

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

Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai Accredited by NAAC with “A” Grade |
Accredited by NBA (CSE, EEE, MECH, CIVIL, ECE, IT)

NAGAPATTINAM – 611 002



MASTER OF COMPUTER APPLICATIONS

Curriculum and Syllabi

Second Year – Third Semester

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

2002CA301 **CRYPTOGRAPHY AND NETWORK SECURITY** **L T P C**
2 0 2 3

PREREQUISITE :

Data Communications and Network Security

COURSE OBJECTIVES:

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

UNIT I ELEMENTARY CRYPTOGRAPHY 12 Hours

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

UNIT II PROGRAM SECURITY 12 Hours

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

UNIT III SECURITY IN NETWORKS 12 Hours

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

UNIT IV SECURITY IN DATABASES 12 Hours

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

UNIT V SECURITY MODELS AND STANDARDS 12 Hours

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

TOTAL: 60 HOURS

FURTHER READING:

1. Challenge –Handshake Authentication Protocol (CHAP)

COURSE OUTCOMES:

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

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

REFERENCES:

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

Lab Module

Module 1:

1. Demonstration of substitution ciphers.
2. Implementation of AES Algorithm.
3. Demonstration of Public key encryption.
4. Exploring the usage of Hash functions.

Module 2:

5. Study of User Authentication flaws and demonstrate good authentication techniques.
6. Exploring security Algorithms
7. Analyzing Email Security issues.
8. Case study on recent security models.

| | | | | | |
|------------------|------------------------------------------------|----------|----------|----------|----------|
| 2002CA302 | DISTRIBUTED SYSTEMS AND CLOUD COMPUTING | L | T | P | C |
| | | 3 | 0 | 0 | 3 |

PREREQUISITE:

1. Computer Networks
2. Operating Systems

COURSE OBJECTIVES:

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

UNIT I DISTRIBUTED SYSTEM MODELS AND ENABLING TECHNOLOGIES 09 Hours

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

UNIT II COMPUTER CLUSTERS FOR SCALABLE PARALLEL COMPUTING 09 Hours

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

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

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

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

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

UNIT V CLOUD PROGRAMMING AND SOFTWARE ENVIRONMENTS 09 Hours

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

TOTAL: 45 HOURS

FURTHER READING:

Fog Computing

COURSE OUTCOMES:

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

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

REFERENCES:

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

2002CA303

HUMAN RESOURCES MANAGEMENT

| | | | |
|----------|----------|----------|----------|
| L | T | P | C |
| 3 | 0 | 0 | 3 |

PREREQUISITE:

1. Software Quality Management
2. Software Project Management

COURSE OBJECTIVES:

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

UNIT I PERSPECTIVES IN HUMAN RESOURCE MANAGEMENT 08 Hours

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

UNIT II THE CONCEPT OF BEST FIT EMPLOYEE 08 Hours

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

UNIT III TRAINING AND EXECUTIVE DEVELOPMENT 10 Hours

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

UNIT IV SUSTAINING EMPLOYEE INTEREST 09 Hours

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

UNIT V PERFORMANCE EVALUATION AND IHRM 10 Hours

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

TOTAL: 45 HOURS

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :

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

COURSE OUTCOMES:

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

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

REFERENCES:

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

2002CA304

DATA ANALYTICS

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 0 | 3 |

PREREQUISITE :

Data Mining

COURSE OBJECTIVES:

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

UNIT I INTRODUCTION TO BIG DATA 9 Hours

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

UNIT II HADOOP FRAMEWORK 9 Hours

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

UNIT III DATA ANALYTIC METHODS USING R 8 Hours

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

UNIT IV MINING DATA STREAMS 9 Hours

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

UNIT V BIG DATA FRAMEWORKS 10 Hours

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

TOTAL: 45 HOURS

FURTHER READING:

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

COURSE OUTCOMES:

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

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

REFERENCES:

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

2002CA305

DATA ANALYTICS LABORATORY

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|----------|----------|----------|----------|
| L | T | P | C |
| 0 | 0 | 4 | 2 |

COURSE OBJECTIVES:

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

TOTAL: 60 HOURS

FURTHER READING:

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

COURSE OUTCOMES:

- On the successful completion of the course, students will be able to
- CO1: Work with basic data structures that are suitable for the problems to be solved efficiently
 - CO2: Design, code, and test small Python programs with a basic understanding of top-down design.
 - CO3: Learn how to create GUI and solve real-world problem using language idioms, data structures and standard library
 - CO4: Build and apply linear and logistic regression
 - CO5: Perform data analysis with machine learning methods
 - CO6: Perform graphical data analysis

REFERENCES:

- 1.Alan Gates and Daniel Dai, "Programming Pig – Dataflow scripting with Hadoop", O'Reilley, 2nd Edition, 2016
2. Hadley Wickham,lggplot2 – Elegant Graphics for Data Analysisl, Springer Publications,2nd Edition, 2016
- 3.Kristina Chodorow, "MongoDB: The Definitive Guide – Powerful and Scalable Data Storage", O'Reilley, 2nd Edition, 2013.
4. Lars George, "HBase: The Definitive Guide", O'Reilley, 2015.
5. Tom White, —Hadoop: The Definitive Guide – Storage and Analysis at Internet Scalel, O'Reilley, 4th Edition, 2015

2002CA306

DISTRIBUTED SYSTEM AND CLOUD LABORATORY

| L | T | P | C |
|----------|----------|----------|----------|
| 0 | 0 | 4 | 2 |

COURSE OBJECTIVES:

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

TOTAL: 60 HOURS

FURTHER READING:

1. Open source tools for distributed and cloud computing

COURSE OUTCOMES:

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

- CO1: Design simple real time applications for distributed systems.
- CO2: Apply virtualization in computer systems
- CO3: Develop cloud applications in public cloud.

CO4: Make use of simulation tools to demonstrate the cloud scheduling models.

CO5: Develop virtual cluster for handling Big Data.

REFERENCES:

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

2004CA307

TECHNICAL SEMINAR AND REPORT WRITING

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 2 | 1 |

Course Objectives:

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

List of Experiments:

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

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

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

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

Total: 30 Hours

Course Outcomes:

After completion of the course, Student will be

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

2004CA308 LIFE SKILL III - APTITUDE – II

L T P C
0 0 2 1

Course Objective (s):

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

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

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

Unit 2 Blood relations, , Clocks, Calendars 6 Hours

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

Unit 3 Time and Distance, Time and Work 6 Hours

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

Unit 4 Data Interpretation and Data Sufficiency 6 Hours

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

Unit 5 Analytical and Critical Reasoning 6 Hours

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

Total 30 Hours

Course Outcomes:

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

References :

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

ELECTIVE II

| Course Code | Course Name | L | T | P | C | Category |
|--------------------|-----------------------------|----------|----------|----------|----------|-----------------|
| 2003CA006 | Machine Learning Techniques | 3 | 0 | 0 | 3 | PE |
| 2003CA007 | Artificial Intelligence | 3 | 0 | 0 | 3 | PE |
| 2003CA008 | Compiler Design | 3 | 0 | 0 | 3 | PE |
| 2003CA009 | Cognitive Computing | 3 | 0 | 0 | 3 | PE |
| 2003CA010 | Visualization Techniques | 3 | 0 | 0 | 3 | PE |

ELECTIVE III

| Course Code | Course Name | L | T | P | C | Category |
|--------------------|--------------------------|----------|----------|----------|----------|-----------------|
| 2003CA011 | R Programming | 2 | 0 | 2 | 3 | PE |
| 2003CA012 | PHP Programming | 2 | 0 | 2 | 3 | PE |
| 2003CA013 | Java Server Pages | 2 | 0 | 2 | 3 | PE |
| 2003CA014 | .NET Programming | 2 | 0 | 2 | 3 | PE |
| 2003CA015 | Block chain Technologies | 2 | 0 | 2 | 3 | PE |