

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, ECE, CIVIL, IT)

NAGAPATTINAM–611002



B.E. Civil Engineering Full Time Curriculum and Syllabus

SEMESTER VI										
Course Code	Course Name	L	T	P	C	Maximum Marks			Category	
						CIA	ES	Total		
Theory Course										
1702CE601	Structural Analysis II	3	2	0	4	40	60	100	PC	
1702CE602	Concrete Structures II	3	0	0	3	40	60	100	PC	
1702CE603	Design Of Steel Structures	3	0	0	3	40	60	100	PC	
1702CE604	Water Supply Engineering	3	0	0	3	40	60	100	PC	
1703CE009	Ground Water Engineering (Elective III)	3	0	0	3	40	60	100	PE	
	Elective IV (Open)	3	0	0	3	40	60	100	PE	
Laboratory Course										
1702CE651	Concrete And Highway Engineering Lab	0	0	2	1	50	50	100	PC	
1702CE652	Environmental And Irrigation Design And Drawing	0	0	4	2	50	50	100	PC	
1704GE651	Life Skills: Aptitude - II	0	0	2	1	100	0	100	EEC	
1702CE653	Mini Project II	0	0	2	1	100	0	100	PC	
1702CE654	Industrial Visit / Presentation	0	0	0	1	-	-	--	-	
Total		18	2	10	25	540	460	1000		

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

1702CE601	STRUCTURAL ANALYSIS II	L	T	P	C
		3	2	0	4
Course Objectives:					
1.To obtain the ability to analyze indeterminate beams and rigid frames by Flexibility and Stiffness Matrix method.					
2.To develop a clear understanding of Displacement functions in Structural element by Finite Element method.					
3.To know the concept of plastic structures and analysis of space and Cable structures.					
Unit I	MATRIX FLEXIBILITY METHOD	12 Hours			
Equilibrium and compatibility- Determinate Vs indeterminate structures – Indeterminacy – Primary structure – Compatibility conditions – Analysis of indeterminate pin-jointed plane frames, continuous beams, rigid jointed plane frames (with redundancy restricted to two).					
Unit II	STIFFNESS MATRIX METHOD	12 Hours			
Element and global stiffness matrices – Analysis of continuous beams – Co-ordinate transformations – Rotation matrix – Transformations of stiffness matrices, load vectors and displacements vectors – Analysis of pin-jointed plane frames and rigid frames (with redundancy limited to two)					
Unit III	PLASTIC ANALYSIS OF STRUCTURES	12 Hours			
Statically indeterminate axial problems – beams in pure bending – Plastic hinge and mechanism –Plastic analysis of indeterminate beams and frames					
Unit IV	INTRODUCTION TO FINITE ELEMENT ANALYSIS	12 Hours			
Introduction- Steps involved in FEA – Displacement functions – truss element – beam element – Triangular elements.					
Unit V	SPACE AND CABLE STRUCTURES	12 Hours			
Analysis of Space trusses using method of tension coefficients – Beams curved in plan Suspension cables – suspension bridges with two and three hinged stiffening girders.					
Total:					45 + 15 Hours
Further Reading:					
1. To analyze and find out the BMD.					
2. To analyze the indeterminate structures.					
Course Outcomes:					
After completion of the course, Student will be able to					
1.Analyze structures using matrix flexibility method.					
2.Analyze structures using stiffness method.					
3.Perform plastic analysis for indeterminate beams and frames.					
4.Implement basic concepts of finite element analysis.					
5.Analyze Space Truss using tension Coefficient method and beams curved in plan and cable suspension bridges.					
References:					
1.Punmia,B.C., Ashok Kumar and Arun Kumar Jain, “ Theory of Structures”, Laxmi Publications, 2005.					
2. Vaidyanathan, R. and Perumal, P., “Comprehensive structural Analysis – Vol I & II”, Laxmi Publications, New Delhi, 2003.					
3. Negi L.S &Jangid R.S., “Structural Analysis”, Tata McGraw Hill Publications, New Delhi, 2003.					
4.Ghali.A, Nebille, A.M. and Brown, T.G, “Structural Analysis” A unified classical and Matrix approach”, 6th Edition, Spon Press, London and New York, 2013.					
5.Gambhir, M.L., “Fundamentals of Structural Mechanics and Analysis”, PHI Learning Pvt. Ltd., New Delhi, 2011.					
6.William Weaver Jr& James M. Gere, “Matrix Analysis of Framed Structures”, CBS Publishers and Distributors, New Delhi, 2004					

1702CE602	CONCRETE STRUCTURES II	L	T	P	C
		3	0	0	3
Course Objectives:					
<ol style="list-style-type: none"> To develop an understanding on the basic concepts in the behavior and design of reinforced concrete structures such as Retaining Wall and counterfort retaining wall. To provide knowledge on design of various components in the water tank by working stress method. To provide knowledge on design of various reinforced concrete structures such as staircases, flat slabs and RC walls. To expose the basic concepts about the yield line theory for the analysis and design of slab of various cross sections. To expose the behavior of masonry structures, and be able to design for various loading conditions. 					
Unit I	RETAINING WALLS	9 Hours			
Retaining walls - types - earth pressure - effects of surcharge - Stability requirements - Cantilever and counterfort retaining walls - detailing of reinforcement.					
Unit II	WATER TANKS	9 Hours			
R.C water tanks resting on ground - general design requirements – Overhead circular and rectangular tanks - Analysis and design using working stress method - detailing of reinforcement - codal provisions.					
Unit III	STAIRS, FLAT SLABS AND WALLS	9 Hours			
Staircases - Ordinary and Doglegged – Flat slabs - Direct design method – Reinforced concrete walls.					
Unit IV	YIELD LINE THEORY	9 Hours			
Yield line – Assumptions – Characteristics – Upper bound and lower bound theories - Yield line analysis - Design of slabs.					
Unit V	BRICK MASONRY	9 Hours			
Introduction - classification of walls - Lateral supports and stability - effective height of wall and columns - effective length of walls - Design loads, load dispersion - Permissible stresses - design of axially and eccentrically loaded brick walls					
Total:					45 Hours
Further Reading :					
<ol style="list-style-type: none"> Students can be able to work on retaining and storage structures Students can be able to design shear walls, deck bridges. 					
Course Outcomes:					
After completion of the course, Student will be able to					
<ol style="list-style-type: none"> Design various types of retaining walls under various loading conditions Design and detailing of different types of water tanks along with the staging and foundation. Attain sufficient knowledge of design for staircases, flat slabs and reinforced concrete walls and gain knowledge about the principles of design of mat foundation, box culvert and road bridges Apply the yield line theory for design of square, rectangular, circular and triangular slabs. Design axially and eccentrically loaded brick walls based on the knowledge gained for various loading conditions 					
References:					
<ol style="list-style-type: none"> B.C. Punmia, Ashok Kumar Jain, Arun Kumar Jain “Limit State Design of Reinforced Concrete”, Laxmi Publications (P) Ltd, New Delhi 2007 Dayaratnam, P., “Brick and Reinforced Brick Structures”, Oxford & IBH Publishing House, 1997. Unnikrishna Pillai, S., Devdas Menon, “Reinforced Concrete Design”. 					

1702CE603	DESIGN OF STEEL STRUCTURES	L	T	P	C
		3	1	0	4
Course Objectives:					
1.To learn the properties of steel sections and design basics and codal provisions- Design of connections 2.To design steel members subjected to tension and compression member. 3.Design steps involved in beams, built up beams and design of plate girder					
Unit I	INTRODUCTION	9 +3Hours			
Structural steel sections – Limit state design concepts - Connections- bolted and welded joints - Failure of joints - Efficiency of joints - Eccentric connections					
Unit II	TENSION MEMBERS	9 +3Hours			
Types of sections – Net area – net effective sections for angles and Tee in tension – Design of connections in tension members – use of lug angles – Design of tension splice – Concept of Shear lag.					
Unit III	COMPRESSION MEMBERS	9 +3Hours			
Effective length about major and minor principal axis - I.S code provisions- permissible stresses - Design rules- design of one component - two components and built up compression members under axial load- Design of Lacings and Battens - Different types of column bases - Slab base and Gusseted base - connection details					
Unit IV	BEAMS	9 +3Hours			
Design of laterally supported and unsupported beams – Built up beams – design of Plate Girders – Intermediate and bearing stiffeners – Web splicing.					
Unit V	VINDUSTRIAL STRUCTURES	9 +3Hours			
Design of roof trusses – Elements of roof trusses – Design of purlins – Estimation of wind loads – Design of gantry girders					
Total:					60 Hours
Further Reading					
Advanced steel structures / Composite steel structures					
Course Outcomes:		After completion of this course, students can able to			
1.Explain the limit state design concept and design of bolted and welded connections. 2.Use the IS codal provisions to the design of tension members. 3.Use the IS codal provisions to the design of compression members 4.Apply the design principles in beams and plate girders. 5.Analysis various components involved in roof truss structures					
References:					
1. S.S. Bhavikatti ,”Design of Steel Structures”, I. K. International Pvt Ltd, 2009. 2. Gaylord, E.H., Gaylord, N.C., and Stallmeyer, J.E., “Design of Steel Structures”, 3rd edition, McGraw-Hill Publications, 1992 3. Negi L.S.” Design of Steel Structures”, Tata McGraw Hill Publishing Pvt Ltd, New Delhi, 2007.					

1702CE604	WATER SUPPLY ENGINEERING	L	T	P	C
		3	0	0	3
Course Objectives:					
<ol style="list-style-type: none"> To examine the water supply system and conveyance system. To create an ability to evaluate the water treatment and advanced water treatment system. To train the students to analyze water distribution system and supply to buildings. 					
Unit I	PLANNING FOR WATER SUPPLY SYSTEM	08 Hours			
Public water supply system -Planning -Design period - Population forecasting -Water demand -Sources of water and their characteristics -Surface and Groundwater- Impounding Reservoir Well hydraulics - Development and selection of source - Water quality - Characterization and standards.					
Unit II	CONVEYANCE SYSTEM	07 Hours			
Water supply -intake structures -Functions and drawings -Pipes and conduits for water- Pipe materials - Hydraulics of flow in pipes -Transmission main design – Materials of pipes- Laying, jointing and testing of pipes - Drawings appurtenances - Types and capacity of pumps -Selection of pumps and pipe materials.					
Unit III	WATER TREATMENT	12 Hours			
Objectives - Unit operations and processes - Principles, functions design and drawing of Screens, Flash mixers, flocculates, sedimentation tanks and sand filters - Disinfection- Residue Management.					
Unit IV	ADVANCED WATER TREATMENT	09 Hours			
Aerator - Iron and manganese removal, Defluoridation and demineralization -Water softening - Desalination - Membrane Systems-Construction and Operation & Maintenance aspects of Water Treatment Plants- Recent advances-Membrane processes.					
Unit V	WATER DISTRIBUTION AND SUPPLY TO BUILDINGS	09 Hours			
Requirements of water distribution -Components -Service reservoirs -Functions and drawings -Network design - Analysis of distribution networks –Pipe Appurtenances -operation and maintenance -Leak detection, Methods. Principles of design of water supply in buildings -House service connection -Fixtures and fittings - Systems of plumbing and drawings of types of plumbing.					
Total:					45 Hours
Further Reading:					
<ol style="list-style-type: none"> Apply an appropriate unit system for the water treatment. Estimate the quantity of wastewater and storm run-off generated from the town/ city and design a suitable collection system for the generated wastewater. 					
Course Outcomes:					
After completion of the course, Student will be able to					
<ol style="list-style-type: none"> Discuss about the principles and development of water supply system. Design the pipelines for water supply system governed with head loss. Design drawing of various unit operations in water supply system. Identify the methods for removing contaminants in water treatment system using advanced techniques. Interpret the network for water supply to buildings and House service connection. 					
References:					
<ol style="list-style-type: none"> Garg, S.K., "Environmental Engineering", Vol.1 Khanna Publishers, New Delhi, 2005. Modi, P.N. "Water Supply Engineering", Vol. I Standard Book House, New Delhi, 2005. Punmia, B.C., Ashok K Jain and Arun K Jain, "Water Supply Engineering", Laxmi Publications Pvt. Ltd., New Delhi, 2005 Government of India, "Manual on Water Supply and Treatment", CPHEEO, Ministry of Urban Development, New Delhi, 2003 Syed R. Qasim and Edward M. Motley Guang Zhu, "Water Works Engineering Planning", Design and Operation, Prentice Hall of India Private Limited, New Delhi, 2006. 					

1703CE009	GROUND WATER ENGINEERING	L	T	P	C
		3	0	0	3
Course Objectives:					
1.To introduce the student to the principles of Groundwater governing Equations and Characteristics of different aquifers 2.Characteristicsofdifferentaquifers 3.To understand the techniques of development and management of groundwater 4.To be introduced to the different theories of traffic flow 5.To be aware of the importance of traffic safety					
Unit I	HYDROGEOLOGICAL PARAMETERS	9 Hours			
Introduction – Water bearing Properties of Rock – Type of aquifers -Aquifer properties –permeability, specific yield, transmissivity and storage coefficient – Methods of Estimation–Ground water table fluctuation and its interpretations – Groundwater development and Potential in India–GEC norms.					
Unit II	WELLHYDRAULICS	9Hours			
ObjectivesofGroundwaterhydraulics–Darcy’sLaw-Groundwaterequation–steadystate flow.DupuitForchheimerassumption-Unsteadystateflow-Theismethod-Jacobmethod-Slug tests – Image well theory –Partial penetrations of wells					
Unit III	GROUNDWATER MANAGEMENT	9Hours			
Need for Management Model – Database for groundwater management –groundwater balance study – Introduction to Mathematical model – Conjunctive use – Collector well and Infiltration gallery					
Unit IV	GROUNDWATER QUALITY	9 Hours			
Ground water chemistry - Origin, movement and quality - Water quality standards – Health and aesthetic aspects of water quality - Saline intrusion – Environmental concern and Regulatory requirements					
Unit V	GROUNDWATER CONSERVATION	9 Hours			
Artificial recharge techniques – Remediation of Saline intrusion– Ground water management studies – Protection zone delineation, Contamination source inventory, remediation schemes - Ground water Pollution and legislation.					
Total:					45 Hours
Further Reading:					
1. Ground water to improving quality parameter 2. Water resource and hydrology for features need.					
Course Outcomes:					
1. Students will be able to understand aquifer properties and its dynamics after the completionofthecourse.Itgivesanexposuretowardswelldesignandpracticalproblems of ground water aquifers 2. Studentswillbeabletounderstandtheimportanceofartificialrechargeandgroundwater quality concepts 3. Model regional ground water flow and design water wells 4.Estimatewaterqualityparameters 5.To safety ground water improvements of quality parameter					
References:					
1. Raghunath,H.M.,GroundWaterHydrology,WileyEasternLtd.,2000. 2. .ToddD.K.,GroundWaterHydrology,JohnWileyandSons,2000 3..VenT.Chow& David R. Maidment, Open Channel Flow, Tata McGraw-Hill Publishing Company, New Delhi, 1988 4.Walton, C, Applied Hydrology, Ground Water Resource Evaluation, McGraw-Hill Publications,1996 5.Karanth,GroundWaterAssessment,DevelopmentandManagement,TataMcGraw Hill,NewDelhi2006					

1702CE651	CONCRETE AND HIGHWAY ENGINEERING LAB	L	T	P	C
		0	0	4	2
Course Objectives:					
<ol style="list-style-type: none"> 1. This course provides an understanding of the basic properties of construction materials, and presents laboratory standards and testing requirements for these materials. 2. To familiarize the students to do the experiments as per the guidelines of BIS. 3. To develop an understanding of the highway materials and to obtain knowledge on properties of these materials. 					
List of Experiments:					
1. Tests on cement					
<ol style="list-style-type: none"> 1. Determination of specific gravity of cement. 2. Determination of standard consistency of cement. 3. Determination of initial and final setting times of cement. 4. Determination of compressive strength of cement mortar. 					
2. Tests on aggregates					
<ol style="list-style-type: none"> 1. Determination of Specific gravity and water absorption of fine & coarse aggregates. 2. Determination of Fineness modulus of fine aggregate & coarse aggregate. 					
3. Tests on fresh and hardened concretes					
<ol style="list-style-type: none"> 1. Determination of degree of workability: Slump cone test, Flow table, Compaction factor and Vee bee Consistometer 2. Determination of Compressive strength of concrete 3. Determination of Flexural strength of concrete 4. Determination of Splitting tensile strength of concrete 					
4. Tests on Highway materials- Sub-grade material and Aggregates					
<ol style="list-style-type: none"> 1. Crushing value test, impact value test, angularity test and abrasion test on aggregates. 2. Marshall stability for bituminous mix 3. Bitume extractor for b ituminous mix 					
5. Tests on Bitumen					
<ol style="list-style-type: none"> 1. Penetration test and Ductility test. 2. Flash point test and viscosity test. 					
Total:					45 Hours
Additional Experiments:					
1. CBR test on the soil/ granular material.					
Course Outcomes:					
After completion of the course, Student will be able to					
<ol style="list-style-type: none"> 1. Evaluate the properties of cement 2. Understand the quality of aggregates used in concrete 3. Analyze the properties of fresh and hardened concrete 4. Knowledge gain about the highway materials 5. Evaluate the properties of bitumen 					
References:					
<ol style="list-style-type: none"> 1. Shetty, M.S, "Concrete Technology", S.Chand and Company Ltd, New Delhi, 2003 2. Santhakumar, A.R; "Concrete Technology" , Oxford University Press, New Delhi, 2007 3. Gambir, M.L; "Concrete Technology", 3rd Edition, Tata McGraw Hill Publishing Co Ltd, New Delhi, 2007 4. IS10262-1982 Recommended Guidelines for Concrete Mix Design, Bureau of Indian Standards, New Delhi, 1998 5. Neville, A.M; "Properties of Concrete", Pitman Publishing Limited, London, 1995 					

1702CE652	ENVIRONMENTAL AND IRRIGATION DESIGN AND DRAWING	L	T	P	C
		3	0	0	3
Course Objectives:					
1.to know about the design of environmental structures 2.to know the pictorial representation of irrigation structures					
Unit I	WATER SUPPLY AND TREATMENT	08 Hours			
Design & Drawing of flash mixer, flocculator, clarifier – Slow sand filter – Rapid sand filter – Infiltration gallery – Intake towers – Service reservoirs – Pumping station – House service connection for water supply and drainage.					
Unit II	SEWAGE TREATMENT & DISPOSAL	07 Hours			
Design and Drawing of screen chamber - Grit channel - Primary clarifier - Activated sludge process – Aeration tank & oxidation ditch – Trickling filters – Secondary clarifiers – Sludge digester – Sludge drying beds – Waste stabilisation ponds - Septic tanks and disposal arrangements – Manholes.					
Unit III	IMPOUNDING STRUCTURES	12 Hours			
Gravity dam, Tank Surplus Weir, Tank Sluice with tower road – Drawing showing plan, elevation, half section including foundation details.					
Unit IV	CANAL TRANSMISSION STRUCTURES	09 Hours			
Aqueducts – Syphon Aqueducts – Super passage – Canal siphon – Canal Drops- Drawing showing plan, elevation and foundation details.					
Unit V	CANAL REGULATION STRUCTURES	09 Hours			
Canal head works- Canal Regular – Canal escape- Proportional Distributors – Drawing showing detailed plan, elevation and foundation.					
Total:					45 Hours
Further Reading:					
1.to analyse and draw advanced irrigation and environmental structures					
Course Outcomes:					
After completion of the course, Student will be able to 1.design environmental treatment system 2. design the irrigation impounding structures 3. design the canal transmission structures 4. design the canal regulation structures					
References:					
1.Garg, S.K., "Environmental Engineering", Vol.1 Khanna Publishers, New Delhi, 2005. 2.Sathyanarayana Murthy "Irrigation Design and Drawing" Published by MrsL.Banumathi, Tuni east Godavari District. A.P. 1998 3.Sharma R.K. Irrigation Engineering and Hydraulic Structures Oxford and IBH Publishing co., New Delhi 2002. 4.Modi, P.N. "Water Supply Engineering", Vol. I Standard Book House, New Delhi, 2005. 5.Punmia, B.C., Ashok K Jain and Arun K Jain, "Water Supply Engineering", Laxmi Publications Pvt. Ltd., New Delhi, 2005 6.Government of India, "Manual on Water Supply and Treatment", CPHEEO, Ministry of Urban Development, New Delhi, 2003 7.Syed R. Qasim and Edward M. Motley Guang Zhu, "Water Works Engineering Planning", Design and Operation, Prentice Hall of India Private Limited, New Delhi, 2006.					

1704CE653

MINI PROJECT II

0 0 2 1

Aim: To carry out a thematic design project in one of the specializations of civil engineering

Course Objectives:

The student should be made to:

To carry out a project which will make the students aware of the different facets of civil engineering

List of areas

1. Geomatics Engineering
2. Construction management
3. Transportation engineering

Course outcomes:

At the end of course, the students will be able to

Geomatics Engineering and Surveying

Prepare central line diagram of buildings and laying out at site Establishment of reduced levels of important points in an area Preparing the layout of a small area by means of compass / theodolite surveying Preparing LS / CS of an alignment..

Construction management

Prepare functional drawings for an occupancy Estimation of building components (using MS Excel) Preparation of work schedule using bar chart Preparation of paper on modern construction techniques

Transportation engineering

Carry out objective oriented traffic survey Carrying out surveys on bus routes – stopping time, ticketing time etc. Carrying out testing of highway making materials Preparation of schematic intersection layouts, grade separators etc.

1704CE654

INDUSTRIAL VISIT PRESENTATION

0 0 2 1

In order to provide the experiential learning to the students, shall take efforts to arrange at least two industrial visit / field visits in a year. A presentation based on Industrial visits shall be made in this semester and suitable credit may be awarded.

Internal Assessment Only	
Test	40
Presentation / Quiz / Group Discussion	40
Report	20
Grades (Excellent / Good / Satisfactory / Not Satisfactory)	

1704GE651

LIFE SKILLS: 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

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.

Unit 1	Partnership, Mixtures and Allegations, Problem on Ages, Simple Interest, Compound Interest	
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	
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	
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	
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	
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 HOURS – 30

References :

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