

# VELTECH HIGH TECH

Dr RANGARAJAN Dr. SAKUNTHALA ENGINEERING  
COLLEGE

(Owned by Vel Trust 1997)

*(An ISO 9001: 2008 Certified Institution)*

Accredited By NAAC with 'A' Grade and NBA Accredited  
Institution

(Approved by AICTE New Delhi and Govt. of Tamil Nadu, Affiliated to  
Anna University Chennai)



## SYLLABUS

### WEEKLY SCHEDULE

VII SEMESTER 2017 - 2018

DEPARTMENT OF CIVIL ENGINEERING

IV YEAR DEGREE COURSE

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Avadi

Chennai – 600062

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## **INSTITUTION VISION**

Elevating well being of humanity by augmenting human resource potential through quality technical education and training

### **INSTITUTION MISSION**

- a. To effectuate supremacy in technical education through articulation of research and industry practices for social relevance.
- b. To inculcate the habit of lifelong learning
- c. To exhibit professional ethics, commitment and leadership qualities

### **DEPARTMENT VISION**

Building human resource talent by infusing the habit of creativity and productivity with holistic ethical standards.

### **DEPARTMENT MISSION**

1. To accomplish technically competent and credible civil engineers for changing societal needs.
2. To propagate lifelong learning.
3. To impart the right proportion of knowledge, attitudes and ethics in students to enable them take up positions of responsibility in the society and make significant contributions.

### **Program Educational Objectives (PEOs)**

The program educational objectives for the Civil Engineering program describe accomplishments that graduates are expected to attain within four years after graduation.

1. Ability to identify, formulate and analyze complex Civil Engineering problems in the areas of structural engineering, geotechnical engineering, water resource management and applications to reach significant conclusions by applying Mathematics, Natural sciences, Civil Engineering principles.
2. Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems related to structural design, software development, analyzing techniques, and information assurance & security in societal and environmental contexts.
3. Apply knowledge of mathematics, natural science, engineering fundamentals and structural design, software development, analyzing techniques, and information assurance & security to the solution of complex engineering problems in civil engineering.
4. Design solutions for complex civil engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
5. Ability to create, select and apply state of the art tools and techniques in designing, developing and testing a structural component

### **Programme Outcomes**

1. An ability to relate the theoretical knowledge of mathematics, science and engineering to practical real world applications.
2. An ability to identify, formulate and derive solutions for engineering problems.
3. An ability to produce the efficient system design and components, design for various civil engineering applications for technology innovation.
4. An ability to conduct and investigate different experiments for analysis, research and synthesis purpose
5. Familiar with modern Engineering tools, Software's and Equipments.
6. An ability to understand the professional responsibility in the techno savvy world.
7. An ability to understand the impact of professional engineering solution in societal and environmental contexts and demonstrate the knowledge and need for sustainable development globally.
8. An understanding of code of conduct and ethical responsibilities.
9. An ability to work on multi-disciplinary task and team work.
10. An ability to write and communicate effectively in verbal, written and graphical form.
11. An ability to develop confidence for self education and for life-long learning.
12. An understanding of Engineering Economics and management principles to manage projects and create innovative ideas

## WEEK DETAILS

<b>SL.NO.</b>	<b>WEEK</b>	<b>FROM</b>	<b>TO</b>
1	<b>WEEK1</b>	<b>24-06-17</b>	<b>24-06-17</b>
2	<b>WEEK2</b>	<b>27-06-17</b>	<b>1-07-17</b>
3	<b>WEEK3</b>	<b>3-07-17</b>	<b>8-07-17</b>
4	<b>WEEK4</b>	<b>9-07-17</b>	<b>15-07-17</b>
5	<b>WEEK5</b>	<b>17-07-17</b>	<b>22-07-17</b>
6	<b>WEEK6</b>	<b>24-07-17</b>	<b>29-07-17</b>
7	<b>WEEK7</b>	<b>31-07-17</b>	<b>5-08-17</b>
8	<b>WEEK8</b>	<b>7-08-17</b>	<b>12-08-17</b>
9	<b>WEEK9</b>	<b>14-08-17</b>	<b>19-08-17</b>
10	<b>WEEK10</b>	<b>21-08-17</b>	<b>26-08-17</b>
11	<b>WEEK11</b>	<b>28-08-17</b>	<b>2-09-17</b>
12	<b>WEEK12</b>	<b>4-09-17</b>	<b>9-09-17</b>
13	<b>WEEK13</b>	<b>11-09-17</b>	<b>16-09-17</b>
14	<b>WEEK14</b>	<b>18-09-17</b>	<b>23-09-17</b>
15	<b>WEEK15</b>	<b>25-09-17</b>	<b>30-09-17</b>
16	<b>WEEK16</b>	<b>2-10-17</b>	<b>7-10-17</b>
17	<b>WEEK17</b>	<b>9-10-17</b>	<b>13-10-17</b>

## SUBJECT CONTENTS

<b>SL.NO</b>	<b>SUBJECT CODE</b>	<b>SUBJECT NAME</b>
<b>THEORY</b>		
1	CE6701	Structural Dynamics and Earthquake Engineering
2	CE6702	Prestressed Concrete Structures
3	CE6703	Water Resources and Irrigation Engineering
4	CE6704	Estimation and Quantity Surveying
5	E-II CE6007	Housing Planning and Management
6	E-III CE6011	Air Pollution Management
<b>PRACTICAL</b>		
7	CE6711	Computer Aided Design and Drafting Laboratory
8	CE6712	Design Project

## TEST / EXAM SCHEDULE

SL.NO	SUBJECT CODE	SUBJECT NAME	UNIT TEST I	UNIT TEST II	PRE MODEL EXAM	UNIT TEST IV	MODEL EXAM
1	CE6701	Structural Dynamics and Earthquake Engineering	10.07.17	27.07.17	16.08.17	07.09.17	28.09.17
2	CE6702	Prestressed Concrete Structures	10.07.17	27.07.17	17.08.17	07.09.17	03.10.17
3	CE6703	Water Resources and Irrigation Engineering	11.07.17	28.07.17	18.08.17	08.09.17	06.10.17
4	CE6704	Estimation and Quantity Surveying	11.07.17	28.07.17	19.08.17	08.09.17	09.10.17
5	E-II CE6007	Housing Planning and Management	12.07.17	29.07.17	21.08.17	09.09.17	11.10.17
6	E-III CE6011	Air Pollution Management	12.07.17	29.07.17	22.08.17	09.09.17	13.10.17

**WEEK – 1****UNIT –I****THEORY OF VIBRATIONS**

Difference between static loading and dynamic loading

**WEEK – 2**

D'Alemberts principles

**WEEK – 3**

Response to harmonic and periodic forces.

**WEEK – 4****UNIT TEST-I****UNIT –II****MULTIPLE DEGREE OF FREEDOM SYSTEM**

Two degree of freedom system – modes of vibrations – formulation of equations of motion of multi degree of freedom (MDOF) system

**WEEK - 5**

Eigen values and Eigen vectors – Response to free and forced vibrations - damped and undamped MDOF system

**WEEK – 6**

Modal superposition methods.

**WEEK – 7****UNIT TEST-II****WEEK – 8****UNIT III****ELEMENTS OF SEISMOLOGY**

Elements of Engineering Seismology - Causes of Earthquake – Plate Tectonic theory

## **WEEK – 9**

Elastic rebound Theory – Characteristic of earthquake – Estimation of earthquake parameters - Magnitude and intensity of earthquakes – Spectral Acceleration.

## **WEEK – 10**

### **UNIT IV**

## **RESPONSE OF STRUCTURES TO EARTHQUAKE**

Effect of earthquake on different type of structures – Behaviour of Reinforced Cement Concrete- Steel and Prestressed Concrete Structure under earthquake loading – Pinching effect - Bouchinger Effects

## **WEEK – 11**

Evaluation of earthquake forces as per IS:1893 – 2002 - Response Spectra – Lessons learnt from past earthquakes

## **WEEK – 12**

### **PRE MODEL**

## **WEEK – 13**

### **UNIT – V**

## **DESIGN METHODOLOGY**

Causes of damage – Planning considerations / Architectural concepts as per IS:4326 – 1993 –Guidelines for Earthquake resistant design

## **WEEK - 14**

Earthquake resistant design for masonry and Reinforced Cement Concrete buildings

## **WEEK - 15**

Later load analysis – Design and detailing as per IS:13920 – 1993.

## **WEEK – 16 and 17**

Modal exam

## **TEXT BOOKS:**

1. Chopra, A.K., “Dynamics of Structures – Theory and Applications to Earthquake Engineering”, 4th Edition, Pearson Education, 2011.
2. Agarwal. P and Shrikhande. M., "Earthquake Resistant Design of Structures", Prentice Hall of India Pvt. Ltd. 2007

**REFERENCES:**

1. Biggs, J.M., “Introduction to Structural Dynamics”, McGraw Hill Book Co., New York, 1964
2. Dowrick, D.J., “Earthquake Resistant Design”, John Wiley & Sons, London, 2009
3. Paz, M. and Leigh.W. “Structural Dynamics – Theory & Computation”, 4 Edition, CBS Publishers & Distributors, Shahdara, Delhi, 2006.



## **CE6702    PRESTRESSED CONCRETE STRUCTURES**

### **WEEK – 1**

#### **UNIT –I**

#### **INTRODUCTION – THEORY AND BEHAVIOUR**

Basic concepts – Advantages – Materials required – Systems and methods of prestressing –

Analysis of sections – Stress concept – Strength concept – Load balancing concept – Effect of

loading on the tensile stresses in tendons – Effect of tendon profile on deflections – Factors

influencing deflections – Calculation of deflections – Short term and long term deflections - Losses

of prestress – Estimation of crack width.

### **WEEK – 2**

D'Alemberts principles

### **WEEK – 3**

Response to harmonic and periodic forces.

### **WEEK – 4**

#### **UNIT TEST-I**

#### **UNIT –II**

#### **DESIGN FOR FLEXURE AND SHEAR**

Basic assumptions for calculating flexural stresses – Permissible stresses in steel and concrete as per I.S.1343 Code

### **WEEK - 5**

Design of sections of Type I and Type II post-tensioned and pre-tensioned beams – Check for strength limit based on I.S. 1343 Code

### **WEEK – 6**

Layout of cables in post-tensioned beams - Location of wires in pre-tensioned beams - Design for shear based on I.S. 1343 Code. Difference between static loading and dynamic loading

**WEEK – 7**

**UNIT TEST-II**

**WEEK – 8**

**UNIT III**

**DEFLECTION AND DESIGN OF ANCHORAGE ZONE**

Factors influencing deflections – Short term deflections of uncracked members – Prediction of long term deflections due to creep and shrinkage – Check for serviceability limit state of deflection.

**WEEK – 9**

Determination of anchorage zone stresses in post-tensioned beams by Magnel's method, Guyon's method and IS1343 code – design of anchorage zone reinforcement – Check for transfer bond length in pre-tensioned beams.

**WEEK – 10**

**UNIT IV**

**COMPOSITE BEAMS AND CONTINUOUS BEAMS**

Analysis and design of composite beams – Methods of achieving continuity in continuous beams

**WEEK – 11**

Analysis for secondary moments – Concordant cable and linear transformation – Calculation of stresses – Principles of design.

**WEEK – 12**

**PRE MODEL**

**WEEK – 13**

**UNIT – V**

**MISCELLANEOUS STRUCTURES**

Design of tension and compression members – Tanks, pipes and poles – Partial prestressing

**WEEK - 14**

Definition, methods of achieving partial prestressing, merits and demerits of partial prestressing.

**WEEK - 15**

Elements of Engineering Seismology - Causes of Earthquake – Plate Tectonic theory

**WEEK – 16 and 17**

Modal exam

**TEXT BOOKS:**

1. Krishna Raju N., "Prestressed concrete", 5<sup>th</sup> Edition, Tata McGraw Hill Company, New Delhi, 2012
2. Pandit.G.S. and Gupta.S.P., " Prestressed Concrete", CBS Publishers and Distributers Pvt. Ltd, 2012.

**REFERENCES:**

1. Rajagopalan.N, "Prestressed Concrete", Narosa Publishing House, 2002.
2. Dayaratnam.P., "Prestressed Concrete Structures", Oxford and IBH, 2013
3. Lin T.Y. and Ned.H.Burns, "Design of prestressed Concrete Structures", Third Edition, Wiley India Pvt. Ltd., New Delhi, 2013.
4. IS1343:1980, Code of Practice for Prestressed Concrete, Bureau of Indian Standards, New Delhi, 2012

## **CE6703 WATER RESOURCES AND IRRIGATION ENGINEERING**

### **WEEK – 1**

#### **UNIT –I**

### **WATER RESOURCES**

Water resources survey – Water resources of India and Tamilnadu – Description of water resources planning

### **WEEK – 2**

Estimation of water requirements for irrigation and drinking- Single and multipurpose reservoir – Multi objective

### **WEEK – 3**

Fixation of Storage capacity -Strategies for reservoir operation - Design flood-levees and flood walls.

### **WEEK – 4**

#### **UNIT TEST-I**

#### **UNIT –II**

### **WATER RESOURCE MANAGEMENT**

Economics of water resources planning; – National Water Policy – Consumptive and nonconsumptive water use

### **WEEK - 5**

Water quality – Scope and aims of master plan - Concept of basin as a unit for development –

### **WEEK – 6**

Water budget- Conjunctive use of surface and ground water

### **WEEK – 7**

#### **UNIT TEST-II**

### **WEEK – 8**

#### **UNIT III**

### **IRRIGATION ENGINEERING**

Need – Merits and Demerits – Duty, Delta and Base period – Irrigation efficiencies

**WEEK – 9**

Crops and Seasons - Crop water Requirement – Estimation of Consumptive use of water.

**WEEK – 10**

**UNIT IV**

**CANAL IRRIGATION**

Types of Impounding structures: Gravity dam – Diversion Head works - Canal drop

**WEEK – 11**

Cross drainage works – Canal regulations – Canal outlets – Canal lining - Kennedy's and Lacey's Regime theory

**WEEK – 12**

**PRE MODEL**

**WEEK – 13**

**UNIT – V**

**IRRIGATION METHODS AND MANAGEMENT**

Lift irrigation – Tank irrigation – Well irrigation – Irrigation methods

**WEEK - 14**

Surface and Sub-Surface and Micro Irrigation - Merits and demerits – Irrigation scheduling – Water distribution

**WEEK - 15**

Participatory irrigation management with a case study .

**WEEK – 16 and 17**

Modal exam

**TEXT BOOKS:**

1. Linsley R.K. and Franzini J.B, “Water Resources Engineering”, McGraw-Hill Inc, 2000.
2. Punmia B.C., et. al; Irrigation and water power Engineering, Laxmi Publications, 16 Edition, New Delhi, 2009
3. Garg S. K., “Irrigation Engineering and Hydraulic structures”, Khanna Publishers, 23 Revised Edition, New Delhi, 2009

**REFERENCES:**

1. Duggal, K.N. and Soni, J.P., “Elements of Water Resources Engineering”, New Age International Publishers, 2005
2. Chaturvedi M.C., “Water Resources Systems Planning and Management”, Tata
3. Michael A.M., Irrigation Theory and Practice, 2nd Edition, Vikas Publishing House Pvt.Ltd.,Noida, Up, 2008
4. Dilip Kumar Majumdar, “Irrigation Water Management”, Prentice-Hall of India, NewDelhi, 2008.
5. Asawa, G.L., “Irrigation Engineering”, New Age International Publishers, New Delhi, 2000.

## **CE6704 ESTIMATION AND QUANTITY SURVEYING**

### **WEEK – 1**

#### **UNIT –I**

#### **ESTIMATE OF BUILDINGS**

Load bearing and framed structures – Calculation of quantities of brick work, RCC, PCC,Plastering, white washing, colour washing and painting / varnishing for shops, rooms, residentialbuilding with flat and pitched roof

### **WEEK – 2**

Various types of arches – Calculation of brick work and RCC works in arches

### **WEEK – 3**

Estimate of joineries for panelled and glazed doors, windows, ventilators,handrails etc.

### **WEEK – 4**

#### **UNIT TEST-I**

#### **UNIT –II**

#### **ESTIMATE OF OTHER STRUCTURES**

Estimating of septic tank, soak pit – sanitary and water supply installations – water supply pipe line

### **WEEK - 5**

Sewer line – tube well – open well – estimate of bituminous and cement concrete roads

### **WEEK – 6**

Estimate of retaining walls – culverts – estimating of irrigation works – aqueduct, syphon, fall.

### **WEEK – 7**

#### **UNIT TEST-II**

### **WEEK – 8**

### **UNIT III**

#### **SPECIFICATION AND TENDERS**

Data – Schedule of rates – Analysis of rates – Specifications – sources –  
Preparation of detailed and general specifications – Tenders – TTT Act – e-tender

#### **WEEK – 9**

Preparation of Tender Notice and Document – Contracts – Types of contracts –  
Drafting of contract documents – Arbitration and legal requirements.

#### **WEEK – 10**

### **UNIT IV**

#### **VALUATION**

Necessity – Basics of value engineering – Capitalised value – Depreciation –  
Escalation –

#### **WEEK – 11**

Value of building – Calculation of Standard rent – Mortgage – Lease

#### **WEEK – 12**

#### **PRE MODEL**

#### **WEEK – 13**

### **UNIT – V**

#### **REPORT PREPARATION**

Principles for report preparation – report on estimate of residential building –  
Culvert

#### **WEEK - 14**

Roads – Water supply and sanitary installations

#### **WEEK – 15**

Tube wells – Open wells.

#### **WEEK – 16 and 17**

Modal exam

#### **TEXT BOOKS:**



1. Dutta, B.N., “Estimating and Costing in Civil Engineering”, UBS Publishers & Distributors Pvt. Ltd., 2003
2. Kohli, D.D and Kohli, R.C., “A Text Book of Estimating and Costing (Civil)”, S.Chand&Company Ltd., 2004

**REFERENCES:**

1. PWD Data Book.
2. Tamilnadu Transparencies in Tender Act, 1998
3. Arbitration and Conciliation Act, 1996
4. Standard Bid Evaluation Form, Procurement of Goods or Works, The World Bank, April 1996.

**CE6007**

**HOUSING PLANNING AND MANAGEMENT**

**WEEK – 1**

**UNIT –I**

**INTRODUCTION TO HOUSING**

Definition of Basic Terms – House, Home, Household, Apartments, Multi storied Buildings, Special Buildings, Objectives and Strategies of National Housing Policies including Slum Housing Policy

**WEEK – 2**

Principle of Sustainable Housing – Integrated approach on arriving holding capacity and density norms

**WEEK – 3**

All basic infrastructure consideration - Institutions for Housing at National, State and Local levels.

**WEEK – 4**

**UNIT TEST-I**

**UNIT –II**

**HOUSING PROGRAMMES**

Basic Concepts, Contents and Standards for Housing Programmes - Sites and Services, Neighborhoods- Plotted land development programs, Open Development Plots, Apartments, Gated communities, Townships, Rental Housing,

**WEEK - 5**

Co-operative Housing, Slum Housing Programmes – Slum improvement – Slum redevelopment and Relocation – Use of GIS and MIS in Slum Housing Projects

**WEEK – 6**

Role of Public housing agencies, and Private sector in supply , quality, infrastructure and pricing – Role of Non-Government Organizations in slum housing.

**WEEK – 7**

## **UNIT TEST-II**

### **WEEK – 8**

## **UNIT III**

### **PLANNING AND DESIGN OF HOUSING PROJECTS**

Formulation of Housing Projects – Land Use and Soil suitability analysis -  
Building Byelaws and Rules and Development Control Regulations

### **WEEK – 9**

Site Analysis, Layout Design, Design of Housing Units (Design Problems) –  
Housing Project Formulation.

### **WEEK – 10**

## **UNIT IV**

### **CONSTRUCTION      TECHNIQUES      AND      COST-EFFECTIVE MATERIALS**

New Constructions Techniques – Cost Effective Modern Materials and methods  
of Construction

### **WEEK – 11**

Green building concept- Building Centers – Concept, Functions and Performance  
Evaluation.

### **WEEK – 12**

## **PRE MODEL**

### **WEEK – 13**

## **UNIT – V**

### **HOUSING FINANCE AND PROJECT APPRAISAL**

Evaluation of Housing Projects for sustainable principles – Housing Finance,  
Cost Recovery

### **WEEK - 14**

Cash Flow Analysis, Subsidy and Cross Subsidy- Public Private Partnership  
Projects

## **WEEK - 15**

Viability Gap Funding - Pricing of Housing Units (Problems )

## **WEEK – 16**

Modal exam

### **TEXT BOOKS:**

1. Meera Mehta and Dinesh Mehta, "Metropolitan Housing Markets", Sage Publications Pvt. Ltd., New Delhi, 1999.
2. Francis Cherunilam and Odeyar D Heggade, "Housing in India", Himalaya Publishing House, Bombay, 1997.

### **REFERENCES:**

1. Wiley- Blackwell, "Neufert Architects" Data, 4th Edition, Blackwell Publishing Ltd, 2012
2. Donald Watson and Michael J.Crosbie, "Time Saver Standards for Architectural Design", 8th Edition, Tata McGraw Hill Edition, 2011
3. Walter Martin Hosack, "Land Development Calculations", McGraw Hill 2 Edition, USA2010
4. Development Control Rules for Chennai Metropolitan Area, CMA, Chennai, 2004.
5. UNCHS, National Experiences with Shelter Delivery for the Poorest Groups, UNCHS Habitat, Nairobi, 1994
6. Government of India, National Housing Policy, 1994

**WEEK – 1****UNIT –I****SOURCES AND EFFECTS OF AIR POLLUTANTS**

Classification of air pollutants – Particulates and gaseous pollutants – Sources of air pollution – Source inventory

**WEEK – 2**

Effects of air pollution on human beings, materials, vegetation, animals – global warming-ozone layer depletion, Sampling and Analysis

**WEEK – 3**

Basic Principles of Sampling – Source and ambient sampling – Analysis of pollutants – Principles.

**WEEK – 4****UNIT TEST-I****UNIT –II****DISPERSION OF POLLUTANTS**

Elements of atmosphere – Meteorological factors – Wind roses – Lapse rate

**WEEK - 5**

Atmospheric stability and turbulence – Plume rise

**WEEK – 6**

Dispersion of pollutants – Dispersion models – Applications.

**WEEK – 7****UNIT TEST-II****WEEK – 8****UNIT III****AIR POLLUTION CONTROL**

Concepts of control – Principles and design of control measures – Particulates control by gravitational, centrifugal, filtration, scrubbing, electrostatic precipitation

**WEEK – 9**

Selection criteria for equipment - gaseous pollutant control by adsorption, absorption, condensation, combustion – Pollution control for specific major industries

**WEEK – 10**

**UNIT IV**

**AIR QUALITY MANAGEMENT**

Air quality standards – Air quality monitoring – Preventive measures - Air pollution control efforts – Zoning – Town planning regulation of new industries

**WEEK – 11**

Legislation and enforcement – Environmental Impact Assessment and Air quality

**WEEK – 12**

**PRE MODEL**

**WEEK – 13**

**UNIT – V**

**NOISE POLLUTION**

Sources of noise pollution – Effects

**WEEK - 14**

Assessment - Standards

**WEEK – 15**

Control methods – Prevention

**WEEK – 16 and 17**

Modal exam

**TEXT BOOKS:**

1. Anjaneyulu, D., "Air Pollution and Control Technologies", Allied Publishers, Mumbai, 2002
2. Rao, C.S. Environmental Pollution Control Engineering, Wiley Eastern Ltd., New Delhi, 1996.
3. Rao M.N., and Rao H. V. N., Air Pollution Control, Tata McGraw Hill, New Delhi, 1996.

**REFERENCES:**

- 1 Heumann.W.L., "Industrial Air Pollution Control Systems", McGraw Hill, New York, 1997.
2. Mahajan S.P., "Pollution Control in Process Industries", Tata McGraw Hill Publishing Company, New Delhi, 1991.
3. Peavy S.W., Rowe D.R. and Tchobanoglous G. "Environmental Engineering", McGraw Hill, New Delhi, 1985.
4. Garg, S.K., "Environmental Engineering Vol. II", Khanna Publishers, New Delhi, 1998
5. Mahajan, S.P., "Pollution Control in Process Industries", Tata McGraw Hill, New Delhi, 1991.
6. ThodGodesh, "Air Quality, Lewis India Edition, 2013.

**CE 6711    COMPUTER AIDED DESIGN & DRAFTING LABORATORY**

**WEEK        EXPERIMENT**

1 to 3.	Design and drawing of RCC cantilever and counter fort type retaining walls with reinforcement details
4 to 7	Design of solid slab and RCC Tee beam bridges for IRC loading and reinforcement details
8 to 10	Design and drafting of circular and rectangular RCC water tanks
10 to 12	Design of plate Girder Bridge - Truss Girder bridges – Detailed Drawings including
12 to 14	Design of hemispherical bottomed steel tank