

**VEL TECH MULTI TECH  
Dr. RANGARAJAN Dr. SAKUNTHALA  
ENGINEERING COLLEGE**

(An ISO 9001: 2008 Certified Institution)

(Owned by 'VEL Shree R. Rangarajan  
Dr. Sagunthala Rangarajan Educational Academy)

(Approved by AICTE, New Delhi

&

Govt. of Tamil Nadu and affiliated to Anna University)



**WEEKLY SCHEDULE**

**VI - SEMESTER**

**2013-2017**

4 Year Degree Course in Engineering

**CIVIL ENGINEERING**

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**WEEK DETAILS****YEAR 2016**

<b>S.NO</b>	<b>WEEKS</b>	<b>DATE</b>	
		<b>FROM</b>	<b>TO</b>
1.	WEEK 1	18.01.16	23.01.16
2.	WEEK 2	25.01.16	30.01.16
3.	WEEK 3	01.02.16	06.02.16
4.	WEEK 4	08.02.16	13.02.16
5.	WEEK 5	15.02.16	20.02.16
6.	WEEK 6	22.02.16	27.02.16
7.	WEEK 7	29.02.16	05.03.16
8.	WEEK 8	07.03.16	12.03.16
9.	WEEK 9	16.03.16	20.03.16
10.	WEEK 10	22.03.16	26.03.16
11.	WEEK 11	27.03.16	02.04.16
12.	WEEK 12	03.04.16	09.04.16
13.	WEEK 13	11.04.16	16.04.16
14.	WEEK 14	18.04.16	23.04.16
15	WEEK 15	25.04.16	30.04.16

# VI SEMESTER

## CONTENTS

<b>S. NO</b>	<b>SUBJECTCODE</b>	<b>SUBJECT NAME</b>
01	CE6601	Design of Reinforce, Concrete & Massionary Structure
02	CE6602	Structural Analysis II
03	CE6603	Design of Steel Structures
04	CE6604	Railway, Airport & Harbour Engineering
05	CE6605	Environmental Engineering II
06	CE6005	Construction Planning & Scheduling
07	CE6611	Environmental Engineering Laboratory
08	CE6612	Concrete & Highway Engineering Lab

## VI SEMESTER

### TEST / EXAM SCHEDULE

SL.NO	SUBJECT CODE	SUBJECT NAME	UNIT TEST I	UNIT TEST II	PRE MODEL EXAM	MODEL EXAM
1	CE6601	Design of Reinforce, Concrete & Massionary Structure	01.02.16	15.02.16	29.02.06	01.04.16
2	CE6602	Structural Analysis II	02.02.16	16.02.16	01.03.16	04.04.16
3	CE6603	Design of Steel Structures	03.02.16	17.02.16	02.03.16	06.04.16
4	CE6604	Railway, Airport & Harbour Engineering	04.02.16	18.02.16	03.03.16	08.04.16
5	CE6605	Environmental Engineering II	05.02.16	19.02.16	04.03.16	11.04.16
6	CE6005	Construction Planning & Scheduling	06.02.15	20.02.16	05.03.16	13.04.16

**CE6601 DESIGN OF REINFORCED  
CONCRETE & BRICK LT P C MASONRY  
STRUCTURES**

**WEEK – 1**

**UNIT I RETAINING WALLS**

Design of Cantilever

**WEEK – 2 Counter fort Retaining walls**

**WEEK – 3 UNIT TEST - 1**

**UNIT II WATER TANKS**

Design of rectangular and circular

**WEEK – 4**

water tanks both below and above ground level

**WEEK - 5**

Design of circular slab.

**WEEK – 6: UNIT TEST – II**

**WEEK - 7**

**UNIT III SELECTED TOPICS**

Design of staircases (ordinary and doglegged) –

Design of flat slabs

**WEEK – 8**

Principles of design of mat foundation, box culvert and road bridges

**WEEK – 9: PRE MODEL EXAM**

**WEEK - 10**

**UNIT IV YIELD LINE THEORY**

Assumptions - Characteristics of yield line -  
Determination of collapse load / plastic moment -  
Application of virtual work method

**WEEK - 11**

Square, rectangular, circular and triangular slabs -  
Design problems **WEEK – 12: UNIT TEST –**

**1V**

**WEEK – 13**

**UNIT V BRICK MASONRY**

Introduction, Classification of walls, Lateral supports and stability, effective height of wall and columns, effective length of walls, design loads, load dispersion

**WEEK – 14**

Permissible stresses, design of axially and eccentrically loaded brick walls

**WEEK – 15 MODEL EXAMS**

**WEEK - 16 & WEEK – 17**

**ICD CLASSES & MODEL EXAM**

**TEXT BOOKS:**

1. Gambhir.M.L., "Design of Reinforced Concrete Structures", Prentice Hall of India Private Limited, 2012.
2. Dayaratnam, P., "Brick and Reinforced Brick Structures", Oxford & IBH Publishing House, 1997
3. Punmia B.C, Ashok Kumar Jain, Arun K.Jain, "R.C.C. Designs Reinforced Concrete Structures", Laxmi Publications Pvt. Ltd., New Delhi, 2006.
4. Varghese.P.C., "Advanced Reinforced Concrete Design", Prentice Hall of India Pvt. Ltd., New Delhi, 2012.

#### **REFERENCES:**

1. Mallick, D.K. and Gupta A.P., "Reinforced Concrete", Oxford and IBH Publishing Company,1997
2. Syal, I.C. and Goel, A.K., "Reinforced Concrete Structures", A.H. Wheelers & Co. Pvt. Ltd., 1998 58
3. Ram Chandra.N. and Virendra Gehlot, "Limit State Design", Standard Book House, 2004.
4. Subramanian. N., "Design of Reinforced Concrete Structures", Oxford University, New Delhi, 2013.

5. IS456:2000, Code of practice for Plain and Reinforced Concrete, Bureau of Indian Standards, New Delhi, 2007
6. IS1905:1987, Code of Practice for Structural use of Unreinforced Masonry Bureau of Indian Standards, New Delhi, 2002

## **CE6602 STRUCTURAL ANALYSIS – II**

### **WEEK – 1**

#### **UNIT I FLEXIBILITY METHOD**

Equilibrium and compatibility – Determinate vs Indeterminate structures – Indeterminacy - Primary structure – Compatibility conditions

**WEEK - 2** Analysis of indeterminate pin-jointed plane frames, continuous beams, rigid jointed plane frames (with redundancy restricted to two)

### **WEEK – 3 UNIT TEST –I**

#### **UNIT II STIFFNESS MATRIX METHOD**

Element and global stiffness matrices – Analysis of continuous beams – Co-ordinate transformations – Rotation matrix

### **WEEK – 4**

Transformations of stiffness matrices, load vectors and displacements vectors

### **WEEK - 5**

Analysis of pin-jointed plane frames and rigid frames (with redundancy limited to two)



## **WEEK – 6 UNIT TEST –II**

## **WEEK – 7**

### **UNIT III FINITE ELEMENT METHOD**

Introduction – Discretisation of a structure –  
Displacement functions – Truss element – Beam element

## **WEEK – 8**

Plane stress and plane strain - Triangular elements

## **WEEK – 9 PRE MODEL EXAM**

## **WEEK - 10**

### **UNIT IV PLASTIC ANALYSIS OF STRUCTURES**

Statically indeterminate axial problems – Beams in pure  
bending – Plastic moment of resistance – Plastic modulus

## **WEEK - 11**

Shape factor – Load factor – Plastic hinge and  
mechanism – Plastic analysis of indeterminate beams and  
frames – Upper and lower bound theorems

## **WEEK – 12 UNIT TEST –IV**

## **WEEK – 13**

### **UNIT V SPACE AND CABLE STRUCTURES**

Analysis of Space trusses using method of tension  
coefficients – Beams curved in plan

## **WEEK – 14**

Suspension cables – suspension bridges with two and  
three hinged stiffening girders

## **WEEK – 15 MODEL EXAMS**

## **WEEK - 16 & WEEK - 17**

## ICD CLASSES & MODEL EXAM

### TEXT BOOKS:

1. Punmia.B.C., Ashok Kumar Jain and Arun Kumar Jain, "Theory of Structures", Laxmi Publications, 2004.
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. BhavaiKatti, S.S, "Structural Analysis – Vol. 1 Vol. 2", Vikas Publishing House Pvt. Ltd., New Delhi, 2008

### REFERENCES:

1. 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.
2. Coates R.C, Coutie M.G. and Kong F.K., "Structural Analysis", ELBS and Nelson, 1990
3. Pandit G.S. & Gupta S.P. "Structural Analysis – A Matrix Approach", Tata McGraw Hill 2004.
4. William Weaver Jr. & James M. Gere, "Matrix Analysis of Framed Structures", CBS Publishers and Distributors, Delhi, 2004
5. Gambhir. M.L., "Fundamentals of Structural Mechanics and Analysis"., PHI Learning Pvt. Ltd., New Delhi, 2011.

# **CE6603 DESIGN OF STEEL STRUCTURES**

## **WEEK – 1**

### **UNIT – I-INTRODUCTION**

Properties of steel – Structural steel sections –  
Limit State Design Concepts Loads on Structures

**WEEK – 2**– Metal joining methods using rivets,  
welding, bolting Design of bolted, riveted and welded  
joints – Eccentric connections - Efficiency of joints –  
High Tension bolts

## **WEEK – 3 UNIT TEST –I**

### **UNIT –II- TENSION MEMBERS**

Types of sections – Net area – Net effective sections for  
angles and Tee in tension

## **WEEK – 4**

Design of connections in tension members – Use of lug  
angles

## **WEEK - 5**

Design of tension splice – Concept of shear lag

## **WEEK – 6 UNIT TEST –II**

## **WEEK – 7**

### **UNIT- III COMPRESSION MEMBERS**

Types of compression members – Theory of columns –  
Basis of current codal provision for compression member  
design – Slenderness ratio – Design of single section and  
compound section compression members

## **WEEK – 8**

Design of laced and battened type columns – Design of column bases – Gusseted base

## **WEEK – 9 PRE MODEL EXAM**

## **WEEK – 10**

### **UNIT- IV BEAMS**

Design of laterally supported and unsupported beams – Built up beams – Beams subjected to uniaxial and biaxial bending

## **WEEK – 11**

Design of plate girders - Intermediate and bearing stiffeners – Flange and web splices.

## **WEEK – 12 UNIT TEST –IV**

## **WEEK – 13**

### **UNIT – V ROOF TRUSSES AND INDUSTRIAL STRUCTURES**

Roof trusses – Roof and side coverings

## **WEEK – 14**

Design of purlin and elements of truss; end bearing – Design of gantry girde

## **WEEK – 15 MODEL EXAMS**

## **WEEK - 16 & WEEK – 17**

## **ICD CLASSES & MODEL EXAM**

### **TEXT BOOKS:**

1. Gambhir. M.L., "Fundamentals of Structural Steel Design", McGraw Hill Education India Pvt. Ltd., 2013

2. Shiyekar. M.R., "Limit State Design in Structural Steel", Prentice Hall of India Pvt. Ltd, Learning Pvt. Ltd., 2nd Edition, 2013.
3. Subramanian.N, "Design of Steel Structures", Oxford University Press, New Delhi, 2013

**REFERENCES:**

1. Narayanan.R.et.al. "Teaching Resource on Structural Steel Design", INSDAG, Ministry of Steel Publications, 2002
2. Duggal. S.K, "Limit State Design of Steel Structures", Tata McGraw Hill Publishing Company, 2005
3. Bhavikatti.S.S, "Design of Steel Structures" By Limit State Method as per IS:800–2007, IK International Publishing House Pvt. Ltd., 2009
4. Shah.V.L. and Veena Gore, "Limit State Design of Steel Structures", IS 800–2007 Structures Publications, 2009.
5. IS800 :2007, General Construction In Steel - Code of Practice, (Third Revision), Bureau of Indian Standards, New Delhi, 2007

## **CE6604 RAILWAYS, AIRPORTS AND HARBOUR ENGINEERING**

### **WEEK – 1**

#### **UNIT I RAILWAY PLANNING**

Significance of Road, Rail, Air and Water transports -  
Coordination of all modes to achieve sustainability -  
Elements of permanent way – Rails, Sleepers, Ballast,

rail fixtures and fastenings, - Track Stress, coning of wheels, creep in rails, defects in rails

**WEEK – 2** Route alignment surveys, conventional and modern methods- - Soil suitability analysis - Geometric design of railways, gradient, super elevation, widening of gauge on curves- Points and Crossings.

### **WEEK - 3 UNIT TEST I**

**UNIT II RAILWAY CONSTRUCTION AND MAINTENANCE** Relevance of Earthwork – Stabilization of track on poor soil – Tunneling Methods, drainage and ventilation

### **WEEK – 4**

Calculation of Materials required for track laying - Construction and maintenance of tracks

### **WEEK - 5**

Modern methods of construction & maintenance - Railway stations and yards and passenger amenities- Urban rail – Infrastructure for Metro, Mono and underground railways

### **WEEK – 6 UNIT TEST II**

### **WEEK – 7**

### **UNIT III AIRPORT PLANNING**

Air transport characteristics-airport classification-air port planning: objectives, components, layout characteristics, socio-economic characteristics of the Catchment area, criteria for airport site selection and ICAO stipulations

## **WEEK – 8**

Typical airport layouts, Case studies, parking and circulation area.

## **WEEK – 9 PRE MODEL EXAM**

## **WEEK - 10**

### **UNIT IV AIRPORT DESIGN**

Runway Design: Orientation, Wind Rose Diagram - Runway length - Problems on basic and Actual Length, Geometric design of runways, Configuration and Pavement Design Principles –

## **WEEK - 11**

Elements of Taxiway Design – Airport Zones – Passenger Facilities and Services – Runway and Taxiway Markings and lighting

## **WEEK – 12 UNIT TEST IV**

## **WEEK – 13**

### **UNIT V HARBOUR ENGINEERING**

Definition of Basic Terms: Harbor, Port, Satellite Port, Docks, Waves and Tides – Planning and Design of Harbours: Requirements, Classification, Location and Design Principles – Harbour Layout and Terminal Facilities – Coastal Structures: Piers, Break waters, Wharves, Jetties, Quays, Spring Fenders,

## **WEEK – 14**

Dolphins and Floating Landing Stage – Inland Water Transport – Wave action on Coastal Structures and

Coastal Protection Works – Environmental concern of  
Port Operations – Coastal Regulation Zone, 2011

**WEEK – 15**

**MODEL EXAMS**

**WEEK - 16 & WEEK - 17**

**ICD CLASSES & MODEL EXAM**

**TEXT BOOKS:**

1. Saxena Subhash C and Satyapal Arora, "A Course in Railway Engineering", Dhanpat Rai and Sons, Delhi, 2003
2. Satish Chandra and Agarwal M.M, "Railway Engineering", 2nd Edition, Oxford University Press, New Delhi, 2013.
3. Khanna S K, Arora M G and Jain S S, "Airport Planning and Design", Nemchand and Brothers, Roorkee, 2012.
4. Bindra S P, "A Course in Docks and Harbour Engineering", Dhanpat Rai and Sons, New Delhi, 2013

**REFERENCES:**

1. Rangwala, "Railway Engineering", Charotar Publishing House, 2013.
2. Rangwala, "Airport Engineering", Charotar Publishing House, 2013.
3. Rangwala, "Harbor Engineering", Charotar Publishing House, 2013.
4. Oza.H.P. and Oza.G.H., "A course in Docks & Harbour Engineering". Charotar Publishing Co., 2013
5. Mundrey J.S. "A course in Railway Track Engineering". Tata McGraw Hill, 2007.



6. Srinivasan R. Harbour, "Dock and Tunnel Engineering", 26th Edition 2013

**CE6605 ENVIRONMENTAL ENGINEERING II**

**WEEK – 1**

**UNIT I PLANNING FOR SEWERAGE SYSTEMS**

Sources of wastewater generation – Effects – Estimation of sanitary sewage flow – Estimation of storm runoff

**WEEK – 2** Factors affecting Characteristics and composition of sewage and their significance – Effluent standards – Legislation requirements

**WEEK - 3 UNIT TEST I**

**UNIT II SEWER DESIGN Sewer Design**

Sewerage – Hydraulics of flow in sewers – Objectives – Design period - Design of sanitary and storm sewers

**WEEK – 4**

Small bore systems - Computer applications – Laying, joining & testing of sewers – appurtenances – Pumps – selection of pumps and pipe Drainage

**WEEK - 5**

Plumbing System for Buildings – One pipe and two pipe system

**WEEK – 6 UNIT TEST II**

**WEEK – 7**

**UNIT III PRIMARY TREATMENT OF SEWAGE**

Objective – Selection of treatment processes – Principles, Functions, Design and Drawing of Units - Onsite sanitation - Septic tank with dispersion

### **WEEK – 8**

Grey water harvesting – Primary treatment – Principles, functions design and drawing of screen, grit chambers and primary sedimentation tanks – Construction, operation and Maintenance aspects.

### **WEEK - 9**

PRE MODEL EXAM

### **WEEK - 10**

## **UNIT IV SECONDARY TREATMENT OF SEWAGE**

Objective – Selection of Treatment Methods – Principles, Functions, Design and Drawing of Units - Activated Sludge Process and Trickling filter – Oxidation ditches, UASB – Waste Stabilization

### **WEEK - 11**

Ponds – Reclamation and Reuse of sewage - sewage recycle in residential complex - Recent Advances in Sewage Treatment – Construction and Operation & Maintenance of Sewage Treatment Plants

### **WEEK – 12 UNIT TEST IV**

### **WEEK – 13**

**UNIT V DISPOSAL OF SEWAGE AND SLUDGE MANAGEMENT** Standards Standards for Disposal -

Methods – dilution – Self purification of surface water bodies – Oxygen sag curve – Land disposal – Sludge characterization – Thickening – Sludge digestion – Biogas recovery

### **WEEK – 14**

Sludge Conditioning and Dewatering – disposal – Advances in Sludge Treatment and disposal.

### **WEEK – 15 MODEL EXAMS**

### **WEEK - 16 & WEEK - 17**

### **ICD CLASSES & MODEL EXAM**

### **TEXT BOOKS:**

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, News letter, 2005

### **REFERENCES:**

1. "Manual on Sewerage and Sewage Treatment", CPHEEO, Ministry of Urban Development, Government of India, New Delhi, 1997.
2. Metcalf & Eddy, "Wastewater Engineering" – Treatment and Reuse, Tata McGraw Hill Company, New Delhi, 2003.
3. Karia G L & Christian R A, "Wastewater Treatment", Prentice Hall of India, New Delhi, 2013.

# **CE6005 CONSTRUCTION PLANNING AND SCHEDULING**

## **WEEK – 1**

### **UNIT I CONSTRUCTION PLANNING**

Basic concepts in the development of construction plans-choice of Technology and Construction method-Defining Work Tasks

**WEEK – 2** Definition- Precedence relationships among activities-Estimating Activity Durations-Estimating Resource Requirements for work activities-coding systems

## **WEEK - 3 UNIT TEST I**

### **UNIT II SCHEDULING PROCEDURES AND TECHNIQUES**

**UNIT II SCHEDULING PROCEDURES AND TECHNIQUES 12** Relevance of construction schedules- Bar charts - The critical path method-Calculations for critical path scheduling-Activity float and schedules-Presenting project schedules-Critical path scheduling for Activity-on-node and with leads

## **WEEK – 4**

Lags and Windows-Calculations for scheduling with leads, lags and windows-Resource oriented scheduling-Scheduling with resource constraints and precedences - Use of Advanced Scheduling

## **WEEK - 5**

Techniques-Scheduling with uncertain durations-  
Crashing and time/cost tradeoffs -Improving the  
Scheduling process – Introduction to application  
software.

**WEEK – 6 PRE MODEL EXAM**

**WEEK – 7**

### **UNIT III COST CONTROL MONITORING AND ACCOUNTING**

The cost control problem-The project Budget-Forecasting  
for Activity cost control - financial accounting systems  
and cost accounts-

**WEEK – 8**

Control of project cash flows-Schedule control-Schedule  
and Budget updates-Relating cost and schedule  
information

**WEEK - 9**

### **UNIT TEST III**

**WEEK - 10**

### **UNIT IV QUALITY CONTROL AND SAFETY DURING CONSTRUCTION**

Quality and safety  
Concerns in Construction-Organizing for Quality and  
Safety-Work and Material Specifications

**WEEK - 11**

Total Quality control-Quality control by statistical  
methods -Statistical Quality control with Sampling by

Attributes-Statistical Quality control by Sampling and Variables-Safety

### **WEEK – 12 UNIT TEST IV**

### **WEEK – 13**

### **UNIT V ORGANIZATION AND USE OF PROJECT INFORMATION**

Types of project information-Accuracy and Use of Information-Computerized organization and use of Information -Organizing information in databases-relational model of Data bases-Other conceptual

### **WEEK – 14**

Models of Databases-Centralized database Management systems-Databases and application programs-Information transfer and Flow

### **WEEK – 15 MODEL EXAMS**

### **WEEK - 16 & WEEK - 17**

### **ICD CLASSES & MODEL EXAM**

### **TEXT BOOKS:**

1. Chitkara, K.K. “Construction Project Management Planning”, Scheduling and Control, Tata McGraw Hill Publishing Co., New Delhi, 2005
2. Srinath,L.S., “Pert and CPM Principles and Applications“, Affiliated East West Press, 2001

### **REFERENCES:**

1. Chris Hendrickson and Tung Au, “Project Management for Construction – Fundamentals Concepts for Owners”, Engineers, Architects and Builders, Prentice Hall, Pittsburgh, 2000.

2. Moder.J., Phillips. C. and Davis E, “Project Management with CPM”, PERT and Precedence Diagramming, Van Nostrand Reinhold Co., 3rd Edition, 1985.
3. Willis., E.M., “Scheduling Construction projects”, John Wiley and Sons, 1986.
4. Halpin,D.W., “Financial and Cost Concepts for Construction Management”, John Wiley and Sons, New York, 1985

**CE6611 ENVIRONMENTAL ENGINEERING  
LABORATORY**

**LIST OF EXPERIMENTS:**

1. Determination of Ammonia Nitrogen in wastewater.
2. Coagulation and Precipitation process for treating waste water
3. Determination of suspended, volatile, fixed and settleable 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)

# **CE6612 CONCRETE AND HIGHWAY ENGINEERING LABORATORY**

## **LIST OF EXPERIMENTS**

### **I. TESTS ON FRESH CONCRETE**

1. Slump cone test
2. Flow table
3. Compaction factor
4. Vee bee test.

### **II. TESTS ON HARDENED CONCRETE**

1. Compressive strength - Cube & Cylinder
2. Flexure test
3. Modulus of Elasticity

### **III. TESTS ON AGGREGATES**

1. Specific Gravity
2. Gradation of Aggregate
3. Crushing Strength
4. Abrasion Value
5. Impact Value
6. Water Absorption
7. Flakiness and Elongation Indices

### **IV. TESTS ON BITUMEN**

1. Penetration
2. Softening Point
3. Ductility
4. Flash and fire points.
5. Viscosity

### **V. TESTS ON BITUMINOUS MIXES**

1. Determination of Binder Content
2. Marshall Stability and Flow values
3. Density