

**DR. BABASAHEB AMBEDKAR
MARATHWADA UNIVERSITY,
AURANGABAD.**



REVISED SYLLABUS OF

T.E.

[CIVIL]

[Effective from - July, 2008]

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MARATHWADA UNIVERSITY,
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T E (CIVIL) Revised syllabus

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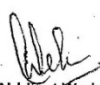
DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY
REVISED STRUCTURE OF TE(CIVIL) REVISED STRUCTURE PART I

SR.NO	NAME OF THE SUBJECT	TEACHING SCHEME HRS/WEEK)			EXAMINATION SCHEME			
		THEORY	PRACTICAL	TOTAL	THEORY	TW	PRACT/ Oral	TOTAL
1	THEORY OF STRUCTURES II	4	0	4	100	0	0	100
2	DESIGN OF STRUCTURES II(STEEL)	4	4	8	100	50	50	200
3	ENGINEERING GEOLOGY & ROCK MECHANICS	4	2	6	100	25	25	150
4	TRANSPORTATION ENGG (i)	4	0	4	100	0	0	100
5	BUILDING PLANNING AND DESIGN	4	4	8	100	50	50	100
	TOTAL	20	10	30	500	125	125	750

REVISED STRUCTURE OF TE(CIVIL) REVISED STRUCTURE PART II

SR.NO	NAME OF THE SUBJECT	TEACHING SCHEME HRS/WEEK)			EXAMINATION SCHEME			
		THEORY	PRACTICAL	TOTAL	THEORY	TW	PRACT/ Oral	TOTAL
7	ENVIRONMENTAL ENGINEERING I	4	0	4	100	0	0	100
8	DESIGN OF STRUCTURES II(RCC)	4	0	4	100	0	0	100
9	GEOTECH ENGINEERING	4	2	6	100	25	25	150
10	WATER RESOURCES ENGINEERING I	4	0	4	100	0	0	100
11	PROFESSIONAL PRACTICE	4	4	8	100	50	25	175
12	SDDII PRACTICAL	0	4	4	0	50	25	75
13	CASE STUDY	0	2	2	0	25	25	50
	TOTAL	20	12	32	500	150	100	750

NOTE : THERE WILL BE THREE PRACTICAL EXAMINATION IN EACH PART


Prof Abhijeet Wadekar
Chairman

Board Of Studies in civil Engg
Dr Babasaheb Ambedkar Marathwada University
Aurangabad

Theory of Structures-II

Theory Lect - 04 Hrs. /Week

Theory – 100
Duration – 3 Hrs.

1. Analysis of redundant pin jointed trusses with degree of redundancy upto two, second theorem of castigliano, Lact of fit, Trussed Beam 5 Hrs.
2. Analysis of indeterminate structures by Moment distribution method, application to continuous beams and partial frames, non-sway and sway frames. 5 Hrs.
3. Analysis of indeterminate structures by slope deflection method, application to continuous beam and portal frames, non-sway and Sway frame 5 Hrs.
4. Analysis of continuous beams and portal frames by Kani's method. The rotation contribution, rotation factor, displacement contribution, displacement factor, storey shear. 5 Hrs.
5. Analysis of two hinged arches, influence line of B.M. and S.F. Rib shortening temperature effect on two hinged arches. 6 Hrs.
6. Plastic theory, collapse load, load factor, plastic hinge, plastic moment of resistance, shape factor, Analysis of continuous beams, portal frames. 5 Hrs.
7. Elastic center analysis of fixed symmetrical arches. 4 Hrs.
8. Experimental stress analysis, Introduction of photo-elasticity material. Plane and circular polariscopes, strain gauges types, electrical resistance strain gauges. 5 Hrs.

Reference Books :

- ✓ 1. Theory of Structures - S.Ramamrutham & R. Narayan
2. Theory of Structures - Timoshenko & Goodier
3. Basic Structural Analysis - C.S.Reddy
4. Advanced Theory of Structures - Dr.N.C.Sinha & Dr.P.K.Gayen
5. Mechanics of Structures - Vazirani & ratwani
6. Experimental Stress Analysis - Dally & Rilley
7. Structural Analysis - L.S.Negi & R.S.Jangid

Design of Structures – I (Steel)

Theory Lect.	= 04 Hrs/Week	Theory	= 100
Pract	= 04 Hrs/Week	T/W	= 50
		PR/Oral	= 50
		Duration	= 3 Hrs.

1. Varieties of Steel used in general construction work and their properties, working stresses, various Indian standard section. [04]
2. Loading on structures : Dead Load, live load, wind load seismic load, erection load, etc. Loading on high way and railway bridges. Recommendation of Indian standards, Indian road congress Standards, Indian Railway Standards. [04]
3. Design of riveted and welded joints, structural connections, framed connection, Design of Joints subjected to tension and bending. [04]
4. Roof trusses : types of trusses, loading trusses and end bearing, Design of tubular structures and connections. [05]
5. Design of simple and compound beams and end connections. [05]
6. Design of plate girder, gantry girder. [08]
7. Design of axially and eccentrically loaded simple columns and compound columns. [04]
8. Column basis : Design of slab base and gusseted base and moment bases. (Use of IS 800 and IS 808 shall be allowed in the examination) [06]

References :

- a) Indian standard Institutes publications :
 - 01) IS : 875- Loading Standard
 - 02) IS : 808- Properties of Section
 - 03) IS : 900- Code of practice for use of steel
 - 04) IS : 226- Structural steel
 - 05) IS : 816- Welding
 - 06) IS : 808- Use of steel tube.
 - 07) Handbook for structural engineers, vol. I, II & III
 - 08) National Building code.
- b) Indian road congress specifications for high way bridges.
- c) Indian railway standard for railway bridges.
- d) Books.

01) Design of Steel structures	:	A.S. Arey and J.I. Ajnani
02) Design of Steel structures	:	B.S. Krishnamachan
03) Design of Steel structures	:	Yazrani & Ratwani
04) Design of Steel structures	:	Dayaratnam.

Term Work –

The termwork shall consists of a detailed design report and set of drawing [drawn on atleast two imperial size sheets] of atleast two steel structures given below]

- Part A Design of a Factory shed consisting of
 i] Roof Truss ii] Columns and Columns bases
- Part B i] Gantry Girder ii] Plate Girder
- Part C Computer Design of any two of the following using software–
 i] Tension and Compression member
 ii] Design of column & connection
 iii] Design of Slab base and gusseted base.

PRACTICAL EXAMINATION

The practical examination shall be based on record submitted by the candidate and viva-voce based on the syllabus.

3005 Engineering Geology & Rock Mechanics

(One paper – 3 hours 100 Marks: Term work: 50 Marks)

Geological Consideration C: Introduction to geology. Importance of lithology, necessity of geology, scope of geology in Civil Engineering.

Physical Geology:- Geological action of running water, river, valley development, normal cycle of regional erosion, water fall, river capture, meanders and Ox-Bow lakes escarpment and related features, transportation and depositions by river flood plane deposits deltas, rejuvenation and related features such as canyons, incised, meander and river terrace.

Earth movement, earthquake, the crust, and interior of earth volcanism types of mountains.

Mineralogy:- Composition on earth crust, rocks and minerals, silicates and nonsilicates minerals, rock forming minerals, physical properties of minerals, Moh's Scale of hardness.

Petrology:- Igneous rock its sub division-volcanic, hypabyssal and plutonic rocks. Hatch scheme of classification study of common rock types, batholiths and intrusive igneous types such as sill, laccolith, lipoliths, phacolith, dyke, vein and apophyses Secondary rocks, rock weathering, decomposition and distintegration of rocks, favourable conditions, processes and product of decomposition and distintegration, transportation and deposition of sediments, classification of secondary rocks, residual, sedimentary, organic and chemical deposits influence of nature of transportation agent and glacial deposits. Clastic texture, stratification and lamination, consolidation by welding and cementation. Characteristics of shallow water deposits. Study of common rock types list.

Metamorphic rocks:- Metamorphism, agents and kinds of metamorphism, metamorphic minerals and structures stress and anti stress minerals, Contact and thermal cataclast, dynamothermal cataclastic, dynamothermal and plutonic metamorphism, study of common rock types.

Structural Geology:- Structural elements of rocks-dip and strikes. Unconformity and overlap, Folds and faults in rocks, their types and effect on outcrops, inliers and outliers.

Stratigraphy and Indian Geology:- General principles of stratigraphy, age of earth and division of geological time. Physiographic division of India and their characteristics. Geological history of peninsula, study of formation in peninsula and significance for their structural characters in engineering.

Engineering Geology:- Preliminary geological investigation, use of geological maps and section bore holes, drill holes, limitation of drilling. Core recovery R, Q, D.

Influence of geological condition on the choice of type and design of dams. Favourable and undesirable conditions for locating dam and precautions to be taken to counteract unsuitable condition, treatment of leaky rocks, and also engineering significance of fault zones, crush zones, dyke, joint, unfavourable dips etc.

Tunnelling:- Importance geological consideration while choosing alignment Difficulties during tunneling as related with lithology nature and structure of material to be excavated geological condition likely to be trouble some.

TRANSPORTATION ENGINEERING -I

Teaching Scheme: Lectures: 4 hrs/ week Examination Scheme Theory-100 Marks Paper-3 hours

History of Bridges and Development, Classification, Alignment Finalization , Investigations, selection of bridge site, flood discharge, water way calculations, afflux, scour, River training works Types of foundations-shallow, piles, coffer dams and caissons

Approaches of bridges, Types of constructions, slab culvert, box pipe, causeways and submersible bridges, IRC Loading, piers, abutment, wing wall and its stability

Layout, Signaling and Interlocking and their principles, objects, construction of tracks and its maintenance, modern trains in railway

Permanent way, gages, sleepers, ballast, function of rails, failures of rails, Rail joints, Rail fixtures and fastenings, Types of gradient, grade compensation, types of curves,

Points and crossings, junctions, stations and yards, requirement of railway

Elements of Docks and Harbours Engineering, classification, Requirements, selection of site. Quay and Bulkhead.

Classification and geological consideration of Tunnels, Types, Tunnel survey setting and modern techniques, Tunnel lining and its safety.

Introduction to Airport, layout, site selection, Runway, Terminals

Reference books

Bridge Engineering--- S.P. Bindra

Elements of Bridge Engineering--- J.S. Alagia

Principals of Railway Engineering --- Saxena and Bindra

Dock and Harber Engineering--- Hasmukh .P. Oza and Gulam H.Oza

Tunnel Engineering--- Subhash C. Saxena

3004 **C** : BUILDING PLANING AND DESIGN

Theory Lect. = 04 Hrs/Week
Pract = 04/Hrs/Week

Theory = 100
T/W = 50
PR/Oral = 25
Duration = 3 Hrs.

1. Classical and Contemporary Indian Architecture – Terms used in Architecture. Important classical order, Contemporary Indian Architecture.
2. Architectural Composition : Principles of Architectural Composition : Unity, Proportion, Mass Composition, Scale, Functional Treatment. Modern Architecture climate and Design Considerations. Recommendation of Central Building Research Institute, Roorkee. Principles of Building Planning.
3. Functional Design : Of Building Based on The Various Requirements for Residential and Public Building such as Educational, Industrial, Offices, Hospitals, Banks, Libraries, Hostels, Markets, Power Houses, Air Terminals etc.
4. Design Aspects For Orientation For Natural Ventilation and Lighting, Acoustical Needs, Sun breakers, Fire Proofing, Energy Audit, Solar Cells.
5. Considerations In Planning : Site Development, Water Supply, Sanitary plumbing and Horizontal Access. Intelligent building concepts.
6. Perspective Drawing General Principles of perspective drawing, One point perspective and Two point perspective mainly for Building.
7. Standards For Planning : Standards for Planning For Apartment Buildings, Hospital Buildings, Shopping of Office Building.
8. Landscaping : Necessity, Landscaping of Residential And Institutional Building.
9. Interior Decoration : Necessity, Different Materials used, Different Color and Color Schemes Used Internal Space Used, Lighting.

PRACTICAL EXAMINATION

The Practical Oral Examination shall consist of Sketching submitted by the candidate and viva-voce based on the syllabus.

The term works will consists of ;

1. Study of AutoCAD Software and exercises Line plan on Residential Building Drawing. (2 Nos. – 3 Rooms & 5 Rooms)
2. Two Sheets of AutoCAD drawing prints on plotter (A2 Size) for one public building,-working plan , layout component building, plumbing etc.
3. One print out of interior decoration of above mentioned residential building & landscaping of institutional building using related software.
4. Submission of Soft copy of above drawing files on CD.
5. One sheet of perspective of a buildings.

Software Required : Latest Version of AutoCAD, Build Master, Interior Designer, 3D-Max Studio.

REFERENCES BOOKS :

- ✓ 1. Planning and Designing of building : Y.S. Sane
2. Principles of Perspective drawing : M.G. Shah & C.M.Kale
3. Architectural Design : Earnest picketing.
4. Indian Architecture (Budhist and Hindu Periods) : Percy Brows/D.B. Taraporwala. Sons and Co. Ltd.
5. An Introduction to Indian Architecture : Dr. Charles Febri Asia Publishing House.
6. The Art and Architecture of India (Budhist and Hindu and Jain) : Benjamin Rolland Published by Penguin Books.
7. Time saver standards : Rowland.

ENVIRONMENTAL ENGINEERING –I

Teaching Scheme
Lecture : 4 hrs/Week

Examination Scheme
Paper : 100 Marks

SECTION A

ECOLOGY

Basic concepts of Ecology, ecological systems (lake,forest,cropland), Biochemical cycle, Energy Flow, food chain, food web,ecological indices and ecological succession.

AIR POLLUTION

Definition,statements of problems, Sources of air pollution, type and classification of air pollutants, primary and secondary air pollutants.

General physiochemical properties of atmosphere, various layers of atmosphere and their importance, atmospheric stability, mixing heights, turbulence, flume types, and diffusion, Atmospheric diffusion theories, plume rise, evaluation of diffusion coefficient, Design of stack height, Gaussian dispersion model, Estimation of ground level concentration, Effects of air pollution on health, man, animal, vegetation materials etc.,photochemical smog, green house effect, ozone depletion, acid rain, control of air pollution, various methods and instruments used for control for SPM, vehicular emission control.

NOISE POLLUTION

Physical properties of sound waves, anatomy of sound, theory of noise measurements and units, weighing networks, sound pressure , loudness, sound intensity, cumulative decibel, control of noise.

SMOKE AND ITS CONTROL

Sources of smoke, measurement of smoke, smoke and public health, smoke prevention and control

ODOUR POLLUTION

Theory of odour, sources of odour, measurement of odour, odour control methods.

SECTION B

WATER SUPPLY

Introduction to water supply schemes:

Quantity: Population forecasting, Rate of water consumption for various purposes, various water demand, its variation and different factors affecting the water demand, fire demand.

Quality: Characteristics, standards and significance.

Treatment: Principles of water treatment processes, Introduction of different water treatment sheets, Aeration, Screening.

Theory of chemical coagulation and flocculation, design of mechanical flocculation, mean velocity gradient and power consumption, common coagulants, coagulant aids.

Principle of sedimentation, efficiency of ideal settling basin, reduction in efficiency by current and other factors, short circuiting, settling velocity, types of sedimentation tanks, inlet and outlet arrangements, Design of Clariflocculator.

Filtration: Theory of filtration, Mechanism of filtration, design of filters, filter material, type of filters and their classification, rapid gravity and slow sand filter, components, materials, under drainage system, operational troubles, design of filters.

Theory of disinfection, factors affecting disinfections, type of disinfectants, type and method of chlorination, break point chlorination, bleaching powder estimation.

Design of various components of water supply scheme including treatment plant.

Softening of water: Methods, lime soda and ion exchange method.

Deminceralization: Reverse osmosis, Electrodialysis.

Distribution Systems: Classification, capacity of distribution or service reservoirs, appurtenances in the distribution system, Plumbing in high rise buildings.

REFERENCES:

1. Stern, "Air Pollution" volume I-IV, Mc Graw Hill
2. Rao H.V.N. & M.N., "Air Pollution", T.M.H. Publication
3. Duggal K.N., "Elements of Environmental Engineering", S. Chand & Company
4. Peavey & Rave, "Environmental Engineering", McGraw Hill
5. Water Supply and Treatment, Manual, Govt. of India Publication
6. Garg S.K., "Water Supply Engineering", Khanna Publishers, New Delhi
7. KVSG Murli Krishna, "Air Pollution and Control", Kaushal and company, Sattenmagudi Veedhi Jagannaickpur, Kakinada -2.
8. Gilbert M. Masters, "Introduction to Environmental Engineering And Science", Pearson Education, New Delhi.

Design of Structures – II [R.C.C.]

Theory Lect. = 04 Hrs/Week

Theory = 100

Duration = 3 Hrs.

1. **Introduction to limit state design**, Types and classification of limit states. Characteristic Strength and characteristic load, factor of safety for characteristic strength and loads. Redistribution of moments and its I.S. Code Provisions. (02)
2. **R.C. Beam Design** : Singly, Doubly reinforced sections, properties of sections according to I.S. Code, Design parameters maximum values, Analysis and design for flexure. (04)
3. **Flanged Sections** :
Effective Width of Flange, Design of a flanged section by I.S. Code method. (04)
4. **Limit State of Collapse (Shear)** shear behavior up to failures, types of failure, Factory affecting shear failure, strength of R.C. beams in shear, design of shear reinforcement as per I.S. recommendations. (02)
5. **Limit state of Collapse – Bond** : Bond types of bond, factory affecting bond resistance, Check for development length. (02)
6. **Limit State a) Serviceability** : Significance of deflection, types of deflection and I.S. requirements. (04)
b) Limit State of cracking :- Cracking, causes mechanism & effects, classification and types of cracks, bar detailing rules.
7. **Limit State of Collapse** : Axial compression and bending : Analysis of axially loaded short columns and design Analysis under uniaxial bending and axial compression. Stress block parameters, Interaction diagrams, Analysis and design of sections. (I.S. 456 SP – 16 Column design charts of sections). (04)
8. **Column footings** – Isolated square footing, rectangular footing (03)
9. **Design of staircases**- Dog-legged Staircase, Openwell Staircase (03)
10. **Design of Slabs** : One way, two way cantilever and continuous slab (04)
11. **Design of Water Tanks** –
Introduction to working stress method and design of rectangular water tank resting on ground. (04)
12. **Introduction to Earthquake Engineering.** (04)

References : I.S. 875 for loading standards & IS. 456 for R.C.C. design
IS 1893 for earthquake Engg. Analysis.

References Books :

Limit State theory & Design	-	Karve & Shah
Limit State theory	-	A.K. Jain
Limit State theory	-	Sinha
Limit State theory	-	Vazrani
Masonry & Timber structures including earthquake resistant Design	-	Anand S. Arya (University of Roorkee)
Earthquake Resistant Design And construction of building	-	Code of Practice www.nicee.org, www.bmtpc.org
Earthquake Tips	-	
Refer IS – 4326 - 1993	-	

GEOTECHNICAL ENGINEERING
One Paper – 3 Hours, 100Marks
(4 Theory and 2 Practical per week)
Term Work – 25 Marks, Oral – 25 Marks

Introduction

Origin of soil, scope of "Geotechnical Engineering", Types of weathering, soil formation, major soil deposits of India, Components of soils, soil minerals, water in clays.

Properties of soil

Mechanical composition of soil, volume and weight relationship, specific gravity, density, relative density, void ratio, porosity, degree of saturation, functional relationships, moisture content, grain size analysis, mechanical and sedimentation analysis, consistency limits, soil texture and structure, elementary ideas about swelling, sensitivity and thixotropy.

Classification of Soil

Particle size classification, Highway Research Board Classification, ISI Classification and Unified Classification.

Soil Moisture And Permeability

Soil moisture, effect of moisture content on soil, structural water, absorbed water, capillary water, effective and neutral pressure, critical hydraulic gradient, seepage of water through soil, permeability, Darcy's law, discharge velocity and seepage velocity, factors affecting the permeability, Laboratory methods of determination of permeability, concept of flow net and its characteristics, graphical method of flow net construction and its application to isotropic soil.

Stress Distribution in Soil

Boussinesq's equation for point load, vertical pressure under loaded circular area and uniformly distributed loads, preparation and use of Newmark's Chart.

Compaction

Proctor density and optimum moisture content, comparison of standard and modified proctor test factor affecting compaction, field methods of compaction control and mechanical stabilization of soil.

Consolidation

Introduction, compressibility of soil, consolidation test, Terzaghi's one dimensional consolidation, secondary compression, square root of time fitting method and logarithm of time fitting method, coefficient of consolidation.

Shear Strength

Concept of shear strength, Principles stresses, Mohr's envelopes for cohesive and non cohesive soils and composite soils, general principle of drained, consolidated un-drained and drained tests. Determination of shear strength by direct, unconfined, tri-axial and vane shear tests. Comparison of these methods.

Earth Pressure

Earth pressure at rest, active and passive condition, elementary idea about Rankine's and Coulomb's earth pressure.

Stability of Slope

Factors contributing to slope failures, Classification of slope failures, Infinite and finite slope, The Swedish method and its application to dry cohesive soils and composite soils, Friction circle method, Taylor' number and stability curve.

ORAL BASED ON PRACTICAL CONDUCTED AND TOTAL SYLLABUS

The oral / practical examination shall consist of viva-voice based on the practical work done during the course, the record of experiments submitted by the candidate and the syllabus of the subject. The assessment will be based on performing an experiment and record of experiments submitted by the candidate. Viva-voice / oral will be based on the syllabus.

The term work shall consist of a record of laboratory experiments as mentioned below:

1. Determination of specific gravity
2. Field density test
3. Determination of particle size distribution of soil by:
Sieve analysis or wet analysis
4. Determination of Atterberg's Limits
5. Permeability test-variable or constant head method
6. Standard proctor compaction test
7. Direct shear test
8. Unconfined compression test
9. Tri-axial shear test
10. Consolidation test
11. Static cone penetration test
12. Standard penetration test

Note: Minimum 10 experiments should be carried out, out of 8, 9, 10, 11 and 12 three demonstration experiments will be permitted.

Reference Books:

1. Alam Singh " Soil Engineering in Theory and Practice, Geotechnical Testing and Instrumentation " , Asia Publishing House (p) Ltd, New Delhi.
2. Punmia B.C. " Soil mechanics and Foundation Engineering", Laxmi Publications Pvt. Ltd., New Delhi.
3. P. Purushottam Raj " Geotechnical Engineering " , Tata McGraw Hill Publishing Company Limited, New Delhi.
4. Kasmalkar B. J. " Geotechnical Engineering " , Pune Vidyarthi Griha Prakashan , Sadashiv Peth, Pune-30.
5. C. Venkatramaiah " Geotechnical Engineering " , New age International Publishers , New Delhi.
6. V.N.S. Murthy " Soil Mechanics And Foundation", Sai Kripa Technical Consultants, Bangalore.
7. Iqbal Hussain Khan " A text book of Geotechnical Engineering " , Prentice Hall of India Pvt. Ltd., New Delhi.

Water Resources Engineering-I

Theory Paper: 100 marks
Time: 3 Hrs.

Lectures: 4 Hrs./week

1. **Hydrology:** Definition, Hydrological cycle, Hydrologic budget, Hydrologic Data, Hydrologic terms and their units.
2. **Precipitation:** Forms of Precipitation, weather systems for precipitation, characteristics of precipitation in India, Measurement, Rainguage network, preparation of precipitation data, presentation of rainfall data, mean precipitation, depth area distribution curves, frequency of rainfall.
3. **Infiltration:** infiltration process, Factors affecting infiltration, measurement indices.
4. **Evaporation and Evapo-transpiration:** Evaporation process, evaporimeter, evaporation reduction, Measurement of evapo-transpiration by Penmen's equation.
5. **Runoff:** Different routes of runoff, Rainfall runoff correction stranger's tables, watershed simulation, factors affecting runoff, flow distribution curve, flow mass curve and uses. Hydrographs Factors affecting flood hydrographs, components of a flood hydrograph, Base flow separation, Effective rainfall, unit hydrograph, and derivation of unit hydrograph from complex storm S curve.
6. **Flood studies:** Design flood and method of its estimation, empirical formula, frequency analysis Dumble's and Log Pearson type III distribution, Muskinghum method.
7. **Water shed management:** Conversation of land and water necessity of watershed development small structures and steps involved in watershed management, ridgeline treatment, upper treatment, drainage line treatments erosion control.
8. **Ground water Hydrology.** Occurrence and Distribution of ground water aquifer parameters, movement of groundwater, specific yield of well, steady flow wells in confined and unconfined aquifers, effect of partial penetration, interference of wells and boundary, recharge of ground water.
9. **Water applications to the crops and water logging:** Functions of water, consumptive and non consumptive use of water, factors affecting crop water; requirement, irrigation water standards, wilting point, Delta, duty, factors affecting crop determination of duty, important crops in India, Their seasons, crop rotation, design and frequency of Irrigation, Various methods of applying water to crops and their comparison, causes and effects of water logging. Its remedial measures, Drainage of Irrigation areas, consumptive use of water
10. **Stream flow & River Training Works:** Site selection for stream gauging, measuring of stage and discharge, flow mass curve and flow duration, river training for flood control, various methods.
11. **G.I.S. applications to water resources engineering:** Introduction of Geographical Information System. Advantages, Application.

Reference Books:

1. Engineering Hydrology: K.Subramanya
2. Hydrology and water resources engineering: S.K.Garg
3. Irrigation water resources and water power Engineering: P.N.Modi & S.N.Seth.
4. Water Resources Engineering: James and Werbs
5. Water Resources Planning and Management:- Daniel Louks
6. Elementary Hydrology: Vijay P.Singh
7. Hydrology- H.M.Ragunath -New Age International publications.
8. Principals of Geographical Information System- Burrough Peter A.
9. An Introduction to Geographical Information System- Heywood Lan.

Professional Practice

Theory Paper: 100 marks
Time: 3 Hrs.
Lectures: 4 Hrs./week

Term Wok: 50 marks
Practical /Oral: 25 marks
Practical: 4 Hrs./week

1.Introduction of IS-1200: for modes of measurement. Taking out quantities-methods of taking out quantities, P.W.D. method, English method, Estimates for building, Slab culvert, pipe culvert, septic tank, walls, Roads, railway track and canals, plumbing works, R.C.C. slab and framed structures, abstracting.

2.Analysis of rates: Analysis of rates for various items of constrictions, Introduction of District Schedule of rates.

3.Approximate Estimates: Methods of preparing approximate estimates for buildings, pads, bridge, water supply schemes, sewerage schemes and irrigation schemes.

4. Specifications: Detailed specifications (Reference to be made to P.W.D. Handbook IS-1200) for typical items of Civil Engineering works. Brief specification principals of writing specifications.

5.Contracts and Tenders: various agencies involved in construction industry, Essentials of valid contract, conditions of contract documents, Role of Civil Engineer in Government works contract, Role of Architect and Civil Engineer in Government works and private organizations, performance of Contract bench of contract, termination of contract.

Contract types-Item rate, Percentage rate, Lump sum, cost plus percentage, cost plus fixed fee, Target piece work, Rate list and labor contracts, negotiated contracts, Contract for supply of material and Transport of materials.

Tender: Definition, Tender notice, Earnest money, Security deposit, preparation and submission of Tenders.

6.Government procedure for execution of works: Classification of works, administrative approval, Technical sanction, bills, measurement, book, Nominal muster roll, Accounts of works and stores, Tools and plants, Materials at site account, Daily diary.

7.Valuation: Definition, nature of value, Factors affecting value, market value of land and Building, Salvage value, Scrap value, Depreciation methods of working out sinking fund and depreciation, Methods of valuation of buildings.

8.Properties: Definition, Mortgage, Amortization, Arbitration, Scale of real and immovable properties, Registrations of sale deed, Formation of co-operative housing Societies and related procedure for execution and construction apartment act.

Term Work

The term work shall consist of any six of the following Assignments:

- 1.Estimate of two storied Building.
- 2.Estimate of a culvert or Road or Railway track or Canal.

3. Estimate of simple RCC framed structure/Industrial steel structure.
4. Analysis of rates for ten items of construction
5. Specification for six items of construction
6. Valuation report for a Building
7. Preparation of a Tender notice.

Practical Examination:

The Practical Examination shall consist of an oral based on term work and syllabus.

Reference books:

1. Estimating and costing in Civil Engg. - B.N. Datta
2. Elements of Estimating and costing - S.C. Rangwala
3. Estimating Costing and Specification - M. Chakroborti
4. Civil Engineering Contracts and Estimating - B.S. Patil

Jagadeesh H Godihal
MIT Aurangabad.

CASE STUDY

MARKS:- TW: 25
BEAL: 25

Broad outline of proposed syllabus in case studies T.E. (CIVIL) with effective from July 2008.

Nature of topics (s) : With relevance in civil engineering application

The case studies scheduled for PartII of TE (civil) class:

- i. Candidates to identify the field / topic ; submit the objectives of the case study, collection of literature in the selected topic ,prepare questionnaire for selected topic
- ii. Visit to reputed institutes /R&D centers in the vicinity of the institute or dwelling of the candidate during the vacation (i.e. after PartI examination)

The candidate shall be encouraged to select live case studies, like

A) Construction:

- I. Building construction adhering byelaws
- II. Old building in the city /town- Structure stability,renovation requirements
- III. Existing road / pavement status & routine maintenance,
- IV. Existing monuments --study & remedial measures
- V. Public buildings

B) Study regarding Environmental

- I. Existing water supply system of city/town/rural area
- II. Metering of water supply system
- III. Existing Sanitary system
- IV. Storm water management of the city
- V. Quality analysis of surface water
- VI. Quality analysis of ground water
- VII. RW -domestic building / public building / industrial building

C) Municipal corporation

- I. Study of byelaws
- II. Town planning /City planning
- III. Solid waste management

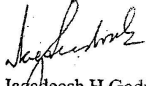
The candidate should emphasis more on practical solution and clearly mention the alternative feasible solutions.

Case Study report shall consist of problem definition, Result, discussion, conclusion drawn.

The case study assesment is on continuous basis.

References shall be of-

1. Minimum five national journal
2. Minimum two international journal
3. Students should refer similar case studies with reference to India.
4. Visit to Local bodies / Government organization / Public and private sectors- interaction with heads of the organizations and also study the previous reports etc.


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C.C

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