

# E.G.S. PILLAY ENGINEERING COLLEGE

(Autonomous)

Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai  
Accredited by NAAC with 'A' Grade | Accredited by NBA (CSE, EEE, MECH)

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

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

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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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<b>1702CA102</b>	<b>PROBLEM SOLVING AND C PROGRAMMING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**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:**

- 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 operation.

**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", 2<sup>nd</sup> 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, 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.
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

**SKILL DEVELOPMENT**

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

**ASSESSMENT PATTERN :**

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
<b>Theory Course</b>								
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
<b>Laboratory Course</b>								
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:**

- 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.

*Employability*

**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.

**EMPLOYABILITY**

**REFERENCES:**

1. Pankaj Jalote, “An Integrated Approach to Software Engineering”, Third Edition, Narosa Publications, 2011.
2. Ian Sommerville, “Software engineering”, Ninth Edition, Pearson Education Asia, 2010.
3. Roger S. Pressman, “Software Engineering – A Practitioner’s Approach”, Seventh Edition, Tata
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.
  - 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.

**EMPLOYABILIT**

**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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# E.G.S. PILLAY ENGINEERING COLLEGE

(Autonomous)

Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai  
Accredited by NAAC with 'A' Grade | Accredited by NBA (CSE, EEE, MECH)

NAGAPATTINAM – 611 002



## 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
<b>Theory Course</b>								
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
<b>Laboratory Course</b>								
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

**EMPLOYABILITY**

**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 – Rumbaugh, 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 – 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

**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, Language User 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-ood-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. [http://www.cs.uct.ac.za/mit\\_notes/web\\_programming.html](http://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**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>4</b>	<b>2</b>

**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

**EMPLOYABILITY**

**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](http://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.

**COURSE OUTCOMES:**

*Employability*

**TOTAL : 30 HOURS**

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
6. B.S. Sijwalii and InduSijwali, "A New Approach to REASONING Verbal & Non-Verbal", 2nd edition, Arihant publication, 2014

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## 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
<b>Theory Course</b>								
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
<b>Laboratory Course</b>								
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

**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", 3<sup>rd</sup> 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)

**COURSE OUTCOMES:**

- Empolyability
- 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.Toth, “AdHoc Mobile Wireless Networks”, Prentice Hall Inc., 2002.
- 4.Jochen Schiller, “Mobile Communications”, Second Edition, Prentice Hall of India, Pearson Education, 2003.
- 5.William Stallings, “Wireless Communications and Networks”, Second Edition, Prentice Hall of India, Pearson Education, 2004.
6. [https://www.tutorialspoint.com/mobile\\_computing/mobile\\_computing\\_pdf\\_version.html](https://www.tutorialspoint.com/mobile_computing/mobile_computing_pdf_version.html)
7. <https://www.tutorialspoint.com/android/>

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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 IoT ARCHITECTURE** **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 Arduino Yun", Packt Publishing, 2014.
7. [https://www.tutorialspoint.com/internet\\_of\\_things](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](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:**

- 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)

*Employability*

**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**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>

**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 (Weightage 40%)**

**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 / LETTER WRITING:**

**(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- practice indifferent types of questions – onetoonointerview&panelinterview– FAQs related to job interview- Emotional and cultural intelligence

**TOTAL: 45 HOURS**

**ADDITIONAL EXPERIMENTS / INNOVATIVE EXPERIMENTS :**

Word building

**COURSE OUTCOMES:**

*Skill Development*

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.

**ATTESTED**

**REFERENCES:**

1. Business English Certificate Materials, Cambridge University Press.
2. Graded Examinations In Spoken English And Spoken English For Work 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](http://www.Slideshare.Net/Rohitjsh/Presentation-On-Group-Discussion)

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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**

**COURSE OUTCOMES:**

*Skill Development*

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, Arihant publication, 2014.

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# E.G.S. PILLAY ENGINEERING COLLEGE

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

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
<b>Theory Course</b>								
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
<b>Laboratory Course</b>								
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 Exam

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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

**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 Gopaldaswamy Ramesh, "Software Testing – Principles and Practices", Pearson Education, 2009.
8. [https://www.tutorialspoint.com/software\\_testing/index.html](https://www.tutorialspoint.com/software_testing/index.html)

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1702CA503

**PYTHON PROGRAMMING**

L	T	P	C
4	0	0	4

**PREREQUISITE :**

1. Object 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:**

- Empellability*
- 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 Interdisciplinary 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**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>4</b>	<b>2</b>

**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:**

- On the successful completion of the course, students will be able to
- Empathy ability*
- 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 Gopaldaswamy Ramesh, "Software Testing – Principles and Practices", Pearson Education, 2009.
9. [https://www.tutorialspoint.com/software\\_testing/index.html](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:**

- 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:**

- Employability
- 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/](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 4<sup>th</sup> 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. Luis R. Gomez-Mejia, David B. Balkin, Robert L. Cardy. Managing Human Resource. PHI Learning, 2012
5. Ivancevich, Human Resource Management, McGraw Hill 2012
6. Bernadin, Human Resource Management, Tata McGraw Hill, 8th edition 2012
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/](http://www.angleritech.com/services/web-application-development/)

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# E.G.S. PILLAY ENGINEERING COLLEGE

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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