorship - laws upholding free speech - Free speech and the Internet - Ethical and professional issues - Internet technologies and privacy - Safety and risk - assessment of safety and risk - risk benefit analysis - reducing risk

UNIT IV COMPUTER TECHNOLOGIES ACCESSIBILITY ISSUES 9

Introduction – Principle of equal access – Obstacles to access for individuals – professional responsibility - Empowering computers in the workplace - Introduction - computers and employment – computers and the quality of work - computerized monitoring in the work place - telecommuting - social, legal and professional issues - Use of Software, Computers and Internet-based Tools - Liability for Software errors - Documentation Authentication and Control - Software engineering code of ethics and practices - IEEE-CS - ACM Joint task force

UNIT V SOFTWARE DEVELOPMENT AND SOCIAL NETWORKING 9

Software Development - strategies for engineering quality standards - Quality management standards – Social Networking – Company owned social network web site – the use of social networks in the hiring process - Social Networking ethical issues - Cyber bullying - cyber stalking - Online virtual world - Crime in virtual world - digital rights management - Online defamation - Piracy - Fraud

TOTAL: 45 PERIODS

COURSE OUTCOMES:

- Helps to examine situations and to internalize the need for applying ethical principles, values to tackle with various situations.
- Develop a responsible attitude towards the use of computer as well as the technology.
- Able to envision the societal impact on the products/ projects they develop in their career
- Understanding the code of ethics and standards of computer professionals.
- Analyze the professional responsibility and empowering access to information in the work place.

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MC 7305 **INTERNET PROGRAMMING** L T P C
3 0 0 3

COURSE OBJECTIVES:

- To provide an overview of working principles of internet, web related functionalities
- To understand and apply the fundamentals core java, packages, database connectivity for computing
- To enhance the knowledge to server side programming
- To provide knowledge on advanced features like Swing, JavaBeans, Sockets.

UNIT I INTERNET APPLICATIONS 9

Domain Name System - Exchanging E-mail - Sending and Receiving Files - Fighting Spam, Sorting Mail and avoiding e-mail viruses - Chatting and Conferencing on the Internet - Online Chatting - Messaging - Usenet Newsgroup - Voice and Video Conferencing - Web Security, Privacy, and site-blocking – FTP.

UNIT II JAVA FUNDAMENTAL 9

Java features - Java Platform - Java Fundamentals - Expressions, Operators, and Control Structures – Classes, Packages and Interfaces - Exception Handling.

UNIT III PACKAGES 9

AWT package – Layouts – Containers – Event Package – Event Model – Painting – Garbage Collection - Multithreading
– Language Packages.

UNIT IV ADVANCED JAVA PROGRAMMING 9

Utility Packages - Input Output Packages - Inner Classes - Java Database Connectivity - Servlets - RMI – Swing Fundamentals - Swing Classes.

UNIT V JAVA BEANS AND NETWORKING 9

Java Beans - Application Builder Tools - Using the Bean Developer Kit-Jar Files-Introspection- BDK-Using BeanInfo Interface - Persistence- Java Beans API - Using Bean Builder - Networking Basics - Java and the Net - InetAddress - TCP/IP Client Sockets - URL -URL Connection - TCP/IP Server Sockets – A Caching Proxy HTTP Server – Datagrams.

TOTAL: 45 PERIODS

COURSE OUTCOMES: Skill Development

- Able to understand the internet standards and recent web technologies like Conferencing, newsgroup etc.
- Able to implement, compile, test and run Java program,
- Able to make use of hierarchy of Java classes to provide a solution to a given set of requirements found in the Java API
- Able to understand the components and patterns that constitute a suitable architecture for a web application using java servlets
- Able to demonstrate systematic knowledge of backend and front end by developing an appropriate application.

REFERENCES:

1. Margaret Levine Young, "Internet and WWW", 2nd Edition, Tata McGraw Hill, 2002.
2. Paul J. Deitel, Harvey M. Deitel, "Internet & World Wide Web: How to Program", Pearson Education International, 2009
3. Herbert Schildt, The Complete Reference - Java 2, 4th Edition, Tata McGraw Hill, 2001
4. Joyce Farrell, "Java Programming", Cengage Learning, Sixth Edition, 2011

MC7312 **INTERNET PROGRAMMING LABORATORY** **L T P C**
0 0 3 2

1. Basics - Sending and receiving mails from one or more email clients, Video Conferencing demonstration.
2. Writing Java programs by making use of class, interface, package, etc for the following
   # Different types of inheritance study
   # Uses of 'this' keyword
   # Polymorphism
   # Creation of user specific packages
   # Creation of jar files and using them
   # User specific exception handling
3. Writing window based GUI applications using frames and applets such as Calculator application, Fahrenheit to Centigrade conversion etc
4. Application of threads examples
5. Reading and writing text files
6. Writing an RMI application to access a remote method
7. Writing a Servlet program with database connectivity for a web based application such as students result status checking, PNR number enquiry etc
8. Creation and usage of Java bean
9. Create a Personal Information System using Swing
10. Event Handling in Swing
11. FTP Using Sockets.

Skill Development

TOTAL : 45 PERIODS

MC7313 **VISUAL PROGRAMMING LABORATORY** **L T P C**
1 0 3 2

VB

1. Database applications using data control.

Skill Development

VC++

1. SDK type programs code for GDI objects.
2. Implementation of Process management using PWCT
3. Implementation of advanced dynamic Slider & Image control applications
4. Programming for reading and writing into documents.
5. Creating DLLs and using them.
6. Data access through ODBC - Cdatabase, Crecordset.
7. Creating status bar application, static and dynamic splitter windows
8. create an application that will load the bit map dynamically with and with out wizard
9. Creating Active-x controls using .Net

TOTAL : 45 PERIODS

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MC7402	OBJECT ORIENTED ANALYSIS AND DESIGN	L T P C 3 0 0 3

COURSE OBJECTIVES:

- To provide a brief, hands-on overview of object-oriented analysis in software process
- To discuss Case studies based project specifications to develop object-oriented models and identify implementation strategies.
- To demonstrate and apply basic object oriented techniques to create and modify object oriented analysis and design models.
- To understand and apply testing techniques for object oriented software

UNIT I INTRODUCTION 9

An overview – Object basics – Object state and properties – Behavior – Methods – Messages – Information hiding – Class hierarchy – Relationships – Associations – Aggregations- Identity – Dynamic binding - Persistence - Metaclasses - Object oriented system development life cycle.

UNIT II METHODOLOGY AND UML 9

Introduction - Survey - Rumbugh, Booch, Jacobson methods - Patterns - Creational - Abstract Factory - Factory Method - Behavioral - Momento - Mediator - Structural - Decorator - Facade - Concurrency Patterns -Lock - Reactor - Scheduler - Frameworks – Unified approach - Unified modeling language - Static and Dynamic models - UML diagrams - Class diagram - Usecase diagrams - Dynamic modeling - Model organization - Extensibility.

UNIT III OBJECT ORIENTED ANALYSIS 9

Identifying Usecase - Business object analysis - Usecase driven object oriented analysis - Usecase model - Documentation - Classification - Identifying object, relationships, attributes, methods - Super-sub class - A part of relationships Identifying attributes and methods - Object responsibility

UNIT IV OBJECT ORIENTED DESIGN 9

Design process and benchmarking - Axioms - Corollaries - Designing classes - Class visibility - Refining attributes - Methods and protocols - Object storage and object interoperability - Databases - Object relational systems - Designing interface objects - Macro and Micro level processes - The purpose of a view layer interface-OOUI - MVC Architectural Pattern and Design - Designing the system.

UNIT V QUALITY AND TESTING 9

Quality assurance – Testing strategies – Test cases – Automated Testing Tools – Case Study - Cryptanalysis - Health Care Systems- Inventory Control System - Rational Rose Suite.

TOTAL : 45 PERIODS

COURSE OUTCOMES: Empolyability

- Understand the basic concepts to identify state & behavior of real world objects
- Able to learn the various object oriented methodologies and choose the appropriate one for solving the problem with the help of various case studies
- Understand the concept of analysis, design & testing to develop a document for the project
- Able to implement analysis, design & testing phases in developing a software project
- Able to understand the testing strategies and know about automated testing tools

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MC7403	DATA WAREHOUSING AND DATA MINING	L T P C 3 0 0 3

COURSE OBJECTIVES:

- To expose the students to the concepts of Data warehousing Architecture and Implementation
- To Understand Data mining principles and techniques and Introduce DM as a cutting edge business intelligence
- To learn to use association rule mining for handling large data
- To understand the concept of classification for the retrieval purposes
- To know the clustering techniques in details for better organization and retrieval of data
- To identify Business applications and Trends of Data mining

UNIT I DATA WAREHOUSE 8

Data Warehousing - Operational Database Systems vs. Data Warehouses - Multidimensional Data Model - Schemas for Multidimensional Databases - OLAP Operations - Data Warehouse Architecture – Indexing - OLAP queries & Tools.

UNIT II DATA MINING & DATA PREPROCESSING 9

Introduction to KDD process - Knowledge Discovery from Databases - Need for Data Preprocessing - Data Cleaning - Data Integration and Transformation - Data Reduction - Data Discretization and Concept Hierarchy Generation.

UNIT III ASSOCIATION RULE MINING 8

Introduction - Data Mining Functionalities - Association Rule Mining - Mining Frequent Itemsets with and without Candidate Generation - Mining Various Kinds of Association Rules - Constraint-Based Association Mining.

UNIT IV CLASSIFICATION & PREDICTION 10

Classification vs. Prediction - Data preparation for Classification and Prediction - Classification by Decision Tree Introduction - Bayesian Classification - Rule Based Classification - Classification by Back Propagation - Support Vector Machines - Associative Classification - Lazy Learners - Other Classification Methods - Prediction - Accuracy and Error Measures - Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section.

UNIT V CLUSTERING 10

Cluster Analysis: - Types of Data in Cluster Analysis - A Categorization of Major Clustering Methods - Partitioning Methods - Hierarchical methods - Density-Based Methods - Grid-Based Methods - Model-Based Clustering Methods - Clustering High- Dimensional Data - Constraint-Based Cluster Analysis – Outlier Analysis.

TOTAL : 45 PERIODS

COURSE OUTCOMES: Employability

Upon Completion of the course, the students will be able to

- Store voluminous data for online processing
- Preprocess the data for mining applications
- Apply the association rules for mining the data
- Design and deploy appropriate classification techniques
- Cluster the high dimensional data for better organization of the data
- Discover the knowledge imbibed in the high dimensional system
- Evolve Multidimensional Intelligent model from typical system
- Evaluate various mining techniques on complex data objects

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MC7404 **NETWORK PROGRAMMING** **L T P C**
3 0 0 3

COURSE OBJECTIVES :

1. To understand interprocess and inter-system communication
2. To understand socket programming in its entirety
3. To understand usage of TCP/UDP / Raw sockets
4. To understand how to build network applications

UNIT I INTRODUCTION **9**

Overview of UNIX OS - Environment of a UNIX process - Process control – Process relationships Signals - Interprocess Communication- overview of TCP/IP protocols

UNIT II ELEMENTARY TCP SOCKETS **9**

Introduction to Socket Programming -Introduction to Sockets - Socket address Structures - Byte ordering functions - address conversion functions - Elementary TCP Sockets - socket, connect, bind, listen, accept, read, write , close functions - Iterative Server - Concurrent Server.

UNIT III APPLICATION DEVELOPMENT **9**

TCP Echo Server – TCP Echo Client – Posix Signal handling – Server with multiple clients – boundary conditions: Server process Crashes, Server host Crashes, Server Crashes and reboots, Server Shutdown - I/O multiplexing - I/O Models - select function - shutdown function - TCP echo Server (with multiplexing) - poll function - TCP echo Client (with Multiplexing)

UNIT IV SOCKET OPTIONS, ELEMENTARY UDP SOCKETS **9**

Socket options - getsocket and setsocket functions - generic socket options - IP socketoptions - ICMP socket options - TCP socket options - Elementary UDP sockets - UDP echo Server - UDP echo Client - Multiplexing TCP and UDP sockets - Domain name system - gethostbyname function - Ipv6 support in DNS - gethostbyadr function -getservbyname and getservbyport functions.

UNIT V ADVANCED SOCKETS **9**

Ipv4 and Ipv6 interoperability - threaded servers - thread creation and termination - TCP echo server using threads – Mutexes – condition variables – raw sockets – raw socket creation – raw socket output - raw socket input - ping program - trace route program.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

Employability

1. To write socket API based programs
2. To design and implement client-server applications using TCP and UDP sockets
3. To analyze network programs

REFERENCES:

1. W. Richard Stevens, B. Fenner, A.M. Rudoff, "Unix Network Programming – The Sockets Networking API", 3rd edition, Pearson, 2004.
2. W. Richard Stevens, S.A Rago, "Programming in the Unix environment", 2nd edition, Pearson, 2005.

TOTAL: 45 PERIODS

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MC7411 SOFTWARE DEVELOPMENT – CASE TOOLS LABORATORY **L T P C 0 0 3 2**

1. Practicing the different types of case tools such as Rational Rose / other Open Source be used for all the phases of Software development life cycle.
2. Data modeling
3. Source code generators
4. Apply the following to typical application problems:
   1. Project Planning
   2. Software Requirement Analysis
   3. Software Design
   4. Data Modeling & Implementation
   5. Software Estimation
   6. Software Testing

Skill Development

A possible set of applications may be the following:

a. Library System
b. Student Marks Analyzing System
c. Text Editor.
d. Create a dictionary.
e. Telephone directory.
f. Inventory System.

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TOTAL: 45 PERIODS

MC7413	TECHNICAL SEMIANR AND REPORT WRITING	L T P C 0 0 3 2

Empolyability

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.
3. The faculty should evaluate the short review and award marks with respect to the following.
    a. Has the student analyzed - not merely quoted - the most significant portions of the primary sources employed?
    b. Has the student offered original and convincing insights?
    c. Plagiarism to be checked.
4. Every student should re-submit and present the review article including issues/ comments/ conclusions which had arisen during the previous discussion.
5. 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.
6. Every student should appear for a final external review exam to defend themselves.

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TOTAL: 45 PERIODS

MC7501 **WEB APPLICATION DEVELOPMENT** L T P C
3 0 0 3

COURSE OBJECTIVES:

- To acquire knowledge on the usage of recent platforms in developing web applications
- To understand architecture of J2EE and design applications using J2EE, Straut and hypernet
- To understand framework of .NET and design applications using .NET, C#, Silverlite
- To Design and develop interactive, client-side, server-side executable web applications LAMP Stack.

UNIT I J2EE Platform 9

Introduction -Enterprise Architecture Styles - J2EE Architecture - Containers - J2EE Technologies - Developing J2EE Applications - Naming and directory services - Using JNDI - JNDI Service providers - Java and LDAP - LDAP operations - Searching an LDAP server - Storing and retrieving java objects in LDAP - Application Servers - Implementing the J2EE Specifications - J2EE packaging and Deployment - J2EE packaging overview - Configuring J2EE packages

UNIT II STRUTS AND HIBERNATE 9

Struts Architecture - Struts classes - Action Forward, Action Form, Action Servlet, Action classes - Understanding struts - config.xml, Understanding Action Mappings, Struts flow with an example application, Struts Tiles Framework, Struts Validation Framework – Hibernate - Architecture of Hibernate - Downloading Hibernate - Exploring HQL - Understanding Hibernate O/R Mapping.

UNIT III LAMP STACK 9

Overview of Lamp Stack - Features of Lamp Stack -Understanding Python Understanding LAMP and Its Effect on Web Development

UNIT IV .Net, C# 9

Introduction - .Net revolution - .Net framework and its architecture - CLR - What is Assembly - Components of Assembly - DLL hell and Assembly Versioning. Overview to C# - C # Compilation and Execution Process - C# Fundamentals (Data types, Operators, Programming constructs) - Inheritance -Sealed Classes - Interface - Overloading - OverRiding - Method Hiding - C# Property - Exception Handling

UNIT V ASP.NET AND SILVERLIGHT 9

ASP.Net- IIS - ASP.Net Page Life Cycle - ASP Vs ASP.Net - HTML Controls Vs Server side Controls - Validation Controls - Data binding in ASP.Net - Caching - Configuration in ASP.Net (web.config) - Session management - View State in ASP.Net - ASP.Net. Introduction - RIA - Silverlight - XAML - App.Xaml - XAP - How Silverlight application executes in a web browser

TOTAL : 45 PERIODS

COURSE OUTCOMES:

- Knows how to design and implement Internet systems for enhancing education and engineering design,
- Able to understand functionality of Internet system
- Able to design a system according to customer needs using the available Internet technologies
- Able to Design and develop interactive, client-side, server-side executable web applications.
- Explore the features of various platforms and frameworks used in web applications development

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MC7502 **SERVICE ORIENTED ARCHITECTURE** L T P C
3 0 0 3

COURSE OBJECTIVES:

- To provide fundamental concepts of Service Oriented Architecture..
- To gain knowledge about SOAP, UDDI and XML to create web services.
- To know about the Cloud Computing architecture and services.

UNIT I SOA BASICS 9

Roots of SOA – Characteristics of SOA - Comparing SOA to client-server and distributed internet architectures – Anatomy of SOA- How components in an SOA interrelate - Principles of service orientation – Service Layers.

UNIT II XML AND WEB SERVICES 9

XML structure - Elements - Creating Well-formed XML - Name Spaces - Schema Elements, Types, Attributes - XSL Transformations - Parser - Web Services Overview - Architecture.

UNIT III WSDL, SOAP and UDDI 9

WSDL - Overview Of SOAP – HTTP – XML-RPC – SOAP: Protocol – Message Structure – Intermediaries - Actors - Design Patterns And Faults - SOAP With Attachments - UDDI.

UNIT IV SOA in J2EE and .NET 9

SOA platform basics – SOA support in J2EE – Java API for XML-based web services (JAX-WS) - Java architecture for XML binding (JAXB) – Java API for XML Registries (JAXR) - Java API for XML based RPC (JAX-RPC) - JAX-RS SOA support in .NET - ASP.NET webservices.

UNIT V CLOUD COMPUTING 9

Vision of Cloud computing - Cloud Definition - Characteristics and Benefits - Virtualization - Cloud computing Architecture - Cloud Reference Model, Types of Clouds - Cloud Platforms in Industry.

TOTAL : 45 PERIODS

COURSE OUTCOMES: Employability

- Known about the basic principles of service oriented architecture , its components and techniques
- Understand the architecture of web services
- Able to design and develop web services using protocol
- Understand technology underlying the service design
- Acquire the fundamental knowledge of cloud computing

REFERENCES:

1. Thomas Erl, "Service-Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2006.
2. Heather Williamson, "XML, The Complete Reference", McGraw Hill Education, 2012.
3. Frank. P. Coyle, "XML, Web Services And The Data Revolution", Pearson Education, 2002.
4. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services. An Architect's Guide", Pearson Education, 2005.

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MC7503 **MOBILE COMPUTING** L T P C
3 0 0 3

COURSE OBJECTIVES:

- To learn the basic concepts, aware of the GSM, SMS, GPRS Architecture.
- To have an exposure about wireless protocols -WLN, Bluetooth, WAP, ZigBee **issues.**
- To Know the Network, Transport Functionalities of Mobile communication
- To understand the concepts of Adhoc and wireless sensor networks.
- To impart knowledge about Mobile Application Development

UNIT I WIRELESS COMMUNICATION FUNDAMENTALS, ARCHITECTURE 9

Frequencies Spectrum- Multiplexing- Spread spectrum-GSM vs CDMA - 2G Mobile Wireless Services -Comparison of 2G and 3 G - GSM Architecture-Entities-Call Routing-PLMN-Address and identifiers-Network Aspects-Mobility Management-Frequency Allocation-Authentication and Security-SMS Architecture-Value Added Service through SMS-GPRS-GPRS and Packet Data Network-Architecture-Network Operations-Data Service-Application .

UNIT II MOBILE WIRELESS SHORT RANGE NETWORKS 9

Introduction-WLAN Equipment-WLAN Topologies-WLAN Technologies-IEEE 802.11 Architecture-WLAN MAC-Security of WLAN, Power Management-Standards- WAP Architecture-WAP 2.0-Bluetooth enabled Devices Network-Layers in Bluetooth Protocol-Security in Bluetooth- IrDA- ZigBee

UNIT III MOBILE IP NETWORK LAYER, TRANSPORT LAYER 9

IP and Mobile IP Network Layer- Packet delivery and Handover Management-Location Management-Registration- Tunneling and Encapsulation-Route Optimization- Dynamic Host Configuration Protocol-VoIP -IPsec -Mobile Transport Layer-Conventional TCP/IP Transport Layer Protocol-Indirect, Snooping, Mobile TCP

UNIT IV MOBILE AD-HOC, SENSOR NETWORKS 9

Introduction to Mobile Ad hoc Network- MANET-Routing and Routing Algorithm-Security - Wireless Sensor Networks-Applications- Distributed Network and Characteristics-Communication Coverage-Sensing Coverage-Localization- Routing -Function Computation- Scheduling

UNIT V MOBILE APPLICATION DEVELOPMENT 9

Mobile Applications Development -Application Development Overflow-Techniques for Composing Applications - Understanding the Android Software Stack - Android Application Architecture - Developing for Android - The Android Application Life Cycle - The Activity Life Cycle - Creating Your First Android Activity - Creating Applications and Activities - Creating User Interfaces - Intents - Broadcast Receivers - Adapters - Data Storage, Retrieval, and Sharing.-Geo services- creating mobile applications like game, Clock, calendar, Convertor, phone book, Text Editor

TOTAL: 45 PERIODS

COURSE OUTCOMES: Employability

- Gain the knowledge about various types of Wireless Data Networks and Wireless Voice Networks.
- understand the architectures, the challenges and the Solutions of Wireless Communication those are in use.
- realize the role of Wireless Protocols in shaping the future Internet.
- know about different types of Wireless Communication Networks and their functionalities.
- Able to develop simple Mobile Application Using Android

ATTESTED
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MC7513	MINI PROJECT (SOCIALLY RELEVANT)	L T P C 0 0 3 2

Employability

- Team Project with a maximum of four in a team
- Students shall select a domain and develop an application with social relevance
- Documentation is to be based on the standards
- Evaluation pattern is like Lab examination
- Need to submit a report, presentation with demo.
- User Based Testing and feedback from the benefited society required

TOTAL: 45 PERIODS.

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