



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

(An ISO 9001: 2008 Certified Institution)

(Owned by Vel Trust)

(Approved by Govt. of Tamil Nadu and affiliated to Anna University)



SYLLABUS

WEEKLY SCHEDULE

V SEMESTER

2014 - 2015

DEPARTMENT OF CIVIL ENGINEERING

IV YEAR DEGREE COURSE

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WEEK DETAILS

SL.NO.	WEEK	FROM	TO
1	WEEK1	24-06-2014	27-06-2014
2	WEEK2	30-06-2014	04-07-2014
3	WEEK3	07-07-2014	11-07-2014
4	WEEK4	14-07-2014	18-07-2014
5	WEEK5	21-07-2014	25-07-2014
6	WEEK6	28-07-2014	01-08-2014
7	WEEK7	04-08-2014	08-04-2014
8	WEEK8	11-08-2014	14-08-2014
9	WEEK9	18-08-2014	22-08-2014
10	WEEK10	25-08-2014	28-08-2014
11	WEEK11	01-09-2014	05-09-2014
12	WEEK12	08-09-2014	12-09-2014
13	WEEK13	15-09-2014	19-09-2014
14	WEEK14	22-09-2014	26-09-2014
15	WEEK15	29-09-2014	01-10-2014
16	WEEK16	06-10-2014	10-10-2014
17	WEEK17	13-10-2014	17-10-2014
18	WEEK18	20-10-2014	24-10-2014
19	WEEK19	27-10-2014	31-10-2014

SUBJECT CONTENTS

SL.NO	SUBJECT CODE	SUBJECT NAME
THEORY		
1	CE2301	Irrigation engineering
2	CE2302	Structural analysis I
3	CE2303	Railways, airports and harbour engineering
4	CE2304	Environmental Engineering -I
5	CE2305	Foundation Engineering
6	CE 2306	Design Of RC Elements
PRACTICAL		
7	CE2307	Concrete And Highway Engineering Lab
8	CE2308	Soil Mechanics Laboratory
9	GE2321	Communication Skills

TEST / EXAM SCHEDULE

SL.NO	SUBJECT CODE	SUBJECT NAME	UNIT TEST I	UNIT TEST II	UNIT TEST III	UNIT TEST IV	UNIT TEST V
1	CE2301	Irrigation engineering	08/07/14 FN	30/07/14 FN	20/08/14 FN	09/09/14 FN	29/09/14 FN
2	CE2302	Structural analysis I	08/07/14 AN	30/07/14 AN	20/08/14 AN	09/09/14 AN	29/09/14 AN
3	CE2303	Railways, airports and harbour engineering	09/07/14 FN	31/07/14 FN	21/08/14 FN	10/09/14 FN	30/09/14 FN
4	CE2304	Environmental Engineering -I	09/07/14 AN	31/07/14 AN	21/08/14 AN	10/09/14 AN	30/09/14 AN
5	CE2305	Foundation Engineering	10/07/14 FN	01/08/14 FN	22/08/14 FN	11/09/14 FN	01/10/14 FN
6	CE 2306	Design Of RC Elements	10/07/14 AN	01/08/14 AN	22/08/14 AN	11/09/14 AN	01/10/14 AN

SL.NO	SUBJECT CODE	SUBJECT NAME	MODEL EXAM
1	CE2301	Irrigation engineering	13-10-2014
2	CE2302	Structural analysis I	14-10-2014
3	CE2303	Railways, airports and harbour engineering	15-10-2014
4	CE2304	Environmental Engineering -I	16-10-2014
5	CE2305	Foundation Engineering	17-10-2014
6	CE 2306	Design Of RC Elements	20-10-2014

CE2301 IRRIGATION ENGINEERING

WEEK 1

UNIT I INTRODUCTION

Irrigation – Need and mode of irrigation – Merits and demerits of irrigation – Crop and crop seasons.

WEEK 2

Consumptive use of water – Duty – Factors affecting duty – Irrigation efficiencies.

WEEK 3

Planning and Development of irrigation projects.

UNIT II UNIT TEST I IRRIGATION METHODS

Canal irrigation – Lift irrigation – Tank irrigation – Flooding methods

WEEK 4

Merits and demerits – Sprinkler irrigation – Drip irrigation.

WEEK 5

UNIT III DIVERSION AND IMPOUNDING STRUCTURES

Weirs – elementary profile of a weir

WEEK 6 UNIT TEST II

WEEK 7

Weirs on pervious foundations- Types of impounding structures

WEEK 8

- Gravity dams – Earth dams – Arch dams - Tanks, Sluices and Weirs.

WEEK 9

– Spillways – Factors affecting location and type of dams – Forces on a dam – Hydraulic design of dams.

WEEK 10 UNIT TEST III

UNIT IV CANAL IRRIGATION

Alignment of canals – Classification of canals – Canal drops —

WEEK 11

Hydraulic design of drops - Cross drainage works.

WEEK 12

Hydraulic design of cross drainage works – Canal Head works –
Canal regulators – River Training works.

WEEK 13

UNIT TEST IV

WEEK 14

UNIT V IRRIGATION WATER MANAGEMENT

Need for optimisation of water use – Minimising irrigation water losses – On farm development works – Percolation ponds.

WEEK 15

Participatory irrigation management – Water users associations.-
Changing paradigms in water management – Performance evaluation.

WEEK-17- UNIT TEST V

WEEK-18- MODEL EXAM

TEXT BOOKS

1. Asawa, g.l., “irrigation engineering”, new age international publishers, 2000
2. Punima B.C. & Pande B.B .Lal Irrigation and Water Power Engineering, Laxmi Publishing, New Delhi 2007
3. Michael, A.M, Irrigation Theory and Practical, Vikas Publishing Pvt Ltd, 2006
4. Gupta, B.L, & Amir Gupta, “Irrigation Engineering”, Satya Praheshan, New Delhi

CE 2302 STRUCTURAL ANALYSIS I– CLASSICAL METHODS

WEEK 1

UNIT I: DEFLECTION OF DETERMINATE STRUCTURES

Principles of virtual work for deflections

WEEK 2

Deflections of pin-jointed plane frames and rigid plane frames

WEEK 3

Willot diagram - Mohr's correction

WEEK 4 UNIT TEST I

UNIT II: MOVING LOADS AND INFLUENCE LINES

Influence lines for reactions in statically determinate structures – influence lines for members 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.

WEEK 5

Muller Breslau's principle – Influence lines for continuous beams and single storey rigid frames – Indirect model analysis for influence lines of indeterminate structures – Beggs deformeter.

WEEK 6 UNIT TEST II

UNIT III ARCHES CYCLE

Arches as structural forms – Examples of arch structures –

WEEK 7 Types of arches – Analysis of three hinged

WEEK 8

Two hinged and fixed arches, parabolic and circular arches.

WEEK 9

Settlement and temperature effects.

WEEK 10 UNIT TEST III

UNIT IV SLOPE DEFLECTION METHOD

Continuous beams and rigid frames (with and without sway) –

WEEK 11

Symmetry and antisymmetry.-- Support displacements.
Simplification for hinged end

WEEK 12 UNIT TEST IV

WEEK 13

MOMENT DISTRIBUTION METHOD

Distribution and carryover of moments

WEEK 14

UNIT V

– Stiffness and carry over factors – Analysis of continuous beams

WEEK 15

Plane rigid frames with and without sway - Naylor's simplification

WEEK 16

UNIT TEST V

WEEK 17

Model Exam

TEXT BOOKS

1. Vaidyanadhan, R and Perumal, P, “Comprehensive Structural Analysis – Vol. 1 & Vol. 2”, Laxmi Publications, New Delhi, 2003.
2. L.S. Negi & R.S. Jangid, “Structural Analysis”, Tata McGraw-Hill Publications, New Delhi, Sixth Edition, 2003.
3. Punmia B.C., Theory of Structures (SMTS) Vol II Laxmi Publishing Pvt ltd, New Delhi, 2004.
4. BhavaiKatti, S.S, Structural Analysis – Vol. 1 & Vol. 2, Vikas Publishing Pvt Ltd., New Delhi, 2008

CE 2303 RAILWAYS, AIRPORTS AND HARBOURS ENGINEERING

WEEK 1

UNIT I INTRODUCTION

Role of Indian Railways in National Development - Engineering Surveys for Track Alignment – Obligatory points - Conventional and Modern methods (Remote Sensing, GIS & GPS, EDM and other equipments) Permanent Way, its Components and Functions of each Component:

WEEK 2

Rails - Types of Rails, Rail Fastenings, Concept of Gauges, Coning of Wheels, Creeps and kinks Sleepers – Functions, Materials, Density Ballasts – Functions, Materials, Ballastless Tracks Geometric Design of Railway Tracks

WEEK 3

Gradients and Grade Compensation, Super-Elevation, Widening of Gauges in Curves, Transition Curves, Horizontal and Vertical Curves (Derivations of Formulae and Problems)

WEEK 4 UNIT TEST I

UNIT II RAILWAY TRACK CONSTRUCTION, MAINTENANCE AND OPERATION

Points and Crossings - Design of Turnouts, Working Principle, Signalling, Interlocking and Track Circuiting, Construction & Maintenance – Conventional, Modern methods and Materials, Track Drainage, Track Modernisation

WEEK 5

Automated maintenance and upgrading, Technologies, Re-laying of Track, Lay outs of Railway Stations and Yards, Rolling Stock, Tractive Power, Track Resistance, Level Crossings

WEEK 6 UNIT TEST II

WEEK 7

UNIT III AIRPORT PLANNING AND DESIGN

Advantages and Limitations of Air Transport, Components of Airports, Airport Planning – Air traffic potential, Site Selection, Design of Components, Cost Estimates, Evaluation and Institutional arrangements, Runway Design- Orientation, Cross wind Component, Wind rose Diagram (Problems), Geometric Design and Corrections for Gradients (Problems), Drainage

WEEK 8

Taxiway Design – Geometric Design Elements, Minimum Separation Distances, Design Speed, Airport Drainage, Airport Zoning - Clear Zone, Computer applications – Laying, jointing and testing of sewers – Sewer appurtenances – Pump selection.

WEEK 10 UNIT TEST III

UNIT IV AIRPORT LAYOUTS, VISUAL AIDS, AND AIR TRAFFIC CONTROL

Airport Layouts – Apron, Terminal Building, Hangars, Motor Vehicle Parking Area and Circulation Pattern, Case studies of Airport Layouts, Airport Buildings – Primary functions, Planning Concept, Principles of Passenger Flow, Passenger Facilities.

WEEK 11

Visual Aids – Runway and Taxiway Markings, Wind Direction Indicators, Runway and Taxiway Lightings, Air Traffic Control – Basic Actions, Air Traffic Control Network, Helipads, Hangars, Service Equipments.

WEEK 12

UNIT TEST IV

WEEK 13

Definition of Terms - Harbours, Ports, Docks, Tides and Waves, Littoral Drift, Sounding, Area, Depth, Satellite Ports, Requirements and Classification of Harbours, Site Selection & Selection Investigation – Speed of water, Dredging, Range of Tides, Waves and Tidal Currents

WEEK 14

UNIT V HARBOUR ENGINEERING & OTHER MODES OF TRANSPORT

, Littoral Transport with Erosion and Deposition, Soundings, Anchoring Grounds, Geological Characteristics, Winds & Storms, Position and Size of Shoals, Shore Considerations- Proximity to Towns/Cities, Utilities, Construction Materials, Coast Lines, Dry and Wet Docks

WEEK 15

Planning and Layouts, Entrance, Position of Light Houses, Navigating, Terminal Facilities – Port Buildings, Warehouse, Transit Sheds, Inter-modal Transfer Facilities, Mooring Accessories,

Navigational Aids, Coastal Structures- Piers, Breakwaters, Wharves, Jetties, Quays, Spring Fenders, Coastal Shipping, Inland Water Transport and Container Transportation.

Pipe Ways, Rope Ways,

WEEK-17- UNIT TEST V

WEEK-18- MODEL EXAM

TEXT BOOKS

1. Saxena Subhash C and Satyapal Arora, A Course in Railway Engineering, Dhanpat Rai and Sons, Delhi, 1998.
2. Khanna S K, Arora M G and Jain S S, Airport Planning and Design, Nemchand and Brothers, Roorkee, 1994.
3. S P Bindra, A Course in Docks and Harbour Engineering, Dhanpat Rai and Sons, New Delhi, 1993.

CE2304 ENVIRONMENTAL ENGINEERING

WEEK 1

UNIT I WATER SUPPLY SYSTEMS – SOURCE & CONVEYANCE

Objectives – Population forecasting – Design period – Water demand characteristics – Sources of water – Source selection

WEEK 2

Source selection – Water quality parameters & significance – Standards – Intake structures

WEEK 3

Conveyance – Hydraulics – Laying, jointing & testing of pipes – Pump selection – appurtenances.

WEEK 4 UNIT TEST I

UNIT II DESIGN PRINCIPLES OF WATER TREATMENT

WEEK 5

Softening – Demineralisation – Aeration – Iron removal – Defluoridation – Operation and Maintenance aspects - Residue Management.

Requirements – Components – Service reservoir design – Analysis of distribution network – Hardy Cross method – Equivalent Pipe method – computer application – Leak detection

WEEK 6 UNIT TEST II

WEEK 7 UNIT III SEWERAGE SYSTEM : COLLECTION & TRANSMISSION

Sources of wastewater – Quantity of sanitary sewage – Storm runoff estimation

WEEK 8

– Wastewater characteristics and significance – Effluent disposal standards of sewers.

WEEK 9

Approach Zone, Buffer Zone, Turning Zone, Clearance over Highways and Railways

WEEK 10 UNIT TEST III

UNIT IV SEWAGE TREATMENT & DESIGN PRINCIPLES

Objectives – Selection of unit operation and process – Design principles of primary and secondary treatment, screen chamber, grit chamber, primary sedimentation tanks, activated sludge process.

WEEK 11

Aeration tank & oxidation ditch – Trickling filter - Stabilisation ponds – Septic tanks with soak pits – Sludge: treatment and disposal – Biogas recovery – Sewage farming.

WEEK 12

UNIT TEST IV

WEEK 13

Objectives – Selection of unit operations and processes

WEEK 14

UNIT V DISPOSAL OF SEWAGE

– Principles of flocculation, sedimentation, filtration, disinfection – Design principles of flash mixer, flocculator, clarifiers, filters – Disinfection devices

WEEK 15

Streeter Phelp's model – Wastewater reclamation techniques - Wastewater reclamation techniques

WEEK-17- UNIT TEST V

WEEK-18- MODEL EXAM

TEXT BOOKS

1. Garg, S.K., Environmental Engineering, Vol.1 Khanna Publishers, New Delhi, 2005.

2. Modi, P.N. Water Supply Engineering, Vol. I Standard Book House, New Delhi, 2005.
3. Punmia, B.C., Ashok K Jain and Arun K Jain, Water Supply Engineering, Laxmi Publications (P) Ltd., New Delhi, 2005

CE2305 FOUNDATION ENGINEERING

WEEK 1

UNIT I SITE INVESTIGATION AND SELECTION OF FOUNDATION

Scope and objectives – Methods of exploration-averaging and boring – Water boring and rotatory drilling – Depth of boring – Spacing of bore hole - Sampling – Representative and undisturbed sampling

WEEK 2

Sampling techniques – Split spoon sampler, Thin tube sampler, Stationary piston sampler – Bore log report – Penetration tests (SPT and SCPT)

WEEK 3

Data interpretation (Strength parameters and Liquefaction potential) – Selection of foundation based on soil condition.

WEEK 4 UNIT TEST I

UNIT II SHALLOW FOUNDATION

Introduction – Location and depth of foundation – codal provisions – bearing capacity of shallow foundation on homogeneous deposits – Terzaghi's formula and BIS formula – factors affecting bearing capacity – problems - Bearing Capacity from insitu tests (SPT, SCPT and plate load) – Allowable bearing pressure.

WEEK 5

Settlement – Components of settlement – Determination of settlement of foundations on granular and clay deposits – Disposal on land – Disposal into water bodies – Oxygen sag curve. Allowable settlements – Codal provision – Methods of minimising settlement, differential settlement.

WEEK 6 UNIT TEST II

WEEK 7

UNIT III FOOTINGS AND RAFTS

Types of foundation – Contact pressure distribution below footings & raft - Isolated and combined footings – types

WEEK 8

Proportioning - mat foundation – types – use - proportioning – floating foundation.

WEEK 9

floating foundation

WEEK 10 UNIT TEST I

UNIT IV PILES

Types of piles and their function – Factors influencing the selection of pile – Carrying capacity of single pile in granular and cohesive soil - Static formula - dynamic formulae (Engineering news and Hiley's) – Capacity from insitu tests (SPT and SCPT).

WEEK 11

Negative skin friction – uplift capacity – Group capacity by different methods (Feld's rule, Converse Labarra formula and block failure criterion) – Settlement of pile groups – Interpretation of pile load test – Forces on pile caps – under reamed piles – Capacity under compression and uplift.

WEEK 12

UNIT TEST IV

WEEK 13

UNIT V RETAINING WALLS

Plastic equilibrium in soils – active and passive states – Rankine's theory – cohesionless and cohesive soil

WEEK 14

- Coloumb's wedge theory – condition for critical failure plane - Earth pressure on retaining walls of simple configurations

WEEK 15

Graphical methods (Rebhann and Culmann) - pressure on the wall due to line load – Stability of retaining walls.

WEEK 16 UNIT TEST V

WEEK 17

Model exam

TEXT BOOKS

1. Murthy, V.N.S, "Soil Mechanics and Foundation Engineering", UBS Publishers Distribution Ltd, New Delhi, 1999.
2. Gopal Ranjan and Rao, A.S.R. "Basic and Applied Soil Mechanics", Wiley Eastern Ltd., New Delhi (India), 2003

CE2306 DESIGN OF RC ELEMENTS

WEEK 1

UNIT I METHODS OF DESIGN OF CONCRETE STRUCTURES

Concept of Elastic method, ultimate load method and limit state method – Advantages of Limit State Method over other methods.

WEEK 2

Design codes and specification – Limit State philosophy as detailed in IS code – Design of flexural members and slabs by working stress method

WEEK 3

Principles of Design of Liquid retaining structures – Properties of uncracked section – Calculation of thickness and reinforcement for Liquid retaining structure.

WEEK 4 UNIT TEST I

UNIT II LIMIT STATE DESIGN FOR FLEXURE

Analysis and design of one way and two way rectangular slab subjected to uniformly distributed load for various boundary conditions and corner effects.

WEEK 5

Analysis and design of singly and doubly reinforced rectangular and flanged beams

WEEK 6 UNIT TEST II

WEEK 7

UNIT III LIMIT STATE DESIGN FOR BOND, ANCHORAGE SHEAR & TORSION

Behaviour of RC members in bond and Anchorage

WEEK 8

Design requirements as per current code - Behaviour of RC beams in shear and torsion.

WEEK 9

Design of RC members for combined bending shear and torsion.

WEEK 10 UNIT TEST III

UNIT IV LIMIT STATE DESIGN OF COLUMNS

Types of columns . raced and unbraced columns

WEEK 11

Types of columns – Braced and unbraced columns – Design of short column for axial, uniaxial and biaxial bending – Design of long columns.

WEEK 12

UNIT TEST IV

WEEK 13

UNIT V LIMIT STATE DESIGN OF FOOTING AND DETAILING

weirs on pervious foundations Design of wall footing – Design of axially and eccentrically loaded rectangular footing

WEEK 14

– Design of combined rectangular footing for two columns only

WEEK 15

Standard method of detailing RC beams, slabs and columns - Special requirements of detailing with reference to erection process.

WEEK 16

UNIT TEST V

WEEK 17

MODEL EXAM

TEXT BOOKS

1. Varghese, P.C., “Limit State Design of Reinforced Concrete”, Prentice Hall of India, Pvt. Ltd., New Delhi 2002.

2. 2. Krishna Raju, N., “Design of Reinforced Concrete Structures”, CBS Publishers & Distributors, New Delhi, 2003

CE2307 CONCRETE AND HIGHWAY ENGINEERING LAB

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 Elastics

III. TESTS ON BITUMEN

1. Penetration
2. Softening Point
3. Ductility
4. Viscosity
5. Elastic Recovery
6. Storage Stability

IV. TESTS ON AGGREGATES

1. Stripping
2. Soundness
3. Proportioning of Aggregates
4. Water Absorption

V. TESTS ON BITUMINOUS MIXES

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

CE2308 SOIL MECHANICS LABORATORY

1. Grain size distribution - Sieve analysis
2. Grain size distribution - Hydrometer analysis
3. Specific gravity of soil grains
4. Relative density of sands
5. Atterberg limits test
6. Determination of moisture - Density relationship using standard Proctor test.
7. Permeability determination (constant head and falling head methods)
8. Determination of shear strength parameters.
 1. Direct shear test on cohesionless soil
 2. Unconfined compression test on cohesive soil
 3. Triaxial compression test (demonstration only)
9. One dimensional consolidation test (Demonstration only)
10. Field density test (Core cutter and sand replacement methods)

GE2321 COMMUNICATION SKILLS LABORATORY

1. A batch of 60 / 120 students is divided into two groups – one group for the PC- based session and the other group for the Class room session.

The English Lab (2 Periods) will be handled by a faculty member of the **English Department**. The Career Lab (2

1. Periods) may be handled by any competent teacher, **not necessarily from English Department**

2. **Record Notebook:** At the end of each session of English Lab, review exercises are given for the students to answer and the computer evaluated sheets are to be compiled as record notebook. Similar exercises for the career lab are to be compiled in the record notebook.

3. **Internal Assessment:** The 15 marks (the other 5 marks for attendance) allotted for the internal assessment will be based on the record notebook compiled by the candidate. 10 marks may be allotted for English Lab component and 5 marks for the Career Lab component.

End semester Examination: The end-semester examination carries 40% weightage for English Lab and 60% weightage for Career Lab
