

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 – Fourth Semester

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

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

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", 3rd edition, Tata McGraw Hill, 2015.
3. Matt Bishop, "Computer Security art and science", Second Edition, Pearson Education, 2002
4. Wade Trappe and Lawrence C. Washington, "Introduction to Cryptography with Coding Theory" Second Edition, Pearson Education, 2007.
5. OWASP top ten security vulnerabilities: <http://xml.coverpages.org/OWASP-TopTen.pdf>
6. <http://nptel.ac.in>

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:

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

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

REFERENCES:

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

1703CA011

INTERNET OF THINGS

L	T	P	C
3	0	0	3

PREREQUISITE :

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

COURSE OBJECTIVES:

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

UNIT I FUNDAMENTALS OF IoT 9 Hours

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

UNIT II IoTARCHITECTURE 8 Hours

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

UNIT III IoT PROTOCOLS 8 Hours

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

UNIT IV BUILDING IoT WITH RASPBERRY PI AND ARDUINO 11 Hours

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

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:

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 Madiseti, “Internet of Things-A hands-on approach”, Universities Press, 2015.
2. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), “Architecting the Internet of Things”, Springer, 2011.
3. Honbo Zhou, “The Internet of Things in the Cloud: A Middleware Perspective”, CRC Press, 2012.
4. Olivier Hersent, David Boswarthick, Omar Elloumi, “The Internet of Things – Key applications and Protocols”, Wiley, 2012.
5. Manoel Carlos Ramon, “Intel® Galileo and Intel® Galileo Gen2: API Features and Arduino Projects for Linux Programmers”, A press, 2014.
6. Marco Schwartz, “Internetof Things with the ArduinoYun”, Packt Publishing, 2014.
7. https://www.tutorialspoint.com/internet_of_things
8. <https://www.edureka.co/blog/iot-tutorial>

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.

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)

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

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:

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. ZigurdMenniaks "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

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

COURSE OBJECTIVES:

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

LIST OF EXPERIMENTS:

1. PC based session (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 – Articulation – Assertiveness – Psychometrics – Innovation and Creativity - Stress Management & Poise - Video Samples
4. **Group Discussion: (1)** Why is GD part of selection process? - Structure of GD – Moderator – led and other GDs Strategies in GD – Team work - Body Language - Mock GD – Video samples
5. **Interview Skills: (1)** Kinds of interviews – Required Key Skills – Corporate culture – Mock interviews- Video samples.

3. Practice Session (Weightage – 60%)

1. RESUME / REPORT PREPARATION / LETTERWRITING:

(06 Hours)

2. SOFTSKILLS

(08 Hours)

Hard skills & soft skills – soft skills: self-management skills & people skills - training in soft skills persuasive skills – sociability skills –interpersonal skills – team building skills – leadership skills – problem solving skills – adaptability - stress management – motivation techniques – life skills

3. GROUPOURDISCUSSIONSKILLS

(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 – one to one interview & panel interview – FAQs related to job interview- Emotional and cultural intelligence

TOTAL: 45 HOURS

ADDITIONAL EXPERIMENTS / INNOVATIVE EXPERIMENTS :

Word building

COURSE OUTCOMES:

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

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

CO2: Perform well in the interviews.

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

REFERENCES:

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

1704CA407

LIFE SKILL III APTITUDE – II

L	T	P	C
0	0	2	1

PREREQUISITE :

Life Skill III-Aptitude I

COURSE OBJECTIVES:

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

UNIT I PARTNERSHIP, MIXTURES AND ALLEGATIONS, PROBLEM ON AGES, SIMPLE INTEREST, COMPOUND INTEREST 6 Hours

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

UNIT II BLOOD RELATIONS, , CLOCKS, CALENDARS 6 Hours

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

UNIT III TIME AND DISTANCE, TIME AND WORK 6 Hours

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

UNIT IV DATA INTERPRETATION AND DATA SUFFICIENCY 6 Hours

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

UNIT V ANALYTICAL AND CRITICAL REASONING 6 Hours

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

TOTAL: 30 HOURS

COURSE OUTCOMES:

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

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

REFERENCES:

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