

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

Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai
Accredited by NAAC with 'A' Grade | Accredited by NBA (CSE, EEE, MECH, CIVIL, ECE, IT)
NAGAPATTINAM – 611 002



B.E. Civil Engineering

Full Time Curriculum and Syllabus

Third Year – Seventh Semester

Course Code	Course Name	L	T	P	C	Maximum Marks		
						CA	ES	Total
Theory Course								
1701MGX01	Professional Ethics	3	0	0	3	40	60	100
1702CE701	Quantity Surveying and Cost Estimation	3	0	0	3	40	60	100
1702CE702	Wastewater Engineering	3	0	0	3	40	60	100
1702CE703	Structural Dynamics and Earth Quake Engineering	3	0	0	3	40	60	100
	Elective V	3	0	0	3	40	60	100
	Elective VI (Open Elective)	3	0	0	3	40	60	100
Laboratory Course								
1702CE751	Computer Aided Design and Drafting Lab	0	0	4	2	50	50	100
1702CE752	Water and Wastewater Engineering Lab	0	0	2	1	50	50	100
1704CE753	Mini Project III	0	0	2	1	100	0	100
1704GE751	Life Skills: Competitive Exams Preparation	2	0	0	2	100	0	100
1704CE754	In-plant Training / Internship Presentation	0	0	0	1	100	0	100

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

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 READING:

1. Analysis about Safety and Risk Management in an Organisation
2. Analysis about Code of Conduct for Ethical & Moral values

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. Pritchard 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.
5. <https://nptel.ac.in/courses>

1702CE701	QUANTITY SURVEYING AND COST ESTIMATION	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

1. To procure the accurate idea of the cost and quantity required to construct a building.
2. To understand the specifications and to arrive the rate analysis of an item of work.
3. To familiarize the basic concepts related to tenders, contracts and tender documents.

UNIT I QUANTITY SURVEYING 9 Hours

Introduction - selection of measurement units for items- modes of measurement for different trades as per I.S.1200- Estimation- definition, purpose-types- different methods - detailed estimate - Load bearing and Framed structures- Earthwork-masonry in foundation, plinth, super structure- DPC-R.C.C works-doors and windows- flooring –plastering-white washing-colour washing-distempering- Deductions for openings

UNIT II ESTIMATION OF OTHER STRUCTURE 9 Hours

Industrial sheds- steel trusses - Water supply and sanitary works - septic tank, soak pit, manhole - Roads – earth work, pitching of slopes, hill roads-estimation of R.C.C. slab culvert, pipe culvert- Irrigation works - canals, aqueducts.

UNIT III SPECIFICATION AND RATE ANALYSIS 9 Hours

Specifications – purpose - principles of general and detailed specifications-detailed specifications for various items of work- Analysis of rates - need, factors affecting -task-work schedule as basis of labour costs - materials cost – Analysis of rates for P.C.C, R.C.C., brick masonry, hollow block masonry, plastering.

UNIT IV VALUATION 9 Hours

Principles - purpose - type of values- valuer duties- factors affecting the valuation of properties-freehold and leasehold properties- methods of valuation - capitalized value – Depreciation – Escalation – Obsolescence- Calculation of Standard Rent - case studies on valuation and rent calculations

UNIT V TENDERS AND CONTRACTS 9 Hours

Tenders –open competition-limited competition-pre-qualification of contractor-tender notice-methods of preparing a tender-submission of tenders - Contracts-types of contracts –conditions of contract-arbitration- Report preparation-buildings, culvert and roads.

TOTAL: 45 Hours

FURTHER READING

Project management

REFERENCES:

1. Dutta .B.N, “Estimating and Costing in Civil Engineering Theory and Practice,” UBS Publishers Pvt. Ltd., 2009.
2. Rangwala , “ Estimating , Costing and Valuation”, Charotar Publishing House Pvt. Ltd., 2013.
3. Patil .B.S , “Civil Engineering Contracts and Estimates”, Universities press(India) Pvt. Ltd., 2006.
4. Jagannathan .G, “Getting More at Less Cost“, - The Value Engineering Way, Tata McGraw Hill, New Delhi, 1995.
5. <https://nptel.ac.in/courses/105/103/105103023/>

1702CE702

WASTEWATER 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 design the waste water treatment system.
3. To impart the signification of disposal of Sewage.

UNIT I PLANNING AND DESIGN OF SEWERAGE SYSTEM 09 Hours

Characteristics and composition of sewage – population equivalent – Sanitary sewage flow estimation – Sewer materials – Hydraulics of flow in sanitary sewers – Sewer design - Storm runoff estimation – sewer appurtenances – sewage pumping - drainage in buildings - plumbing systems for drainage - Discharge standards for Effluents.

UNIT II PRIMARY TREATMENT 09 Hours

Objectives – Unit Operations and Processes – Selection of treatment processes – Onsite sanitation - Septic tank- Primary treatment – Principles, functions and design of treatment units - screens - grit chamber-primary sedimentation tanks – Operation and Maintenance aspects.

UNIT III SECONDARY TREATMENT 10 Hours

Objectives – Selection of Treatment Methods – Principles, Functions, - Activated Sludge Process and Extended aeration systems –Rotating biological contactors-Trickling filters Waste Stabilization Ponds – Operation and Maintenance.

UNIT IV ADVANCED TREATMENT 07 Hours

Sequencing Batch Reactor – Moving bed biofilm reactor-Membrane Bioreactor - UASB – Biogas recovery-Reclamation and Reuse of sewage – Constructed Wetland –Nutrient removal systems.

UNIT V DISPOSAL OF SEWAGE AND SLUDGE MANAGEMENT 10 Hours

Dilution – Self purification of surface water bodies Oxygen sag curve – deoxygenation and reaeration - Land disposal – Sewage farming – sodium hazards - Soil dispersion system. Objectives - Sludge characterization – Sludge Thickening – Dewatering – Drying – ultimate residue disposal – Septage Management.

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.

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.
5. <https://nptel.ac.in/courses>

1703CE015

PRE-STRESSED CONCRETE

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

- 1.To learn the principles, materials, methods and systems of prestressing
- 2.To learn the design of prestressed concrete beams for flexural, shear and tension and to calculate ultimate flexural strength of beam
- 3.Useful course for structural engineers in designing economical structures.

UNIT I INTRODUCTION – THEORY AND BEHAVIOUR 9 Hours

Basic Concepts - Historical development - classification and types - advantages over ordinary reinforced concrete – Prestressing Materials – Loads – Design Concepts –Prestressing Techniques – Systems of Prestressing – Loss of Prestress.

UNIT II DESIGN FOR FLEXURE AND CABLE LAYOUT 9 Hours

Basic assumptions - permissible stresses in steel and concrete as per IS 1343-1980 code - Design of sections of post-tensioned and pre-tensioned beams (Type I and II) - check for strength limit state based on IS 1343 – 1980 code - Layout of cables in post-tensioned beams - location of wires in pre-tensioned beams.

UNIT III SHEAR AND DEFLECTION 9 Hours

Design for shear based on IS 1343 - 1980 code - Factors influencing deflections - short term deflections of uncracked members - prediction of long term deflections - check for serviceability limit state of deflection- Anchorage Zone

UNIT IV COMPOSITE CONSTRUCTION 9 Hours

Composite Sections – Types – Advantages – Analysis and Design – Shear Keys.

UNIT V CIRCULAR PRESTRESSING 9 Hours

Prestressed Concrete Tanks - Columns – Poles – Tension Members

Total: 45 Hours

FURTHER READING:

- 1.Various methods of prestressing and the concepts of partial pre-stressing.
- 2.beams, pipes, water tanks, posts and similar structures

REFERENCES:

1. Krishna Raju N, " Prestressed Concrete", Tata McGraw Hill Publishing Company, Delhi, 2007. .
2. Edward G Nawy, "Prestressed Concrete", A Fundamental Approach, 3rd Edition, Prentice Hall, Upper Saddle river, NewJersy, 2000.
3. Rajagopalan N, " Prestressed Concrete", Narosa Publishing House, NewDelhi, 2002.
4. Sinha N C and Roy S K, "Fundamentals of Prestressed Concrete", S Chand & Co, 1985.
5. Lin T Y and Ned H Burns, " Design of Prestressed Concrete Structures", John Wiley Sons, NewYork, 1982.
6. Mallik S K and Gupta A P, "Prestressed Concrete", Oxford & IBH Publishing Co., Pvt. Ltd., India, 2nd Edition, 1986.
7. <https://nptel.ac.in/courses>

1702CE751	COMPUTER AIDED DESIGN AND DRAFTING LAB	L	T	P	C
		0	0	2	1

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: 30 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

REFERENCES:

1. Computer Aided Design and Drafting Lab Manual – G.Prakash, AP/Civil - EGSPEC
2. Krishna Raju N, "Design of Reinforced Concrete Structures", CBS Publishers & Distributors, New Delhi, 2003.
3. Krishna Raju N, Structural Design and Drawing (Reinforced Concrete and Steel). University press, Hyderabad, 2006.
4. Krishnamoorthy, C.S. and Rajeev, S., Computer Aided Design and Analytical Tools, Narosa, 1993.
5. Papacostas, C.S., Fundamentals of Transportation Engineering Prentice-Hall of India, 2001
6. Loucks, D.P., Stedinger, J.R. and Haith, D.A., Water Resource Systems Planning and Analysis, Prentice-Hall INC, 1981.

1702CE752	WATER AND WASTEWATER ENGINEERING LAB	L	T	P	C
		0	0	2	1

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. Coagulation and Precipitation process for 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: 30 HOURS

ADDITIONAL EXPERIMENTS:

1. Conductivity meter
2. UASB Reactor

REFERENCES:

1. Water And Wastewater Engineering Lab Manual – S.Shyam Sundar, AP/Civil - EGSPEC
2. Standard methods for the examination of water and wastewater, APHA, 20th Edition, Washington, 1998.
3. Garg, S.K., “Environmental Engineering Vol. I & II”, Khanna Publishers, New Delhi.
4. Modi, P.N., “Environmental Engineering Vol. I & II”, Standard Book House, Delhi-6.

1704CE753

MINI PROJECT III

L	T	P	C
0	0	2	1

COURSE OBJECTIVES:

To guide the students in such a way so that they carry out a work on a topic as a forerunner to the full ledged 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 engineering, Electrical engineering, Biotechnology, Chemical engineering, Computer science.

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

TOTAL: 30 HOURS

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	LIFE SKILLS: COMPETITIVE EXAMS PREPARATION	L	T	P	C
		2	0	0	2

COURSE OBJECTIVES:

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.

LIST OF EXPERIMENTS

1. BUILDING MATERIALS: brick, stones, aggregates, cement, Timber
2. CONSTRUCTION PRACTICES: Construction of stone masonry, brick masonry and R.C.C. and block masonry– construction equipment.
3. ENGINEERING SURVEY: Survey - computation of areas - Chain Survey - Compass surveying - Plane table survey-levelling
4. STRENGTH OF MATERIALS: Stresses and strains -Thermal stresses- elastic constants - Beams and bending – Bending moment and shear force in beams
5. STRUCTURAL ANALYSIS: Indeterminate beams - Stiffness and flexibility methods of structural analysis – Slope deflection - Moment Distribution method – Arches and suspension cables
6. 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
7. ENVIRONMENTAL ENGINEERING: Sources of water - Ground water Hydraulics - Characteristics of water - Water analysis -water treatment - water borne diseases. Sewerage system
8. 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
9. HYDRAULICS: Hydrostatics-applications of Bernoulli equation – flow measurement in channels, Applications of Momentum equation, Kinematics of flow.
10. TRANSPORTATION ENGINEERING: Different modes of transport and their characteristics. Geometric design of highways. –Design and Construction of bituminous and concrete roads - Maintenance of roads.

TOTAL: 30 HOURS

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.

1704CE754

IN-PLANT TRAINING / INTERNSHIP PRESENTATION

L T P C
0 0 0 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 Marks
Presentation / Quiz / Group Discussion	40 Marks
Report	20 Marks
Total	100 marks
Grades: (Excellent / Good / Satisfactory / Not Satisfactory)	