

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 V										
Course Code	Course Name	L	T	P	C	Maximum Marks			Category	
						CIA	ES	Total		
Theory Course										
1702CE501	Structural Analysis I	3	2	0	4	40	60	100	PC	
1702CE502	Concrete Structures I	3	0	0	3	40	60	100	PC	
1702CE503	Concrete Technology	3	0	0	3	40	60	100	HS	
1702CE504	Geotechnical Engineering II	3	0	0	3	40	60	100	PC	
1703CE001	Remote Sensing and GIS (Elective I)	3	0	0	3	40	60	100	PE	
1703CE006	Solid Waste Management (Elective II)	3	0	0	3	40	60	100	PE	
Laboratory Course										
1702CE551	Computer Aided Building and Drawing Lab	0	0	4	2	40	60	100	PC	
1702CE552	Survey Camp*	0	0	0	1	100	0	100	PC	
1704CE553	Mini Project I	0	0	2	1	100	0	100	PC	
1704GE551	Life Skills: Aptitude - I	0	0	2	1	100	0	100	EEC	
Total		18	4	08	24	580	420	1000	-	

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

1702CE501	STRUCTURAL ANALYSIS I	L	T	P	C	
		3	2	0	4	
Course Objectives:						
	1. To understand the concept of analysis of indeterminate structures.					
	2. To Understand the methods of analysis of indeterminate trusses for external loads, lack of fit and thermal effects and also the influence line concept for indeterminate structure.					
	3. To study behavior of arches, Settlement and temperature effects.					
Unit I	INDETERMINATE FRAMES	12 Hours				
Degree of static and kinematic indeterminacies for plane frames – analysis of indeterminate pin-jointed frames – rigid frames (Degree of statical indeterminacy up to two) – Energy and consistent deformation methods.						
Unit II	SLOPE DEFLECTION METHOD	12 Hours				
Analysis of continuous beams - sinking of supports – rigid frames (with and without sway)						
Unit III	MOMENT DISTRIBUTION METHOD	12 Hours				
Distribution and carryover of moments – Stiffness and carry over factors - Analysis of continuous beams - sinking of supports – Rigid frames (with and without sway).						
Unit IV	MOVING LOADS AND INFLUENCE LINES	12 Hours				
Influence lines for reactions in statically determinate structures – influence lines for member forces in pin-jointed frames – Influence lines for shear force and bending moment in beam sections –Calculation of critical stress resultants due to concentrated and distributed moving loads. Muller Breslau’s principle – Influence lines for continuous beams and single storey rigid frames.						
Unit V	ARCHES	12 Hours				
Arches as structural forms – Examples of arch structures – Types of arches – Analysis of three hinged, two hinged and fixed arches, parabolic and circular arches – Settlement and temperature effects.						
				Total:	45 + 15 Hours	
Further Reading:						
	1. To analyze and find out BMD					
Course Outcomes:						
	After completion of the course, Student will be able to					
	1. Analyze The Pin Jointed Plane Frames Using Energy And Consistent Deformation Method.					
	2. Analyze Indeterminate Structures Using Slope Deflection Method.					
	3. Analyze Indeterminate Structures Using Moment Distribution Method.					
	4. Analyze Indeterminate Beams With Moving Loads.					
	5. Analyze the arches under external loads, temperature effects and support settlements.					
References:						
1. Vaidyanadhan, R and Perumal, P, “Comprehensive Structural Analysis – Vol. 1 & Vol. 2”, Laxmi Publications Pvt. Ltd, New Delhi, 2003.						
2. L.S. Negi& R.S. Jangid, “Structural Analysis”, Tata McGraw Hill Publications, New Delhi, 6th Edition, 2003.						
3. Punmia.B.C, Ashok Kumar Jain and Arun Kumar Jain, " Theory of structures", Laxmi Publications Pvt. Ltd., New Delhi, 2004						
4. Reddy. C.S., "Basic Structural Analysis", Tata McGraw Hill Education Pvt. Ltd., New Delhi,2013.						
5. BhavaiKatti, S.S, "Structural Analysis – Vol. 1 & Vol. 2", Vikas Publishing Pvt Ltd., New Delhi, 2008						
6. Wang C.K. , “Indeterminate Structural Analysis”, Tata McGraw Hill Education Pvt. Ltd.,New Delhi, 2010						
7. DevadasMenon, “Structural Analysis”, Narosa Publishing House, 2008						
8. Ghali.A., Nebille and Brown. T.G., "Structural Analysis - A unified classical and matrix approach" Sixth Edition, SPON press, New York, 2013.						
9. Gambhir. M.L., "Fundamentals of Structural Mechanics and Analysis"., PHI Learning Pvt.Ltd., New Delhi, 2011.						

1702CE502	CONCRETE STRUCTURES I	L	T	P	C
		3	0	0	3
Course Objectives:					
	1. To develop an understanding on the basic concepts in the behaviour and design of reinforced concrete systems and elements using working stress method.				
	2. To introduce the basic concepts and steps in the design of beams and slabs mainly in accordance with Limit state method.				
	3. To underline the design principles of RC members for shear, bond, and torsion.				
	4. To introduce the concepts in the design of RC Column design.				
	5. To give the knowledge in the concept of RC footings.				
Unit I	FUNDAMENTALS	9 Hours			
Stages in structural design - Structural planning - Design philosophies - Working stress method - Ultimate load method - Limit state method - Characteristic strength - Characteristic load - Design values - Partial safety factors - Codal provisions - Practical aspects of design - Design of flexural members and slabs by working stress method.					
Unit II	LIMIT STATE DESIGN FOR FLEXURE	9 Hours			
Analysis and design of One way and two way slabs – Singly and doubly reinforced rectangular and flanged beams - Cantilever beams - Standard method of detailing of RC beams and slabs.					
Unit III	LIMIT STATE DESIGN FOR BOND, ANCHORAGE, SHEAR AND TORSION	9 Hours			
Behaviour of RC members in bond and anchorage – Curtailment of reinforcement - Design requirements as per code provision – Behaviour of RC beams in shear and torsion - Design of RC members for combined bending, shear and torsion.					
Unit IV	LIMIT STATE DESIGN OF COLUMNS	9 Hours			
Columns – Assumptions – Effective length – Classification – Design guidelines – Axially loaded short columns with lateral ties and helical reinforcement – Columns subjected to uni-axial bending and biaxial bending – Slender columns - Standard method of detailing of RC columns.					
Unit V	LIMIT STATE DESIGN OF FOOTING	9 Hours			
Introduction and selection of footing under different site conditions - Design of wall footing – Design of axially and eccentrically loaded rectangular footing – Combined footing - Standard method of detailing of RC footing.					
				Total:	45 Hours
Further Reading :					
	1. students can be able to design whole elements in a building				
	2. students can be able to select suitable footing type				
Course Outcomes:					
	After completion of the course, Student will be able to				
	1. Know the basic principles of different design methods				
	2. Design flexural members using limit state method under different loading and end conditions.				
	3. Design flexural members of any cross sectional shape for shear, bond, and torsion.				
	4. Design RC columns of any cross section with different end conditions.				
	5. Select and design RC footing of different cross section under various site conditions				
References:					
1. B. C Punmia, Ashok. Kumar Jain, Arun Kumar Jain “Limit State Design of Reinforced Concrete”, Laxmi Publications (P) Ltd, New Delhi 2007.					
2. Unnikrishna Pillai, S., Devdas Menon, “Reinforced Concrete Design”, Tata McGraw-Hill Publishing Company Ltd., New Delhi 2003.					
3. Sinha, S.N., “Reinforced Concrete Design”, Tata McGraw-Hill Publishing Company Ltd., New Delhi 2002.					
3. Varghese, P.C., “Limit State Design of Reinforced Concrete”, Prentice Hall of India, Pvt. Ltd., New Delhi 2002					
4. Krishna Raju, N., “Design of Reinforced Concrete Structures”, CBS Publishers & Distributors, New Delhi, 2003.					

1702CE503	CONCRETE TECHNOLOGY			L	T	P	C
				3	0	0	3
Course Objectives:							
1. To impart knowledge of building materials used in construction. 2. To train in various test for fresh and hardened concrete 3. To impart knowledge to the students on the properties of materials for concrete by suitable tests, mix design for concrete and special concretes							
Unit I	CONSTITUENT MATERIALS						9 Hours
Cement-Different types-Chemical composition and Properties -Tests on cement-IS Specifications- Aggregates-Classification-Mechanical properties and tests as per BIS Grading requirements- Water- Quality of water for use in concrete.							
Unit II	CHEMICAL AND MINERAL ADMIXTURES						9 Hours
Accelerators-Retarders- Plasticisers- Super plasticizers- Water proofers - Mineral Admixtures like Fly Ash, Silica Fume, Ground Granulated Blast Furnace Slag and Metakaoline -Their effects on concrete properties							
Unit III	PROPORTIONING OF CONCRETE MIX						9 Hours
Principles of Mix Proportioning-Properties of concrete related to Mix Design-Physical properties of materials required for Mix Design - Design Mix and Nominal Mix-BIS Method of Mix Design - Mix Design Examples							
Unit IV	FRESH AND HARDENED PROPERTIES OF CONCRETE						9 Hours
Workability-Tests for workability of concrete-Slump Test and Compacting factor Test-Segregation and Bleeding-Determination of Compressive and Flexural strength as per BIS - Properties of Hardened concrete-Determination of Compressive and Flexural strength-Stress-strain curve for concrete-Determination of Young's Modulus							
Unit V	SPECIAL CONCRETES						12 Hours
Light weight concretes - High strength concrete - Fibre reinforced concrete – Ferrocement - Ready mix concrete - SIFCON-Shotcrete – Polymer concrete - High performance concrete- Geopolymer Concrete.							
						Total:	45 + 15 Hours
Course Outcomes:							
After completion of the course, Student will be able to							
1. Explain the properties of various ingredients of concrete 2. Interpret the suitable admixture for concrete with special propertie 3. Apply the concrete mix using I.S code methods 4. Illustrate the properties of fresh and hardened concrete 5. Explain the special concrete and their specific applications interpret							
References:							
1. Santhakumar,A.R; "Concrete Technology" , Oxford University Press, New Delhi, 2007							
2. Neville, A.M; "Properties of Concrete", Pitman Publishing Limited, London,1995							
3. Gambir, M.L; "Concrete Technology", 3 rd Edition, Tata McGraw Hill Publishing Co Ltd, New							

1702CE504	GEOTECHNICAL ENGINEERING II	L	T	P	C
		3	0	0	3
Course Objectives:					
<p>1.Familiarize the students with a basic understanding of the essential stepsinvolved in a geotechnical site investigation.</p> <p>2.Introduce to the students, the principal types of foundations and the factorsgoverning the choice of the most suitable type of foundation for a givensolution.</p> <p>3.Familiarize the student with the procedures used for : a) bearing capacityestimation, b) load carrying capacity of pile, c) determining earth pressureand e) concept on stability of slope.</p>					
Unit I	SOIL EXPLORATION AND SITE INVESTIGATION	9 Hours			
Introduction – Planning and stages in sub-surface exploration – depth and spacing of exploration – Methods of exploration – Test pit – Trenches – Geophysical methods: Seismic refraction and Electrical resistivity method –Boring : Auger boring, Shell and Auger, Wash boring and Rotary drilling – Types of soil sample: disturbed and undisturbed soil samples – Features of sampler affecting soil disturbance – standard penetration test – static and dynamic cone penetration test – bore log report					
Unit II	SHALLOW FOUNDATION AND BEARING CAPACITY	9 Hours			
Introduction – Bearing capacity- definition – types of shear failure – Bearing capacity of shallow foundation on homogeneous deposits - Methods: Terzaghi’s ,Skempton’s and BIS methods – Effect of water table on bearing capacity – Plate load test – Bearing capacity from in-situ tests - SPT, SCPT and plate load test methods of improving bearing capacity of soil.					
Unit III	FOOTING, RAFT AND SETTLEMENT OF FOUNDATION	9 Hours			
Types of foundation – contact pressure distribution below isolated footing – types and proportioning of combined footing – types and application of mat foundation – floating foundation – Settlement: total and differential settlements – causes and methods of minimizing settlement					
Unit IV	DEEP FOUNDATION	9 Hours			
capacity of single pile in cohesionless and cohesive soil – static formula – dynamic formulae (Engineering News and Hileys) – Capacity from in-situ tests (SPT and SCPT) – Negative skin friction – Carrying capacity of Pile group – Pile load test – Under-reamed piles – Introduction to well foundation and Diaphragm wall.					
Unit V	EARTH PRESSURE AND STABILITY OF SLOPES	9 Hours			
Earth pressure in soils: active and passive states – Lateral earth pressure Rankine’s theory – stratified soil – Cullman’s Graphical method –Slopes – Infinite and finite slopes – types of failure – causes of failure – Procedure for slip circle method and method of slices.					
					Total: 45 Hours
Further Reading:					
To select suitable foundation for various soil condition.					
Course Outcomes:					
After completion of the course, Student will be able to					
1.Illustrate the suitable techniques used for sub soil exploration.					
2.Explain the type of foundation required for the given soil condition.					
3.Select the dimensions of the foundation for various types of footing.					
4.Interpret the load carrying capacity of piles.					
5.Explain the stability analysis of retaining walls.					
References:					
1. Bowles .J.E, “Foundation analysis and design”, McGraw Hill, 2001.					
2.Murthy .V.N.S, “Textbook of Soil Mechanics and Foundation Engineering”,CBS Publishers and Distributors, New Delhi, 2009.					
3. Arora .K.R, “Soil Mechanics and Foundation Engineering”, Standard Publishers and Distributors, New Delhi, 2011.					
4.Punmia .B.C, “Soil Mechanics and Foundations Engineering”, Laxmi Publications Pvt.Ltd. New Delhi, 2005.					
5.Das .B.M, “Principles of Foundation Engineering” (Fifth edition), Thomson Books, 2010					

1702CE551	COMPUTER AIDED BUILDING AND DRAWING LAB	L	T	P	C
		0	0	4	2
Course Objectives:					
	1. To develop skills in manual and AutoCAD drafting of building plans, elevation and sections				
	2. To understand the Functional Planning and architectural design of buildings and introduction to building physics.				
	3. To prepare detailed working drawing for doors, windows, etc.				
List of Experiments:					
	1. Functional planning – Introduction to anthropometrics and ergonomics – Occupancy classification of Buildings –Essentials of National Building Code – Essentials of Building and development rules – Introduction to green building.				
	2. Building Physics : Sun's movement and building: Sun control devices –Exposed walls and Openings				
	3. Lighting and acoustics				
	4. Introduction to AutoCAD – Draw and modify tools- Dimensioning-Layers- Blocks-Printing- Two dimensional drawing 3D commands				
	5. Door, Windows, Ventilators.				
	6. Foundation, Staircase				
	7. Residential buildings – Plan, Section, Elevations				
	8. Public buildings like office, dispensary, post office, bank etc				
	9. Industrial buildings				
		Total:	45 Hours		
Additional Experiments:					
	1. Commercial building like sky scrapers				
	2. Domed structures				
Course Outcomes:					
	After completion of the course, Student will be able to				
	4. Ability to develop a concept drawing based on the requirements				
	5. Ability to draw Building Drawing as per planning authority requirement in AutoCAD.				
	6. Understand to draw plan, elevation and section of public and industrial structures				
	7. Apply the requirements to draw plan, elevation and section of load bearing and framed structures.				
	8. Analysis the building code and sun movements before drawing				
References:					
	1. Sikka V. B., A Course in Civil Engineering Drawing, 4th Edition, S.K. Kataria and Sons, 1998.				
	2. George Omura, "Mastering in AUTOCAD 2002", BPB Publications, 2002				
	3. Verma.B.P., "Civil Engineering Drawing and House Planning", Khanna Publishers, 1989.				
	4. A Guide to building information modeling for Owners, Managers, Designers, Engineers, and Contractors, John Wiley and Sons. Inc., 2008.				
	5. Marimuthu V.M., Murugesan R. and Padmini S., "Civil Engineering Drawing-I", Pratheeba Publishers, 2008.				

1702CE552	SURVEYCAMP	L	T	P	C
		0	0	4	1
Course Objectives:					
1. Two weeks Survey Camp will be conducted during summer vacation in the following activities using Theodolite, cross staff, leveling staff, tapes, plane table and total station. The camp must involve work on a large area of not less than 400 hectares. At the end of the camp, each student shall have mapped and contoured the area. The camp record shall include all original field observations, calculations and plots.					
List of Experiments:					
1.Triangulation					
2.Trilaterationand					
3.Rectangulation					
4.Alignment of Road survey					
5.contouring (hill survey)					
EVALUATION PROCEDURE					
Internal Marks : 20 marks (decided by the staff in-charge appointed by the Institution)					
Evaluation of Survey Camp Report : 30 marks 2.(Evaluated by the external examiner appointed the University)					
3. Viva voce examination : 50 marks (evaluated by the internal examiner appointed by the HOD with the approval of HOI and external examiner appointed by the University – with equal Weightage)					
Course Outcomes:					
After completion of the course, Student will be able to					
1. The camp must involve work on a large area of not less than 400 hectares					
2. The camp record shall include all original field observations, calculations and plots.					
3. Theodolite, cross staff, levelling staff, tapes, plane table and total station					
4. Formation and extent of road					
5.can able to design drainage and pipe networks.					
References:					
1.Kanetkar T.P., Surveying and Levelling, Vols. I and II, United Book Corporation, Pune, 1994					
2. Bannister A. and Raymond S., Surveying, ELBS, Sixth Edition, 1992.					
3. Punmia B.C. Surveying, Vols. I, II and III, Laxmi Publications, 1989					

1702CE553

MINI PROJECT 1

0 0 2 1

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

Course Objectives:

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

List of areas

1. Structural Engineering
2. Geotechnical Engineering
3. Water Resources Engineering

Course outcomes:

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

Structural Engineering

1. Prepare a structural lay out from architectural drawings Calculation loads Design of representative structural elements like slab, beam, columns, foundation etc.
2. Carry out testing in Strength of materials / concrete / structural labs
3. Learn any software and solving a problem using that.

Geotechnical Engineering

1. Collect samples of soil and identification of their types Collection of literature on types of foundation
Presentation of soil improvement techniques
2. Learn any software and solving a problem using that.

Water Resources And Environmental Engineering

1. Carry out population survey and working out water requirement. Preparation of a schematic diagram of water / wastewater treatment plants Assessment of quality of water / sewage by experiments Design of dock gates

1704GE551

LIFE SKILLS: APTITUDE – I

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:

- Learners should be able to understand number and solving problems least time using various shortcut
- Solve problems on averages; compare two quantities using ratio and proportion.
- Calculate concept of percentages, implement business transactions using profit and loss.
- Workout concepts of Coding and Decoding, ability to visualize directions and understand the logic behind a sequence.
- Learners should be able to find a series the logic behind a sequence.

Unit1	Introduction to Number System, Basic Shortcuts of addition, Multiplication, Division	
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 2	Ratio and proportion, Averages	
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 3	Percentages, Profit And Loss	
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 4	Coding and decoding, Direction sense	
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 5	Number and letter series Number and Letter Analogies, Odd man out	
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		

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.