

SCHEME AND SYLLABI

FOR

FIFTH SEMESTER

OF

BACHELOR OF TECHNOLOGY

IN

CIVIL ENGINEERING

FROM 2009 ADMISSION ONWARDS

CALICUT UNIVERSITY (P.O), THENHIPALAM

UNIVERSITY OF CALICUT
CIVIL ENGINEERING
SCHEME OF STUDIES AND EXAMINATION AND SYLLABUS FOR
B. TECH DEGREE (FULL-TIME)
III to VIII SEMESTERS 2009 SCHEME

3rd Semester

Sl. No	Code	Subject	Hours / week			Marks		Sem-end Duration Hours	Credits
			L	T	P/D	Inte- rnal	Sem- end		
1	EN09 301	Engineering Mathematics III	3	1	-	30	70	3	4
2	EN09 302	Humanities and Communication Skills	2	1	-	30	70	3	3
3	CE09 303	Mechanics of Solids	4	1	-	30	70	3	5
4	CE09 304	Building Technology I	3	1	-	30	70	3	4
5	CE09 305	Surveying I	3	1	-	30	70	3	4
6	CE09 306	Engineering Geology	3	1	-	30	70	3	4
7	CE09 307(P)	Surveying Lab I	-	-	3	50	50	3	2
8	CE09 308(P)	Materials Testing Lab I	-	-	3	50	50	3	2
		Total	18	6	6				28

4th Semester

Sl. No	Code	Subject	Hours / week			Marks		Sem-end Duration Hours	Credits
			L	T	P/D	Inte- rnal	Sem- end		
1	EN09 401A	Engineering Mathematics IV	3	1	-	30	70	3	4
2	EN09 402	Environmental Studies	2	1	-	30	70	3	3
3	CE09 403	Fluid Mechanics	4	1	-	30	70	3	5
4	CE09 404	Structural Analysis I	3	1	-	30	70	3	4
5	CE09 405	Engineering Economics & Principles of Management	3	1	-	30	70	3	4
6	CE09 406	Surveying II	3	1	-	30	70	3	4
7	CE09 407(P)	Surveying Lab II	-	-	3	50	50	3	2
8	CE09 408(P)	Civil Engineering Drawing I	-	-	3	50	50	3	2
		Total	18	6	6				28

5th Semester

Sl. No	Code	Subject	Hours / week			Marks		Sem-end Duration Hours	Credits
			L	T	P/D	Inte- rnal	Sem- end		
1	CE09 501	Transportation Engineering I	4	1	-	30	70	3	5
2	CE09 502	Structural Design I	3	1	-	30	70	3	4
3	CE09 503	Open Channel Hydraulics & Hydraulic Machinery	3	1	-	30	70	3	4
4	CE09 504	Geotechnical Engineering I	3	1	-	30	70	3	4
5	CE09 505	Structural Analysis II	3	1	-	30	70	3	4
6	CE09 506	Building Technology II	2	1	-	30	70	3	3
7	CE09507(P)	Civil Engineering Drawing II	-	-	3	50	50	3	2
8	CE09 508(P)	Fluid Mechanics Lab	-	-	3	50	50	3	2
		Total	18	6	6				28

6th Semester

Sl. No	Code	Subject	Hours / week			Marks		Sem-end Duration s Hours	Credit
			L	T	P/D	Inte S - rnal end	em- end		
1	CE09 601	Hydrology & Irrigation Engineering	4	1	-	30	70	3	5
2	CE09 602	Structural Design II	3	1	-	30	70	3	4
3	CE09 603	Structural Analysis III	3	1	-	30	70	3	4
4	CE09 604	Geotechnical Engineering II	3	1	-	30	70	3	4
5	CE09 605	Transportation Engineering II	2	1	-	30	70	3	3
6	CE09 Lxx	Elective I	3	1	-	30	70	3	4
7	CE09607(P)	Geotechnical Engineering Lab	-	-	3	50	50	3	2
8	CE09608(P)	Materials Testing Lab II	-	-	3	50	50	3	2
		Total	18	6	6				28

Elective I

- CE09 L01 Advanced Mechanics of Materials
- CE09 L02 Traffic Engineering
- CE09 L03 Maintenance and Repair of Buildings
- CE09 L04 Computer Applications and Operations Research
- CE09 L05 Functional Design of Buildings

7th Semester

Sl. No	Code	Subject	Hours / week			Marks		Sem-end Duration Hours	Credits
			L	T	P/D	Inte S - rnal end	em- end		
1	CE09 701	Structural Design III	4	1	-	30	70	3	5
2	CE09 702	Design of Hydraulic Structures	2	-	2	30	70	3	4
3	CE09 703	Environmental Engineering I	2	1	-	30	70	3	3
4	CE09 704	Construction Engineering & Management	2	1	-	30	70	3	3
5	CE09 Lxx	Elective II	3	1	-	30	70	3	4
6	CE09 Lxx	Elective III	3	1	-	30	70	3	4
7	CE09 707(P)	Computer Applications Lab	-	-	3	50	50	3	2
8	CE09 708(P)	Environmental Engineering Lab	-	-	3	50	50	3	2
9	CE09 709(P)	Project	-	-	1	100	-	3	1
		Total	16	5	9				28

8th Semester

Sl. No	Code	Subject	Hours / week			Marks		Sem-end Duration Hours	Credits
			L	T	P/D	Inte S	em- nal end		
1	CE09 801	Environmental Engineering II	4	1	-	30	70	3	5
2	CE09 802	Quantity Survey & Valuation	2	1	-	30	70	3	3
3	CE09 Lxx	Elective IV	3	1	-	30	70	3	4
4	CE09 Lxx	Elective V	3	1	-	30	70	3	4
5	CE09 805(P)	Seminar	-	-	3	100	-	3	2
6	CE09 806(P)	Project	-	-	11	100	-	3	7
7	CE09 807(P)	Viva Voce	-	-	-	-	100	3	3
		Total	12	4	14				28

Electives for 7th and 8th Semesters

CE09 L06 Advanced Structural Design I
 CE09 L07 Advanced Structural Design II
 CE09 L08 Advanced Geotechnical Engineering I
 CE09 L09 Advanced Geotechnical Engineering II
 CE09 L10 Highway Pavement Design
 CE09 L11 Ecology and Environmental Chemistry
 CE09 L12 Industrial Structures
 CE09 L13 Structural Dynamics & Seismic Design
 CE09 L14 Soil Exploration, Testing and Evaluation
 CE09 L15 Surface Hydrology and Water Power
 CE09 L16 Urban Transportation Planning
 CE09 L17 Architecture and Town Planning
 CE09 L18 Advanced Construction Engineering and Management
 CE09 L19 Coastal Engineering & Marine Structures
 CE09 L20 Ground Water Hydrology
 CE09 L21 Ground Improvement Techniques
 CE09 L22 Environmental Pollution Control Engineering*
 CE09 L23 Experimental Stress Analysis*
 CE09 L24 Remote Sensing and GIS*
 CE09 L25 Finite Element Methods*

Global Electives

CS09 L24 Computer Based Numerical Methods
 PE09 L24 Industrial Psychology
 PE09 L25 Entrepreneurship
 ME09 L22 Quality Engineering and Management
 ME09 L25 Energy Engineering and Management
 ME09 L23 Industrial Safety Engineering
 AN09 L24 Project Management
 CH09 L24 Industrial Pollution Control
 EC09 L23 Data Structures and Algorithms
 EE09 L22 Soft Computing Techniques

CE09 501: TRANSPORTATION ENGINEERING I

Teaching Scheme

Credits: 5

4 hours lecture and 1 hour tutorial per week

Objective:

To equip the students to plan, and design various structures and traffic control devices coming under two modes of transportation viz: Highways and Airports.

Module I (16 hours)

Introduction – Role of transportation in society- Different modes of transport- Importance of roads in India- classification of roads - road patterns -typical cross sections of roads in urban and rural areas - requirements and factors controlling alignment of roads - engineering surveys for highway location.

Highway geometric design - pavement surface characteristics - camber and width requirements – sight distances - stopping and overtaking sight distances - overtaking zone requirements - design of horizontal alignment – speed – radius - super elevation - methods of providing super elevation - extra widening of pavements - transition curves - design of vertical alignment - gradient - grade compensation – summit curves and valley curves - worked out problems

Module II (22 hours)

Transportation Planning

Classification of transport technologies-inter modal co-ordination - ITS and automated highways – salient features of first, second and third and forth road development plans in India - planning surveys and master plan preparations - Expressways - case studies- Traffic Engineering:

Introduction - road user, vehicle and traffic characteristics - traffic engineering studies – speed – speed and delay - volume - origin and destination - parking and accident studies - worked out problems –

Road intersections- principles of design of at grade intersection - simple layouts

Traffic operation-Traffic control devices- classifications and uses of traffic signs and markings – traffic signals – signal co-ordination- design of isolated signals by Webster's method

Module III (20 hours)

Highway materials-Desirable properties and testing of highway materials –subgrade soil, road aggregates and bituminous materials

Highway Economics- Principles of economic evaluation – road user benefits - highway cost – economic evaluation by annual cost, benefit cost ratio and net present value method - worked out problems

Design of flexible and rigid pavements - IRC methods - worked out problems

Construction -- bituminous and cement concrete pavements

Failures in pavements - flexible and rigid pavements

Module IV (14 hours)

Airport planning and design:-

Introduction - aircraft characteristics and their influence on planning of airports - airport obstructions and zoning - component parts of airports and site selection - runway design - orientation - basic runway length - corrections and geometric design; design of taxiways and aprons – Controlling of air traffic-Operation of instrument landing system-terminal area planning concepts and its facilities - aircraft parking configurations - surface and subsurface drainage systems - worked out problems

Text books:

1. Khanna.S.K and Justo.C.E.G., Highway Engineering, Nemchand and Bros.
2. Khanna.S.K and Arora.M.G., Airport Planning and Design, Nemchand&Bros.

References:

1. Kadiyali.L.R., Traffic Engineering and Transportation planning, Khanna Publishers, New Delhi
2. Kadiyali.L.R., Principles of Highway Engineering, Khanna Publishers, New Delhi
3. Yoder and Witenzak, Principles of Pavement design, John Wiley and sons, New York
4. IRC 37-2001-Guide lines for flexible pavement design
5. National Transport Policy Committee Report, Planning Commission, New Delhi.
6. Vision 2021, Road Development Plan, IRC, New Delhi,
7. IRC 58-2002 Guide lines for rigid pavement design
8. O'Flaherty.C.A, Highway - Traffic Planning and Engineering, Edward Arnold London
9. Horonjoff.R, Planning and Design of Airports, Mcgraw Hill book

Internal work assessment (Maximum Marks – 30)

60%- Tests(minimum 2)

30%- Assignments (minimum2) such as home work, group discussions, quiz, literature survey, seminar, term-project..

10%- Regularity in the class.

University Examination pattern

PART A: Short answer questions

5×2 marks=10 Marks

All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

PART B: Analytical / Problem solving questions

4×5 marks=20 Marks

Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.

PART C: Descriptive/Analytical / Problem solving questions.

4×10 marks= 40 Marks

Two questions from each module with choice to answer one question.

Maximum Total marks: 70

CE09 502: STRUCTURAL DESIGN I

Teaching Scheme

Credits:

4

3 hours lecture and 1 hour tutorial per week

Objective

- To provide the students with the knowledge of the behaviour of reinforced concrete structural elements in flexure, shear, compression, tension and torsion, and to enable them to design such elements under various loads.

Module I (16 Hours)

Material strength and properties - grades of concrete and steel - characteristic strength and working strength - types of loads, characteristic loads, load combinations, - Working Stress Method of design of RC sections - principles, assumptions - durability and fire resistance - moment of resistance of singly and doubly reinforced rectangular and flanged sections - deflection criterion for flexural members - bond, flexural and anchorage bonds, development length - design of sections subjected to flexure, shear and torsion using Working Stress Method.

Module II (12 Hours)

Limit State Method of design of RC sections - principles and assumptions - partial safety factors - comparison with Working Stress Method, advantages - moment of resistance of singly and doubly reinforced rectangular and flanged sections - bond, flexural and anchorage bonds, development length, - design of sections subjected to flexure, shear and torsion using Limit State Method.

Module III (14 Hours)

Design and detailing of simply supported, cantilever and continuous RC beams - design and detailing of one way simply supported and continuous RC slabs - IS Code coefficients for continuous beams and slabs - design and detailing of two way RC slabs with various support conditions using IS Code coefficients. All designs shall be done by both Limit State and Working Stress Methods with greater importance attached to the former.

Module IV (12 Hours)

Design of stairs - general principles - design and detailing of various types of stairs - stairs with waist slab, stringer beam stairs, and stairs with cantilever steps - dog legged and folded plate stairs. Design and detailing of RC columns by Working Stress Method - general principles - axially loaded short and long columns – helically reinforced columns – short and long columns with eccentric loads – design and detailing of RC tension members by Working Stress Method.

Text Books

1. Pillai S. U. and Menon D., Reinforced Concrete Design, Tata McGraw Hill
2. Sinha S. N., Reinforced Concrete Design, Tata McGraw Hill
3. Varghese P. C., Limit State Design of Reinforced Concrete, Prentice Hall of India
4. Punmia B. C., Jain A. K. and Jain A. K., Limit State Design of Reinforced Concrete, Laxmi Publications (P) Ltd., 1st Edition, 2007.

Reference Books

1. Park and Paulay, Reinforced Concrete
2. Mallick S. K. and Gupta A. K., Reinforced Concrete, Oxford and IBH.
3. Jain A. K., Reinforced Concrete- Limit State Design, Standard Book House.
4. Jain and Jaikrishna, Plain and Reinforced Concrete Vol I, Nemchand
5. Sinha N. C. and Roy S. K., Fundamentals of Reinforced Concrete, S. Chand and Company Ltd.
6. Purushothaman, Behaviour, Analysis and Design of Reinforced Concrete Elements, Tata McGraw Hill.
7. Gambhir M. L., Design of Reinforced Concrete Structures, , Prentice Hall of India

Internal Continuous Assessment (Maximum Marks-30)

60% - Tests (minimum 2)

30% - Assignments (minimum 2) such as home work, problem solving, quiz, seminar, term-project, software exercises, etc.

10% - Regularity in the class

University Examination pattern

PART A: Short answer questions

5×2 marks=10 Marks

All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

PART B: Analytical / Problem solving questions

4×5 marks=20 Marks

Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.

PART C: Descriptive/Analytical / Problem solving questions

4×10 marks= 40 Marks

Two questions from each module with choice to answer one question.

The weightage for numerical questions may be modified

IS:456 and IS:875 are allowed to be used during examination

Maximum Total marks: 70

CE09 503: OPEN CHANNEL HYDRAULICS AND HYDRAULIC MACHINERY

Teaching scheme
3 hours lecture and 1 hour tutorial per week

Credits: 4

Objective:

- To learn, understand and develop concepts regarding the types of free surface flow and their applications in order to have adequate background for the design of various hydraulic structures.

Module I (14 hours)

Introduction: Difference between open channel flow and pipe flow. Types of channels- types of flow .Velocity distribution in open channels. Geometrical parameters of a channel. Qualification for uniform flow –Computation of uniform flow – Chezy's and Manning's equations . Determination of normal depth - Algebraic & Graphical method. Most efficient cross section- Rectangular – trapezoidal –triangular, circular cross section not flowing full. Conveyance – Hydraulic exponent N for uniform flow computation
Energy and Momentum Principles: Concept of specific energy, specific force, critical flow, critical depth critical velocity- hydraulic exponents M for critical flow. Application of specific energy principle - transitions in rectangular channel – problems. Metering flumes- venturi - standing wave - par shall.

Module II (13 hours)

Non uniform flow: gradually varied flow - basic assumptions - dynamic equation for gradually varied flow - different forms of the dynamic equation - characteristics of flow profiles in prismatic channels.
Back water curve: computation of length of back water curve - numerical integration – Standard step method- direct step method – computation of backwater profile using spreadsheet.
Stream flow measurement - gauges and recorders - determination of velocity of flow - measurement of discharge in rivers - area-velocity method - stage - discharge relation

Module III (13 hours)

Rapidly varied flow: characteristics of the flow - hydraulic jump - initial and sequent depths – nondimensional equation - practical application of hydraulic jump - types of jump in horizontal floor – basic characteristics of the jump - energy loss - efficiency - height of jump - jump as energy dissipater – stilling basins - jump position - tail water conditions - jump types - stilling basins of generalized design – rapidly varied unsteady flow – introduction to surges and types of shallow water waves (Numerical examples not expected)

Module IV (14 hours)

Hydraulic machines

Turbines: hydrodynamic force on plates - impact of jets - fixed and moving - flat and curved – velocity triangles - equation for power and work done - classification of turbines - components of Pelton wheel, Francis turbine, Kaplan turbine (Design is not expected) - specific speed - selection of turbines – penstock and surge tanks

Pumps: classification- NPSH – Selection of pumps

Rotodynamic pumps: types - volute and whirl pool chambers - velocity triangle for pumps – least starting speed - efficiency - specific speed - multistage pumps - operating characteristics of centrifugal pumps

Positive displacement pumps: reciprocating pump - types - work done - effect of acceleration and frictional resistance - slip and coefficient of discharge - separation in suction and delivery pipes – air vessel - gear pump

Deep well pumps: submersible, jet and airlift pumps - general principle of working - selection and installation of pumps

Text book:

Modi P.N. & Seth S.M., Hydraulics & Fluid Mechanics, Standard Book House

Reference books:

1. Subramanya K., Flow in Open Channels, Tata McGraw Hill
2. Hanif Choudhary M., Open Channel Flow, Prentice Hall of India
3. Chow V.T., Open Channel Hydraulics, McGraw Hill
4. Richard French H., Open Channel Hydraulics, McGraw Hill
5. Addison H., A Treatise on Applied Hydraulics, Asia Publishing House
6. Michael, Wells and Pumping Machinery

Internal work assessment (Maximum Marks – 30)

60%- Tests(minimum 2)

30%- Assignments (minimum 2) such as home work, group discussions, quiz, literature survey, seminar, term-project..

10%- Regularity in the class.

University Examination Pattern

PART A: Short answer questions (one/two sentences)

5 x 2 marks=10 marks

All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

PART B: Analytical/Problem solving questions

4 x 5 marks=20 marks

Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module. (20% to 30% numerical questions)

PART C: Descriptive/Analytical/Problem solving questions

4 x 10 marks=40 marks

Two questions from each module with choice to answer one question. (50% to 70% numerical questions)

Maximum Total Marks: 70

CE09 504: GEOTECHNICAL ENGINEERING I

Teaching Scheme

Credits: 4

3 hours lecture and 1 hour tutorial per week

Objectives

To equip the students to understand the properties and behavior of soil for the design of foundations, earth and earth retaining structures.

Module I (13hours)

Nature of soil and functional relationships: Formation of soils - Soil type - 3 phase system - void ratio - specific gravity - dry density - porosity - water content - saturated unit weight - submerged unit weight - degree of saturation – Soil Structure: single grained, honey combed, flocculated and dispersed structure and their effects on the basic soil properties.

Laboratory and field identification of soils: Determination of water content by oven drying – Specific gravity using pycnometer and specific gravity bottle - Grain size analysis by sieve analysis, hydrometer analysis and pipette analysis - Atterberg limits and indices – Visual identification by simple field tests – Field density by core cutter, sand replacement and wax coating methods

Classification of soils: Necessity - Principles of classification - I.S. classification – Plasticity charts – Group index

Module II (15 hours)

Soil water: Modes of occurrence – adsorbed and capillary water types - Total stress - Effective stress – Pore pressure - Pressure diagrams

Permeability: Definition - Darcy's law - Factors affecting permeability – Laboratory determination - Stratified soils : average permeability.

Shear Strength: Definition - Mohr's strength and stress circles - origin of planes - Mohr's envelope - Mohr- Coulomb strength theory –Direct shear test – triaxial shear test - drainage conditions – UU, CU and CD tests - Measurement of pore pressure -Total and effective stress strength parameters - UCC test - Vane shear tests - Choice of test conditions for field problems.

Module III (14 hours)

Consolidation: Definition –Spring analogy for primary consolidation - Terzaghi's theory of one dimensional consolidation – Concepts of coefficient of compressibility - Coefficient of volume change and compression index – Laboratory consolidation test - e-log p curves - pre-consolidation pressure - Time rate of consolidation - difference between consolidation and compaction

Compaction: Definition and objectives of compaction – Standard and Modified Proctor tests - Concept of OMC and maximum dry density - Zero air voids line - Factors influencing compaction - Effect of compaction on soil properties - Field compaction methods - Proctor needle for field control.

Module IV (12 hours)

Earth pressure: Earth pressure at rest - Active and passive earth pressure for cohesionless and cohesive soils - Rankine's and Coulomb's theories - Point of application of earth pressure for cases of with and without surcharge in cohesionless and cohesive soils - Culmann's and Rebhan's graphical construction for active earth pressure-

Stability of slopes: Slope failure, base failure and toe failure - Swedish circle method – $\Phi = 0$ analysis and $c = 0$ analysis - Friction circle method - Taylor's stability number -Stability charts.

Text Books

1. Arora K. R., Soil Mechanics & Foundation Engineering, Standard Publications, 1987.
2. Punmia B. C., Soil Mechanics & Foundations, Laxmi Publications, 1988
3. Murthy V. N. S., Soil Mechanics & Foundation Engineering, Dhanpat Rai, 1996

Reference Books

1. Terzaghi K. & Peck R.B., Soil Mechanics in Engineering Practice, John Wiley & Sons, US, 1967.
2. Venkatramiah C., Geotechnical Engineering, New Age International Publishers, 2006
3. Gopal Ranjan & Rao A. S. R., Basic & Applied Soil Mechanics, New Age International Publishers, 2000
4. Khan I.H., Text Book of Geotechnical Engineering, Prentice Hall of India
5. Cudoto, Geotechnical Engineering Principles and Practices, Pearson Education, 2007

Internal work assessment (Maximum Marks – 30)

60%- Tests(minimum 2)

30%- Assignments (minimum 2) such as home work, group discussions, quiz, literature survey, seminar, term-project..

10%- Regularity in the class.

University Examination pattern

PART A: Short answer questions

5×2 marks=10 Marks

All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

PART B: Analytical / Problem solving questions

4×5 marks=20 Marks

Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.

PART C: Descriptive/Analytical / Problem solving questions.

4×10 marks= 40 Marks

Two questions from each module with choice to answer one question.

Maximum Total marks: 70

CE09 505 STRUCTURAL ANALYSIS II

Teaching scheme

Credits: 2

3 hours lecture and 1 hour tutorial per week

Objectives

- To equip the students with the force and displacement methods of structural analysis with emphasis on analysis of rigid frames and trusses

Module I (17 Hours)

Slope Deflection Method and Moment Distribution Method

Review of force method and displacement methods of analysis

Slope Deflection method - analysis of continuous beams - beams with overhang - analysis of rigid frames - frames without sway and with sway - different types of loads - settlement effects

Moment Distribution method – analysis of beams and frames – non sway and sway analysis – frames with sloping legs – gabled frames

Module II (13 Hours)

Clapeyrons Theorem (Three Moment Equation) and Kani's Method

Derivation of three moment equation - application of three moment equation for analysis of continuous beams under the effect of applied loads and uneven support settlement.

Kani's Method of analysis applied to continuous beams and rigid frames of different geometry - frames without sway and with sway.

Module III (13 Hours)

Approximate Methods of Analysis of Multistoried Frames

Analysis for vertical loads-substitute frames-loading condition for maximum hogging and sagging moments in beams and maximum bending moment in columns - wind load analysis of multistoried frames – portal method and cantilever method for lateral load analysis.

Module IV (11 Hours)

Plastic Theory

Introduction – plastic hinge concept – plastic modulus – shape factor – redistribution of moments – collapse mechanisms – plastic analysis of beams and portal frames by equilibrium and mechanism methods.

Text Books:

1. R.Vaidyanathan and P.Perumal, Comprehensive Structural Analysis Volume I & II, Laxmi Publications (P) Ltd.
2. Hibbeler, RC, Structural analysis, Pearson Education
3. Daniel L Schodak, Structures, Pearson Education
4. Reddy . C.S., Basic Structural Analysis, Tata McGraw Hill
5. S.S. Bhavikatti, Structural Analysis, Vikas Publication Houses (P) Ltd

Reference Books:

1. Wang C. K., Intermediate Structural Analysis, Tata McGraw Hill
2. Wilbur J. B. & Norris C. H., Theory of Structures, McGraw Hill
3. Timoshenko S. P. and Young D. H., Theory of Structures, McGraw Hill
4. Kinney J. S., Indeterminate Structural Analysis, Oxford & IBH
5. Negi L. S. and Jangid R. S., Structural Analysis, Tata McGraw Hill
6. Rajasekaran S. and Sankarasubramanian G., Computational Structural Mechanics, PHI
7. SP:6 (6): Application of Plastic Theory in Design of Steel Structures
8. Ghali A. and Neville A. M, Structural Analysis – A Unified and Matrix Approach, Chapman and Hall, 3rd edition 1989
9. Prakash Rao D. S., Structural Analysis – A Unified Approach, Universities Press

Internal Continuous Assessment (Maximum Marks-30)

60% - Tests (minimum 2)

30% - Assignments (minimum 2) such as home work, problem solving, group discussions, quiz, literature survey, seminar, term-project, software exercises, etc.

10% - Regularity in the class

University Examination pattern

PART A: Short answer questions

5×2 marks=10 Marks

All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

PART B: Analytical / Problem solving questions

4×5 marks=20 Marks

Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.

PART C: Analytical / Problem solving questions.

4×10 marks= 40 Marks

Two questions from each module with choice to answer one question.

Maximum Total marks: 70

CE09 506: BUILDING TECHNOLOGY –II

Teaching Scheme

Credits: 3

2 hours lecture and 1 hour tutorial per week

Objective:

- To impart the basic concepts in functional requirements of building and building services.
- To develop understanding about framed construction, building failures and earth quake resistant construction.

Module I (9 hours)

Multi-storeyed Buildings – Framed building – steel and concrete frame – structural systems – erection of steel work – bolting, riveting, welding –concrete framed construction – reinforcement – concreting of columns, beams, slabs and stairs – formwork – contraction and expansion joints – introduction to prefabricated construction – slip form construction. Vertical transportation – Elevators – types – terminology – passenger, service and goods elevators – design considerations for passenger elevators – handling capacity – arrangement and positioning of lifts – escalators – features –use of ramps.

Module II (7 hours)

Fire safety – Fire resistant construction – fire load – fire resisting properties of materials – precautionary measures against origin and spread of fire – Alarm systems – hydrants – sprinklers - fire escape – requirements of high rise construction
Plumbing services – Typical details of water supply and sewage disposal for single and multistoreyed buildings – systems of plumbing - standard requirements.

Module III (10 hours)

Thermal control – Thermal comfort of human beings –human body's thermal balance and heat loss; Thermal control of buildings- insulation – principles - materials – methods of thermal insulation – insulation by orientation and shading – Features of tropical climate. Ventilation – functions – provisions for ventilation – orientation – external features – cross ventilation – openings - mechanical ventilation systems – summer and winter air conditioning – introduction to different types of air-conditioning systems.
Lighting – photometric quantities – types of visual tasks -lighting requirements of various buildings- day lighting -day light factor – need for artificial lighting .
Acoustics – Introduction – criteria for acoustic environment – sound – control, insulation, and isolation – Acoustic materials and methods of fixing – acoustic requirement of auditorium.

Module IV (10 hours)

Introduction to Cost-effective construction - principles of filler slab and rat-trap bond masonry
Building failures – General reasons – classification – Causes of failures in RCC and Steel structures – Foundation failure – failures by alteration, improper maintenance, overloading – Fire, Wind and Earthquake.
Earthquake resistant construction (Reference no. 7 and 8) – (only construction aspects are to be covered and detailed designs not contemplated) – principles – lightness – continuity – suspended parts. Building configuration – strength in various directions – foundations – ductility. Seismic strengthening of masonry and earthen structures – band reinforcing- buttressing.

Text books:

1. Koenigsberger. Manual of tropical housing and building Part I – Climate Design. Orient Longman.
2. Punmia B.C, Building construction. Laxmi Publications
3. Arora and Bindra, Building construction, Dhanpath Rai and Sons.
4. Rangwala, S C Building Construction, Charotar Publishing House

References:

1. Smith P & Julian W. Building services, Applied Science Pub.
2. Mcking T.M, Building Failures, Applied Science Pub.
3. Huntington W.C., Building construction, John Wiley.
4. Narasimhan V, Introduction to Building Physics.
5. Adler R, Vertical Transportation for Building, American Elsevier Pub.
6. Bureau of Indian Standards , National Building Code of India, 2005
7. Code of practice for earthquake resistant design and construction of buildings, IS:4326-1993
8. Hand book on building construction practices – BIS, SP 62 (S&T) – 1997
9. Tall building systems & concepts, Monograph on planning and design of Tall building, council on Tall buildings and Urban Habitat.
- 10 Patil, S.M., Building Services, Sachin Printers, Mumbai

Internal Continuous Assessment (Maximum Marks-30)

60% - Tests (minimum 2)

30% - Assignments (minimum 2) such as home work, problem solving, quiz, seminar, term-project, software exercises, etc.

10% - Regularity in the class

University Examination pattern

PART A: Short answer questions

5×2 marks=10 Marks

All questions are compulsory. There should be at least one question from each module and not more than two questions from any module.

PART B: Analytical / Problem solving questions

4×5 marks=20 Marks

Candidates have to answer four questions out of six. There should be at least one question from each module and not more than two questions from any module.

PART C: Descriptive/Analytical / Problem solving questions

.4×10 marks= 40 Marks

Two questions from each module with choice to answer one question.

Maximum Total marks: 70

CE09 507(P): CIVIL ENGINEERING DRAWING II

Teaching scheme

Credits :

2

3hours / week

Objective

- To make the students to be able to plan and draw different views of Building according to State Building rules.
- To make the students to draw different views of Building in drafting packages.
- (The student is expected to know the local building rules and National Building Code provisions. After the course, the student should be in a position to prepare building sketches for the clients and submission drawings for approval. Each student shall complete a term project in tracing paper).

Module 0: (8 Hours).

- Prepare Building Drawings with specification in any popular drafting software

Module I: (34 hours) Planning from given requirements of areas and specifications and preparation of Sketch & working drawings for :

- Different types of residential buildings- Single and two storied with RCC (flat & sloped) roof, Two storied Flats. (4 sheets)
- Planning of simple tile roof building. (2 sheets)
- Variety of Public Buildings- Small public utility shelters, dispensaries, libraries, schools, banks, hostels, offices, factories etc. (5 sheets)

Module II (12 hours)

1. Preparation of site plan and service plans as per building rules. (2 sheets)
2. Building Services (for single and two storied buildings only). (1 sheet)
3. Septic tanks and soak pit detailed drawing. (1 sheet)

Assignment : Plan and draw all the views of a Single Storied Building with all details in any popular drafting package as per prevailing building rules on any fictitious plot.

Reference Books:

1. National Building Code of INDIA
2. Kerala Building rules
3. Balagopal T.S. Prabhu, Building drawing and detailing, Spades Publishers
4. Shah and Kale ,Building Drawing, Tata McGraw Hill

Internal assessment

Any 10 Sheets – 20 marks

Assignment - 15 marks

Test - 10 marks

Regularity - 5 marks

CE09 508(P): FLUID MECHANICS LABORATORY

Teaching scheme
3 hours practical per week

Credits: 2

Group A

1. Study of instruments: pressure gauge - piezometer - manometer-pressure transducers - pilot tubes - current meter.
2. Demonstration: Bernoulli's theorem - phreatic lines - fluming horizontally and vertically
3. Steady flow through pipes: determination of friction factor for various types of pipes
4. Orifices and mouthpieces: various types-steady case
5. Notches and weirs: various types-steady case
6. Time of emptying: unsteady flow
7. Discharge measurements: venturimeter - venturi flume - orifice meter - water meter

Group B

8. Open channel flow: determination of Manning's coefficient
9. Plotting the specific energy curve
10. Tracing back water profiles / draw down profiles
11. Hydraulic jump parameters

Group C

12. Study of pelton wheel - Francis-Kapalan turbines
13. Study of centrifugal - reciprocating - jet and deep well pumps
14. Calibration of pressure gauge.
15. Air flow measurement using air blowers.

Internal Continuous Assessment (Maximum Marks-50)

60%-Laboratory practical and record
30%- Test/s
10%- Regularity in the class

Semester End Examination (Maximum Marks-50)

70% - Procedure, conducting experiment, results, tabulation, and inference
20% - Viva voce
10% - Fair record