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27.5.2009

UNIVERSITY OF MUMBAI



Revised Syllabus for the
Third Year Civil Engineering
(Semester V & VI)

Rizvi College of Engineering
(With effect from the academic year 2009-2010)

UNIVERSITY OF MUMBAI
SCHEME OF INSTRUCTIONS AND EXAMINATION
(RR-2007)

THIRD YEAR ENGINEERING: (Civil Engineering)

Semester V

	Subjects	No. of periods per week (60 minutes each)			Duration of theory paper (hours)	Marks				
		Lecture	Practical	Tutorial		Theory Paper	Term Work	Practical	Oral	Total
1.	Structural Analysis-II*	4	-	2	3	100	25	-	25	150
2.	Geotechnical Engineering-I*	4	2	-	3	100	25	25	-	150
3.	Building Design and Drawing-II*	2	3	-	4	100	50	25@	-	175
4.	Applied Hydraulics-I	4	2	-	3	100	25	-	-	125
5.	Transportation Engineering-I*	4	-	2	3	100	25	-	-	125
6.	Entrepreneurship and Management	3	-	2	3	100	25	-	-	125
Total		21	7	6	-	600	175	50	25	850

* Common to Construction Engineering.

@ Oral and sketching

Semester - VI

	Subjects	No. of periods per week (60 minutes each)			Duration of theory paper (hours)	Marks				
		Lecture	Practical	Tutorial		Theory Paper	Term Work	Practical	Oral	Total
1.	Geotechnical Engineering-II *	4	2	-	3	100	25	-	25	150
2.	Design & Drawing of Steel Structures	4	-	2	4	100	25	-	25@	150
3.	Applied Hydraulics-II	3	2	-	3	100	25	-	25	150
4.	Transportation Engineering-II*	4	2	-	3	100	25	-	25	150
5.	Environmental Engineering-I	4	2	-	3	100	25	-	-	125
6.	Theory of Reinforced and Prestressed Concrete	4	-	2	3	100	25	-	-	125
Total		23	8	4	-	600	150	-	100	850

* Common to Construction Engineering

@ Oral and sketching

Rizvi College of Engineering

Class:-T E(Civil/Construction.)		Semester VI	
Subject:-Geotechnical Engineering - II			
Periods/week – each Period of 60 minutes duration	Lecture	04	
	Practical	02	
	Tutorial	-	
		Hours	Marks
Evaluation System	Theory Examination	03	100
	Practical	-	-
	Oral	-	25
	Term Work	-	25
	Total		150

Detailed Syllabus

Module	Topics	No. of Lectures
1.	Stability of slopes Introduction, different factors of safety, types of slope failures, analysis of finite and infinite slopes, wedge failure, Swedish circle method, friction circle method, stability numbers and charts.	05
2.	Lateral earth pressure theories i Introduction: applications of earth pressure theories, different types of earth pressures - at rest, active and passive pressures ii Rankine's earth pressure theory: Rankine's earth pressure theory, active earth pressure and passive earth pressure for horizontal and inclined backfill including the direction of failure planes for cohesionless and cohesive soils. iii Coulomb's wedge theory: Coulomb's active pressure in cohesionless soils, expression for active pressure, Coulomb's passive earth pressure. iv Rebhann's construction for active pressure, Culmann's graphical solutions for active wedge method, passive pressure by friction circle method for cohesionless and cohesive soils.	10
3.	Earth retaining structures Rigid and flexible retaining structures, stability analysis of retaining walls, cantilever retaining walls, deflection, bending moment and earth pressure diagrams for cantilever sheet piles, computation of embedment depth, construction details, drainage and wall joints.	05
4.	Bearing capacity of shallow foundations i Definitions of ultimate bearing capacity, gross, net and safe pressures, allowable bearing pressure, types of shallow foundations, modes of failures. ii Bearing capacity theories: Rankine's approach, Prandtl's approach and Terzaghi's approach, concept behind derivation of equation, general bearing capacity equation, bearing capacity equations for square and circular footings, factors influencing bearing capacity, performance of footings in different soils, Vesic's chart, ultimate bearing capacity in case of local shear failure.	12

	iii Plate load test in detail with reference to IS 1888 and its applications and estimation of settlements, bearing capacity based on standard penetration test.	
5.	Axially loaded pile foundations i Introduction to pile foundations, necessity of pile foundation, classification of piles, construction methods of bored piles, concrete bored piles, driven cast in-situ piles. ii Pile capacity based on static analysis, piles in sand, piles in clay, dynamic methods and their limitations, in-situ penetration tests and pile load test as per IS 2911 specifications, negative skin friction. iii Pile groups, ultimate capacity of groups, settlement of pile groups in sand and in clays as per IS 2911 and critical depth method.	06
6.	Underground conduits Classes of underground conduits, load on a ditch conduit, settlement ratio, ditch condition and projection condition, imperfect ditch conduit.	03
7.	Open cuts Difference in open cuts and retaining walls, apparent pressure diagrams, average apparent pressure diagrams for sand, soft and stiff clay, estimation of loads on struts.	03
8.	Reinforced soil The mechanism, reinforcement (elements), reinforced-soil interaction, applications, reinforced soil embankments, simple problems.	04

Theory Examination:-

1. Question paper will consist of total seven questions carrying 20 marks each.
2. Only five questions need to be attempted.
3. Question number 1 will be compulsory and based on maximum part of the syllabus.
4. Remaining questions will be mixed in nature.
5. In question paper weightage of each module may be proportional to the number of respective lecture hours as mentioned in the syllabus.

Oral Examination:-

Oral examination will be based on entire syllabus.

List of practicals: (At least six to be performed)

1. Consolidation test
2. Triaxial test (UU)
3. Direct shear test
4. Unconfined compression strength test
5. California bearing ratio test
6. Vane shear Test
7. Determination of free swell index

Application of the test performed to foundation problems should be demonstrated by solving at least two problems using data from the test conducted.

Termwork:-

Each student has to appear for at least one written test during the term. Report on experiments performed as detailed above, assignments including 10 problems and the graded answer paper for the term test shall be submitted as term work

The distribution of term work marks will be as follows:

Report on experiments performed and assignments	:	10 marks
Written test (at least one)	:	10 marks
Attendance (Theory and Practical)	:	05 marks

The final certification and acceptance of term work ensures the satisfactory performance of laboratory work and at least minimum passing in the term-work.

Recommended Books:-

1. Soil Engineering in Theory and Practice: Alam Singh, CBS Publishers & distributors, New Delhi
2. Soil Mechanics and Foundation Engineering: V. N. S. Murthy, Saitech Publications
3. Soil Mechanics and Foundation Engineering: K. R. Arora, Standard Publishers and Distributors, New Delhi
4. Soil Mechanics in Engineering Practice: K. Terzaghi and R. B. Peck, II Edn.
5. Foundation Engineering: R. B. Peck, W. E. Hansen & T. H. Thornburn, Wiley Eastern
6. Design aids in Soil Mechanics and Foundation Engineering: S. R. Kaniraj, Tata McGraw Hill, New Delhi
7. Foundation Design Manual: N. V. Nayak, Dhanpat Rai Publications, New Delhi
8. Relevant Indian Standard Specifications & Codes, BIS Publications, New Delhi.

Rizvi College of Engineering

Class:-T E (Civil)		Semester VI	
Subject:-Design & Drawing of Steel Structures			
Periods/week – each Period of 60 minutes duration	Lecture	04	
	Practical	-	
	Tutorial	02	
		Hours	Marks
Evaluation System	Theory Examination	04	100
	Practical	-	-
	Oral & Sketching	-	25
	Term Work	-	25
	Total		150

Detailed Syllabus

Module	Topics	No. of Lectures
1	Introduction to types of steel, mechanical properties of steel, advantages of steel as structural material, design philosophies of Working Stress Method (WSM) and Limit State Method (LSM)	02
2	Limit state method, limit state of strength and serviceability (deflection, vibration, durability, fatigue, fire), characteristics and design loads, Classification of cross section- plastic, compact, semi-compact and slender, limiting width to thickness ratio.	07
3	Design of tension members with welded / bolted end connections using single and double angle sections by LSM, design strength due to- yielding of gross section, rupture of critical section and block shear.	05
4	Design of compression members with welded / bolted end connections using single and double angle by LSM, design strength, effective length of compression members.	04
5	Design of columns with single and built-up sections, design of lacing and batten plates with bolted and welded connections using LSM, column buckling curves, effective length, slenderness ratio, limiting values of effective slenderness ratio, buckling class of various cross sections.	04
6.	Design of slab base and gusseted base using bolted and welded connection by LSM, effective area of a base plate.	04
7.	Design of members subjected to bending by LSM, design strength in bending, effective length, laterally supported and unsupported beams, single and built-up rolled steel sections using bolted and welded connections, shear lag effect, design for shear, web buckling and web crippling	08
8.	Introduction to bolted and welded connections by LSM, beam to beam and beam to column connections, design of simple framed, unstiffened and stiffened seat connections.	09
9.	Truss: Determinate truss, imposed load on sloping roof, wind load on sloping roof and vertical cladding including effect of permeability and wind drag, analysis of pin jointed trusses under various loading cases, design and detailing of member end connections and supports, design of purlins, wind bracing for roof system.	05

Theory Examination:-

1. Question paper will consist of total seven questions carrying 20 marks each.
2. Only five questions need to be attempted.
3. Question number 1 will be compulsory and based on maximum part of the syllabus.
4. Remaining questions will be mixed in nature.
5. In question paper weightage of each module may be proportional to the number of respective lecture hours as mentioned in the syllabus.

Oral and Sketching Examination:-

Oral and sketching examination will be based on entire syllabus.

Term work:

The Term work shall consist of a Design report and detailed drawings on two projects as indicated below:

- i. Roofing system including details of supports.
- ii. Flooring system including Columns.

The drawing should be drawn in pencil only on minimum of A-1 (imperial) size drawing sheets. Each student has to appear for at least one written test during the term. Solution of at least 15 problems with neat sketches wherever necessary and graded answer paper shall be submitted as term work.

The distribution of term work marks will be as follows:

Drawing sheets and assignments	10 marks
Written test (at least one)	10 marks
Attendance (Practical and theory)	05 marks

The final certification and acceptance of term work ensures the satisfactory performance of laboratory work and at least minimum passing in the term-work.

Recommended Books:

1. Design of Steel Structures: Arya and Ajmani, Nemchand Brothers.
2. Design of Steel Structures, Vol I and Vol II: Ramchandra, Standard Book House
3. Design of Steel Structures: Punamia, Jain, Laxmi Publications
4. Design of Steel Structures, Third Edition: Edwin H. Gaylord, Charles N. Gaylord and James E. Stallmeyer, McGraw-Hill, 1992.
5. Design of Steel Structures: Mac. Ginely T.
6. Design of Steel Structures: N. Subramanian, Oxford.
7. LRFD Steel Design, Second Edition: William T. Segui, PWS Publishing, 1999.
8. Structural Steel Design, LRFD Method, Third Edition: Jack C. McCormac and James K. Nelson, Jr., Prentice Hall, 2003.
9. Steel Structures Design and Behavior, Fourth Edition: Charles G Salmon and John E. Johnson, Harper Collins, 1996.
10. Design of Steel Structures: Syal and Satinder Singh Standard Publishers
11. Design of Steel Structures: Dayaratnam, Wheeler Publication.
12. Behaviour of Structures: Engerlink.
13. Relevant IS codes, BSI Publications, New Delhi

Class:-T E (Civil)		Semester VI	
Subject:-Applied Hydraulics - II			
Periods/week – each	Lecture	03	
Period of 60 minutes duration	Practical	02	
	Tutorial	-	
		Hours	Marks
Evaluation System	Theory Examination	03	100
	Practical	-	-
	Oral	-	25
	Term Work	-	25
	Total	-	150

Detailed Syllabus

Module	Topics	No. of Lectures
1	Boundary layer theory: Development of boundary layer over flat and curved surfaces, laminar and turbulent boundary layer, boundary layer thickness, displacement thickness, momentum thickness, energy thickness, drag force on a flat plate due to a boundary layer, turbulent boundary layer on a flat plate, analysis of turbulent boundary layer, total drag on a flat plate due to laminar and turbulent boundary layer, boundary layer separation and control.	6
2	Flow around submerged bodies: Force exerted by a flowing fluid on a stationary body, expression for drag and lift, drag on a sphere, terminal velocity of a body, drag on a cylinder, development of a lift on a circular cylinder, development of a lift on an airfoil.	6
3	Flow through open channel: i. Classification. ii. Uniform flow, Chezy's formula, Manning's formula, Prismatic and non-prismatic channels, hydraulically efficient channel cross-section, Velocity distribution in open channels, pressure distribution in open channels, Applications of Bernoulli's equation to open channel flow. iii. Non - uniform flow, Specific energy, Discharge curve, Dimensionless specific energy and discharge curve, applications of specific energy, Momentum principle, application to open channel flow, specific force, small waves and surges in open channels, gradually varied flow, control section, hydraulic jump, location of hydraulic jump.	18
4	Irrigation channels (silt theories): Kennedy's theory, Kennedy's methods of channel design, silt supporting capacity according to Kennedy's theory, drawbacks in Kennedy's theory, Lacey's regime theory, Lacey's theory applied to channel design, comparison of Kennedy's and Lacey's theory, defects in Lacey's theory.	6

Theory Examination:-

1. Question paper will consist of total seven questions carrying 20 marks each.
2. Only five questions need to be attempted.
3. Question number 1 will be compulsory and based on maximum part of the syllabus.
4. Remaining questions will be mixed in nature.
5. In question paper weightage of each module may be proportional to the number of respective lecture hours as mentioned in the syllabus.

Oral Examination:-

Oral examination will be based on entire syllabus.

List of practicals:- (At least six to be performed)

1. Chazy's roughness factor
2. Study of gradually varied flow
3. Hydraulic jump
4. Calibration of venturimeter
5. Calibration of standing wave flume
6. Boundary Layer
7. Studies in Wind Tunnel
8. Calibration of Broad crested / submerged weir

Term work:

Each student has to appear for at least one written test during the term. Report on experiments performed as detailed above, assignments including 15 problems and the graded answer paper for the term test shall be submitted as term work

The distribution of term work marks will be as follows:

Report of experiments and assignments	: 10 marks
Written test (at least one)	: 10 marks
Attendance (Theory and Practical)	: 05 marks

The final certification and acceptance of term work ensures the satisfactory performance of laboratory work and at least minimum passing in the term-work.

Recommended Books:

1. Hydraulics and Fluid Mechanics: Modi P.M. and Seth S.M., Standard Book House
2. Theory and Applications of Fluid Mechanics: Subramanaya K., Tata McGraw Hill.
3. Fluid Mechanics: Dr. Jain A.K., Khanna Publishers.
4. Fluid Mechanics: Nagarathnam S., Khanna Publishers.
5. Flow in Open Channels: Subramanya K., Tata McGraw Hill.
6. Irrigation and Water Power Engineering: B.C.Punmia., Standard Publishers
7. Irrigation Engineering and Hydraulic Structures: S.K.Garg, Khanna Publishers

Class:-T E(Civil/Construction.)		Semester VI	
Subject:-Transportation Engineering - II			
Periods/week – each	Lecture	04	
Period of 60 minutes duration	Practical	02	
	Tutorial	-	
		Hours	Marks
Evaluation System	Theory Examination	03	100
	Practical	-	-
	Oral	-	25
	Term Work	-	25
	Total		150

Detailed Syllabus

Module	Topics	No. of Lectures
01	<p>Highway Planing</p> <p>i Classification of roads, brief history of road developments in India, present status of roads in India</p> <p>ii Highway alignment, basic requirement of ideal alignment, factors governing highway alignment</p> <p>iii Highway location survey, map study, reconnaissance, topographic surveys, highway alignment in hilly area, drawing and report preparation</p>	03
02	<p>Geometric design of highway</p> <p>i Terrain classification, vehicular characteristics, highway cross section elements, salient dimensions, clearances, width of carriage way, shoulders, medians, width of road way, right of way, camber and its profile.</p> <p>ii Design speed, sight distance, perception time, break reaction time, analysis of safe sight distance, analysis of overtaking sight distance, intersection sight distance</p> <p>iii Horizontal curves: design of superelevation and its provisions, minimum radius of horizontal curves, widening of pavement, transition curves.</p> <p>iv Gradients: different types, maximum, minimum, ruling and exceptional, grade compensation in curves, vertical curves: design factors, comfort and sight distance. Summit curve, valley curve.</p> <p>v Introduction of geometric design software.</p>	10
03	<p>Pavement materials:</p> <p>i Subgrade materials: desirable properties, modulus of elasticity, modulus of subgrade reaction, classification of subgrade soils, importance of CBR.</p> <p>ii Subbase material: desirable properties, different tests on aggregate, requirement of aggregate for different types of pavements.</p> <p>iii Bituminous materials: types of bituminous material, test on bituminous material, desirable properties, grade of bitumen</p>	04
04	<p>Pavement Design:</p> <p>i Types of pavements, different method of pavement design, comparison of flexible and rigid pavements, design wheel load, equivalent single wheel load, equivalent wheel load factor,</p>	08

	<ul style="list-style-type: none"> ii Flexible pavement design: GI method, IRC approach, Burmister's layers theory, introduction to AASHTO method. iii Stress in Rigid Pavements, critical load position, stress due to load, stress due to temperature variation, combine loading and temperature stress. iv Introduction to pavement design software, relationship between number of cumulative axle, strain value and elastic modulus of materials. 	
05	<p>Highway construction</p> <ul style="list-style-type: none"> i. Modern equipment for road construction, construction of different types of roads: water bound macadam (WBM) road, different types of bituminous pavements, cement concrete pavement. ii. Constructions of stabilized roads: different method of soil stabilization, use of geo-textile and geogrid in highway subgrade. 	05
06	<p>Highway Maintenance and Rehabilitation</p> <ul style="list-style-type: none"> i. Pavement failure: flexible pavement failure, rigid pavement failure, maintenance of different types of pavements. ii. Evaluation of pavements: structural evaluation of pavements, functional evaluation of pavement. iii. Strengthening of existing pavement: objective of strengthening, types of overlay, different types of overlay, design of overlay using Benkeleman beam method 	05
07	<p>Traffic Engineering and Control</p> <ul style="list-style-type: none"> i. Traffic study and surveys: speed studies, presentation of data, journey time and delay studies, use of various methods, merits and demerits ii. Vehicular volume count: types, various available methods, planning of traffic count. iii. O-D survey, need and uses, various available methods iv. Parking survey, need and types, traffic sign and marking, signals, miscellaneous traffic control aids, traffic regulations, traffic signals. v. Intersection types: at grade and grade separation, factors influencing design. vi. Introduction to traffic design related softwares. 	08
08	Highway drainage, necessity, surface drainage, subsurface drainage.	02
09	<p>Bridge Engineering</p> <ul style="list-style-type: none"> i. Bridge engineering: importance, investigations, site selection, collection of data, determination of flood discharge, waterway, afflux, economic span, scour depth ii. Pier, abutment, Bearing 	03

Theory Examination:-

1. Question paper will consist of total seven questions carrying 20 marks each.
2. Only five questions need to be attempted.
3. Question number 1 will be compulsory and based on maximum part of the syllabus.
4. Remaining questions will be mixed in nature.
5. In question paper weightage of each module may be proportional to the number of respective lecture hours as mentioned in the syllabus.

Oral Examination:-

Oral examination will be based on entire syllabus.

List of practicals:- (At least seven to be performed)

1. Impact test on aggregates
2. Abrasion test on aggregates
3. Crushing test on aggregates
4. Shape test on aggregates
5. Penetration test on bitumen
6. Ductility test on bitumen
7. Softening point test on bitumen
8. Viscosity test on bitumen

Term Work:

Each student has to appear for at least one written test during term. A report on traffic volume and speed studies, report of experiments performed and at least 10 assignments (including numerical problems and layout sketches) and graded answer paper for the term test shall be submitted as term work.

The distribution of term work marks will be as follows:

Reports of experiments performed and assignments	:	10 marks
Written test (at least one)	:	10 marks
Attendance (Practical and theory)	:	05 marks

The final certification and acceptance of term work ensure the satisfactory performance of laboratory work and at least minimum passing in the term-work.

Recommended Books:

1. A Course of Railway Engineering: Saxena S. C. and ... a S. P., Dhanpat Rai and Sons, New Delhi.
2. Airport Planning and Design: Khanna & Arora, Nemchand Bros, Roorkee
3. Indian Railway Track: Agarwal M. M., Suchdeva press, N.D.
4. Docks and Harbour Engineering: Bindra S. P., Dhanpat Rai and Sons
5. Harbour, Dock and Tunnel Engineering: R Shrinivas, Central Publishing House
6. A text book on Highway Engineering and Airports: Seligson S. E., Bhanot K. L., S. Chand & Co.
7. Planning and Design of Airport: Horonjeff and Mckelvey, Tata McGraw Hill.
8. Design & Construction of Ports and Marine Structures: ... nn A D, Tata McGraw Hill
9. Airport Engineering: Rao G. V., Tata McGraw Hill

Class:-T E(Civil)		Semester VI	
Subject:-Environmental Engineering - I			
Periods/week - each	Lecture	04	
Period of 60 minutes duration	Practical	02	
	Tutorial	-	
		Hours	Marks
Evaluation System	Theory Examination	03	100
	Practical	-	-
	Oral	-	-
	Term Work	-	25
	Total		125

Detailed Syllabus

Module	Topics	No. of Lectures
1.	Ecology: Basic principles, food chain, food webs and ecological pyramids, tropic structure gross production to total community, respiration ratio (p/r), biochemical cycles, limiting factors-Liebig's law, extended ecological regulation, important ecosystems such as the seas, estuaries & sea shores, streams & rivers, lakes & ponds	05
2.	i. Environmental Pollution: definition, different types of pollutions such as water pollution, air pollution, noise pollution, thermal pollution, soil pollution, marine pollution, nuclear hazards ii. Water Pollution: Water resources. Water pollutants: oxygen demanding wastes, pathogens, nutrients, salts thermal pollution, heavy metals, pesticides, volatile organic compounds. Surface water quality, water quality in lakes, rivers and ground water.	07
3.	Water i. Man's environment: importance of environmental sanitation. ii. Water supply systems: need for planned water supply schemes, components of water supply system and determination of their design capacities, distribution system of water, types of intake structure. iii. Quality of water: wholesomeness and palatability, physical, chemical, bacteriological standards. iv. Treatment of water; impurities in water-processes for their removal-typical flow -sheets. v. Sedimentation: factors affecting efficiency, design values of various parameters, tube settlers. vi. Coagulation and flocculation: mechanisms, common coagulations, rapid mixing and flocculating devices, G and GT values, Jar test, coagulant aids- polyelectrolyte etc. vii. Filtration: classification, slow and rapid sand filters, dual media filters, sand, gravel and under-drainage system, mode of action, cleaning, limitations, operational difficulties, performance, basic design consideration, pressure filters: construction and operation. viii. Water softening: lime soda and base exchange methods, principle reactions, design considerations, sludge disposal. ix. Miscellaneous treatments: removal of iron and manganese, taste, odour and colour, principles and methods, de-fluoridation, reverse	24

	osmosis. x. Disinfection: chlorination, chemistry of chlorination, kinetics of disinfection, chlorine demand, free and combined chlorine, break point chlorination, superchlorination, dechlorination, chlorine residual, use of iodine, ozone, ultraviolet rays and chlorine dioxide as disinfectants, well water disinfection.	
4.	Municipal solid waste management: i. Solid Waste: Sources, types, composition, physical and biological properties of solid wastes, sources and types of hazardous and infectious wastes in municipal solid wastes ii. Solid waste generation and collection, storage, handling transportation, processing. iii. Treatment and disposal methods: iv. Material separation & recycle, physico-chemical and biological stabilization and solidification thermal methods, land disposal, site remediation, leachate and its control v. Hazardous wastes: vi. Definition, identification, mutagenesis, carcinogenesis, toxicity testing, human studies, lot of evidence categories for potential carcinogens.	10

Theory Examination:-

1. Question paper will consist of total seven questions carrying 20 marks each.
2. Only five questions need to be attempted.
3. Question number 1 will be compulsory and based on maximum part of the syllabus.
4. Remaining questions will be mixed in nature.
5. In question paper weightage of each module may be proportional to the number of respective lecture hours as mentioned in the syllabus.

List of practicals:-

1. Determination of Alkalinity in water.
2. Determination of Hardness of water.
3. Determination of pH of water.
4. Determination of Turbidity of water.
5. Determination of Optimum dose of coagulant by using Jar Test Apparatus.
6. Determination of Residual chlorine from water
7. Solid waste: Determination of pH
8. Solid waste: Determination of moisture content
9. Most probable number

Term Work:-

Each student has to appear for at least one written test during the term. Reports on experiments performed as detailed above and the graded answer paper for the term shall be submitted as term work. A brief report on the visit to water treatment plant should also be included as the term work.

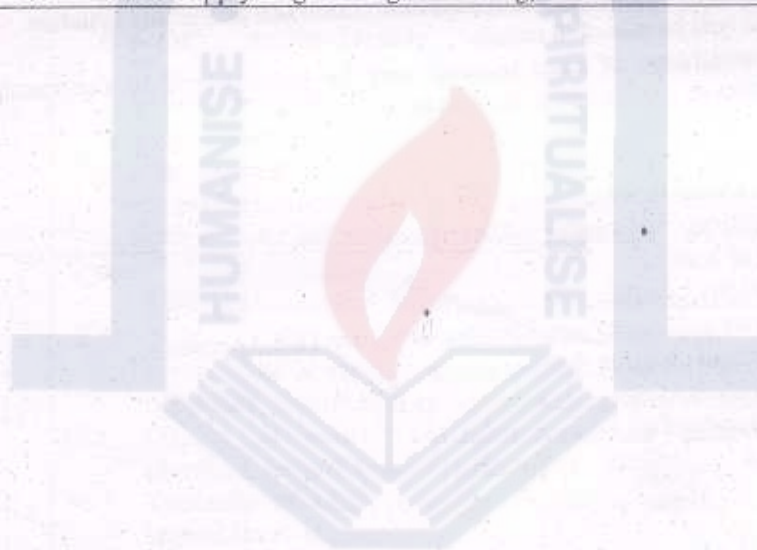
The distribution of term work marks will be as follows:

Reports of experiments performed, assignments and site visit report :	10 marks
Written test (at least one)	: 10 marks
Attendance (Practical and theory)	: 05 marks

The final certification and acceptance of term work ensures the satisfactory performance of laboratory work and at least minimum passing in the term-work.

Recommended Books:-

1. Water Supply and Sanitary Engineering: S.K. Hussain, Oxford & IBH Publications, New Delhi
2. Manual on water supply and Treatment, (latest Ed.) Ministry of works & Housing, New Delhi
3. Introduction to Environmental Engineering, Vesilind, PWS Publishing Company.
4. Water Supply & Sewage, E. W. Steel, Tata McGraw Hill
5. Water Supply & Sewage, T. J. McGhee, Tata McGraw Hill
6. Water Supply and Pollution Control, J.W. Clark, W. Veisman, M.J.Hammer, International Text Book Co.
7. Relevant Indian Standard Specifications
8. CPHEEO Manual on Water Supply & Treatment
9. Water supply Engineering: Dr. P.N. Modi
10. Fundamentals of Ecology: Eugene P. Odum, Nataraj Publications
11. Integrated solid Waste Management: Tchobanoglous. Theissen & Vigil, McGraw Hill Publication
12. Solid Waste Management in Developing Countries: A. D. Bhide & B. B. Sundaresan
13. Manual on municipal Solid waste Management: Ministry of urban Development, New Delhi
14. Environmental pollution: Gilbert Masters
15. Basic Environmental Engineering: Nathanson J. A. Prentice Hall Of India
16. Environmental Pollution Control Engineering: C. S. Rao, New Age International
17. Water Supply Engineering: S.K. Garg, Khanna Publications



Rizvi College of Engineering

Class:-T E (Civil)		Semester VI	
Subject:-Theory of Reinforced and Prestressed Concrete			
Periods/week – each Period of 60 minutes duration	Lecture	04	
	Practical	-	
	Tutorial	02	
		Hours	Marks
Evaluation System	Theory Examination	03	100
	Practical	-	-
	Oral	-	-
	Term Work	-	25
	Total		125

Detailed Syllabus

Module	Topics	No. of Lectures
1.	Concept of reinforced concrete, Working Stress Method (WSM) of design for reinforced concrete, permissible stresses as per IS-456-2000, stress strain curve of concrete and steel, characteristics of concrete and steel reinforcement.	04
2.	Analysis and design of singly reinforced and doubly reinforced rectangular, Tee, Ell-beams for flexure by WSM, balanced, under reinforced and over reinforced sections.	06
3.	Design for shear and bond by WSM.	04
4.	Analysis and Design of rectangular and circular columns subjected to axial and bending by WSM.	06
5.	Design of one way and two way slab by WSM	06
6.	Design of axially loaded isolated sloped and pad footings	05
7.	Prestressed Concrete: Basic principles of prestressed concrete, materials used and their properties, methods and systems of prestressing, losses in prestress, analysis of various types of sections subjected to prestress and external loads.	09
8.	General design principles: Concepts of centre of compression, kern of a section, efficiency of the section, pressure line and safe cable zone, principal tension in prestressed concrete members.	04
9.	Simple design of prestressed concrete I beams (excluding end block design)	04

Theory Examination:-

1. Question paper will consist of total seven questions carrying 20 marks each.
2. Only five questions need to be attempted.
3. Question number 1 will be compulsory and based on maximum part of the syllabus.
4. Remaining questions will be mixed in nature.
5. In question paper weightage of each module may be proportional to the number of respective lecture hours as mentioned in the syllabus.

Term work

Each student has to appear for at least one written test during the term. Solution of at least 20 problems with neat sketches wherever necessary and graded answer paper shall be submitted as term work.

The distribution of term work marks will be as follows:

Reports of assignments	:	10 marks
Written test (at least one)	:	10 marks
Attendance (Theory and Tutorial)	:	05 marks

The final certification and acceptance of term work ensures the satisfactory performance of Tutorial work and at least minimum passing in the term-work.

Recommended Books:

1. Design of Reinforced Concrete Structures: By Dayaratnam P., Oxford & IBH.
2. Fundamentals of Reinforced Concrete: Sinha and Roy, S. Chand & Co., New Delhi.
3. Reinforced Concrete: Warnerr. R. F. Rangan B.C. & Hall A. S., Pitman.
4. Reinforced Concrete. Vol. I: H.J.Shah, Charotar Publishers.
5. Reinforced Concrete: Syal and Goel, Wheeler Publishers
6. Design of Prestressed Concrete Structures: Lin T.Y. & Ned Burns, John Wiley.
7. Prestressed Concrete: Krishna Raju, Tata McGraw Hill.
8. Prestressed Concrete: Evans R. H. & Bennett E. W., Chapman & Hall.
9. Prestressed Concrete: N. Rajgopalan, Narosa Publishers
10. Relevant IS codes, BIS Publications, New Delhi
11. Reinforced Concrete Design: Pillai S.U., Menon Devdas, Tata McGraw Hill.



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