

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 VII

Course Code	Course Name	L	T	P	C	Maximum Marks			Category
						CIA	ES	Total	
Theory Course									
1702CE701	Quantity Surveying & Cost Estimation	3	0	0	3	40	60	100	PC
1702CE702	Waste Water Engineering	3	0	0	3	40	60	100	PC
1702CE703	Structural Dynamics and Earth Quake Engineering	3	0	0	3	40	60	100	PC
1701MGX01	Professional Ethics	3	0	0	3	40	60	100	HS
1703CE015	Pre-Stressed Concrete (Elective V)	3	0	0	3	40	60	100	PE
	Elective VI (Open)	3	0	0	3	40	60	100	PE
Laboratory Course									
1702CE751	Computer Aided Design and Drafting Lab	0	0	4	2	50	50	100	PC
1702CE752	Water And Waste Water Engineering Lab	0	0	2	1	50	50	100	PC
1702CE753	Mini Project III	0	0	2	1	100	0	100	PC
1704GE751	Competitive exams Preparation	2	0	0	2	100	0	100	EEC
1702CE754	In plant Training / Internship Presentation	0	0	0	1	-	-	-	-
Total		21	0	10	25	540	460	1000	-

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

1702CE701	QUANTITY SURVEYING & COST ESTIMATION	L	T	P	C
		3	0	0	3
Course Objectives:					
	1.To providethestudentwiththeability to estimate the quantities of item of works involved in buildings				
	2.To providethestudentwiththeability to estimate the quantities of item of works involved in buildings, water supply and sanitary works, road works and irrigation works				
	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	Procedure of estimation quantity				9 Hours
Introduction– Estimate–Typesof Estimates–Unitsofmeasurements–Methodsof building estimate– calculationofquantitiesof earthwork, stonemasonry,brickmasonry,plastering, cementconcrete,R.C.C,PCC Doors,Windows,Flooring,WhiteWashing,colourwashing andpaintingNourishingforloadbearingstructuresandframedstructures.					
Unit II	ESTIMATE OF OTHER STRUCTURES				9Hours
Estimatingofseptic tank, soakpit–sanitaryandwatersupplyinstallations–watersupplypipeline–sewerline– tubewell–openwell–estimateofbituminousandcementconcreteroads–estimateof retainingwalls–culverts– estimatingofirrigationworks–aqueduct, syphon, fall					
Unit III	SPECIFICATIONANDTENDERS				9Hours
Data–Scheduleofrates–Analysisofrates–Specifications–sources– Preparationofdetailed and general specifications – Tenders – TTTAct – e-tender– Preparation ofTenderNotice and Document–Contracts– Typesofcontracts–Draftingofcontractdocuments–Arbitrationand legal requirements					
Unit IV	VALUATION				9 Hours
Necessity–Basicsofvalueengineering –Capitalisedvalue –Depreciation–Escalation– Valueof building– Calculationof Standardrent –Mortgage–Lease					
Unit V	REPORTPREPARATION				9 Hours
Principlesforreportpreparation–reportonestimateofresidentialbuilding–Culvert–Roads – Watersupplyandsanitary installations–Tubewells– Openwells.					
				Total:	45 Hours
Further Reading:					
	1.Effective cost of good quality of building in civil engineering world.				
	2.Estimation of bridge ,road,culvert and other special structure using some software				
Course Outcomes:					
	1.The student shall be able to estimate the material quantities, prepare a bill of quantities, make specifications and prepare tender documents. Student shall be able to prepare value estimates.				
	2.To knowtheimportanceofpreparingthetypesofestimatesunderdifferent conditions				
	3 To applylogicalthoughtsandpreparetherate analysisandbills				
	4. Toanalyzeandsynthesizecosteffectiveapproachforcivilengineeringprojects				
	5. To comprehenddetailedreportonestimationandvaluationprocess				
References:					
1. Dutta,B.N.,EstimatingAndCosting,SDutta&Co.,Lucknow2006.					
2. .Rangawala,S.C.,EstimatingAndCosting,CharotarAnandPublications,1996					
3..Kohli,D.D.AndKohliR.C.,ATextBookOnEstimating,CostingAndAccounts, S.ChandAndCo,New Delhi,1994					
4.CpwdSpecificationsAndScheduleOfRates					

1702CE702		WASTE WATER ENGINEERING			
		L	T	P	C
		3	0	0	3
Course Objectives:					
	1. To understand the importance of planning and design of sewerage system.				
	2. To create an ability to evaluate the waste water treatment system.				
	3. To impart the signification of disposal of Sewage.				
Unit I	PLANNING FOR SEWERAGE SYSTEMS				09 Hours
Sources of wastewater generation – Effects – Estimation of sanitary sewage flow – Estimation of storm runoff – Factors affecting Characteristics and composition of sewage and their significance – Effluent standards – Legislation requirements.					
Unit II	DESIGN OF SEWER				09 Hours
Sewerage – Hydraulics of flow in sewers – Design period - Design of sanitary and storm sewers – Small bore systems – Materials of sewers– Laying, joining & testing of sewers – Forces acting on sewers– Cleaning and maintenances of sewers- Sewer appurtenances – Pumps – selection of pumps and pipe Drainage -. Plumbing System for Buildings – One pipe and two pipe system.					
Unit III	PRIMARY TREATMENT OF SEWAGE				09 Hours
Objective – Unit Operation and Processes – Selection of treatment processes – Principles, functions design and drawing of screen, grit chambers and primary sedimentation tanks – Operation and Maintenance aspects – Onsite sanitation - Septic tank, Grey water harvesting.					
Unit IV	SECONDARY TREATMENT OF SEWAGE				09 Hours
Objective – Selection of Treatment Methods – Principles, Functions, Design and Drawing of Units - Activated Sludge Process and Trickling filter, other treatment methods – Oxidation ditches, UASB – Waste Stabilization Ponds – Reclamation and Reuse of sewage - Recent Advances in Sewage Treatment – Construction and Operation & Maintenance of Sewage Treatment Plants.					
Unit V	DISPOSAL OF SEWAGE AND SLUDGE				09 Hours
Standards for Disposal - Methods – dilution – Self-purification of surface water bodies – Oxygen sag curve – Land disposal – Sewage farming – Deep well injection – Soil dispersion system -Sludge characterization – Thickening – Sludge digestion – Biogas recovery – Sludge Conditioning and Dewatering – disposal – Advances in Sludge Treatment and disposal.					
				Total:	45 Hours
Further Reading:					
	1. Design the necessary treatment units for energy conservation.				
	2. Design the suitable disposal unit for the sludge without endangering the environment.				
Course Outcomes:					
	After completion of the course, Student will be able to				
	1. Examine the waste water quality characteristics and standards.				
	2. Design sewerage systems and discuss about the treatment process step by step done in primary level.				
	3. Design the various unit operations for waste water treatment.				
	4. Design the sludge treatment and disposal methods.				
	5. Perform quality analysis of sewage the characteristics and composition of sewage, self - Purification of streams.				
References:					
1. Garg, S.K., Environmental Engineering Vol. II, Khanna Publishers, New Delhi, 2003.					
2. Punmia, B.C., Jain, A.K., and Jain.A., Environmental Engineering, Vol.II, Lakshmi Publications, Newsletter, 2005					
3. Manual on Sewerage and Sewage Treatment, CPHEEO, Ministry of Urban Development, Government of India, New Delhi, 1997.					
4. Wastewater Engineering – Treatment and Reuse, Tata Mc.Graw-Hill Company, New Delhi, 2003.					

1702CE703	STRUCTURAL DYNAMICS AND EARTH QUAKE ENGINEERING	L	T	P	C	
		3	0	0	3	
Course Objectives:						
1.To introduce dynamic loading and the dynamic performance of the structures to the students. Different types of dynamic loading also to be discussed.						
2.The detailed study on the performance of structures under earthquake loading is also one of the focus of the course.						
Unit I	PRINCIPLES OF VIBRATION ANALYSIS	9 Hours				
Mathematical models of single degree of freedom systems - Free and forced vibration of SDOF systems, Response of SDOF to special forms of excitation, Effect of damping, Transmissibility.						
Unit II	MULTIPLE DEGREE OF FREEDOM SYSTEM	9 Hours				
Two degree of freedom system – Normal modes of vibration – Natural frequencies - Mode shapes - Introduction to MDOF systems – Decoupling of equations of motion – Concept of mode superposition (No derivations).						
Unit III	ELEMENTS OF EARTHQUAKE ENGINEERING	9 Hours				
Earthquake magnitude and intensity Focus and Epicentre, Causes and Effects of Earthquakes, Characteristics of Earthquake, Seismic zone mapping– Spectral Acceleration.						
Unit IV	DESIGN SEISMIC FORCES	9 Hours				
Codal provision for design - IS 1893-2002 – Response spectrum – determination of lateral forces – base shear – by response spectrum method for 2 storey moment resistant frame- calculation of drift Aspects in planning and layout - regular and irregular buildings- calculation of centre of mass and centre of rigidity for simple layouts- eccentricity and torsion.						
Unit V	Ductile Detailing	9 Hours				
Ductility of R.C structures- Confinement- detailing as per IS-13920-1993- moment redistribution – principles of design of beams, columns – beam column joints – soft story concept. Base Isolation: Isolation systems – Effectiveness of base isolation.						
					Total:	45 Hours
Further Reading:						
At the end of the course,						
1. Analyse structures subjected to dynamic loading.						
2. Design the structures for seismic loading as per code provisions.						
Course Outcomes:						
After completion of the course, Student will be able to						
1. Analyse single degree of freedom systems without damping and with damping						
2. Analyse multi degree freedom system and continuous systems using iterative techniques.						
3. Knowledge on earthquakes and Effects of Earthquakes						
4. Knowledge on earthquakes and its resistant features for different types of buildings						
5. Determine the design lateral forces by means of codal provisions.						
References:						
1. Pankaj Agarwal, “Earthquake Resistant Design of Structures” PHI Learning Private Limited, New Delhi, 2010.						
2. Chopra. AK, “Dynamics of Structures – Theory and Applications to Earthquake Engineering” Second Edition, Pearson Education, 2003						
3.SK.Duggal, ”Earthquake Resistant Design of Structures”, Oxford University Press, New Delhi, 2010						
4. “Learning earthquake Design and Construction”, Earthquake Tips 1 to 24, Authored by C.V.R. Murthy, IIT, Kanpur. eqtips@iitk.ac.in Web sites: www.nicee.org.						
5. IS 1893: 2001, (Part I) “Criteria for Earthquake Resistant Design of Structures - Part 1: General Provisions and Buildings”, BIS, 2002.						

1701MGX01	PROFESSIONAL ETHICS			L	T	P	C
				3	0	0	3
Course Objectives:							
1.The primary goal is to stimulate critical and responsible reflection on moral issues surrounding engineering practice and to provide the conceptual tools necessary for pursuing those issues. 2.Also to make the students aware of the different ethical issues, codes of conduct for engineers in the society and moralities in an organization.							
Unit I	INTRODUCTION & HUMAN VALUES						9 Hours
Morals, Values and Ethics- Work Ethic - Team work – Types of Ethics - Respect for Others- Living Peacefully- Honesty- Courage - Valuing Time - Co-operation - Commitment- Self-Confidence - Customs and religion-Caring and Sharing.							
Unit II	ENGINEERING ETHICS						9 Hours
Engineering ethics – Variety of moral issues – Types of Inquiry – Professional accountability – Self Interest – Moral dilemmas – Kohlberg’s Theory – Gilligan’s Theory – Theories about Right Action – Ethical codes of IEEE and Institution of Engineers.							
Unit III	SAFETY & RESPONSIBILITY OF ENGINEERS						10 Hours
Engineering as experimentation – Safety and Risks – Risk – benefit analysis – Computer Technology Privacy – Social Policy – Engineering standards – Communicating Risk and Public Policy – Occupational Crime – Professional Rights and Employee Rights – Whistle Blowing – Collective Bargaining – Conflicts of Interest.							
Unit IV	ENGINEER’S ROLE						9 Hours
Engineers as Managers, Advisors, Consultants, Experts and Witness – Engineers role in industry and society – Theories about right action – Moral leadership - Collegiality and loyalty – IPR – Discrimination - Bhopal gas tragedy case study.							
Unit V	GLOBAL ISSUES						8 Hours
Multinational corporations-Environmental Ethics- Weapons Development- Code of Conduct – Eco – friendly production system – Sustainable technology & development – ozone depletion – Eco system – Pollution control.							
						Total:	45 Hours
Further Proceeding:							
1. Analysis about Safety and Risk Management in an Organisation							
2. Analysis about Code of Conduct for Ethical & Moral values							
Course Outcomes:							
After completion of the course, Student will be able to							
3. Obtain awareness on Human Values & Social Values of the every individual.							
4. Knowledge about ethical theories and relevant code of conduct for engineers.							
5. Enumerate the safety and responsibility of engineers in the society.							
6. Realize their responsibilities, professional rights and moralities for the enhancement of an organization.							
7. Explain about the environmental impacts at present day scenario.							
References:							
1. Govindarajan M, Natarajan S, Senthil Kumar V. S, “ Engineering Ethics”, Prentice Hall of India, New Delhi, 2004.							
2. Charles D. Fleddermann, "Engineering Ethics", Pearson Education/ Prentice Hall, New Jersey,2004 (Indian Reprint now available)							
3. Charles E Harris, Michael S. Protchard and Michael J Rabins, “Engineering Ethics – Concepts and Cases”, Wadsworth Thompson Learning, United States, 2000 (Indian Reprint now available).							
4. John R Boatright, “Ethics and the conduct of business”, Pearson Education, New Delhi,2003.							

1702CE751	COMPUTER AIDED DESIGN AND DRAFTING LAB			
	L	T	P	C
	B.E CIVIL ENGINEERING			
Course Objectives:				
	1.To learn the software developing skills for structural design			
	2.To understand the computing skills in the field of geotechnical engineering.			
	3.To study the different software packages for analysis and design			
List of Experiments:				
	1.Design of building elements (RC)-Standard method of detailing RC beams, slabs and columns – Special requirements of detailing with reference to erection process.			
	2.Design of Industrial Buildings - Steel roof trusses			
	3.Design of Overhead water tanks (RC & Steel)			
	4.Design of box culvert and slab bridges			
	5.Design of steel chimneys			
		Total:	45 Hours	
Additional Experiments:				
	1.Transportation planning process- Trip generation and distribution- Network analysis - Shortest path algorithms			
	2.Water resources - Pipe networks - Canal design - Backwater profile - Synthetic derivation of stream flows using random numbers - Dam stability			
Course Outcomes:				
	After completion of the course, Student will be able to			
	1. Learn software developing skills for structural design			
	2. Study the different software packages for analysis and design			
	3. Use computer software to model any type of structure			
	4. Compute loads and use computer software to analyse a structure			
	5. Use computer software to design a structure based on is codal provisions.			
References:				
	1. Krishna Raju N, "Design of Reinforced Concrete Structures", CBS Publishers & Distributors, New Delhi, 2003.			
	2. Krishna Raju N, Structural Design and Drawing (Reinforced Concrete and Steel). University press, Hyderabad, 2006			
	3. Krishnamoorthy, C.S. and Rajeev, S., Computer Aided Design and Analytical Tools, Narosa, 1993.			
	4. Papacostas, C.S., Fundamentals of Transportation Engineering Prentice-Hall of India, 2001			
	5. Loucks, D.P., Stedinger, J.R. and Haith, D.A., Water Resource Systems Planning and Analysis, Prentice-Hall INC, 1981.			

1702CE752	WATER AND WASTE WATER ENGINEERING LAB B.E CIVIL ENGINEERING	L	T	P	C
		0	0	4	2
Course Objectives:					
	1. To know the basics, importance of water and wastewater treatment and methods measurement.				
	2. To study the various effects of water and waste water pollution.				
	3.Effect of BOD and COD				
	4.To find Calcium, Potassium and Sodium				
	5.Heavy metal effects and finding methods				
List of experiments					
	1. Determination of Ammonia Nitrogen in waste water.				
	2.CoagulationandPrecipitationprocessfor treating waste water				
	3. Determination of suspended, volatile fixed and settles able solids in wastewater.				
	4.B.O.D. test				
	5.C.O.D. test				
	6.Nitrate in wastewater				
	7.Phosphate in wastewater				
	8.Determination of Calcium, Potassium and Sodium				
	9. Heavy metals determination-Chromium, Lead and Zinc. (Demonstration only)				
				Total:	45 Hours
Additional Experiments:					
	1.conductivity meter				
	2.UASB Reactor				
Course Outcomes:					
	After completion of the course, Student will be able to				
	1.characterize given water and waste water sample				
	2.perform filtration techniques and methods				
	3. characterize hazardous and non-hazardous substances				
References:					
	1.Standard methods for the examination of water and wastewater, APHA, 20 th Edition, Washington, 1998				
	2. Garg, S.K., “Environmental Engineering Vol. I & II”, Khanna Publishers, New Delhi				
	3. Modi, P.N., “Environmental Engineering Vol. I & II”, Standard Book House, Delhi-6				

1704CE753

MINI PROJECT III

0 0 2 1

Aim:

To carry out a design project in one of the specializations of civil engineering with substantial multidisciplinary component

Course Objectives:

The student should be made to:

To guide the students in such a way so that they carry out a work on a topic as a forerunner to the full fledged project work to be taken subsequently in VIII semester. The project work shall consist of substantial multidisciplinary component

List of Experiments:

The students will carry out a project in one of the following civil engineering areas but with substantial multidisciplinary component involving Architecture, Mechanical engg. Electrical engg., Biotechnology, Chemical engg., Computerscience.

1. Structural Engineering
2. Geotechnical Engineering
3. Water Resources engineering and environmental engg.
4. Geomatics Engineering and surveying
5. Construction management
6. Transportation engineering

Student groups will be formed (6 in a group) and a faculty member will be allocated to guide them. There will be three reviews. First review will not carry any marks but the project topic will be finalized in it. Of remaining 2 reviews one will be carried out in the mid-semester and the last one by the end of semester.

**1704GE751 BE PREPARED TO ACE THE TECHNICAL SKILLS
IN COMPETITIVE EXAMS**

2002

Course Objectives

The students should be made to:

1. Study the concepts of concrete structures, design and analysis.
2. Study the process and implementation of surveying, geotechnical engineering.
3. Familiar with the construction materials, management and waste water engineering

Total: 30 Periods

BUILDING MATERIALS : brick, stones, aggregates, cement, Timber

CONSTRUCTION PRACTICES: Construction of stone masonry, brick masonry and R.C.C. and block masonry– construction equipments.

ENGINEERING SURVEY: Survey - computation of areas - Chain Survey - Compass surveying - Plane table survey –levelling

STRENGTH OF MATERIALS: Stresses and strains -Thermal stresses- elastic constants - Beams and bending – Bending moment and shear force in beams

STRUCTURAL ANALYSIS: Indeterminate beams - Stiffness and flexibility methods of structural analysis – Slope deflection - Moment Distribution method – Arches and suspension cables

GEOTECHNICAL ENGINEERING: Formation of soils - types of soils - classification of soils for engineering practice – Field identification of soils - Physical properties of soils - Three phase diagram-Soil exploration - Soil sampling techniques -Borelog profile - shallow foundations

ENVIRONMENTAL ENGINEERING: Sources of water - Ground water Hydraulics - Characteristics of water - Water analysis -water treatment - water borne diseases. Sewerage system

DESIGN OF REINFORCED CONCRETE: Design of concrete members - limit state and working stress design concepts - design of slabs - one way, two way and flat slabs

HYDRAULICS: Hydrostatics-applications of Bernoulli equation – flow measurement in channels, Applications of Momentum equation, Kinematics of flow.

TRANSPORTATION ENGINEERING: Different modes of transport and their characteristics. Geometric design of highways. –Design and Construction of bituminous and concrete roads – Maintenance of roads.

1704GE754 IN-PLANT TRAINING / INTERNSHIP PRESENTATION 0 0 2 1

In order to provide the experiential learning to the students, the students undergo in-plant training or internship during summer / winter vacation between III and VII semesters. A presentation based on in-plant training / internship 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)	