Department of Civil Engineering

B.Tech (Civil Engineering)

COURSE STRUCTURE

(Applicable for 2012-13 admitted batch)

B.Tech 7th Semester

Code	Course	Theory	Practical	Credits
	Design of Steel Structures	3+1*	-	4
	Design of Reinforced Concrete Structures	3+1*	-	4
	Foundation Engineering	3+1*	-	4
	Elective-III			
	1. Environmental Hydraulics and advanced Waste water treatment 2. Earthquake Resistant Design 3. Remote Sensing and GIS Applications	3+1*	-	4
	Elective- IV			
	1. Airport and Harbor Engineering 2. Pavement Analysis and Design 3. Urban Transportation Planning	3+1*	-	4
	GIS Lab	-	3	2
	Structural Design Lab	-	3	2
	Mini Project	-	3	2
	Internship	-	-	2
	Total	20	9	28

B.Tech 8th Semester

Code	Course	Theory	Practical	Credits
	Construction Costing and Management	3	-	4
	Elective-V			
	1.Applied Soil Mechanics 2.Design and Drawing of Irrigation Structures 3.Retrofitting and Rehabilitation of Structures	3+1*	-	4
	Elective- VI			
	1. Ground Improvement Techniques 2. Integrated watershed management 3. Solid Waste and Environmental Management	3+1*	-	4
	Project work	-		12
	Total	11		24

Department of Civil Engineering
B.Tech- 7th Semester

SYLLABUS
(Applicable for 2012-13 admitted batch)

Course Title: DESIGN OF STEEL STRUCTURES **Course Code:**
L: T: P: C:: 3:1:0:4

OBJECTIVES:

Learner is expected to

i). Understand the fundamental principles and procedures of structural steel design;
ii). Understand the versatility of Steel structures based on requirement
iii). Apply the principles of steel design to real world problems;
iv). Design basic steel members subjected compression, tension and bending as per IS 800 codal Provisions

OUTCOMES:

At the end of the course the learners will be able to

a) Apply the basic requirements of the IS design specifications.
b) Apply the concepts of strain compatibility and equilibrium concepts to determine the strength of members made of steel
c) Design for welded connections between steel members
d) Design simple steel members subjected compression, tension bending and their combinations

UNIT – I

MATERIALS AND CONNECTIONS: **(11+4)**

Properties of Structural Steel, I. S. Rolled Sections, I. S. Specifications,

Welded connections: Introduction, Advantages and disadvantages of welding- Strength of welds-Butt and fillet welds: Permissible stresses – IS Code requirements. Design of welds fillet weld subjected to moment acting in the plane and at right angles to the plane of the joints, beam to beam and beam to Column connections only.

DESIGN OF TENSION MEMBERS :

Introduction to different modes of failures – gross section yielding, Net Section rupture and block shear failure. Determines the design strength due to yielding of gross section, rupture of critical section and block shear. Design procedure of tension members.(simple problems)

COMPRESSION MEMBERS: Effective length of columns. Slenderness ratio – permissible stresses. Design procedure of compression members – problems on simple sections only (no builtup sections).

UNIT – II **(11+4)**

BEAMS: Allowable stresses, design requirements as per IS Code-Design of simple and compound beams, check for deflection, shear, buckling, check for bearing, laterally supported beams only.

DESIGN OF BUILT UP COLUMNS: Necessity & design of built up columns, laced and battened columns including the design of lacing and battens.

FOUNDATIONS: Column bases: Slab base, Gusset base.

UNIT–III **(11+4)**

PLASTIC ANALYSIS: Introduction, plastic hinge concept, plastic modulus, shape factor, upper and lower hound theorems, collapse mechanisms, combined mechanism, plastic analysis of beams and portal frames by equilibrium and mechanism methods.

PLATE GIRDER: Introduction, elements of plate girder, design steps of a plate girder, necessity of stiffeners in plate girder, various types of stiffeners, web and flange splices (only introduction),

UNIT – IV **(11+4)**

GANTRY GIRDERS: Introduction, various loads, specifications, design of gantry girder.

DESIGN OF MEMBERS OF ROOF TRUSS: Design of purlins ONLY. Introduction to pre-engineered structures, concepts and advantages, disadvantages.

Note: All the designs should be taught in the limit state design method as per IS 800-2007.weilding connections to be used.

DRAWINGS:
1. Detailing of built up columns, laced and battened columns
2. Detailing of Plate girder including curtailment, splicing and stiffeners.
3. Detailing of Gantry girder including curtailment, splicing and stiffeners
4. Roof truss.

These codes and steel tables are permitted in the examinations.

IS Codes:

1) IS -800 – 2007
2) IS – 875 – Part III
3) Steel Tables.

Text Books:

1. Design of Steel structures – N. Subramanian, Oxford University Press.
2. Design of steel structures by S.K. Duggal, Tata Mcgraw Hill, New Delhi
3. Design of steel structures – Ramchandra (Vol. I & II)
4. Structural Design and Drawing by N.Krishna Raju; University Press, KAKINADA

References:

1. Limit State Design of steel structures IS: 800-2007-V.L. Shah and Veena Gore, Structures Publications, Jai – Tarang, 36 Parvati, Pune.
2..Design of steel structures by Limit State Method as per IS: 800-2007 – S.S. Bhavikatti IK Internatinoal Publishing House, Bangalore – 560 001..
3. Structural design in steel by Sarwar Alam Raz, New Age International Publishers, New Delhi
4. Design of Steel Structures by P.Dayaratnam; S. Chand Publishers
5. Design of Steel Structures by M.Raghupathi, Tata Mc. Graw-Hill.

Department of Civil Engineering
B.Tech- 7th Semester

SYLLABUS
(Applicable for 2012-13 admitted batch)

Course Title: DESIGN OF REINFORCED CONCRETE STRUCTURES **Course Code:**
L: T: P: C:: 3:1:0:4

OBJECTIVES:

Leaner is expected to

i). Design continuous beams and slabs as per IS456: 2000
ii). Design flat slab and grid slab as per IS456: 2000
iii). Analyze and design the combined footings.
iv). Analyze for the forces in retaining and learn the detailing of reinforcement.

OUTCOMES:

At the end of the course student will be able to

a) Design the cross section and evaluate the amount of reinforcement required in the continuous beam as per IS: 456 codal recommendations for all practical loadings.
b) Design the amount of reinforcement required in the continuous slab and stair case as per IS: 456 codal recommendations for all practical loadings.
c) Design flat and grid slab as per the recommendations of code IS: 456:2000
d) Evaluate the governing forces and design the combined as per the recommendations of code IS:
    a. 456:2000.
e) Evaluate the stabilizing and destabilizing forces and able to design the retaining walls.

UNIT – I **(12+4)**

BEAMS: Design examples in simply supported and continuous beams, detailing.

SLABS: Design of continuous slab Using IS Coefficients, detailing, Design of stair case.

UNIT – II **(11+4)**

FLAT SLABS: Direct design method, Design of interior and exterior panels, reinforcement detailing.

GRID SLAB: IS code method, reinforcement detailing.

UNIT–III **(11+4)**

COMBINED FOOTINGS: Combined slab footing, Combined beam slab footing.

RETAINING WALLS: Design and reinforcement detailing of cantilever and counter-port retaining walls

UNIT – IV **(11+3)**

DESIGN OF RCC WATER TANKS: Design of RCC rectangular and Circular types

Note: The students should prepare the following plates using Auto-Cad

Plate 1 Detailing of Continuous beams
Plate 2 Detailing of Continuous slabs and stair case
Plate 3 Detailing of flat and grid slab
Plate 4 Detailing of combined footing and retaining wall
Plate 5 Detailing of rectangular and circular water tanks

Text Books:

1. Structural Design and Drawing (Concrete and Steel) by N. Krisna Raju, University press publications
2. Design of R.C.C structural elements by S.S Bhavikatti, New age International publications.
3.Reinforced Concrete Design by N. Krishna Raju and R. N Pranesh, New age international Publishers Pvt.Ltd

References:

1. Reinforced concrete Design by S.N Sinha, Tata Mc. Hill publications
2. Fundamentals of Reinforced concrete design by M.L. Gambhir, Prentice Hall of India
3. Limit State Design by B.C Punmia, Laxmi publications

Department of Civil Engineering
B.Tech- 7th Semester

SYLLABUS
(Applicable for 2012-13 admitted batch)

Course Title: FOUNDATION ENGINEERING **Course Code:**
L: T: P: C:: 3:1:0:4

OBJECTIVES:

Leaner is expected to

i). Conceptualize the necessity of site investigations for soil sampling.
ii). Understand the essence of engineering properties in design of various structures constructed on and with soil.
iii). Ascertain the stability of earthen structures.
iv). Know the importance of foundation and different types with their design concepts.

OUTCOMES:

At the end of the course student will be able to

a) Learn various types and methods of undisturbed and disturbed soil sampling.
b) Perform computations for stability of earthen structures.
c) Use the various properties of soils to design the shallow foundations for different loading conditions.
d) Extend the theory of foundation design for special foundation types namely deep foundations.

UNIT – I **(12+ 4)**

SOIL EXPLORATION: Methods of soil exploration – Boring and Sampling methods – Field tests – Penetration Tests – Plate load test – planning of Programme- preparation of soil investigation report.

EARTH SLOPE STABILITY: Infinite and finite earth slopes – types of failures – factor of safety of infinite slopes: stability analysis- Bishop's Simplified method – Taylor's Stability Number- Stability of slopes of earth dams under different conditions.

UNIT – II **(10+ 3)**

EARTH PRESSURE THEORIES: Rankine's theory of earth pressure – earth pressures in layered soils – Coulomb's earth pressure theory – Culmann's graphical method.

RETAINING WALLS: Types of retaining walls – stability of retaining walls.

UNIT – III **(10 + 4)**

SHALLOW FOUNDATIONS: Types - choice of foundation – Location of depth – Safe Bearing Capacity – and IS Methods Safe bearing pressure based on N- value

Allowable bearing pressure; safe bearing capacity and settlement from plate load test – allowable settlements of structures

UNIT –IV **(13 + 4)**

PILE FOUNDATION: Types of piles – Load carrying capacity of piles based on static pile formulae – Dynamic pile formulae – Pile load tests - Load carrying capacity of pile groups.

WELL FOUNDATIONS: Types – Different shapes of wells – Components of wells – functions- construction of well foundations- Sinking of wells – Tilts and shifts.

Text Books:

1. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt. Ltd, (2004).
2. Foundation Engineering by Varghese,P.C., Prentice Hall of India., New Delhi.
3. Soil Mechanics and Foundations by - by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

References:

1. Das, B.M., - (1999) Principles of Foundation Engineering –6th edition (Indian edition) Thomson Engineering
2. Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill Publishing company, Newyork.
3. Analysis and Design of Substructures – Swami Saran, Oxford and IBH Publishing company Pvt Ltd (1998).
4. Geotechnical Engineering by S. K.Gulhati & Manoj Datta – Tata Mc.Graw Hill Publishing company New Delhi. 2005.
5. Teng,W.C – Foundation Design , Prentice Hall, New Jers

Department of Civil Engineering
B.Tech- 7th Semester
SYLLABUS
(Applicable for 2012-13 admitted batch)

Course Title: EARTHQUAKE RESISTANT DESIGN (ELECTIVE – III) **Course Code:**
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The student is expected to:

i). Create a strong understanding on application of single degree and multi-degree of freedom systems.
ii). Impart the knowledge on causes and effects of earthquakes.
iii). Formulate and analyze structures subjected to earthquake excitation.
iv). Familiarize with seismic codal and detailing provisions.

OUTCOMES:

On successful completion of this course, it is expected that students should be able to;

a) Analyze the free and forced vibration response of single-degree and multi-degree of freedom and continuous systems.
b) Distinguish between earthquake magnitude and earthquake damage (intensity),
c) Understand why earthquakes occur, how they are measured and categorized and the effect they may have on engineering structures. Predict the Dynamic Behavior of simple structural systems,
d) Develop an understanding of structural dynamics of simple systems subject to harmonic, impulse and/or arbitrary loading,
e) Employ the Response Spectrum Analysis Method for Earthquake resistant R/C Buildings,
f) Apply the Basic Principles of Conceptual Design for Earthquake resistant R/C Buildings. Understand the concepts and implementation of IS codes in relation to earthquake design.

UNIT – I **(9+4)**

INTRODUCTION TO STRUCTURAL DYNAMICS: – Theory of vibrations – Lumped mass and continuous mass systems –Single Degree of Freedom (SDOF) Systems – Formulation of equations of motion – Un damped and damped free vibration –Damping – Response to harmonic excitation – Concept of response spectrum.

UNIT – II **(9+4)**

MULTI-DEGREE OF FREEDOM (MDOF) SYSTEMS: - Formulation of equations of motion – Free vibration –Determination of natural frequencies of vibration and mode shapes – Orthogonal properties of normal modes – Mode superposition method of obtaining response.

UNIT – III **(13+4)**

EARTHQUAKE ANALYSIS : - Introduction – Rigid base excitation – Formulation of equations of motion for SDOF and MDOF Systems – Earthquake response analysis of single and multi-storyed buildings – Use of response spectra.

EARTHQUAKE ENGINEERING: - Engineering Seismology – Earthquake phenomenon – Causes and effects of earthquakes – Faults – Structure of earth – Plate Tectonics – Elastic Rebound Theory – Earthquake Terminology – Source, Focus, Epicenter etc - Earthquake size – Magnitude and intensity of earthquakes – Classification of earthquakes – Seismic waves – Seismic zones – Seismic Zoning Map of India – Seismograms and Accelegrams.

UNIT – IV **(10+3)**

CODAL DESIGN PROVISIONS : - Review of the latest Indian seismic code IS:1893 – 2002 (Part-I) provisions for buildings Earthquake design philosophy – Assumptions – Design by seismic coefficient and response spectrum methods – Displacements and drift requirements – Provisions for torsion.

CODAL DETAILING PROVISIONS: - Review of the latest Indian Seismic codes IS:4326 and IS:13920 provisions for ductile detailing of R.C buildings – Beam, column and joints

Text Books:

1. Dynamics of Structures – Clough & Penzien, McGraw Hill – International Edition.
2. Earthquake Resistant Design of Structures – Pankaj Agarwal & Manish Shrikhande – Printice Hall of India, New Delhi

References:

1. Dynamics of Structures by A.K.Chopra – Pearson Education, Indian Branch, Delhi.
2. Earthquake Tips by C.V.R.Murty, I.I.T. Kanpur.
3. Structural Dynamics by Mario Paaz.

IS Codes: IS: 1893, IS: 4326 and IS:13920

Department of Civil Engineering
B.Tech- 7th Semester

SYLLABUS
(Applicable for 2012-13 admitted batch)

Course Title: ENVIRONMENTAL HYDRAULICS AND ADVANCED WASTEWATER TREATMENT (Elective-III)

Course Code:
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to:

i). Learn about the horizon of the waste, like the hazardous waste from various industries and its characteristics and to get thorough knowledge of waste water treatment.
ii). Understand treatment processes adopted by industries
iii). Analyze the relative merits and economy of different waste treatment processes
iv). Learns about requirements of distribution systems
v). Identifies the merits and merits of sewerage systems.

OUTCOMES:

At the end of the course students are able to:

a) Comprehends the importance of treatment of Liquid waste from various industries.
b) Identifies liquid waste and characteristics at difference stages in various types of industries.
c) Learn about the manufacturing process of various products in industries and how the waste is treated in various industries.
d) Identifies the design requirements of distribution systems
e) Identifies the suitability of sewerage system for a given site conditions.

UNIT-I **(15)**

BASIC THEORIES OF INDUSTRIAL WASTE WATER MANAGEMENT – Volume reduction – Strength reduction – Neutralization – Equalization and proportioning. Joint treatment of industrial wastes and domestic sewage – consequent problems-

SPECIAL TREATMENT METHODS – Adsorption – Reverse Osmosis – Defluoridation – Ion exchange – Ultra Filtration- Quality requirements of boiler and cooling waters – Industrial waste water discharges into streams. Lakes and oceans and problems - Quality requirements of process water for Textiles – Food processing - and Brewery Industries – Boiler and Cooling water treatment methods.

UNIT-II **(10)**

WASTEWATER TREATMENT OF INDUSTRIAL EFFLUENTS: Textiles, Paper and Pulp industries, Tanneries, Fertilizers, Distilleries, Dairy, Sugar Mills, Steel Plants -Common Effluent Treatment Plants – Advantages and Suitability, Limitations, Effluent Disposal Methods.

UNIT-III **(10)**

DISTRIBUTION SYSTEMS: requirements – methods and layouts-Design procedures- Hardy Cross and equivalent pipe methods service reservoirs – joints, valves such as sluice valves, air valves, scour valves and check valves water meters – laying and testing of pipe lines – pump house.

UNIT-IV **(10)**

SEWAGE SYSTEM : Storm water estimation – time of concentration – storm water overflows combined flow – Design of sewers – shapes and materials – sewer appurtenances manholes –inverted siphon – catch basins – flushing tanks – ejectors, pumps and pump houses – house drainage – components requirements – sanitary fittings-traps – one pipe and two pipe systems of plumbing

Text Books:

1. Waste Water Treatment by M.N. Rao and Dutta, Oxford & IBH, New Delhi.
2. Sewage disposal and air pollution Engineering by S K Garg,
3. Water supply engineering by S K Garg, Dhanpat Rai Publishing

References:

Water Supply Engineering, Vol. 1, waste water Engineering, Vol. II, B.C.Punmia, Ashok Jain & Arun Jain, Laxmi Publications Pvt.Ltd, New Delhi.

Department of Civil Engineering
B.Tech- 7th Semester

SYLLABUS
(Applicable for 2012-13 admitted batch)

Course Title: REMOTE SENSING AND GIS APPLICATIONS (Elective-III) **Course Code:**
L: T: P: C:: 3:1:0:4

OBJECTIVES:

Learner is expected to

i). Introduce the high level understanding of Remote Sensing Techniques

ii). Explain the basic concept of GIS and different types of data representation in GIS

iii). Impart the knowledge of different data analysis techniques in GIS.

iv). Introduce the various spatial data models and data base models in GIS.

v). Discuss various applications of RS and GIS in Civil Engineering.

OUTCOMES:

At the end of the course, the student is able to:

a) Understand the basic concepts of spatial data acquisition procedures
b) Assess the quality of acquired spatial data in a quantitative way
c) Make informed and critical judgments on technical issues relating to the acquisition, storage, management, analysis and display of spatial data.
d) Understand the complexity of spatial data and their relationships with non-spatial information;
e) Appreciate and understand the spatial data and spatial analysis requirements of a remote sensing and/or GIS project;
f) Perform spatial analysis techniques on a varied range of applications in civil engineering

UNIT – I **(14+4)**

INTRODUCTION TO REMOTE SENSING: Basic concepts and foundation of remote sensing, Elements involved in remote sensing, Electromagnetic spectrum, remote sensing terminology and units, Energy resources, energy interactions with earth surface features and atmosphere and spectral properties of vegetation, soil and water bodies,

REMOTE SENSING PLATFORMS & SENSORS: Introduction, Characteristics of imaging remote sensing instruments, satellite remote sensing system - a brief over view, other remote sensing satellites, Resolution in Remote Sensing, Elements of Visual Interpretation and Basics of DIP.

UNIT – II **(12+4)**

GEOGRAPHIC INFORMATION SYSTEM: Introduction, GIS definition and terminology, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS, Applications and Advantages of GIS, Layer based GIS, Feature based GIS mapping, Functions of GIS, Process of GIS.

DATA MANAGEMENT AND METADATA CONCEPT: Introduction, Concept of Database and DBMS, Advantages of DBMS, Functions of DBMS, File and* Data Access, Data Models, Database Models, Data Models in GIS, Concept of Meta Data.

UNIT – III **(9+4)**

SPATIAL DATA MODEL: Introduction, Different dimensions of Geographic Data, Spatial Entity and Object, Spatial Data Model, Raster Data Model, Vector Data Model, Raster versus Vector, Object Oriented Data Model, File Formats of Spatial Data.

GEOSPATIAL ANALYSIS: Introduction, Geospatial Data Analysis, Integration and Modeling of Spatial Data, Geospatial Data Analysis Methods, database query, Geospatial measurements, Overlay Operations, Network Analysis, Surface Analysis.

UNIT – IV **(10+3)**

APPLICATIONS I: LULC, Agriculture, Forestry, Geology, Geomorphology, Urban Development, Flood Zone Delineation and Mapping, Ground Water Prospects and Recharge.

APPLICATIONS II: GIS data base design for physical facility planning, Decision support systems for land use planning. GIS based Highway alignment, GIS based road network planning and GIS based traffic congestion analysis, Accident investigation**,** Network Planning.

Text Books:

1. Remote Sensing and Image Interpretation by Thomas M. Lillesand, Ralph.W.Kiefer, Jonathan.W.Chipman; Fifth Edition, Wiley India Pvt Ltd
2. Remote Sensing and Geographical Information System: A.M.Chandra and S.K.Ghosh, Narosha Publications
3. Remote Sensing and Geographical Information systems by M.Anji Reddy JNTU Hyderabad 2001, B.S.Publications.
4. Remote Sensing and GIS by Basudeb Batta, 2nd Edition, Oxford University Press.

References:

1. Introduction to Remote Sensing, James B. Cambell, Taylor & Francis
2. Remote Sensing: Principles and Interpretation by Floyd F. Sabins, Third Edition
3. Geographical Information System, Volume I: Principal and Technical Issues, Edited by P.A.Longley, M.F. Goodchild, D.J. Manguire, D.W. Rhino, John Wiley & Sons
4. Geographical Information System: Volume II: Management Issues and Applications, Edited by P.A. Longley, M.F. Goodchild, D.J. Manguire, D.W. Rhino, John Wiley & Sons

Department of Civil Engineering
B.Tech- 7th Semester
SYLLABUS
(Applicable for 2012-13 admitted batch)

Course Title: AIRPORT AND HARBOUR ENGINEERING (Elective-IV) Course Code:
L: T: P: C:: 3:1:0:4

OBJECTIVES:

Learner is expected to

i). Build knowledge on airport planning and design considerations
ii). Build knowledge on runway design and its considerations
iii). Understand the requirements to plan the docks and harbors
iv). Build knowledge on design and maintain considerations of docks and harbors

OUTCOMES:

At the end of the course the learners will be able to

a) Model the airport layout with all features
b) Design runway based on terrain
c) Model the docks and harbors layout
d) Design structures and non-structures and their maintenance in docks and harbors

UNIT-I

AIRPORT PLANNING AND DESIGN: Airport site selection – Air craft characteristics – Zoning laws – Airport classification

AIRPORT DESIGN: Runway orientation – Wind rose diagram – Runway length – Taxiway design – Terminal area and Airport layout – Visual aids and Air traffic control.

UNIT- II

RUNWAY DESIGN: Various Design factors – Design methods for Flexible pavements – Design methods for Rigid pavements – LCN system of Pavement Design

RUNWAY FAILURES AND MAINTENANCE: Airfield Pavement Failures – Maintenance and Rehabilitation of Airfield pavements – Evaluation & Strenthening of Airfield pavements – Airport Drainage – surface and subsurface drainage.

UNIT- III

PLANNING AND LAYOUT SHORE STRUCTURES: Definition of Terms - Harbors, Ports, Docks, Tides and Waves, Dredging, Littoral Drift, Sounding, Area, Depth, Satellite Ports-Requirements and Classification of Harbors.

Site Selection & Selection Investigation, Shore Considerations- Proximity to Towns/Cities, Utilities, Construction Materials, Coast Lines, Dry and Wet Docks

PLANNING AND LAYOUT OFF SHORE STRUCTURES: Planning and Layouts. Terminal Facilities – Port Buildings, Warehouse, Transit Sheds, Inter-modal Transfer Facilities, Mooring Accessories

UNIT-IV

CONSTRUCTION OF DOCKS & HARBOURS: Coastal Structures- Piers, Breakwaters, Wharves, Jetties, Quays, Spring Fenders Coastal Shipping, Inland Water Transport and Container Transportation. Pipe Ways, Rope Ways

MAINTENANCE OF DOCKS & HARBOURS: Maintenance of Ports and Harbors – Navigational aids.

Text Books:

1. Airport Enginnering- Khanna & Arora- nemchand Bros, new Delhi
2. Airport engineering Virendra kumar , , Dhanpathi Rai Publishers, new Delhi
3. Docks and Harbour Engineering,Bindra S.P- Dhanpathi Rai & Sons, New Delhi

References:

1. Ashford, N. J., Mumayiz, S. A., and Wright, P. H. Airport Engineering: Planning, Design and Development of 21st Century Airports, Fourth Edition, John Wiley & Sons, New Jersey, USA, 2011.
2. Kumar, V., and Chandra, S. Air Transportation Planning and Design, Galgotia Publications Pvt. Ltd., New Delhi, India, 1999.
3. Seetharaman, S. Dock and Harbour Engineering, Umesh Publications, New Delhi, India, 1999.
4. Srinivasan, R., Harbour, Dock and Tunnel Engineering, Charotar Publishing House, Anand, India, 2009.

Department of Civil Engineering
B.Tech- 7th Semester
SYLLABUS
(Applicable for 2012-13 admitted batch)

Course Title: PAVEMENT ANALYSIS AND DESIGN (Elective-IV) **Course Code:**
L: T: P: C:: 3:1:0:4

OBJECTIVES:

i) To understand the various factors affecting in pavement design
ii) To build knowledge on design aspects and methods for flexible pavement design
iii) To build knowledge on design aspects and methods for rigid pavement design
iv) To build knowledge on types of pavement failures and maintenance solutions

OUTCOMES:

At the end of the course the learners will be able to

a) Build knowledge on the various factors affecting in pavement design
b) Design flexible pavement considering sub grade condition and axle loads
c) Design rigid pavement considering sub grade condition and axle loads
d) Discover pavement failures and their remedies

UNIT-I

ROAD FACTORS IN PAVEMENT DESIGN: Variables Considered in Pavement Design, Types of Pavements, Functions of Individual Layers, Classification of Axle Types of Rigid Chassis and Articulated Commercial Vehicles, Legal Axle and Gross Weights on Single and Multiple Units, Tire Pressure, Contact Pressure, EAL and ESWL Concepts

TRAFFIC FACTORS IN PAVEMENT DESIGN: ADT, AADT, Truck Factor, Growth Factor, Lane Distributions & Vehicle Damage Factors, Effect of Transient & Moving Loads.

UNIT- II

REQUIREMENTS AND FUNCTIONS OF FLEXIBLE PAVEMENT DESIGN: Objects and requirements of pavements-Types-Functions of pavement components

DESIGN FACTORS AND METHODS OF FLEXIBLE PAVEMENT: Flexible pavement Design methods-CBR method-IRC method-Bur mister method -IRC Method for volume Flexible Pavements

UNIT- III

RIGID PAVEMENTS DESIGN CONSIDERATIONS: Design considerations-wheel load stresses-Temperature stresses-frictional stresses-combination of stresses

DESIGN ELEMENTS AND METHODS OF FLEXIBLE PAVEMENT: Design of slabs-Design of joints-IRC method for low volume roads-Continuously Reinforced cement concrete pavements-Roller Compacted Concrete Pavements

UNIT-IV

PAVEMENT FAILURES:

Causes of pavement failures-failures in flexible pavements-alligator cracking-consolidation of pavement failures-shear failure-longitudinal cracking-frost heaving-reflection cracking-formation of waves and corrugation

REMEDIES FOR PAVEMENT FAILURES: alligator cracking-consolidation of pavement failures-shear failure-longitudinal cracking-frost heaving-reflection cracking-formation of waves and corrugation

Text Books:

1. Highway engineering by khanna & justo
2. Yoder and Witczak, Priniciples of Pavement Design, John Wiley and Sons
3. 2. Yang. H. Huang, Pavement Analysis and Design, Second Edition, Prentice Hall Inc.
4. IRC:37 & 58 Codes for Flexible and Rigid Pavements Design.

References:

1. Rajib B. Mallick and Tahar El-Korchi, Pavement Engineering – Principles and Practice, CRC Press (Taylor and Francis Group)
2. W.Ronald Hudson, Ralph Haas and Zeniswki , Modern Pavement Management, Mc Graw Hill and Co .
3. Shell Pavement Design Manual – asphalt pavements and overlays for road traffic, by Nilanjan Sarkar, Ooms Avenhorn Holding India Pvt.Ltd;
4. Relevant IRC Codes

Department of Civil Engineering
B.Tech- 7th Semester
SYLLABUS
(Applicable for 2012-13 admitted batch)

Course Title: URBAN TRANSPORTATION PLANNNING (Elective-IV) Course Code:
L: T: P: C:: 3:1:0:4

OBJECTIVES:

Learner is expected to

i). Understand urban transportation issues and to generate remedies
ii). Build knowledge on data requirement for efficient transportation planning
iii). Build knowledge on four stages of transportation planning
iv). Learn the choice of land utilization in urban transport planning

OUTCOMES:

At the end of the course the learners will be able to

a) Understand urban transportation issues and learn the solution generation
b) Build knowledge data inventory for efficient transportation planning
c) Build knowledge on requirement of four stages of transportation planning
d) Model the land utilization for urban transport planning

UNIT-I

URBAN TRANSPORTATION ISSUES: Urban Issues, Travel Characteristics, Supply and Demand – Systems approach

PROBLEMS AND SOLUTIONS: Transport Planning Process, Problem Definition, Solution Generation, Solution Analysis,

UNIT- II

DATA COLLECTION:

Collection of data – Organization of surveys and Analysis, Study Area, Zoning, Types and Sources of Data, Road Side Interviews, Home Interview Surveys, Commercial Vehicle Surveys,

INVENTORIES: Sampling Techniques, Expansion Factors, Accuracy Checks, Use of Secondary Sources, Economic data – Income – Population – Employment – Vehicle Owner Ship.

UNIT- III

FOUR STAGE DEMAND FORECASTING TRIP GENERATION AND TRIP DISTRIBUTION:

UTPS Approach, Trip Generation Analysis: Zonal Models, Category Analysis, Household Models, Trip Attraction models

Trip Distribution: Gravity Model, Growth Factor Methods of Trip Distribution, Uniform Factor Method, Average Factor Method, Fratar Growth-Factor Method

FOUR STAGE DEMAND FORECASTING MODE CHOICE ANALYSIS AND TRAFFIC ASSIGNMENT:

Mode Choice Behaviour, Competing Modes, Modal Split Model

Traffic Assignment: Basic Elements of Transport Networks, Coding, Route Properties, Path Building Criteria, Skimming Tree, All-or-Nothing Assignment

UNIT-IV

LAND USE TRANSPORTATION MODELS : Urban forms and structures, location Models, Accessibility land use models, Lowry derivative models, quick response techniques, Non transport solutions for transport problems,

CASE STUDIES: Brief Case studies of Comprehensive Traffic and Transportation problems of Indian towns /cities.

Text Books:

1. Traffic Engineering and Transport Planning - Kadiyali L.R., Khanna Publishers
2. C.S. Papacostas and P.D. Prevedouros, Transportation Engineering and Planning, Prentice Hall of India Pvt. Ltd., 2001.
3. Lecture notes on UTP - Prof. S. Raghavachari , R.E.C.Warangal.

References:

1. Introduction to Transportation Planning – M.J.Bruton; Hutchinson of London Ltd.
2. Introduction to Urban System Planning - B.G.Hutchinson; Mc Graw Hill.
3. Metropolitan transportation planning – John W. Dickey, Tata Mc Graw Hill, New Delhi, 1975.

Department of Civil Engineering
B.Tech- 7th Semester
SYLLABUS
(Applicable for 2012-13 admitted batch)

Course Title: GIS LAB **Course Code:**
L: T: P: C:: 0:0:3:2

OBJECTIVES:

Learner is expected to

i). Give hands on experience on GIS.
ii). Give hands on experience on advanced surveys.
iii). Orient them towards usage of spatial technologies
iv). Give exposure on the state of the art technologies in geomatics.

OUTCOMES:

At the end of the course the student will be able to
a) Work on ArcGIS
b) Work on Advanced Surveys
c) Work independently in using spatial technologies
d) Understand state of the art technologies in Geomatics

LIST OF EXERCISES:

1. Geo-referencing
2. Projection of Map
3. Digitization of Map/Toposheet
4. Creation of thematic maps.
5. Study of features estimation
6. Generation of Digital Elevation model
7. Generation of LULC
8. Watershed Delineation
9. Road Network Layer Analysis
10. Adding of Tables
11. Integration and working with other surveying data in GIS
12. Working with AutoCAD drawings
13. Simple Applications of GIS in Water Resources and Transportation Engineering.

REQUIRED SOFTWARE: ARCGIS

Any Eight of the above experiments to be performed.

Department of Civil Engineering
B.Tech- 7th Semester
SYLLABUS
(Applicable for 2012-13 admitted batch)

COURSE TITLE: STRUCTURAL ENGINEERING LAB **Course Code:**
L: T: P: C:: 0:0:3:2

OBJECTIVES:

Learner is expected to

i). Model, analyze and design simple steel frames subjected practical loads.
ii). Model, analyze and design steel trusses of various shapes used in the field
iii). Model, analyze the given multi storied structure.
iv). Design the reinforcement in beams, slabs and stair cases.
v). Design the reinforcement in retaining walls and water tanks.

OUTCOMES:

At the end of the course the student will be able to

a) Validate the results of analysis and design of portal frame
b) Analyze and Interpret of results of analysis of Steel trusses used in practice
c) Model, analyze and design the components of multi storied RCC framed structure
d) Interpret and cross check the reinforcement provided in the construction sites of buildings.
e) Interpret and cross check the reinforcement provided in the construction sites of retaining walls and water tanks.

EXPERIMENTS TO BE PERFORMED (MIN 8 EXPERIMENTS)
ANALYSIS AND DESIGN USING STAAD

1. Analysis and design of portal frame

2. Analysis and Interpretation of Results of Analysis of Steel trusses

3. Analysis and Interpretation of Results of Analysis of RCC Frame.

RCC WORKING DRAWINGS

Plate 1 Detailing of Continuous beams
Plate 2 Detailing of Continuous slabs and stair case
Plate 3 Detailing of flat and grid slab
Plate 4 Detailing of combined footing and retaining wall
Plate 5 Detailing of rectangular and circular water tanks

SOFTWARE REQUIRED: STAAD PRO.
All experiments are compulsory.

Department of Civil Engineering
B.Tech- 8th Semester

SYLLABUS
(Applicable for 2012-13 admitted batch)

Course Title: CONSTRUCTION COSTING AND MANAGEMENT **Course Code:**
L: T: P: C: 3:0:0:4

OBJECTIVES:

i). Learn the quantity estimation of the different components of the civil engineering structures
ii). Learn the cost estimate of the different components of the civil engineering structures.
iii). Organize and schedule of estimating work.
iv). Clearly understand the cost management discipline and process.
v). Use a cost management estimation and control plan

OUTCOMES:

At the end of the course the learners will be able to

a) Identify, analyze and solve the complex problems that deal with estimation of buildings and pavements.
b) Perform cost analysis of Civil Engineering projects.
c) Establish relationship between cost and quality of the construction process.
d) Manage and administer construction contracts.
e) Estimate the value of existing infrastructure.

PART-A

UNIT – I **(12+3)**

GENERAL ITEMS OF WORK IN BUILDING: Standard Units. Principles of working out quantities for detailed and abstract estimates. Approximate method of Estimating.
RATE ANALYSIS: Working out data for various items of work over head and contingent charges. Standard specifications for different items of building construction.

UNIT – II **(10+4)**

REINFORCEMENT BAR BENDING SCHEDULES: Reinforcement bar bending and bar requirement schedules.
VALUATION OF BUILDINGS: Valuation of various components of buildings

UNIT – III **(11+3)**

CONTRACTS: Types of contracts - Contract Documents - Conditions of contract.
PLANNING OF CONSTRUCTION PROJECTS: Planning scheduling and monitoring of building construction projects, Bar chart, CPM and PERT Network planning. Computation of times and floats – their significance.

PART-B **(12+5)**

DETAILED ESTIMATES OF BUILDINGS: Individual wall method and center line method.

TEXT BOOKS:

1. Estimating and Costing by B.N. Dutta, UBS publishers, 2000.
2. Estimating and Costing by G.S. Birdie
3. PERT and CPM – Project planning and control with by Dr.B.C.Punmia & Khandelwal – Laxmi publications.

REFERENCES:

1. Standard Schedule of rates and standard data book by public works department.
2. I. S. 1200 (Parts I to XXV - 1974/ method of measurement of building and Civil Engineering works - B.I.S.)
3. Estimation, Costing and Specifications by M. Chakraborthi; Laxmi publications.
4. National Building Code.

Department of Civil Engineering
B.Tech- 8th Semester

SYLLABUS
(Applicable for 2012-13 admitted batch)

Course Title: APPLIED SOIL MECHANICS (Elective-V) **Course Code:**
L: T: P: C: 3:1:0:4

OBJECTIVES:

Student is expected to

i). Understand soil formation and complexity of soil nature.
ii). Understand the effects of compaction and aspects of the stress strain response of soil,
iii). Develop an insight in to soil strength and deformation of soil
iv). Apply strength- deformation concepts

OUTCOMES:

At the end of this course a student will be able to

a) Describe various minerals in soil and structure of minerals
b) Apply the theory of compaction process in field works.
c) Determine the settlements due to consolidation
d) Analyse various forces in soil mass and develop strength envelopes
e) Apply the concept of strength in slope stability and compute stability of slopes.

UNIT-1

Factors influencing nature and formation of soils, Soils as multiphase materials. Complexity of soil nature. Soil Structure:- Type of bonds, Important clay minerals , Atomic and symbolic representation , Base exchange capacity, Force fields between soils particles and exchangeable ions, Guoy - Champ man diffused double layer theory, Clay structural measurement.

UNIT-2

Behavior of compacted soils- General , Effect of compaction on structure ,Swelling pressure, Shrinkage, Shear Strength, Pore Water pressure , Permeability, Comparison of dry of O.M.C & wet of O.M.C.
Immediate settlement, Methods of determination, Estimation of Preconsolidation pressure. Three dimensional consolidation, precompression of clay deposits with and without sand drains. Secondary consolidation factors.

UNIT-3

Shear strength parameters of cohesion less and saturated cohesive soils, Principles of Effective stress condition, Effect of rate of stress on shear parameters , Stress- Strain relationship , Skempton's Pore pressure coefficients, Hvorslev's true shear parameters, Effect of over consolidation on shear parameters.

UNIT-4

Elastic theories of stress distributions in soils - Boussinesq equation, Westergaard, Burmister Theories, Different conditions of loads, Constitutive relationship for soils.
Stability analysis of slope-effective vs. total stress analysis, Bishop's rigorous analysis Short method , Bishop Morgenstem stability co-efficients.

References:

1. Grim , R.E. " Clay Mineralogy"
2. Harr, M.E. Foundation of Theoretical soil Mechanics.
3. Lambe & Whitman " Soil Mechanics"
4. Scott, R.F. Principles of Soil Mechanics

Department of Civil Engineering
B.Tech- 8th Semester

SYLLABUS
(Applicable for 2012-13 admitted batch)

Course Title: DESIGN AND DRAWING OF IRRIGATION STRUCTURES **(Elective-V)**
Course Code:
L: T: P: C: 3:1:0:4

OBJECTIVES:

The leaner is expected to

i). Study the design and drawing of hydraulic Structures such as Surplus weir, Tank sluices with tower head, Canal drop, Canal regulator, under tunnel and siphon aqueduct.

ii). Relate substructure components of irrigation canals and irrigation head works.

OUTCOMES:

At the end of the course the learners will be able to

a) Identify design components of various irrigation structures
b) Create the drawings of various irrigation structures.
c) Illustrate the component parts of Hydraulic structures
d) Summarize the requirements of irrigation design engineers in large and small consulting firms, and at all levels of government and Private sectors

SYLLABUS:

1. SURPLUS WEIR.
2. TANK SLUICE WITH TOWER HEAD
3. TYPE III SYPHON AQUEDUCT.
4. TRAPEZOIDAL NOTCH FALL.
5. CANAL REGULATOR.
6. UNDER TUNNEL

Final Examination pattern: Any two questions of the above six designs may be asked out of which the candidate has to answer one question. The duration of examination will be three hours.

REFERENCES:

1. Design of minor irrigation and canal structures by C.Satyanarayana Murthy, Wiley eastern Ltd.
2. Irrigation engineering and Hydraulic structures by S.K.Garg, Standard Book House.
3. Irrigation and Water Resources & Water Power by P.N.Modi, Standard Book House.
4. Irrigation Water Management by D.K. Majundar Printice Hall of India.

Department of Civil Engineering
B.Tech- 8th Semester

SYLLABUS
(Applicable for 2012-13 admitted batch)

Course Title: RETROFITING AND REHABILITATION OF STRUCTURES (Elective-V)

Course Code:

L: T: P: C: 3:1:0:4

OBJECTIVES:

The student is expected to

i) Recognize the mechanisms of degradation of concrete structures and conduct preliminary forensic assessment of deteriorated concrete structures;
ii) Learn how to conduct field monitoring and non-destructive evaluation of concrete structures;
iii) Assess alternative repair strategies for deteriorated concrete structures including repairing with composites;
iv) Evaluate stabilizing and strengthening techniques of reinforced concrete structural elements;
v) Carry out a study on a topic related to the durability and repair of concrete structures, author a technical paper on the study and present it verbally.

OUTCOMES:

At the end of the course the learners will be able to

a) Identify the probable reasons for the deterioration of various structural members
b) Able to assess the severity of damage in the structural members
c) Choose materials and appropriate technologies for repair.
d) Identify the appropriate method for strengthening of existing members.
e) Plan for the monitoring of the new buildings by using sensor technology.

UNIT – I: **(9+4)**

STRUCTURAL DISTRESS: Introduction – Deterioration of Structures – Distress in Structures – Causes and prevention.

STRUCTURAL DAMAGE: Mechanism of Damage – Types of Damage.

UNIT – II: **(11+4)**

CORROSION AND FIRE DAMAGE: Corrosion of Steel Reinforcement – Causes – Mechanism and Prevention. Damage of Structures due to Fire – Fire Rating of Structures – Phenomena of Desiccation.

DIAGNOSIS AND DAMAGE ASSESSMENT: Inspection and Testing – Symptoms and Diagnosis of Distress - Damage assessment – NDT.

UNIT – III: **(13+4)**

DAMAGE REPAIRS: Repair of Structure – Common Types of Repairs – Repair in Concrete Structures – Repairs in Under Water Structures – Guniting – Shot Create – Underpinning.

RETROFITTING: Strengthening of Structures – Strengthening Methods – Retrofitting – Jacketing.

UNIT – IV: **(7+3)**

MONITORING: Health Monitoring of Structures – Use of Sensors

BUILDING INSTRUMENTATION: Various instruments used in for monitoring structural behavior of building.

Text Books:

1. Concrete Technology by A.R. Santakumar, Oxford University press
2. Defects and Deterioration in Buildings, E F & N Spon, London
3. Non-Destructive Evaluation of Concrete Structures by Bungey - Surrey University Press
4. Maintenance and Repair of Civil Structures, B.L. Gupta and Amit Gupta, Standard Publications.

References:

1. Concrete Repair and Maintenance Illustrated, RS Means Company Inc W. H. Ranso, (1981)
2. Building Failures : Diagnosis and Avoidance, EF & N Spon, London, B. A. Richardson, (1991)

Department of Civil Engineering
B.Tech- 8th Semester

SYLLABUS
(Applicable for 2012-13 admitted batch)

Course Title: GROUND IMPROVEMENT TECHNIQUES (Elective-VI) **Course Code:**
L: T: P: C: 3:1:0:4

OBJECTIVES:

i). Understand the modern methods of treating soils in order to improve their engineering properties.
ii). Explain the underlying principles of the different methods of ground treatment
iii). identify when such treatment may be necessary what results can be expected in different soil types

OUTCOMES:

At the end of the course the learners will be able to

a) Interpret the concepts behind a range of ground improvement and soil remediation techniques.
b) Find out the advantages, disadvantages, limitations for each ground improvement method discussed.
c) Choose appropriate techniques for a range of ground and site conditions.
d) Identify criteria to determine the applicability of each ground improvement method for a specific project and soil condition under consideration.

UNIT – I **(11+3)**

DEWATERING: Methods of de-watering - sumps and interceptor ditches - single, multi stage well points - vacuum well points - Horizontal wells - foundation drains - blanket drains - criteria for selection of fill material around drains - Electro-osmosis.

GROUTING: Objectives of grouting - grouts and their properties - grouting methods - ascending, descending and stage grouting - hydraulic fracturing in soils and rocks - post grout test.

UNIT – II **(12+5)**

IN – SITU DENSIFICATION METHODS IN GRANULAR SOILS: Vibration at the ground surface, Impact at the Ground Surface, Vibration at depth, Impact at depth.

IN – SITU DENSIFICATION METHODS IN COHESIVE SOILS: Preloading or dewatering, Vertical drains – Sand Drains, Sand wick geo drains – Stone and lime columns – thermal methods.

UNIT – III **(13+5)**

STABILISATION: Methods of stabilization – mechanical – cement – lime – bituminous - chemical stabilization with calcium chloride - sodium silicate and gypsum

EXPANSIVE SOILS: Problems of expansive soils – tests for identification – methods of determination of swell pressure - Improvement of expansive soils – Foundation techniques in expansive soils – under reamed piles.

UNIT – IV **(9+2)**

GEOSYNTHETICS : Geotextiles- Types, Functions and applications – geogrids and geomembranes – functions and applications.

REINFORCED EARTH: Principles – Components of reinforced earth – factors governing design of reinforced earth walls – design principles of reinforced earth walls.

Text Books:

1. Hausmann M.R. (1990), Engineering Principles of Ground Modification, McGraw-Hill International Edition.
2. Purushotham Raj. Ground Improvement Techniques, Laxmi Publications, New Delhi

References:

1. Moseley M.P. (1993) Ground Improvement, Blackie Academic and Professional, Boca Taton, Florida, USA.

2. Xanthakos P.P, Abramson, L.W and Brucwe, D.A (1994) Ground Control and Improvement, John Wiley and Sons, New York, USA.

3. Robert M. Koerner, Designing with Geosynthetics, Prentice Hall New Jercy, US

Department of Civil Engineering
B.Tech- 8th Semester

SYLLABUS
(Applicable for 2012-13 admitted batch)

Course Title: INTEGRATED WATERSHED MANAGEMENT (Elective-VI) **Course Code:**

L: T: P: C: 3:1:0:4

OBJECTIVES:

i). To study the factors affecting watershed
ii). To study the principles of Erosion and Sedimentation process
iii). To understand the measures to control Erosion
iv). To understand the Water Harvesting methods
v). To understand the Ecosystem Management

OUTCOMES:

At the end of the course the learners will be able to

a) learn the characteristics of watershed
b) learn the various types of Erosion and Sedimentation process
c) learn the underlying principles or measures to control Erosion
d) learn the various Water Harvesting methods
e) understand Ecosystem Management and its practical implications

UNIT – I **(11+3)**

INTRODUCTION: Concept of watershed development, objectives of watershed development, need for watershed development in India, Integrated and multidisciplinary approach for watershed management. **CHARACTERISTICS OF WATERSHED:** size, shape, physiography, slope, climate, drainage, land use, vegetation, geology and soils, hydrology and hydrogeology, socio-economic characteristics, basic data on watersheds.

UNIT – II **(12+5)**

PRINCIPLES OF EROSION: Types of erosion, factors affecting erosion, effects of erosion on land fertility and land capability, estimation of soil loss due to erosion, Universal soil loss equation. **MEASURES TO CONTROL EROSION:** Contour techniques, ploughing, furrowing, trenching, bunding, terracing, gully control, rockfill dams, brushwood dam, Gabion.

UNIT – III **(13+5)**

WATER HARVESTING: Rainwater Harvesting, catchment harvesting, harvesting structures, soil moisture conservation, check dams, artificial recharge, farm ponds, percolation tanks. **LAND MANAGEMENT:** Land use and Land capability classification, management of forest, agricultural, grassland and wild land. Reclamation of saline and alkaline soils.

UNIT – IV: **(9+2)**

ECOSYSTEM MANAGEMENT: Role of Ecosystem, crop husbandry, soil enrichment, inter, mixed and strip cropping, cropping pattern, sustainable agriculture, bio-mass management, dry land agriculture, Silvi pasture, horticulture, social forestry and afforestation.

PLANNING AND ADMINSTRATION: Planning of watershed management activities, peoples participation, preparation of action plan, administrative requirements.

Text Books:

1. Watershed Management by JVS Murthy, - New Age International Publishers.
2. Water Resource Engineering by R.Awurbs and WP James, - Prentice Hall Publishers.

References:

1. Land and Water Management by VVN Murthy, - Kalyani Publications.
2. Irrigation and Water Management by D.K.Majumdar, Printice Hall of India.

Department of Civil Engineering
B.Tech- 8th Semester

SYLLABUS
(Applicable for 2012-13 admitted batch)

Course Title: SOLID WASTE AND ENVIRONMENTAL MANAGEMENT (Elective-VI)

Course Code:

L: T: P: C: 3:1:0:4

OBJECTIVES:

The course content enables students to:

i). Develop insight into the collection, transfer, and transport of municipal solid waste.
ii). Explain the design and operation of a municipal solid waste landfill.
iii). Examine the design and operation of a resource recovery facility.
iv). Summarize the design and operation of a waste-to-energy facility

OUTCOMES:

At the end of the course students are able to :

a) Understand the implications of the production, resource management and environmental impact of solid waste management;
b) Assimilate the significance of recycling, reuse and reclamation of solid wastes;
c) be familiar with relationships between inappropriate waste management practices and impacts on water, soil and sediment quality;
d) Appreciate the current practices available and implement the systems available in solid waste management;
e) be capable of carrying out an assessment of the relationships between environmental guidelines, human activities and environmental quality of impacted soils and water;
f) Integrate technical solid waste management options and imposed environmental legislation and guidance to develop legal and safe solutions.

UNIT-I **(13)**

SOLID WASTE MANAGEMENT: – sources, composition and properties of solid waste – collection and handling – separation and processing

SOLID WASTE DISPOSAL METHODS: Land filling – Incineration composting

UNIT-II **(10)**

ENVIRONMENTAL IMPACT ASSESSMENT: Hazardous Waste –Biomedical wastes –Control methods-Impact Assessment - Methodologies-Impacts on water-air-soil-biological environments-Quality indices

UNIT-III **(13) AUDIT**

AND LEGISLATIONS: Environmental Audit & Environmental legislation objectives of Environmental Audit, Types of environmental Audit, Audit-protocol, stages of Environmental Audit, onsite activities, evaluation of Audit data and preparation of Audit report - Post Audit activities

UNIT – IV **(9)**

POLLUTION ACTS AND REGULATORY BODIES: The Environmental pollution Act, The water Act, The Air (Prevention & Control of pollution Act.), Bio medical waste Rules, Solid Waste Management Rules, Hazardous Waste Management Rules, ISO 14000 series – Quality management – case studies on EIA, Audit and ISO series

Text Books:

1. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B.S. Publication, Sultan Bazar, KAKINADA.
2. Environmental Science and Engineering, by Suresh K. Dhaneja – S.K.,Kataria & Sons Publication., New Delhi.

References:

1. Environmental Engineering, by H S Peavy, L Rowe and G Tchobanoglous, Mc Graw Hill Publications.
2. Environmental Pollution and Control, by Dr H.S. Bhatia – Galgotia Publication (P) Ltd, Delhi

Department of Civil Engineering

B.Tech (Civil Engineering)

COURSE STRUCTURE

(Applicable for 2013-14 admitted batches)

B.Tech - 5th Semester

Code	Course	Theory	Practical	Credits
	Elements of Reinforced Concrete Design	3+1*	-	4
	Environmental Engineering	3+1*	-	4
	Methods of Structural Analysis	3+1*	-	4
	Transportation Engineering	3+1*	-	4
Elective-I				
	1. Geomatics 2. Finite Element methods in Civil Engineering. 3. Building Technology	3+1*	-	4
	Building Planning and AutoCAD Lab	-	3	2
	Transportation Engineering Lab		3	2
	Term paper/Mini project		3	2
	Total	20	9	26

B.Tech- 6th Semester

Code	Course	Theory	Practical	Credits
	Design of Steel Structures	3+1*	-	4
	Hydrology and Irrigation Engineering	3+1*	-	4
	Soil Mechanics	3+1*	-	4
Elective-II				
	1. Air and Noise pollution 2. Airport and Harbor Engineering 3. Solid Waste and Environmental Management	3+1*	-	4
Elective- III (Open elective)				
	Cloud Computing (IT); Disaster Management(Civil) Fundamentals of GPS(ECE), Ind. Safety and Hazards Operation Research (ME) Renewable Energy (EEE), Soft Computing (CSE)	3+1*	-	4
	Environmental Engineering Lab	-	3	2
	Soil Mechanics Lab	-	3	2
	Mini Project/Term paper	-	-	2
	Audit Course	-	-	-
	Total	20	6	26

***Tutorial**

Department of Civil Engineering

B.Tech (Civil Engineering)

COURSE STRUCTURE

(Applicable for 2013-14 admitted batches)

B.Tech- 7th Semester

Code	Course	Theory	Practical	Credits
	Foundation Engineering	3+1*	-	4
	Hydraulic Structures	3+1*	-	4
	Elective-IV			
	4. Design of Reinforced concrete Structures 5. Earthquake Resistant Design 6. Retrofitting and Rehabilitation of Structures	3+1*	-	4
	Elective- V			
	1.Pavement Analysis and Design 2. Construction Costing Management. 3. Ground improvement Techniques.	3+1*	-	4
	Geomatics Lab	-	3	2
	Software Applications in Civil Engineering Lab	-	3	2
	Total	16	6	20

***Tutorial**

B.Tech- 8th Semester

Code	Course	Theory	Practical	Credits
	Full semester Industrial Internship			20

Department of Civil Engineering
B.Tech- 5th Semester

SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: ELEMENTS OF REINFORCED CONCRETE DESIGN

Course Code:
L: T: P: C:: 3:1:0:4

OBJECTIVES:

This course enables the student
i) To learn design principles of Working stress and Limit state Designs as per IS: 456-2000
ii) To know the design parameters of singly reinforced, doubly reinforced, flanged beam elements for flexure as well as their load carrying capacities.
iii) To design beam element subjected to shear, torsion and bond.
iv) To know the design parameters of short and long columns subjected axial load, axial load and moments using SP: 16 charts
v) To know the design parameters of slabs and footings.
vi) To check for Limit state of serviceability

OUTCOMES:

At the end of the course student will be able to
At the end of the course student will be able to
a) **Design** a singly reinforced concrete beam of rectangular cross section by using Working Stress Design philosophy.
b) **Apply** IS: 456-2000, codal requirements of limit state philosophy related to shear bond, torsion and **Design** singly, doubly reinforced beams of rectangular, T and L cross sections.
c) Design long and short rectangular and circular columns subjected to axial load, uniaxial and biaxial moments as per IS: 456-2000
d) **Design** the isolated rectangular and combined footing subjected to axial load, axial load and moment as per IS: 456-2000
e) **Design** one way and two way slabs as per IS: 456-2000
f) **Compute** the deflections under serviceability criteria as per IS: 456-2000

UNIT –I: **(8+2)**

WORKING STRESS DESIGN: Introduction- Materials, recommendation of IS 456 – 2000, elastic theory, design constants; singly reinforced beam.

INTRODUCTION OF LIMIT STATE DESIGN: Concepts of limit state design – Basic statistical principles – Characteristic loads –Characteristic strength – Partial load and safety factors – representative stress-strain curves for cold worked deformed bars and mild steel bars. Assumptions in limit state design – stress - block parameters – limiting moment of Resistance

UNIT –II: **(12+5)**

BEAMS: Limit state analysis and design of singly reinforced, doubly reinforced, T and L beam sections.

SHEAR, TORSION AND BOND: Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length, I.S. code provisions.

UNIT – III: **(13+5)**

COLUMNS: Short and Long columns – under axial loads, uniaxial bending and biaxial bending – Braced and un-braced columns – I S Code provisions.

FOOTINGS: Different types of footings – Design of isolated, square, rectangular and circular footings.

UNIT – IV: **(12+3)**

SLABS: Design of Two-way slabs, one way slab

DEFLECTION: Limit state design for serviceability for deflection, cracking and codal provision.

NOTE: All the designs to taught in Limit State Method. Following plates should be prepared by the students.

1. Reinforcement particulars of simply supported, cantilever-beams.
2. Reinforcement detailing of T and L-beams
3. Reinforcement particulars of columns and footings.
4. Detailing of One way, two way slabs

FINAL EXAMINATION PATTERN:

The end examination paper should consist of Part A and Part B. part A consist of two questions in Design and Drawing out of which one question is to be answered. Part B should consist of five questions and design out of which three are to be answered. Weightage for Part – A is 40% and Part- B is 60%.

Text books:

1.Reinforced concrete design by S.UnnikrishnaPillai&DevdasMenon, Tata Mc.Graw Hill, New Delhi.
2.Reinforced concrete design by N. Krishna Raju and R.N. Pranesh, New age International Publishres, New Delhi
3.Limit State Design by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

References :

1.Fundamentals of Reinforced concrete design by M.L. Gambhir, Printice Hall of India Private Ltd., New Delhi.
2.Reinforced concrete structural elements – behaviour, Analysis and design by P.Purushotham, Tata Mc.Graw-Hill, 1994.
3.Reinforced concrete structures, Vol.1, by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt.Ltd., New Delhi
4.Limit state designed of reinforced concrete – P.C.Varghese, Printice Hall of India, New Delhi.

Department of Civil Engineering
B.Tech- 5th Semester

SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: ENVIRONMENTAL ENGINEERING

Course Code:
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to:

i) Develop overall technical competence in the students for understanding the concepts of the subject and enabling them to address the industry problems
ii) Update students knowledge in planning, design, construction, operation and maintenance aspects of water supply and sewerage systems.
iii) Reinforce management skills with regard to sustainable water supply and sewerage facilities.
iv) Provide theoretical background and practical expertise in the field of water supply and sewerage engineering.

OUTCOMES :

At the end of the course the learners will be able to

a) List the factors affecting water supply and wastewater generation
b) Understand the various types of water and wastewater characteristics
c) Design water and wastewater systems
d) Analyze available disposal options and their practical implications

UNIT – I: **(11+3)**

WATER SOURCES AND QUALITY

Introduction: Waterborne diseases – protected water supply – Population forecasts, design period – water demand – factors affecting – fluctuations – fire demand – storage capacity – water quality and testing – drinking water standards. Sources of water: Comparison from quality and quantity and other considerations – intakes

UNIT – II: **(12+5)**

DESIGN OF WATER TREATMENT UNITS

Layout and general outline of water treatment units – sedimentation – principles – design factors – coagulation-flocculation, clarifier design – coagulants – feeding arrangements, Filtration – theory – working of slow and rapid gravity filters – multimedia filters – design of filters – troubles in operation, comparison of filters – disinfection – theory of chlorination, chlorine demand, other disinfection practices- Miscellaneous treatment methods-water softening.

UNIT – III **(13+5)**

SEWAGE QUALITY AND DESIGN OF SEWAGE TREATMENT UNITS

Conservancy and water carriage systems –characteristics of sewage – B.O.D. – C.O.D. equations. ultimate disposal of sewage –dilution-Self purification of rivers - Layout and general outline of various units in a waste water treatment plant – primary treatment design of screens – grit chambers – skimming tanks – sedimentation tanks – principles of design – biological treatment – trickling filters – standard and high rate.

UNIT – IV: **(9+2)**

SLUDGE HANDLING AND DESIGN OF PONDS

Concept of ponds-Construction and design of anaerobic and oxidation ponds - Sludge digestion – factors effecting – design of Digestion tank – Sludge disposal by drying – Other options-septic tanks working principles and design – soak pits.

Text Books:

1. Water Supply Engineering, Vol. 1, Wastewater Engineering, Vol. II, B.C. Punmia, Ashok Jain &Arun Jain, Laxmi Publications Pvt. Ltd, New Delhi

2. Water supply and Sanitary Engineering by G.S. Birdi, DhanpatRai& Sons Publishers.

3. Elements of Environmental Engineering by K.N. Duggal, S. Chand Publishers

References:

1. Water and Waste Water Technology by Mark J Hammer and Mark J. Hammer Jr.
2. Waste water treatment- concepts and design approach by G.L. Karia and R.A. Christian, Prentice Hall of India
3. Unit operations in Environmental Engineering by R. Elangovan and M.K. Saseetharan, New age India Publishing

Department of Civil Engineering
B.Tech- 5th Semester

SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title : METHODS OF STRUCTURAL ANALYSIS

Course Code:
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to:

i) Become proficient in applying the classical methods of analysis with speed and accuracy
ii) Understand the concept used in the structural analysis software.
iii) Use updated structural analysis software in solving indeterminate structures
iv) Submit accurate analysis in an efficient and professional way
v) Preparing student to Identify the relevant method for the analysis

OUTCOMES :

At the end of the course student will be able to

a) Analyze three /two hinged arches and obtain internal forces at any cross section.
b) Determine design forces in arches subjected to concentrated, distributed and varying loads.
c) Determine the forces in indeterminate frames subjected to lateral loads by using approximate methods of analysis.
d) Solve statically indeterminate beams and frames using classical methods.
e) Evaluate the suitability of classical methods for a given structure and loading.
f) Utilize modern structural analysis software

UNIT – I: **(12+4)**

THREE HINGEDARCHES:

Elastic theory of arches – Eddy's theorem – Determination of horizontal thrust, bending moment, normal thrust and radial shear – effect of temperature.**(5)**

TWO HINGED ARCHES: Determination of horizontal thrust bending moment, normal thrust and radial shear – Rib shortening and temperature stresses, **(6)**

UNIT – II: **(10+3)**

APPROXIMATE METHOD OF STRUCTURAL ANALYSIS: Application to building frames. (i) Portal method (ii) Cantilever method.**(5)**

SLOPE DEFLECTION METHOD: Derivation of slope deflection equation of supports application to continuous beams including settlement of supports.**(5)**

UNIT – III: **(13+4)**

MOMENT DISTRIBUTION METHOD – Stiffness and carry over factors – Distribution factors – Analysis of continuous beams with and without sinking of supports – storey portal frames – including Sway.**(7)**

KANI'S METHOD – including settlement of supports and single bay portal frames with side sway by Kani's method.**(6)**

UNIT – IV: **(10+4)**

FLEXIBILITY METHOD: Introduction, application to continuous beams including support settlements (maximum of two unknowns) **(5)**

STIFFNESS METHOD: Introduction, application to continuous beams including support settlements. (maximum of two unknowns) **(5)**

Text Books:

1. Analysis of structures– Vol. I & 2 by Vazrani&Ratwani – Khanna Publications
2. Analysis of Structures by Bhavikatti, Vikas publications
3. Structural Analysis (Matrix Approach) by Pundit and Gupta – Tata Mc.Graw Hill publishers.

References :

1. Strength of Materials and mechanics of solids Vol-2 by B.C. Punmia, Laxmi Publications, New Delhi
2. Structural Analysis by C.S. Reddy, Tata Macgrawhill, New Delhi
3. Theory of structures by Ramamuratam

Department of Civil Engineering
B.Tech- 5th Semester

SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: TRANSPORTATION ENGINEERING

Course Code:
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to:

i). To learn highway alignment and design aspects of
ii). To Identify traffic problems and to regulate and manage the traffic.
iii). To Build knowledge on highway materials,construction and maintenance
iv). To Build knowledge on railway track components and design

OUTCOMES:

At the end of the course the Students will be able to:

a) Understand to fix ideal alignment and design of highway
b) Identify traffic problems and give measures to regulate the traffic
c) Build knowledge on highway materials quality, construction and maintenance
d) Adapt railway engineering terminology, basics and build knowledge on track geometric design

UNIT – I:

HIGHWAY DEVELOPMENT AND ALIGNMENT

Highway development in India - Classification of Roads- Road Network Patterns –Highway Alignment- Factors affecting Alignment- Engineering Surveys

HIGHWAY GEOMETIC DESIGN:

Importance of Geometric Design- Design controls and Criteria- Highway Cross Section Elements- Sight Distance Elements-Stopping sight Distance, Overtaking Sight Distance and Intermediate Sight Distance- Design of Horizontal Alignment-Design of Super elevation and Extra widening- Design of Transition Curves- Vertical curves.

UNIT – II

TRAFFIC ENGINEERING AND MANAGEMENT:

Basic Parameters of Traffic-Volume, Speed and Density- Traffic Volume Studies-Speed studies-Parking Studies - Road Accidents-Causes and Preventive measures- Traffic Signs and Road markings

INTERSECTION DESIGN:

Types of Intersections: At grade and grade separated – Need for channelization Islands-
Design of Traffic Signals –Webster Method – Design of Rotary Intersection –Advantages and Disadvantages of Rotary Intersection

UNIT – III

HIGHWAY MATERIALS AND CONSTRUCTION & MAINTENANCE: Highway materials: Aggregate properties and tests, Bitumen properties and tests. Highway Construction: Earthen roads, WBM roads, bituminous roads and Cement Concrete Roads.
Highway Drainage: Surface and Sub surface Drainage System.
HIGHWAY MAINTENANCE: Failure of Flexible and Rigid pavements and their maintenance.

UNIT – IV

INTRODUCTION TO RAILWAY ENGINEERING:

Permanent way components -Cross Section of Permanent Way - Functions of various Components like Rails, Sleepers and Ballast -Rail Fastenings -Creep of Rails- Adzing of Sleepers- Sleeper density.

GEOMETRIC DESIGN OF RAILWAY TRACK:

Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency -Degree of Curve - Crossings and Turn outs.

Text Books:

1. Highway Engineering – S.K.Khanna & C.E.G.Justo, Nemchand & Bros., 7th edition (2000).
2. Highway Engineering Design – L.R.Kadiyali and Lal- Khanna Publications
3. Traffic engineering- L.R.Kadiyali, Khanna publishers
4. Railway Engineering by S.C Saxena and S.P. Arora, Dhanpat Rai Publications, N.Delhi.

References:

1. Railway Engineering , A text book of Transportation Engineering -S.P.chadula -S.Chand & Co. Ltd. (2001).
2. Railway Engineering ,August , Prabha & Co., 15th Edition , 1994.

Department of Civil Engineering
B.Tech- 5th Semester

SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: GEOMATICS (Elective-I) **Course Code:**
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to:

i) Introduce the high level understanding of Remote Sensing Techniques

ii) Explain the basic concept of GIS and different types of data representation in GIS

iii) Impart the knowledge of different data analysis techniques in GIS.

iv) Introduce the various spatial data models and data base models in GIS.

v) Discuss various applications of RS and GIS in Civil Engineering.

OUTCOMES:

At the end of the course, the student is able to:

a) Understand the basic concepts of spatial data acquisition procedures
b) Assess the quality of acquired spatial data in a quantitative way
c) Make informed and critical judgments on technical issues relating to the acquisition, storage, management, analysis and display of spatial data.
d) Understand the complexity of spatial data and their relationships with non-spatial information;
e) Appreciate and understand the spatial data and spatial analysis requirements of a remote sensing and/or GIS project;
f) Perform spatial analysis techniques on a varied range of applications in civil engineering

UNIT – I: **(14+4)**

INTRODUCTION TO REMOTE SENSING: Basic concepts and foundation of remote sensing, Elements involved in remote sensing, Electromagnetic spectrum, remote sensing terminology and units, Energy resources, energy interactions with earth surface features and atmosphere and spectral properties of vegetation, soil and water bodies,

REMOTE SENSING PLATFORMS & SENSORS: Introduction, Characteristics of imaging remote sensing instruments, satellite remote sensing system - a brief over view, other remote sensing satellites, Resolution in Remote Sensing, Elements of Visual Interpretation and Basics of DIP.

UNIT – II: **(12+4)**

GEOGRAPHIC INFORMATION SYSTEM: Introduction, GIS definition and terminology, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS, Applications and Advantages of GIS,Layer based GIS, Feature based GIS mapping, Functions of GIS, Process of GIS.
DATA MANAGEMENT AND METADATA CONCEPT: Introduction,Concept of Database and DBMS, Advantages of DBMS, Functions of DBMS, File and Data Access, Data Models, Database Models, Data Models in GIS, Concept of Meta Data.

UNIT – III **(9+4)**
SPATIAL DATA MODEL: Introduction, Different dimensions of Geographic Data, Spatial Entity and Object, Spatial Data Model, Raster Data Model, Vector Data Model, Raster versus Vector, Object Oriented Data Model, File Formats of Spatial Data.

GEOSPATIAL ANALYSIS: Introduction, Geospatial Data Analysis, Integration and Modeling of Spatial Data, Geospatial Data Analysis Methods, database query, Geospatial measurements, Overlay Operations, Network Analysis, Surface Analysis.

UNIT – IV: **(10+3)**
GLOBAL POSITIONING SYSTEM: Introduction, elements of satellite surveying, the global positioning system, GPS satellites, adjustment computations, GPS observables.

APPLICATIONS: LULC, Agriculture, Forestry, Geology, Geomorphology, Urban Development, Flood Zone Delineation and Mapping, Ground Water Prospects and Recharge.GIS data base design for physical facility planning, Decision support systems for land use planning. GIS based Highway alignment, GIS based road network planning and GIS based traffic congestion analysis, Accident investigation**,** Network Planning.

Text Books:

1. Remote Sensing and Image Interpretation by Thomas M. Lillesand, Ralph.W.Kiefer, Jonathan.W.Chipman; Fifth Edition, Wiley India Pvt Ltd
2. Remote Sensing and Geographical Information System: A.M.Chandra and S.K.Ghosh, Narosha Publications
3. Remote Sensing and Geographical Information systems by M.Anji Reddy JNTU Hyderabad 2001, B.S.Publications.
4. Remote Sensing and GIS by BasudebBatta, 2nd Edition, Oxford University Press.
5. GPS Satellite Surveys, Alfred Leick, Willey & Sons.

References:

1. **Introduction to Remote Sensing,** James B. Cambell, Taylor & Francis
2. Remote Sensing: Principles and Interpretation by Floyd F. Sabins, Third Edition
3. **Geographical Information System, Volume I:** Principal and Technical Issues, **Edited by** P.A. Longley, M.F. Goodchild, D.J. Manguire, D.W. Rhino, John Wiley & Sons
4. **Geographical Information System: Volume II:** Management Issues and Applications, **Edited by** P.A. Longley, M.F. Goodchild, D.J. Manguire, D.W. Rhino, John Wiley & Sons

Department of Civil Engineering
B.Tech- 5th Semester

SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: FINITE ELEMENT METHODS IN CIVIL ENGINEERING (Elective-I)

Course Code:
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to :

i) To Understand the fundamental ideas of the FEM
ii) To Know the behavior and usage of each type of elements covered in this course
iii) To prepare a suitable FE model for structural mechanical analysis problems
iv) To interpret and evaluate the quality of the results (know the physics of the problems)
v) To be acquaint with the limitations of the FEM being it to be a numerical tool.

OUTCOMES:

At the end of the course the learners will be able to

a) Idealize given structure with mathematical modeling and boundary conditions.
b) Model the given structure with suitable elements.
c) Conceptualize the Finite Element Analysis (FEA) procedure.
d) Apply FEA procedure to 1-dimensional structures bars, trusses, plane stress and plane strain conditions using triangular and rectangular elements.
e) Evaluating the suitability of type of element and methods of discretization.
f) Set up and solve 1-D, 2-D, and 3-D structural problems using contemporary finite element software.
g) Interpret results obtained from FEA software solutions, not only in terms of conclusions but also awareness of limitations.

UNIT –I **(12+4)**

INTRODUCTION: CONCEPTS OF FEM – Steps involved – merits & demerits – energy principles – Discretization – Rayleigh –Ritz method of functional approximation.

PRINCIPLES OF ELASTICITY: Equilibrium equations – strain displacement relationships in matrix form – Constitutive relationships for plane stress, plane strain and Axi-symmetric bodies of revolution with axi-symmetric loading.

UNIT –II **(11+3)**

ONE DIMENSIONAL FEM : Stiffness matrix for bar element - shape functions for one dimensional elements – one dimensional problems.

UNIT –III **(12+4)**

TWO DIMENSIONAL FEM : Different types of elements for plane stress and plane strain analysis – Displacement models –generalized coordinates – shape functions – convergent and compatibility requirements – Geometric invariance – Natural coordinate system – area and volume coordinates

UNIT –IV **(10+4)**

Generation of element stiffness and nodal load matrices for 3-node triangular element and four node rectangular elements.

ISOPARAMETRICFORMULATION:– Concepts of, isoparametric elements for 2D analysis -formulation of CST element, 4 –noded and 8-noded iso-parametric quadrilateral elements –Lagrangian and Serendipity elements.

Text Book:

1. Finite Elements Methods in Engineering by Tirupati.R. Chandrepatla and Ashok D. Belegundu - Pearson Education Publications.
2. Finite element analysis by S.S. Bhavakatti-New age international publishers
3. .Finite element analysis by David V Hutton, Tata Mcgraw Hill, New Delhi

References:

1. Concepts and Applications of Finite Element Analysis by Robert D.Cook, David S. Malkus and Michael E.Plesha. Jhon Wiley & Sons.
2. Finite Element analysis – Theory & Programming by C.S.Krishna Murthy- Tata Mc.Graw Hill Publishers.
3. Text book of Finite Element analysis by P.Seshu – Prentice Hall of India.

B.Tech- 5th Semester

SYLLABUS

(Applicable for 2013-14 admitted batch)

Course Title: BUILDING TECHNOLOGY(Elective-I) **Course Code:**

L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to:

i). Get an idea about building drawing standards in various phases of a project.
ii). Know the detailing in building construction.
iii). Understand about planning of various buildings like residential, educational, office buildings and hospital buildings.
iv). To know about the project planning and management techniques.

OUTCOMES:

At the end of the course the learners will be able to

a) Know the various building bye-Laws laid by town planning authorities and local regulatory bodies for planning various buildings like residential, educational, office buildings and hospital buildings.
b) Know about the techniques for project planning and management.
c) Understand the building drawing standards in various phases of a project.
d) Understand the detailing in building construction.

UNIT – I:

BUILDING BYELAWS AND REGULATIONS: Introduction – Terminology – Objectives of building byelaws.Principles underlying building byelaws.Classification of buildings.Floor Area Ratio (FAR). Floor Space Index (FSI). Open space requirements. Builtup area limitations.Height of Buildings.Wall thickness.Lighting and ventilation requirement.

UNIT – II:

PLANNING OF CONSTRUCTION PROJECTS: Planning scheduling and monitoring of building construction projects, Bar chart, CPM and PERT Network planning.Computation of times and floats – their significance.

UNIT – III

RESIDENTIAL BUILDINGS: Minimum standards for various parts of buildings. Requirementsof different rooms and their grouping.Characteristicsof various types of residential buildings.

UNIT – IV:

PUBLIC BUILDINGS: Planning of Educational institutions, hospitals, dispensaries, office buildings, banks, industrial buildings, hotels and motels, buildings for recreation.

Text Books:

1. Construction Planning, Equipment and methods by R.L. Peurifoyetal. – Tata Mc. Graw Hill Publications.
2. PERT and CPM – Project planning and control with by Dr.B.C.Punmia&Khandelwal – Laxmi publications.
3. 'A' Series & 'B' Series of JNTU Engineering College, Anantapur,

References:

1.Building by laws by state and Central Governments and Municipal corporations
2. Planning, Designing and scheduling – Girescharan Singh &Jagadish Singh.

Department of Civil Engineering
B.Tech- 5th Semester

SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: BUILDING PLANNING AND AUTOCAD LAB **Course Code:**
L: T: P: C:: 0:0:3:2

OBJECTIVES:
The course content enables students to:

i) Plot the layout of building for a given details
ii) Create multi-view drawings (orthographic projections).
ii) Draw section views.
iv)Create shapes and symbols for different uses.
v) Create and manage symbols libraries.

OUTCOMES:
At the end of the course student will be able to

a) Create, display, and plot working drawings.
b) Use layering techniques.
c) Construct technical drawings using a standard computer aided drafting program.
d) Identify, operate and adjust input and output devices.
e) Demonstrate file management techniques.

LIST OF EXERCISES:

1. Using CAD software draw & print the following drawings.

1.1 Draw conventional signs as per I.S. standards , symbols used in civil engineering drawing.

1.2 Draw the important joinery components of the building like elevation of fully panelled double leaf door, elevation of partly glazed and partly panelled window.

1.3 Prepare the king post & Queen post truss and lable the various parts.

2 Residential buildings.

2.1 Plan, Elevation, Section of single roomed building

2.2 Single storied Two bed room residential building.

3 Structural detailing drawings

3.1 Lintel cum Sunshade
3.2 Continuous Beam.
3.3 Isolated Column with square footing

4 Drawings to be submitted for approval to corporation or municipality showing required details in one sheet such as

4.1 Plan – Showing Dimensions of all rooms.
4.2 Section – showing Specifications and Typical Foundation Details.
4.3 Elevation.
4.4 Site Plan – Showing Boundaries of Site and Plinth Area
4.5 Key plan – Showing the location of Building.
4.6 Title Block – Showing signature of Owner & Licensed surveyor's.

Department of Civil Engineering
B.Tech- 5th Semester

SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: TRANSPORTATION ENGINEERING LAB

Course Code:

L: T: P: C:: 0:0:3:2

OBJECTIVES:
The course content enables students to:
i) Conduct tests and Evaluate the quality of aggregates used in the road construction
ii) Conduct tests and Evaluate the quality of bitumen used in the road construction
iii) Analyze and comprehend he data pertaining to traffic volume studies.

OUTCOMES:
At the end of course student will be able to
a) Know the behavior of Road Aggregates
b) Know the behavior of Bituminous materials
c) Know the Traffic volume counts

LIST OF EXERCISES:

I. ROAD AGGREGATES:
1. Aggregate Crushing value
2. Aggregate Impact Test.
3. Specific Gravity and Water Absorption.
4. Attrition Test
5. Abrasion Test.
6. Shape tests

II. BITUMINOUS MATERIALS:
1. Penetration Test.
2. Ductility Test.
3. Softening Point Test.
4. Flash and fire point tests.

III. TRAFFIC VOLUME STUDIES:
1. Traffic volume study at mid blocks and intersection.
2. Spot Speed Studies.
3. Parking Studies.

Department of Civil Engineering
B.Tech- 6th Semester
SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: DESIGN OF STEEL STRUCTURES **Course Code:**
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to:

i). Understand the fundamental principles and procedures of structural steel design;
ii). Understand the versatility of Steel structures based on requirement
iii). Apply the principles of steel design to real world problems;
iv). Design basic steel members subjected compression, tension and bending as per IS 800 codal
v). Provisions

OUTCOMES:

At the end of the course the learners will be able to

a) Apply the basic requirements of the IS design specifications.
b) Apply the concepts of strain compatibility and equilibrium concepts to determine the strength of members made of steel
c) Design for welded connections between steel members
d) Design simple steel members subjected compression, tension bending and their combinations

UNIT – I

MATERIALS AND CONNECTIONS: **(11+4)**

Properties of Structural Steel, I. S. Rolled Sections, I. S. Specifications,

Welded connections: Introduction, Advantages and disadvantages of welding- Strength of welds-Butt and fillet welds: Permissible stresses – IS Code requirements. Design of welds fillet weld subjected to moment acting in the plane and at right angles to the plane of the joints, beam to beam and beam to Column connections only.

DESIGN OF TENSION MEMBERS :

Introduction to different modes of failures – gross section yielding, Net Section rupture and block shear failure. Determines the design strength due to yielding of gross section, rupture of critical section and block shear. Design procedure of tension members.(simple problems)

COMPRESSION MEMBERS: Effective length of columns. Slenderness ratio – permissible stresses. Design procedure of compression members – problems on simple sections only (no builtup sections).

UNIT – II **(11+4)**

BEAMS: Allowable stresses, design requirements as per IS Code-Design of simple and compound beams, check for deflection, shear, buckling, check for bearing, laterally supported beams only.

DESIGN OF BUILT UP COLUMNS: Necessity & design of built up columns, laced and battened columns including the design of lacing and battens.

FOUNDATIONS: Column bases: Slab base, Gusset base.

UNIT–III **(11+4)**

PLASTIC ANALYSIS: Introduction, plastic hinge concept, plastic modulus, shape factor, upper and lower hound theorems, collapse mechanisms, combined mechanism, plastic analysis of beams and portal frames by equilibrium and mechanism methods.

PLATE GIRDER: Introduction, elements of plate girder, design steps of a plate girder, necessity of stiffeners in plate girder, various types of stiffeners, web and flange splices (only introduction),

UNIT – IV **(11+4)**

GANTRY GIRDERS: Introduction, various loads, specifications, design of gantry girder.

DESIGN OF MEMBERS OF ROOF TRUSS: Design of purlins ONLY. Introduction to pre-engineered structures, concepts and advantages, disadvantages.

Note: All the designs should be taught in the limit state design method as per IS 800-2007.weilding connections to be used.

DRAWINGS: 1. Detailing of built up columns, laced and battened columns
2. Detailing of Plate girder including curtailment, splicing and stiffeners.
3.Detailing of Gantry girder including curtailment, splicing and stiffeners
4. Roof truss.

These codes and steel tables are permitted in the examinations.

IS Codes:

1) IS -800 – 2007
2) IS – 875 – Part III
3) Steel Tables.

Text Books:

1.Design of Steel structures – N. Subramanian, Oxford University Press.
2. Design of steel structures by S.K. Duggal, Tata Mcgraw Hill, New Delhi
3. Design of steel structures – Ramchandra (Vol. I & II)
4. Structural Design and Drawing by N.KrishnaRaju; University Press, KAKINADA

References:

1. Limit State Design of steel structures IS: 800-2007-V.L. Shah and Veena Gore, Structures Publications, Jai – Tarang, 36 Parvati, Pune.
2..Design of steel structures by Limit State Method as per IS: 800-2007 – S.S. Bhavikatti IK Internatinoal Publishing House, Bangalore – 560 001..
3. Structural design in steel by SarwarAlamRaz, New Age International Publishers, New Delhi
4. Design of Steel Structures by P.Dayaratnam; S. Chand Publishers
5. Design of Steel Structures by M.Raghupathi, Tata Mc. Graw-Hill.

Department of Civil Engineering
B.Tech- 6th Semester
SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: HYDROLOGY AND IRRIGATION ENGINEERING

Course Code:
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to:

i). Understand Hydrology and hydrologic cycle, Classification of Precipitation, estimation of missing rain fall data,
ii). Learn about unit hydrograph, estimation of hydrograph of different storm durations by using unit hydrograph and Synthetic hydrograph.
iii). Learn about the Geological formation of the aquifers radial flow to wells in confined and unconfined aquifers.
iv). Understand the Necessity and Impotence of irrigation, types of Irrigation, methods of application of irrigation water, duty and delta, Soil-water-plant relationship.
v). Know about Classification of canals and design irrigation canals by Kennedys and Laceys methods and also discussed about flood routing.

OUTCOMES:

At the end of the course students will be able to

a. Identify components of hydraulic structures
b. Estimate direct run off from total rain fall, ground water recharges potential, base flow and flood discharge in the catchment area.
c. Construct Hydrograph at a particular location on the stream.
d. Calculate the inflow quantity in to the confined and unconfined wells and seepage characteristics of the ground.
e. Calculate duty and delta, depth and frequency of irrigation to improve the irrigation efficiency and design of irrigation canals suitable for different type of soils.

UNIT – I:

INTRODUCTION: Engineering hydrology and its applications, Hydrologic cycle.

PRECIPITATION: Types and forms of precipitation, rainfall measurement, types of rain gauges, rain gauge network, average rainfall over a basin, consistency of rainfall data, frequency of rainfall, intensity-duration-frequency curves, probable maximum precipitation

ABSTRACTIONS:

EVAPORATION- factors affecting evaporation, measurement of evaporation, evaporation reduction,

EVAPOTRANSPIRATION- factors affecting evapotranspiration, measurement of evapotranspiration

INFILTRATION- factors affecting infiltration, measurement of infiltration, infiltration indices.

UNIT – II:

RUNOFF: Factors affecting runoff, components of runoff, computation of runoff-rational and SCS methods, separation of base flow,

UNIT HYDROGRAPH : Definition of Unit Hydrograph, assumptions, derivation of Unit Hydrograph, unit hydrographs of different durations, principle of superposition and S-hydrograph methods, limitations and applications of UH, Synthetic Unit Hydrograph,

FLOODS AND FLOOD ROUTING: Stream gauging, direct and indirect methods, floods-causes and effects, flood frequency analysis-Gumbel's method, log Pearson type III method, flood control methods

FLOOD ROUTING-hydrologic routing, channel and reservoir routing-Muskingum and Pulse method of routing.

UNIT – III:

GROUND WATER: Occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, types of wells, Darcy's law, Dupuit's equation steady radial flow to wells in confined and unconfined aquifers, yield of a open well-recuperation test.

IRRIGATION

Necessity and Importance of Irrigation, advantages and ill effects of Irrigation, types of Irrigation, methods of application of Irrigation water, water logging and drainage, standards of quality for Irrigation water, principal crops and crop seasons, crop rotation.

UNIT – IV:

SOIL-WATER-PLANT RELATIONSHIP: vertical distribution of soil moisture, soil moisture tension, consumptiveuse, estimation of consumptive use,

DUTY AND DELTA- factors affecting duty, depth and frequency of Irrigation, irrigation efficiencies.

CANALS: Classification of canals, design of canals by Kennedy's and Lacey's theories, balancing depth of cutting, canal lining, design of lined canal, economics of canal lining.

Text Books:

1. Engineering Hydrology by K. Subramanya, TATA McGraw-HILL Education Private Limited.
2. Engineering Hydrology P. Jayaram Reddy, Laxmi publications pvt. Ltd., New Delhi
3. Irrigation and water power engineering by B.C. Punmia&Lal, Laxmi publications pvt.Ltd.,New Delhi

References:

1. Hand book of applied hydrology by VenTe Chow, Tata-McGraw Hill.
2. Hydrology by HM Raghunath, New Age International Publishers.
3. Irrigation and Water Resources & Water Power by P.N.Modi, Standard Book House.
4. Irrigation and Hydraulic structures by SK Garg, Khanna Publishers.

Department of Civil Engineering
B.Tech- 6th Semester
SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: SOIL MECHANICS

Course Code:
L: T: P: C:: 3:1:0:4

OBJECTIVES:

i). Creating awareness to student about soils and their engineering importance.
ii). Helping students in aquatinting various procedures and tests for classifying soils and develop relationships among various properties.
iii). Imparting knowledge for students about behavior of soils under various drainage Conditions.
iv). Making students to perform computations for determination of strength parameters of soil with using various theories.
v). Developing knowledge about conduct of different lab tests for determining engineering properties by simulating field conditions.

OUTCOMES:

At the end of the course student will be able to

a) Understand soil as a building material and load bearing member.
b) Understand different procedures for classifying soils.
c) Asses the influence of soil water relationship and analyze engineering behaviour of soils under different load/ drainage conditions
d) Analyze the influence of field conditions on strength and consolidation properties of soils.

UNIT-I.:

INTRODUCTION **(10 + 4)**

Introduction to Soil Mechanics and Soil Engineering; Complexity of soil nature; Soil formationand soil types.

SOIL STRUCTURE: Basic concepts of clay minerals; Soil structure and fabric.

SIMPLE SOIL PROPERTIES AND CLASSIFICATION

Basic definitions; Phase relations; Index properties; Grain size distribution; Soil aggregate properties.Indian standard soil classification system.

UNIT-II :

PRINCIPLE OF EFFECTIVE STRESS AND RELATED PHENOMENA **(12+4)**

Principle of effective stress; Capillarity; Seepage force and quicksand condition; Total, effective and neutral pressures.

PERMEABILITY: One-dimensional flow; Darcy's law; Laboratory methods for permeability determination; Field pumping tests for permeability determination; Permeability as a function of soil type, permanent, void ratio, soil fabric, and effective stress.

SEEPAGE THROUGH SOILS: Two-dimensional flow; Flow nets and their characteristics; Uplift pressure, exit gradient, and piping; Criteria for filters.

UNIT-III:

COMPACTION AND STRESS DISTRIBUTION **(10+3)**

Laboratory compaction tests; Factors affecting compaction; Structure and engineering behaviour of compacted cohesive soils; Field compaction; Compaction specifications and field control.

INTRODUCTION TO STRESS DISTRIBUTION: 2 to 1 method, Boussinesq's theory for point, circular loads and Newmarks' chart.

UNIT-IV:

CONSOLIDATION AND SHEAR STRENGTH **(13 +4)**

COMPRESSIBILITY AND CONSOLIDATION BEHAVIOUR

Components of total settlement; Effects of soil type, stress history, and effective stress on compressibility; Normally consolidated and over-consolidated soils; Terzaghi's theory of onedimensional consolidation; Time-rate of consolidation; Evaluation of compressibility and consolidation parameters from consolidometer data.

SHEAR STRENGTH: Mohr's stress circle; Mohr-Coulomb failure criterion; Laboratory tests for shear strength determination; Effective and total stress shear strength parameters; Shear strength characteristics of clays and sands.

Text Books:

1. A text book of Geotechnical Engineering by C.V.Ramaiah
2. Soil Mechanics and Foundation Engineering by B.C.Punmia

Reference Books:

1. Basics of applied soil mechanics - GopalRanjan, ASR Rao
2. Geotechnical engineering by S.K.Gulhati and ManojDatta

Department of Civil Engineering
B.Tech- 6th Semester
SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: AIR AND NOISE POLLUTION CONTROL (Elective-II) **Course Code:**
L: T: P: C:: 3:1:0:4

OBJECTIVES: The course content enables students to:

i). To study the fundamentals of air pollution and its global implication
ii). To study the various mechanisms involved in meteorological aspects of air pollution dispersion
iii). To understand the models available for predicting the air pollution dispersion
iv). To understand the principles of design of particulate control devices
v). To understand the principles of design of gaseous emission control devices
vi). To study the concepts of noise pollution and its control aspects

OUTCOMES:

At the end of the course the learners will be able to

a) learn the concepts of air pollution and its associated problems on a global scale
b) learn the influence of meteorological aspects on air pollution and its dispersion
c) design the different components of particulate and gaseous control equipment
d) understand problems of noise pollution
e) learn the basics of noise pollution and its control measures

UNIT – I: **(10+3)**

Air Pollution – Definitions, Scope, Significance and Episodes, Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary, point and Non- Point, Line and Areal Sources of air pollution- stationary and mobile sources- Effects of Air pollutants on man, material and vegetation: Global effects of air pollution – Green House effect, Heat Islands, Acid Rains, Ozone Holes – Carbon trading

UNIT – II: **(12+4)**

Meteorology and plume Dispersion; properties of atmosphere; Heat, Pressure, Wind forces, Moisture and relative Humidity, Influence of Meteorological phenomena on Air Quality-wind rose diagrams-Lapse Rates, Pressure Systems, Winds and moisture plume behaviour and plume Rise Models; Gaussian Model for Plume Dispersion.

UNIT – III: **(12+4)**

Control of particulates – Control at Sources, Process Changes, Equipment modifications, Design and operation of control Equipment's – Settling Chambers, Centrifugal separators, filters Dry and Wet scrubbers, Electrostatic precipitators.

UNIT – IV: **(11+4)**

General Methods of Control of NOx and SOx emissions, Air Quality Management – Measurement and monitoring of SPM, SO; NO and CO Emissions- Standards-Air quality Index- Noise Pollution – effects of noise and control methods

Text Books:

1) Environmental Engineering, by H S Peavy, L Rowe and G Tchobanoglous, McGraw Hill Publications.
2) Air pollution by M.N.Rao and H.V.N.Rao – Tata Mc.Graw Hill Company

References:

1) Sewage disposal and air pollution Engineering by S K Garg, Khanna Publishers
2) An introduction to Air pollution by R.K. Trivedy and P.K. Goel, B.S. Publications
3) Environmental Pollution and Control, by Dr H.S. Bhatia – Galgotia Publication (P) Ltd, Delhi
4) Air pollution and control by KVSG Muralikrishna

Department of Civil Engineering
B.Tech- 6th Semester
SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: AIRPORT AND HARBOUR ENGINEERING (Elective-II)

Course Code:
L: T: P: C:: 3:1:0:4

OBJECTIVES: The course content enables students to:

i). Build knowledge on airport planning and design considerations
ii). Build knowledge on runway design and its considerations
iii). Understand the requirements to plan the docks and harbors
iv). Build knowledge on design and maintain considerations of docks and harbors

OUTCOMES: At the end of the course the learners will be able to

a) Model the airport layout with all features
b) Design runway based on terrain
c) Model the docks and harbors layout
d) Design structures and non-structures and their maintenance in docks and harbors

UNIT-I

AIRPORT PLANNING AND DESIGN: Airport site selection – Air craft characteristics – Zoning laws – Airport classification

AIRPORT DESIGN: Runway orientation – Wind rose diagram – Runway length – Taxiway design – Terminal area and Airport layout – Visual aids and Air traffic control.

UNIT- II

RUNWAY DESIGN: Various Design factors – Design methods for Flexible pavements – Design methods for Rigid pavements – LCN system of Pavement Design

RUNWAYFAILURES AND MAINTENANCE: Airfield Pavement Failures – Maintenance and Rehabilitation of Airfield pavements – Evaluation &Strenthening of Airfield pavements – Airport Drainage – surface and subsurface drainage.

UNIT- III

PLANNING AND LAYOUT SHORE STRUCTURES: Definition of Terms - Harbors, Ports, Docks, Tides and Waves,Dredging, Littoral Drift, Sounding, Area, Depth, Satellite Ports-Requirements and Classification of Harbors.

Site Selection & Selection Investigation, Shore Considerations- Proximity to Towns/Cities, Utilities, Construction Materials, Coast Lines, Dry and Wet Docks

PLANNING AND LAYOUT OFF SHORE STRUCTURES: Planning and Layouts. Terminal Facilities – Port Buildings, Warehouse, Transit Sheds, Inter-modal Transfer Facilities, Mooring Accessories

UNIT-IV

CONSTRUCTION OF DOCKS & HARBOURS: Coastal Structures- Piers, Breakwaters, Wharves, Jetties, Quays, Spring Fenders Coastal Shipping, Inland Water Transport and Container Transportation. Pipe Ways, Rope Ways

MAINTENANCE OF DOCKS &HARBOURS: Maintenance of Ports and Harbors – Navigational aids.

Text Books:

4. Airport Enginnering- Khanna&Arora- nemchand Bros, new Delhi
5. Airport engineering Virendrakumar , , DhanpathiRai Publishers, new Delhi
6. Docks and HarbourEngineering,Bindra S.P- DhanpathiRai& Sons, New Delhi

References:

3. **Ashford, N. J., Mumayiz, S. A.,** and **Wright, P. H.** Airport Engineering: Planning, Design and Development of 21st Century Airports, Fourth Edition, John Wiley & Sons, New Jersey, USA, 2011.
4. **Kumar, V.,** and **Chandra, S.** Air Transportation Planning and Design, Galgotia Publications Pvt. Ltd., New Delhi, India, 1999.
3. Seetharaman, S. Dock and Harbour Engineering, Umesh Publications, New Delhi, India, 1999.
4. Srinivasan, R., Harbour, Dock and Tunnel Engineering, Charotar Publishing House, Anand, India, 2009.

Department of Civil Engineering
B.Tech- 6th Semester
SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: SOLID WASTE AND ENVIRONMENTAL MANAGEMENT (Elective-II)

Course Code:

L: T: P: C:: 3:1:0:4

OBJECTIVES: The course content enables students to:

i). Develop insight into the collection, transfer, and transport of municipal solid waste.
ii). Explain the design and operation of a municipal solid waste landfill.
iii). Examine the design and operation of a resource recovery facility.
iv). Summarize the design and operation of a waste-to-energy facility

OUTCOMES:

At the end of the course students are able to :

a) Understand the implications of the production, resource management and environmental impact of solid waste management;
b) Assimilate the significance of recycling, reuse and reclamation of solid wastes;
c) be familiar with relationships between inappropriate waste management practices and impacts on water, soil and sediment quality;
d) Appreciate the current practices available and implement the systems available in solid waste management;
e) be capable of carrying out an assessment of the relationships between environmental guidelines, human activities and environmental quality of impacted soils and water;
f) Integrate technical solid waste management options and imposed environmental legislation and guidance to develop legal and safe solutions.

UNIT-I **(13)**

SOLID WASTE MANAGEMENT: – sources, composition and properties of solid waste – collection and handling – separation and processing

SOLID WASTE DISPOSAL METHODS: Land filling – Incineration composting

UNIT-II **(10)**

ENVIRONMENTAL IMPACT ASSESSMENT: Hazardous Waste –Biomedical wastes –Control methods-Impact Assessment - Methodologies-Impacts on water-air-soil-biological environments-Quality indices

UNIT-III **(13)**

AUDIT AND LEGISLATIONS: Environmental Audit & Environmental legislation objectives of Environmental Audit, Types of environmental Audit, Audit-protocol, stages of Environmental Audit, onsite activities, evaluation of Audit data and preparation of Audit report - Post Audit activities

UNIT – IV **(9)**

POLLUTION ACTS AND REGULATORY BODIES: The Environmental pollution Act, The water Act, The Air (Prevention & Control of pollution Act.), Bio medical waste Rules, Solid Waste Management Rules, Hazardous Waste Management Rules, ISO 14000 series – Quality management – case studies on EIA, Audit and ISO series

Text Books:

1. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B.S. Publication, Sultan Bazar, KAKINADA.

2. Environmental Science and Engineering, by Suresh K. Dhaneja – S.K.,Kataria& Sons Publication., New Delhi.

References:

1. Environmental Engineering, by H S Peavy, L Rowe and G Tchobanoglous, McGraw Hill Publications.
2.Environmental Pollution and Control, by Dr H.S. Bhatia – Galgotia Publication (P) Ltd, Delhi

Department of Civil Engineering
B.Tech- 6th Semester
SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: DISASTER MANAGEMENT (Open Elective) **Course Code:**
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to :

i). Demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response

ii). Understand and appreciate the specific contributions of the Red Cross/Red Crescent movement to the practice and conceptual understanding of disaster management and humanitarian response and their significance in the current context

iii). Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives

iv). Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations
Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in, and

v). Respond to disaster risk reduction initiatives and disasters in an effective, humane and sustainable manner.

OUTCOMES:

At the end of the course the learners will be able to Integrate knowledge and to analyze, evaluate and manage the different public health aspects of disaster events at a local and global levels, even when limited information is available.

a) Describe, analyze and evaluate the environmental, social, cultural, economic, legal and organizational aspects influencing vulnerabilities and capacities to face disasters.
b) Work theoretically and practically in the processes of disaster management (disaster risk reduction, response, and recovery) and relate their interconnections, particularly in the field of the Public Health aspects of the disasters.
c) Manage the Public Health aspects of the disasters.
d) Obtain, analyze, and communicate information on risks, relief needs and lessons learned from earlier disasters in order to formulate strategies for mitigation in future scenarios with the ability to clearly present and discuss their conclusions and the knowledge and arguments behind them.
e) Design and perform research on the different aspects of the emergencies and disaster events while demonstrating insight into the potential and limitations of science, its role in society and people's responsibility for how it is used.
f) Analyze and evaluate research work on the field of emergencies and disaster while demonstrating insight into the potential and limitations of science, its role in society and people's responsibility for how it is used.

UNIT-1:

DISASTER MANAGEMENT AN OVER VIEW: Introduction of DM- inter disciplinary – nature of the subject – Hyogo frame of work of action (HFA) (2005-2015) – Five priorities for action

NATURAL HAZARDS AND DISASTER AND THEIR MANAGEMENT: Case study methods of the following: floods, droughts, - Earthquakes – global warming, cyclones & Tsunamis – Post Tsunami hazards along the Indian coast – landslides

UNIT-II:

MANMADE DISTRE AND THEIR MANAGEMENT ALONG WITH CASE STUDY METHODS OF THE FOLLOWING: Fire hazards – transport hazard dynamics – solid waste management – post disaster – bio terrotirism -threat in mega cities, rail and air craft's accidents, and Emerging infectious diseases & Aids and their management.

RISK AND VULNERABILITY: BUILDING codes and land use planning-social vulnerability – environmental vulnerability – Macroeconomic management and sustainable development, Climate change risk rendition-financial management of disaster – related losses.

UNIT – III

ROLE OF TECHNOLOGY IN DISASTER MANAGEMENTS: Disaster management for infra structures, taxonomy of infrastructure treatment plants and process facilities – electrical substations – roads and bridges – mitigation programme for earth quakes – flowchart, geospatial information in agriculture drought assessment – multimedia technology in disaster risk management and training – transformable indigenous knowledge in disaster reduction.

EDUCATION AND COMMUNITY PREPAREDNESS: Education in disaster risk reduction – Essentials of school disaster education – community capacity and disaster resilience – Community based disaster recovery - Community based disaster management and social capital – Designing resilience – building community capacity for action

UNIT-IV

MULTI – SECTIONAL ISSUES: Impact of disaster on poverty and deprivation - Climate change adaptation and human health – Exposure, health hazards and environmental capacity in disaster management - the red cross and red crescent movement - Corporate sector and disaster risk reduction A community focused approach

FIELD VISIT: visit to a loccal area / site where natural or manmade hazard has occurred and prepare a report with the following details i) location of site, ii) nature of the hazard (natural or manmade), iii) details of loss of life and property iv) response from the government / NGO etc. v) whether the response is adequate or not vi) the role of technology in risk reduction vii) suggestion for improvement of disaster response / preventive measures viii) Conclusions

Text Books:

1. Disaster management - Global Challenges and local solution, Edited by Rajibshash and R.R.Krishnamurthy (2009) published by universities press
2. Disaster management - future challenges and opportunities (2007) editor by Jagbirsingh. Published by I K international publishing house pvt. Ltd.

Reference Book:

1. Disaster management edited by H K Gupta (2003) published by universities press.

Department of Civil Engineering
B.Tech- 6th Semester
SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: ENVIRONMENTAL ENGINEERING LAB **Course Code:**

L: T: P: C:: 0:0:3:2

OBJECTIVES:

i). The course content enables students to:
ii). Determine of pH and Electrical Conductivity
iii). Estimate total Hardness
iv). Determine of Alkalinity, Acidity of given water sample
v). Determine chlorides, Iron, total solids, dissolved solids in water
vi). Determine D.O B.O.D/COD.

OUTCOMES:

At the end of course student will be able to

a) know how to perform relevant tests in the laboratory to determine the major characteristics of water and wastewater
b) Get hands on experience in operating the various equipment/methods available for examining water and wastewater
c) understand the practical significance of the characteristics, the relevant codes of practice for examination and permissible limits for the characteristics of water and wastewater

LIST OF EXERCISES:

i). Determination of pH and Electrical Conductivity
ii). Determination and estimation of total Hardness
iii). Determination of Calcium and Magnesium hardness
iv). Determination of Alkalinity
v). Determination of Acidity
vi). Determination of chlorides in water and soil.
vii). Determination and estimation of total solids, dissolved solids
viii). Determination of Iron
ix). Determination of dissolved oxygen with D.O Meter &Winklers Method
x). Physical parameters-Temperature, Turbidity
xi). Determination of B.O.D/COD
xii). Determination of chlorine demand
xiii). Determination of optimum coagulant dose

Department of Civil Engineering
B.Tech- 6th Semester
SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: SOIL MECHANICS LAB **Course Code:**

L: T: P: C:: 0:0:3:2

OBJECTIVES:

i). To make the student learn, apply his ability of knowledge with hands of practice to determine index and engineering properties of soils.
ii). To have an exposure for determining various properties of soils in field and through simulating in lab.

OUTCOMES:

a) Identify tools, equipment required and familiarity with experimental procedures for determining index and engineering properties of soils
b) Perform field tests for soil investigations.
c) Apply field conditions for computing and analyzing the experimental data.
d) Infer the results and compare.

LIST OF EXERCISES:

1. Determination of Consistency Limits (Liquid, plastic and Shrinkage limit) for soil.
2. Determination of Field density with Core cutter method & Sand replacement method.
3. Determination of particle size distribution through mechanical and hydrometer analysis.
4. Determination of Optimum Moisture content and Maximum Dry Density for given soil with Proctor Compaction Tests.
5. Determination of coefficient Permeability of soil with constant head and variable head Tests.
6. Determination of strength parameters of given soil with Unconfined Compression strength (UCS) test.
7. Determination of Consolidation characteristics of given cohesive soil by performing consolidation test.
8. Determination of Free swell index for soil.
9. Determination of Strength parameters of given soil under different drainage conditions with Triaxial Test.
10. Determination of strength parameter of given cohesion-less soil by performing Direct shear test.
11. Determination of C.B.R Value of given soil with Laboratory CBR Test. (Any eight shall be conducted.)

Department of Civil Engineering
B.Tech- 7th Semester

SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: FOUNDATION ENGINEERING **Course Code:**
L: T: P: C:: 3:1:0:4

OBJECTIVES:

Leaner is expected to

i). Conceptualize the necessity of site investigations for soil sampling.
ii). Understand the essence of engineering properties in design of various structures constructed on and with soil.
iii). Ascertain the stability of earthen structures.
iv). Know the importance of foundation and different types with their design concepts.

OUTCOMES:

At the end of the course student will be able to

a) Learn various types and methods of undisturbed and disturbed soil sampling.
b) Perform computations for stability of earthen structures.
c) Use the various properties of soils to design the shallow foundations for different loading conditions.
d) Extend the theory of foundation design for special foundation types namely deep foundations.

UNIT – I **(12+ 4)**

SOIL EXPLORATION: Methods of soil exploration – Boring and Sampling methods – Field tests – Penetration Tests – Plate load test – planning of Programme- preparation of soil investigation report.

EARTH SLOPE STABILITY: Infinite and finite earth slopes – types of failures – factor of safety of infinite slopes: stability analysis- Bishop's Simplified method – Taylor's Stability Number- Stability of slopes of earth dams under different conditions.

UNIT – II **(10+ 3)**

EARTH PRESSURE THEORIES: Rankine's theory of earth pressure – earth pressures in layered soils – Coulomb's earth pressure theory – Culmann's graphical method.

RETAINING WALLS: Types of retaining walls – stability of retaining walls.

UNIT – III **(10 + 4)**

SHALLOW FOUNDATIONS: Types - choice of foundation – Location of depth – Safe Bearing Capacity – and IS Methods Safe bearing pressure based on N- value

Allowable bearing pressure; safe bearing capacity and settlement from plate load test – allowable settlements of structures

UNIT –IV **(13 + 4)**

PILE FOUNDATION: Types of piles – Load carrying capacity of piles based on static pile formulae – Dynamic pile formulae – Pile load tests - Load carrying capacity of pile groups.

WELL FOUNDATIONS: Types – Different shapes of wells – Components of wells – functions- construction of well foundations- Sinking of wells – Tilts and shifts.

Text Books:

1. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt. Ltd, (2004).
2. Foundation Engineering by Varghese,P.C., Prentice Hall of India., New Delhi.
3. Soil Mechanics and Foundations by - by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

References:

1. Das, B.M., - (1999) Principles of Foundation Engineering –6th edition (Indian edition) Thomson Engineering
2. Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill Publishing company, Newyork.
3. Analysis and Design of Substructures – Swami Saran, Oxford and IBH Publishing company Pvt Ltd (1998).
4. Geotechnical Engineering by S. K.Gulhati & Manoj Datta – Tata Mc.Graw Hill Publishing company New Delhi. 2005.
5. Teng,W.C – Foundation Design , Prentice Hall, New Jersy

Department of Civil Engineering
B.Tech- 7th Semester

SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: HYDRAULIC STRUCTURES **Course Code:**

L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to

i). Relate the head works constructed at the head of the canal and types and different components and their purposes.
ii). Understand different theories behind the design of impervious floor in permeable soils.
iii). Identify canal regulation structures and cross drainage structures come in the alignment of the channels.
iv). Analyze for the forces to be considered in the in the stability Gravity dams
v). Distinguish between earthen embankments and Causes of its failures and seepage theories

OUTCOMES:

At the end of the course students will be able to

a) Design the different water retaining structures.
b) Analyze the parameters needed in the design of weirs/barrages in permeable soils.
c) Analyze and design the Gravity dams and Earth dams with available foundation strata.
d) Design the canal regulation structures and cross drainage structure
e) Understand the design principles of canal fall and Spillway and able to design various components.

UNIT-I

DIVERSION HEAD WORKS: Types of Diversion head works-diversion and storage head works, weirs and barrages, layout of diversion head works, components. Causes and failure of hydraulic structures on permeable foundations, Bligh's creep theory, Khosla's theory, determination of uplift pressure, impervious floors using Bligh's and Khosla's theory, exit gradient, functions of U/s and d/s sheet piles.

DAMS: Types of dams, merits and demerits, factors affecting selection of type of dam, factors governing selecting site for dam, types of reservoirs, selection of site for reservoir, zones of storage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve.

UNIT-II

EARTH DAMS: types of Earth dams, causes of failure of earth dam, criteria for safe design of earth dam, seepage through earth dam-graphical method, measures for control of seepage.

GRAVITY DAMS: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile and practical profile of a gravity dam, limiting height of a low gravity dam, stability analysis, drainage galleries.

UNIT-III

SPILLWAYS: types of spillways, design principles of Ogee spillways, types of spillway gates.

CANAL FALLS: types of falls and their location, design principles of Sarda type fall, trapezoidal notch fall and straight glacis fall.

UNIT-IV

CANAL REGULATION WORKS: Head regulator and cross regulator, design principles of Cross regulator and head regulators, canal outlets, types of canal modules, proportionality, sensitivity and flexibility.

CROSS DRAINAGE WORKS: types, selection of site, design principles of aqueduct, siphon aqueduct and super passage.

Text Books:

1. Irrigation engineering and hydraulic structures by S.K Garg, Khanna publishers.
2. Irrigation engineering by K.R.Arora
3. Irrigation Engineering by R.K. Sharma and T.K. Sharma, S. Chand Publishers

References:

1. Irrigation and water resources engineering by G.L. Asawa, New Age International Publishers
2. Concrete dams by Varshney.
3. Theory and Design of Hydraulic structures by Varshney, Gupta & Gupta
4 Water resources engineering by Satyanarayana Murthy. Challa, New Age International Publishers.

Department of Civil Engineering
B.Tech- 7th Semester

SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: DESIGN OF REINFORCED CONCRETE STRUCTURES (Elective-IV)
Course Code:
L: T: P: C:: 3:1:0:4

OBJECTIVES:
The student is expected to
i). Design continuous beams and slabs as per IS456: 2000
ii). Distinguish between RCC and PSC members
iii). Understand principle in various methods of pre stressing systems
iv). Evaluate the losses in pre and post tensioned members
v). Analyze and design members subjected to flexure and shear.

OUTCOMES:
At the end of the course student will be able to
a) **Design** the cross section and evaluate the amount of reinforcement required in the continuous beam as per IS: 456 codal recommendations for all practical loadings.
b) **Design** the amount of reinforcement required in the continuous slab and stair case as per IS: 456 codal recommendations for all practical loadings.
c) Perform analysis and design of prestressed concrete members and connections
d) Identify and interpret the appropriate relevant industry design codes.
e) Relate with professional and contemporary issues in the design and fabrication of prestressed concrete members.
f) Perform an industry relevant design project in a team setting.

UNIT – I: **(9+4)**

BEAMS: Design examples in simply supported and continuous beams, detailing.

SLABS: Design of continuous slab Using IS Coefficients, detailing, Design of stair case.

UNIT – II: **(11+4)**

INTRODUCTION: Historic development – General principles of prestressing pretensioning and post tensioning – Advantages and limitations of prestressed concrete – Materials – High strength concrete and high tensile steel their characteristics.

ANALYSIS OF PRESTESS & METHODS OF PRESTESSING: I.S.Code provisions, Methods and Systems of Prestressing; Pre-tensioning and post tensioning methods – Analysis of post tensioning - Different systems of prestressing like Hoyer System, Magnel System Freyssinet system and Gifford – Udall System.

UNIT–III: **(13+4)**

LOSSES OF PRESTRESS: Loss of prestress in pre-tensioned and post-tensioned members due to various causes like elastic shortage of concrete, shrinkage of concrete, creep of concrete, Relaxation of steel, slip in anchorage bending of member and frictional losses.

ANALYSIS OF SECTIONS FOR FLEXURE: Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons.

UNIT – IV:

DESIGN OF SECTIONS FOR FLEXURE AND SHEAR: **(12+3)**

Allowable stress, Design criteria as per I.S.Code – Elastic design of simple rectangular and I-section for flexure, shear, and principal stresses – design for shear in beams – Kern – lines, cable profile.

Text books:

1.Structural Design and Drawing (Concrete and Steel) by N. Krisna Raju, University press publcations
2.Design of R.C.C structural elements by S.S Bhavikatti, New age International publications.

3. Prestressed Concrete by Krishna Raju; - Tata Mc.Graw Hill Publications.
4.Prestressed Concrete by N.Rajasekharan; - Narosa publications.

References:

1. Reinforced concrete Design by S.N Sinha,Tata Mc. Hill publications
2. Prestressed Concrete by Ramamrutham; Dhanpatrai Publications.
3. Design of Prestressed concrete structures (Third Edition) by T.Y. Lin & Ned H.Burns, John Wiley & Sons.

Department of Civil Engineering
B.Tech- 7th Semester
SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: EARTHQUAKE RESISTANT DESIGN (Elective – IV) **Course Code:**
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The student is expected to:

i). i). Create a strong understanding on application of single degree and multi-degree of freedom systems.
ii). Impart the knowledge on causes and effects of earthquakes.
iii). Formulate and analyze structures subjected to earthquake excitation.
iv). Familiarize with seismic codal and detailing provisions.

OUTCOMES:

On successful completion of this course, it is expected that students should be able to;

a) Analyze the free and forced vibration response of single-degree and multi-degree of freedom and continuous systems.
b) Distinguish between earthquake magnitude and earthquake damage (intensity),
c) Understand why earthquakes occur, how they are measured and categorized and the effect they may have on engineering structures. Predict the Dynamic Behavior of simple structural systems,
d) Develop an understanding of structural dynamics of simple systems subject to harmonic, impulse and/or arbitrary loading,
e) Employ the Response Spectrum Analysis Method for Earthquake resistant R/C Buildings,
f) Apply the Basic Principles of Conceptual Design for Earthquake resistant R/C Buildings. Understand the concepts and implementation of IS codes in relation to earthquake design.

UNIT – I **(9+4)**

INTRODUCTION TO STRUCTURAL DYNAMICS: – Theory of vibrations – Lumped mass and continuous mass systems –Single Degree of Freedom (SDOF) Systems – Formulation of equations of motion – Un damped and damped free vibration –Damping – Response to harmonic excitation – Concept of response spectrum.

UNIT – II **(9+4)**

MULTI-DEGREE OF FREEDOM (MDOF) SYSTEMS: - Formulation of equations of motion – Free vibration –Determination of natural frequencies of vibration and mode shapes – Orthogonal properties of normal modes – Mode superposition method of obtaining response.

UNIT – III **(13+4)**

EARTHQUAKE ANALYSIS : - Introduction – Rigid base excitation – Formulation of equations of motion for SDOF and MDOF Systems – Earthquake response analysis of single and multi-storyed buildings – Use of response spectra.

EARTHQUAKE ENGINEERING: - Engineering Seismology – Earthquake phenomenon – Causes and effects of earthquakes – Faults – Structure of earth – Plate Tectonics – Elastic Rebound Theory – Earthquake Terminology – Source, Focus, Epicenter etc - Earthquake size – Magnitude and intensity of earthquakes – Classification of earthquakes – Seismic waves – Seismic zones – Seismic Zoning Map of India – Seismograms and Accelegrams.

UNIT – IV **(10+3)**

CODAL DESIGN PROVISIONS : - Review of the latest Indian seismic code IS:1893 – 2002 (Part-I) provisions for buildings Earthquake design philosophy – Assumptions – Design by seismic coefficient and response spectrum methods – Displacements and drift requirements – Provisions for torsion.

CODAL DETAILING PROVISIONS: - Review of the latest Indian Seismic codes IS:4326 and IS:13920 provisions for ductile detailing of R.C buildings – Beam, column and joints

Text Books:

1. Dynamics of Structures – Clough & Penzien, McGraw Hill – International Edition.
2. Earthquake Resistant Design of Structures – Pankaj Agarwal & Manish Shrikhande – Printice Hall of India, New Delhi

References:

1. Dynamics of Structures by A.K.Chopra – Pearson Education, Indian Branch, Delhi.
2. Earthquake Tips by C.V.R.Murty, I.I.T. Kanpur.
3. Structural Dynamics by Mario Paaz.

IS Codes: IS: 1893, IS: 4326 and IS:13920

Department of Civil Engineering
B.Tech- 7th Semester

SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: RETROFITING AND REHABILITATION OF STRUCTURES (Elective-IV)

Course Code:

L: T: P: C: 3:1:0:4

OBJECTIVES:

The student is expected to:

i). Recognize the mechanisms of degradation of concrete structures and conduct preliminary forensic assessment of deteriorated concrete structures;
ii). Learn how to conduct field monitoring and non-destructive evaluation of concrete structures;
iii). Assess alternative repair strategies for deteriorated concrete structures including repairing with composites;
iv). Evaluate stabilizing and strengthening techniques of reinforced concrete structural elements;
v). Carry out a study on a topic related to the durability and repair of concrete structures, author a technical paper on the study and present it verbally.

OUTCOMES:

At the end of the course the learners will be able to

a) Identify the probable reasons for the deterioration of various structural members
b) Able to assess the severity of damage in the structural members
c) Choose materials and appropriate technologies for repair.
d) Identify the appropriate method for strengthening of existing members.
e) Plan for the monitoring of the new buildings by using sensor technology.

UNIT – I: **(9+4)**

STRUCTURAL DISTRESS: Introduction – Deterioration of Structures – Distress in Structures – Causes and prevention.

STRUCTURAL DAMAGE: Mechanism of Damage – Types of Damage.

UNIT – II: **(11+4)**

CORROSION AND FIRE DAMAGE: Corrosion of Steel Reinforcement – Causes – Mechanism and Prevention. Damage of Structures due to Fire – Fire Rating of Structures – Phenomena of Desiccation.

DIAGNOSIS AND DAMAGE ASSESSMENT: Inspection and Testing – Symptoms and Diagnosis of Distress - Damage assessment – NDT.

UNIT – III: **(13+4)**

DAMAGE REPAIRS: Repair of Structure – Common Types of Repairs – Repair in Concrete Structures – Repairs in Under Water Structures – Guniting – Shot Create – Underpinning.

RETROFITTING: Strengthening of Structures – Strengthening Methods – Retrofitting – Jacketing.

UNIT – IV: **(7+3)**

MONIT ORING: Health Monitoring of Structures – Use of Sensors

BUILDING INSTRUMENTATION: Various instruments used in for monitoring structural behavior of building.

Text Books:

1. Concrete Technology by A.R. Santakumar, Oxford University press
2. Defects and Deterioration in Buildings, E F & N Spon, London
3. Non-Destructive Evaluation of Concrete Structures by Bungey - Surrey University Press
4. Maintenance and Repair of Civil Structures, B.L. Gupta and Amit Gupta, Standard Publications.

References:

1. Concrete Repair and Maintenance Illustrated, RS Means Company Inc W. H. Ranso, (1981)
2. Building Failures : Diagnosis and Avoidance, EF & N Spon, London, B. A. Richardson, (1991)

Department of Civil Engineering
B.Tech- 7th Semester

SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: CONSTRUCTION COSTING AND MANAGEMENT (Elective-V)

Course Code:
L: T: P: C: 3:1:0:4

OBJECTIVES:

i). Learn the quantity estimation of the different components of the civil engineering structures
ii). Learn the cost estimate of the different components of the civil engineering structures.
iii). Organize and schedule of estimating work.
iv). Clearly understand the cost management discipline and process.
v). Use a cost management estimation and control plan

OUTCOMES:

At the end of the course the learners will be able to

a) Identify, analyze and solve the complex problems that deal with estimation of buildings and pavements.
b) Perform cost analysis of Civil Engineering projects.
c) Establish relationship between cost and quality of the construction process.
d) Manage and administer construction contracts.
e) Estimate the value of existing infrastructure.

PART-A

UNIT – I **(12+3)**

GENERAL ITEMS OF WORK IN BUILDING: Standard Units. Principles of working out quantities for detailed and abstract estimates. Approximate method of Estimating.
RATE ANALYSIS: Working out data for various items of work over head and contingent charges. Standard specifications for different items of building construction.

UNIT – II **(10+4)**

REINFORCEMENT BAR BENDING SCHEDULES: Reinforcement bar bending and bar requirement schedules.
VALUATION OF BUILDINGS: Valuation of various components of buildings

UNIT – III **(11+3)**

CONTRACTS: Types of contracts - Contract Documents - Conditions of contract.
PLANNING OF CONSTRUCTION PROJECTS: Planning scheduling and monitoring of building construction projects, Bar chart, CPM and PERT Network planning. Computation of times and floats – their significance.

PART-B **(12+5)**

DETAILED ESTIMATES OF BUILDINGS: Individual wall method and center line method.

TEXT BOOKS:

1. Estimating and Costing by B.N. Dutta, UBS publishers, 2000.
2. Estimating and Costing by G.S. Birdie
3. PERT and CPM – Project planning and control with by Dr.B.C.Punmia & Khandelwal – Laxmi publications.

REFERENCES:

1. Standard Schedule of rates and standard data book by public works department.
2. I. S. 1200 (Parts I to XXV - 1974/ method of measurement of building and Civil Engineering works - B.I.S.)
3. Estimation, Costing and Specifications by M. Chakraborthi; Laxmi publications.
4. National Building Code.

Department of Civil Engineering
B.Tech- 7th Semester

SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: GROUND IMPROVEMENT TECHNIQUES (Elective-V) **Course Code:**
L: T: P: C: 3:1:0:4

OBJECTIVES:

i). Understand the modern methods of treating soils in order to improve their engineering properties.
ii). Explain the underlying principles of the different methods of ground treatment
iii). identify when such treatment may be necessary what results can be expected in different soil types

OUTCOMES:

At the end of the course the learners will be able to

a) Interpret the concepts behind a range of ground improvement and soil remediation techniques.
b) Find out the advantages, disadvantages, limitations for each ground improvement method discussed.
c) Choose appropriate techniques for a range of ground and site conditions.
d) Identify criteria to determine the applicability of each ground improvement method for a specific project and soil condition under consideration.

UNIT – I **(11+3)**

DEWATERING: Methods of de-watering - sumps and interceptor ditches - single, multi stage well points - vacuum well points - Horizontal wells - foundation drains - blanket drains - criteria for selection of fill material around drains - Electro-osmosis.

GROUTING: Objectives of grouting - grouts and their properties - grouting methods - ascending, descending and stage grouting - hydraulic fracturing in soils and rocks - post grout test.

UNIT – II **(12+5)**

IN – SITU DENSIFICATION METHODS IN GRANULAR SOILS: Vibration at the ground surface, Impact at the Ground Surface, Vibration at depth, Impact at depth.

IN – SITU DENSIFICATION METHODS IN COHESIVE SOILS: Preloading or dewatering, Vertical drains – Sand Drains, Sand wick geodrains – Stone and lime columns – thermal methods.

UNIT – III **(13+5)**

STABILISATION: Methods of stabilization – mechanical – cement – lime – bituminous - chemical stabilization with calcium chloride - sodium silicate and gypsum

EXPANSIVE SOILS: Problems of expansive soils – tests for identification – methods of determination of swell pressure - Improvement of expansive soils – Foundation techniques in expansive soils – under reamed piles.

UNIT – IV **(9+2)**

GEOSYNTHETICS : Geotextiles- Types, Functions and applications – geogrids and geomembranes – functions and applications.

REINFORCED EARTH: Principles – Components of reinforced earth – factors governing design of reinforced earth walls – design principles of reinforced earth walls.

Text Books:

1. Hausmann M.R. (1990), Engineering Principles of Ground Modification, McGraw-Hill International Edition.
2. Purushotham Raj. Ground Improvement Techniques, Laxmi Publications, New Delhi

References:

1. Moseley M.P. (1993) Ground Improvement, Blackie Academic and Professional, Boca Taton, Florida, USA. 2. Xanthakos P.P, Abramson, L.W and Brucwe, D.A (1994) Ground Control and Improvement, John Wiley and Sons, New York, USA. 3. Robert M. Koerner, Designing with Geosynthetics, Prentice Hall New Jercy, US

Department of Civil Engineering
B.Tech- 7th Semester
SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: PAVEMENT ANALYSIS AND DESIGN (Elective-V) **Course Code:**
L: T: P: C:: 3:1:0:4

OBJECTIVES:

i). To understand the various factors affecting in pavement design
ii). To build knowledge on design aspects and methods for flexible pavement design
iii). To build knowledge on design aspects and methods for rigid pavement design
iv). To build knowledge on types of pavement failures and maintenance solutions

OUTCOMES:

At the end of the course the learners will be able to

a) Build knowledge on the various factors affecting in pavement design
b) Design flexible pavement considering sub grade condition and axle loads
c) Design rigid pavement considering sub grade condition and axle loads
d) Discover pavement failures and their remedies

UNIT-I

ROAD FACTORS IN PAVEMENT DESIGN: Variables Considered in Pavement Design, Types of Pavements, Functions of Individual Layers, Classification of Axle Types of Rigid Chassis and Articulated Commercial Vehicles, Legal Axle and Gross Weights on Single and Multiple Units, Tire Pressure, Contact Pressure, EAL and ESWL Concepts

TRAFFIC FACTORS IN PAVEMENT DESIGN: ADT, AADT, Truck Factor, Growth Factor, Lane Distributions & Vehicle Damage Factors, Effect of Transient & Moving Loads.

UNIT- II

REQUIREMENTS AND FUNCTIONS OF FLEXIBLE PAVEMENT DESIGN: Objects and requirements of pavements-Types-Functions of pavement components

DESIGN FACTORS AND METHODS OF FLEXIBLE PAVEMENT: Flexible pavement Design methods-CBR method-IRC method-Bur mister method -IRC Method for volume Flexible Pavements

UNIT- III

RIGID PAVEMENTS DESIGN CONSIDERATIONS: Design considerations-wheel load stresses-Temperature stresses-frictional stresses-combination of stresses

DESIGN ELEMENTS AND METHODS OF FLEXIBLE PAVEMENT: Design of slabs-Design of joints-IRC method for low volume roads-Continuously Reinforced cement concrete pavements-Roller Compacted Concrete Pavements

UNIT-IV

PAVEMENT FAILURES:

Causes of pavement failures-failures in flexible pavements-alligator cracking-consolidation of pavement failures-shear failure-longitudinal cracking-frost heaving-reflection cracking-formation of waves and corrugation

REMEDIES FOR PAVEMENT FAILURES: alligator cracking-consolidation of pavement failures-shear failure-longitudinal cracking-frost heaving-reflection cracking-formation of waves and corrugation

Text Books:

5. Highway engineering by khanna & justo
6. Yoder and Witczak, Priniciples of Pavement Design, John Wiley and Sons
7. 2. Yang. H. Huang, Pavement Analysis and Design, Second Edition, Prentice Hall Inc.
8. IRC:37 & 58 Codes for Flexible and Rigid Pavements Design.

References:

5. Rajib B. Mallick and Tahar El-Korchi, Pavement Engineering – Principles and Practice, CRC Press (Taylor and Francis Group)
6. W.Ronald Hudson, Ralph Haas and Zeniswki , Modern Pavement Management, Mc Graw Hill and Co .
7. Shell Pavement Design Manual – asphalt pavements and overlays for road traffic, by Nilanjan Sarkar, Ooms Avenhorn Holding India Pvt.Ltd;
4. Relevant IRC Codes

Department of Civil Engineering
B.Tech- 7th Semester

SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: GEOMATICS LAB **Course Code:**
L: T: P: C: 0:0:3:2

OBJECTIVES

i). Megascopic identification of Rock forming, Ore forming minerals and rocks based on physical properties.
ii). Interpretation of geological maps showing tilted beds, faults, unconformities etc.
iii). Solving Structural Geology problems.
iv). To orient them towards usage of spatial technologies
v). To give exposure on the state of the art technologies in Geomatics

OUCOMES
At the end of course student will be able to

a) Identify the various rocks and minerals based on the physical properties
b) Interpret different geological maps
c) Solve the various strike and dip problems
d) Work independently on various spatial technologies
e) Understand state of the art technologies in Geomatics

LIST OF EXERCISES:

ENGINEERING GEOLOGY

1. Physical properties of minerals: Megascopic identification of
a) Rock forming minerals – Quartz group, Feldspar group, garnet group, mica group & talc, Chlorite, olivine, kyanite, asbestos, tourmelene, calcite, gypsum, etc…
b) Ore forming minerals – magnetite, hematite, pyrite, pyralusite, graphite, chromite, etc…
2. Megascopic description and identification of rocks.
a) Igneous rocks – Types of granite, pegmatite, gabbro, dolerite, syenite, Granite poryphery, Basalt, etc…
b) Sedimentary rocks – sand stone, ferrugineous sand stone, lime stone, shale, laterite, Conglomerate, etc…
c) Metamorphic rocks – biotite – granite gneiss, slate, muscovite & biotite, schist, marble, khondalite etc…
3. Interpretation of geological maps
4. Simple Structural Geology problems.

GIS

1. Georeferencing
2. Projection of Map
3. Digitization of Map/Toposheet
4. Creation of thematic maps.
5. Study of features estimation
6. Generation of Digital Elevation model
7. Generation of LULC
8. Watershed Delineation

Department of Civil Engineering
B.Tech- 7th Semester
SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: SOFTWARE APPLICATIONS IN CIVIL ENGINEERING **Course Code:**
L: T: P: C:: 0:0:3:2

OBJECTIVES:
Learner is expected to

i). Model, analyze and design simple steel frames subjected practical loads.
ii). Model, analyze and design steel trusses of various shapes used in the field
iii). Model, analyze the given multi storied structure.
iv). Design the reinforcement in beams, slabs and stair cases.
v). Design the reinforcement in retaining walls and water tanks.

OUTCOMES:

At the end of the course the student will be able to

a) Validate the results of analysis and design of portal frame
b) Analyze and Interpret of results of analysis of Steel trusses used in practice
c) Model, analyze and design the components of multi storied RCC framed structure
d) Interpret and cross check the reinforcement provided in the construction sites of buildings.
e) Interpret and cross check the reinforcement provided in the construction sites of retaining walls and water tanks.

EXPERIMENTS TO BE PERFORMED (MIN 8 EXPERIMENTS)
ANALYSIS AND DESIGN USING STAAD

1. Analysis and design of portal frame

2. Analysis and Interpretation of Results of Analysis of Steel trusses

3. Analysis and Interpretation of Results of Analysis of RCC Frame.

RCC WORKING DRAWINGS

Plate 1 Detailing of Continuous beams
Plate 2 Detailing of Continuous slabs and stair case
Plate 3 Detailing of flat and grid slab
Plate 4 Detailing of combined footing and retaining wall
Plate 5 Detailing of rectangular and circular water tanks

SOFTWARE REQUIRED: STAAD PRO.
All experiments are compulsory.

Department of Civil Engineering

B.Tech (Civil Engineering)

COURSE STRUCTURE

(Applicable for 2013-14 admitted batches)

B.Tech - 5th Semester

Code	Course	Theory	Practical	Credits
	Elements of Reinforced Concrete Design	3+1*	-	4
	Environmental Engineering	3+1*	-	4
	Methods of Structural Analysis	3+1*	-	4
	Transportation Engineering	3+1*	-	4
Elective-I				
	1. Geomatics 2. Finite Element methods in Civil Engineering. 3. Building Technology	3+1*	-	4
	Building Planning and AutoCAD Lab	-	3	2
	Transportation Engineering Lab		3	2
	Term paper/Mini project		3	2
	Total	**20**	**9**	**26**

B.Tech- 6th Semester

Code	Course	Theory	Practical	Credits
	Design of Steel Structures	3+1*	-	4
	Hydrology and Irrigation Engineering	3+1*	-	4
	Soil Mechanics	3+1*	-	4
Elective-II				
	3. Air and Noise pollution 4. Airport and Harbor Engineering 3. Solid Waste and Environmental Management	3+1*	-	4
Elective- III (Open elective)				
	Cloud Computing (IT); Disaster Management(Civil) Fundamentals of GPS(ECE), Ind. Safety and Hazards Operation Research (ME) Renewable Energy (EEE), Soft Computing (CSE)	3+1*	-	4
	Environmental Engineering Lab	-	3	2
	Soil Mechanics Lab	-	3	2
	Mini Project/Term paper	-	-	2
	Audit Course	-	-	-
	Total	**20**	**6**	**26**

***Tutorial**

Department of Civil Engineering

B.Tech (Civil Engineering)

COURSE STRUCTURE

(Applicable for 2013-14 admitted batches)

B.Tech- 7th Semester

Code	Course	Theory	Practical	Credits
	Foundation Engineering	3+1*	-	4
	Hydraulic Structures	3+1*	-	4
Elective-IV				
	1. Design of Reinforced concrete Structures 2. Earthquake Resistant Design 3. Retrofitting and Rehabilitation of Structures	3+1*	-	4
	Geomatics Lab	-	3	2
	Software Applications in Civil Engineering Lab	-	3	2
	Total	**12**	**6**	**16**

B.Tech- 8th Semester

Code	Course	Theory	Practical	Credits
	Construction Costing Management.	3+1*		4
Elective-V				
	1. Design and Drawing of Irrigation Structures 2. Ground Improvement Techniques. 3. Pavement Analysis and Design	3+1*		4
Elective-VI				
	1.Environmental hydraulics and Waste Water treatment 2. Prestressed Concrete Design 3.Traffic Engineering	3+1*		4
	Project work	4		12
Total		**12**		**24**

***Tutorial**

Department of Civil Engineering
B.Tech- 5th Semester

SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: ELEMENTS OF REINFORCED CONCRETE DESIGN

Course Code:
L: T: P: C:: 3:1:0:4

OBJECTIVES:

This course enables the student

i). i). To learn design principles of Working stress and Limit state Designs as per IS: 456-2000
ii). To know the design parameters of singly reinforced, doubly reinforced, flanged beam elements for flexure as well as their load carrying capacities.
iii). To design beam element subjected to shear, torsion and bond.
iv). To know the design parameters of short and long columns subjected axial load, axial load and moments using SP: 16 charts
v). To know the design parameters of slabs and footings.
vi). To check for Limit state of serviceability

OUTCOMES:

At the end of the course student will be able to
At the end of the course student will be able to

a) **Design** a singly reinforced concrete beam of rectangular cross section by using Working Stress Design philosophy.
b) **Apply** IS: 456-2000, codal requirements of limit state philosophy related to shear bond, torsion and **Design** singly, doubly reinforced beams of rectangular, T and L cross sections.
c) **Design** long and short rectangular and circular columns subjected to axial load, uniaxial and biaxial moments as per IS: 456-2000
d) **Design** the isolated rectangular and combined footing subjected to axial load, axial load and moment as per IS: 456-2000
e) **Design** one way and two way slabs as per IS: 456-2000
f) **Compute** the deflections under serviceability criteria as per IS: 456-2000

UNIT –I: **(8+2)**

WORKING STRESS DESIGN: Introduction- Materials, recommendation of IS 456 – 2000, elastic theory, design constants; singly reinforced beam.

INTRODUCTION OF LIMIT STATE DESIGN: Concepts of limit state design – Basic statistical principles – Characteristic loads –Characteristic strength – Partial load and safety factors – representative stress-strain curves for cold worked deformed bars and mild steel bars. Assumptions in limit state design – stress - block parameters – limiting moment of Resistance

UNIT –II: **(12+5)**

BEAMS: Limit state analysis and design of singly reinforced, doubly reinforced, T and L beam sections.

SHEAR, TORSION AND BOND: Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length, I.S. code provisions.

UNIT – III: **(13+5)**

COLUMNS: Short and Long columns – under axial loads, uniaxial bending and biaxial bending – Braced and un-braced columns – I S Code provisions.

FOOTINGS: Different types of footings – Design of isolated, square, rectangular and circular footings.

UNIT – IV: **(12+3)**

SLABS: Design of Two-way slabs, one way slab

DEFLECTION: Limit state design for serviceability for deflection, cracking and codal provision.

NOTE: All the designs to taught in Limit State Method. Following plates should be prepared by the students.

1. Reinforcement particulars of simply supported, cantilever-beams.
2. Reinforcement detailing of T and L-beams
3. Reinforcement particulars of columns and footings.
4. Detailing of One way, two way slabs

FINAL EXAMINATION PATTERN:

The end examination paper should consist of Part A and Part B. part A consist of two questions in Design and Drawing out of which one question is to be answered. Part B should consist of five questions and design out of which three are to be answered. Weightage for Part – A is 40% and Part- B is 60%.

Text books:

1.Reinforced concrete design by S.UnnikrishnaPillai&DevdasMenon, Tata Mc.Graw Hill, New Delhi.
2.Reinforced concrete design by N. Krishna Raju and R.N. Pranesh, New age International Publishres, New Delhi
3.Limit State Design by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

References :

1.Fundamentals of Reinforced concrete design by M.L. Gambhir, Printice Hall of India Private Ltd., New Delhi.
2.Reinforced concrete structural elements – behaviour, Analysis and design by P.Purushotham, Tata Mc.Graw-Hill, 1994.
3.Reinforced concrete structures, Vol.1, by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt.Ltd., New Delhi
4.Limit state designed of reinforced concrete – P.C.Varghese, Printice Hall of India, New Delhi.

Department of Civil Engineering
B.Tech- 5th Semester

SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: ENVIRONMENTAL ENGINEERING

Course Code:
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to:

i). i). Develop overall technical competence in the students for understanding the concepts of the subject and enabling them to address the industry problems
ii). Update students knowledge in planning, design, construction, operation and maintenance aspects of water supply and sewerage systems.
iii). Reinforce management skills with regard to sustainable water supply and sewerage facilities.
iv). Provide theoretical background and practical expertise in the field of water supply and sewerage engineering.

OUTCOMES :

At the end of the course the learners will be able to

a) List the factors affecting water supply and wastewater generation
b) Understand the various types of water and wastewater characteristics
c) Design water and wastewater systems
d) Analyze available disposal options and their practical implications

UNIT – I: **(11+3)**

WATER SOURCES AND QUALITY

Introduction: Waterborne diseases – protected water supply – Population forecasts, design period – water demand – factors affecting – fluctuations – fire demand – storage capacity – water quality and testing – drinking water standards. Sources of water: Comparison from quality and quantity and other considerations – intakes

UNIT – II: **(12+5)**

DESIGN OF WATER TREATMENT UNITS

Layout and general outline of water treatment units – sedimentation – principles – design factors – coagulation-flocculation, clarifier design – coagulants – feeding arrangements, Filtration – theory – working of slow and rapid gravity filters – multimedia filters – design of filters – troubles in operation, comparison of filters – disinfection – theory of chlorination, chlorine demand, other disinfection practices- Miscellaneous treatment methods-water softening.

UNIT – III **(13+5)**

SEWAGE QUALITY AND DESIGN OF SEWAGE TREATMENT UNITS

Conservancy and water carriage systems –characteristics of sewage – B.O.D. – C.O.D. equations. ultimate disposal of sewage –dilution-Self purification of rivers - Layout and general outline of various units in a waste water treatment plant – primary treatment design of screens – grit chambers – skimming tanks – sedimentation tanks – principles of design – biological treatment – trickling filters – standard and high rate.

UNIT – IV: **(9+2)**

SLUDGE HANDLING AND DESIGN OF PONDS

Concept of ponds-Construction and design of anaerobic and oxidation ponds - Sludge digestion – factors effecting – design of Digestion tank – Sludge disposal by drying – Other options-septic tanks working principles and design – soak pits.

Text Books:

1. Water Supply Engineering, Vol. 1, Wastewater Engineering, Vol. II, B.C. Punmia, Ashok Jain &Arun Jain,
   Laxmi Publications Pvt. Ltd, New Delhi
2. Water supply and Sanitary Engineering by G.S. Birdi, DhanpatRai& Sons Publishers.
3. Elements of Environmental Engineering by K.N. Duggal, S. Chand Publishers

References:

1. Water and Waste Water Technology by Mark J Hammer and Mark J. Hammer Jr.
2. Waste water treatment- concepts and design approach by G.L. Karia and R.A. Christian, Prentice Hall of India
3. Unit operations in Environmental Engineering by R. Elangovan and M.K. Saseetharan, New age India Publishing

Department of Civil Engineering
B.Tech- 5th Semester

SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title : METHODS OF STRUCTURAL ANALYSIS

Course Code:
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to:

i). i). Become proficient in applying the classical methods of analysis with speed and accuracy
ii). Understand the concept used in the structural analysis software.
iii). Use updated structural analysis software in solving indeterminate structures
iv). Submit accurate analysis in an efficient and professional way
v). Preparing student to Identify the relevant method for the analysis

OUTCOMES :

At the end of the course student will be able to

a) Analyze three /two hinged arches and obtain internal forces at any cross section.
b) Determine design forces in arches subjected to concentrated, distributed and varying loads.
c) Determine the forces in indeterminate frames subjected to lateral loads by using approximate methods of analysis.
d) Solve statically indeterminate beams and frames using classical methods.
e) Evaluate the suitability of classical methods for a given structure and loading.
f) Utilize modern structural analysis software

UNIT – I: **(12+4)**

THREE HINGEDARCHES:

Elastic theory of arches – Eddy's theorem – Determination of horizontal thrust, bending moment, normal thrust and radial shear – effect of temperature.**(5)**

TWO HINGED ARCHES: Determination of horizontal thrust bending moment, normal thrust and radial shear – Rib shortening and temperature stresses, **(6)**

UNIT – II: **(10+3)**

APPROXIMATE METHOD OF STRUCTURAL ANALYSIS: Application to building frames. (i) Portal method (ii) Cantilever method.**(5)**

SLOPE DEFLECTION METHOD: Derivation of slope deflection equation of supports application to continuous beams including settlement of supports.**(5)**

UNIT – III: **(13+4)**

MOMENT DISTRIBUTION METHOD – Stiffness and carry over factors – Distribution factors – Analysis of continuous beams with and without sinking of supports – storey portal frames – including Sway.(**7)**

KANI'S METHOD – including settlement of supports and single bay portal frames with side sway by Kani's method.**(6)**

UNIT – IV: **(10+4)**

FLEXIBILITY METHOD: Introduction, application to continuous beams including support settlements (maximum of two unknowns) **(5)**

STIFFNESS METHOD: Introduction, application to continuous beams including support settlements. (maximum of two unknowns) **(5)**

Text Books:

1. Analysis of structures– Vol. I & 2 by Vazrani&Ratwani – Khanna Publications
2. Analysis of Structures by Bhavikatti, Vikas publications
3. Structural Analysis (Matrix Approach) by Pundit and Gupta – Tata Mc.Graw Hill publishers.

References :

1. Strength of Materials and mechanics of solids Vol-2 by B.C. Punmia, Laxmi Publications, New Delhi
2. Structural Analysis by C.S. Reddy, Tata Macgrawhill, New Delhi
3. Theory of structures by Ramamuratam

Department of Civil Engineering
B.Tech- 5th Semester

SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: TRANSPORTATION ENGINEERING

Course Code:
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to:

i). To learn highway alignment and design aspects of
ii). To Identify traffic problems and to regulate and manage the traffic.
iii). To Build knowledge on highway materials,construction and maintenance
iv). To Build knowledge on railway track components and design

OUTCOMES:

At the end of the course the Students will be able to:

a) Understand to fix ideal alignment and design of highway
b) Identify traffic problems and give measures to regulate the traffic
c) Build knowledge on highway materials quality, construction and maintenance
d) Adapt railway engineering terminology, basics and build knowledge on track geometric
e) design

UNIT – I:

HIGHWAY DEVELOPMENT AND ALIGNMENT

Highway development in India - Classification of Roads- Road Network Patterns –Highway Alignment- Factors affecting Alignment- Engineering Surveys

HIGHWAY GEOMETIC DESIGN:

Importance of Geometric Design- Design controls and Criteria- Highway Cross Section Elements- Sight Distance Elements-Stopping sight Distance, Overtaking Sight Distance and Intermediate Sight Distance- Design of Horizontal Alignment-Design of Super elevation and Extra widening- Design of Transition Curves- Vertical curves.

UNIT – II

TRAFFIC ENGINEERING AND MANAGEMENT:

Basic Parameters of Traffic-Volume, Speed and Density- Traffic Volume Studies-Speed studies-Parking Studies - Road Accidents-Causes and Preventive measures- Traffic Signs and Road markings

INTERSECTION DESIGN:

Types of Intersections: At grade and grade separated – Need for channelization Islands-
Design of Traffic Signals –Webster Method – Design of Rotary Intersection –Advantages and Disadvantages of Rotary Intersection

UNIT – III

HIGHWAY MATERIALS AND CONSTRUCTION & MAINTENANCE: Highway materials: Aggregate properties and tests, Bitumen properties and tests. Highway Construction: Earthen roads, WBM roads, bituminous roads and Cement Concrete Roads.
Highway Drainage: Surface and Sub surface Drainage System.
HIGHWAY MAINTENANCE: Failure of Flexible and Rigid pavements and their maintenance.

UNIT – IV

INTRODUCTION TO RAILWAY ENGINEERING:

Permanent way components -Cross Section of Permanent Way - Functions of various Components like Rails, Sleepers and Ballast -Rail Fastenings -Creep of Rails- Adzing of Sleepers- Sleeper density.

GEOMETRIC DESIGN OF RAILWAY TRACK:

Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency -Degree of Curve - Crossings and Turn outs.

Text Books:

1. Highway Engineering – S.K.Khanna & C.E.G.Justo, Nemchand & Bros., 7th edition (2000).
2. Highway Engineering Design – L.R.Kadiyali and Lal- Khanna Publications
3. Traffic engineering- L.R.Kadiyali, Khanna publishers
4. Railway Engineering by S.C Saxena and S.P. Arora, Dhanpat Rai Publications, N.Delhi.

References:

1. Railway Engineering , A text book of Transportation Engineering -S.P.chadula -S.Chand & Co. Ltd. (2001).
2. Railway Engineering ,August , Prabha & Co., 15th Edition , 1994.

Department of Civil Engineering
B.Tech- 5th Semester

SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: GEOMATICS (Elective-I) **Course Code:**
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to:

i). Introduce the high level understanding of Remote Sensing Techniques

ii). Explain the basic concept of GIS and different types of data representation in GIS

iii). Impart the knowledge of different data analysis techniques in GIS.

iv). Introduce the various spatial data models and data base models in GIS.

v). Discuss various applications of RS and GIS in Civil Engineering.

OUTCOMES:

At the end of the course, the student is able to:

a) Understand the basic concepts of spatial data acquisition procedures
b) Assess the quality of acquired spatial data in a quantitative way
c) Make informed and critical judgments on technical issues relating to the acquisition, storage, management, analysis and display of spatial data.
d) Understand the complexity of spatial data and their relationships with non-spatial information;
e) Appreciate and understand the spatial data and spatial analysis requirements of a remote sensing and/or GIS project;
f) Perform spatial analysis techniques on a varied range of applications in civil engineering

UNIT – I: **(14+4)**

INTRODUCTION TO REMOTE SENSING: Basic concepts and foundation of remote sensing, Elements involved in remote sensing, Electromagnetic spectrum, remote sensing terminology and units, Energy resources, energy interactions with earth surface features and atmosphere and spectral properties of vegetation, soil and water bodies,

REMOTE SENSING PLATFORMS & SENSORS: Introduction, Characteristics of imaging remote sensing instruments, satellite remote sensing system - a brief over view, other remote sensing satellites, Resolution in Remote Sensing, Elements of Visual Interpretation and Basics of DIP.

UNIT – II: **(12+4)**

GEOGRAPHIC INFORMATION SYSTEM: Introduction, GIS definition and terminology, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS, Applications and Advantages of GIS,Layer based GIS, Feature based GIS mapping, Functions of GIS, Process of GIS.
DATA MANAGEMENT AND METADATA CONCEPT: Introduction,Concept of Database and DBMS, Advantages of DBMS, Functions of DBMS, File and Data Access, Data Models, Database Models, Data Models in GIS, Concept of Meta Data.

UNIT – III **(9+4)**
SPATIAL DATA MODEL: Introduction, Different dimensions of Geographic Data, Spatial Entity and Object, Spatial Data Model, Raster Data Model, Vector Data Model, Raster versus Vector, Object Oriented Data Model, File Formats of Spatial Data.

GEOSPATIAL ANALYSIS: Introduction, Geospatial Data Analysis, Integration and Modeling of Spatial Data, Geospatial Data Analysis Methods, database query, Geospatial measurements, Overlay Operations, Network Analysis, Surface Analysis.

UNIT – IV: **(10+3)**
GLOBAL POSITIONING SYSTEM: Introduction, elements of satellite surveying, the global positioning system, GPS satellites, adjustment computations, GPS observables.

APPLICATIONS: LULC, Agriculture, Forestry, Geology, Geomorphology, Urban Development, Flood Zone Delineation and Mapping, Ground Water Prospects and Recharge.GIS data base design for physical facility planning, Decision support systems for land use planning. GIS based Highway alignment, GIS based road network planning and GIS based traffic congestion analysis, Accident investigation**,** Network Planning.

Text Books:

1. Remote Sensing and Image Interpretation by Thomas M. Lillesand, Ralph.W.Kiefer, Jonathan.W.Chipman; Fifth Edition, Wiley India Pvt Ltd
2. Remote Sensing and Geographical Information System: A.M.Chandra and S.K.Ghosh, Narosha Publications
3. Remote Sensing and Geographical Information systems by M.Anji Reddy JNTU Hyderabad 2001, B.S.Publications.
4. Remote Sensing and GIS by BasudebBatta, 2nd Edition, Oxford University Press.
5. GPS Satellite Surveys, Alfred Leick, Willey & Sons.

References:

1. **Introduction to Remote Sensing,** James B. Cambell, Taylor & Francis
2. Remote Sensing: Principles and Interpretation by Floyd F. Sabins, Third Edition
3. **Geographical Information System, Volume I:** Principal and Technical Issues, **Edited by** P.A. Longley, M.F. Goodchild, D.J. Manguire, D.W. Rhino, John Wiley & Sons
4. **Geographical Information System: Volume II:** Management Issues and Applications, **Edited by** P.A. Longley, M.F. Goodchild, D.J. Manguire, D.W. Rhino, John Wiley & Sons

Department of Civil Engineering
B.Tech- 5th Semester

SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: FINITE ELEMENT METHODS IN CIVIL ENGINEERING (Elective-I)

Course Code:
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to :

i). i). To Understand the fundamental ideas of the FEM
ii). To Know the behavior and usage of each type of elements covered in this course
iii). To prepare a suitable FE model for structural mechanical analysis problems
iv). To interpret and evaluate the quality of the results (know the physics of the problems)
v). To be acquaint with the limitations of the FEM being it to be a numerical tool.

OUTCOMES:

At the end of the course the learners will be able to

a) Idealize given structure with mathematical modeling and boundary conditions.
b) Model the given structure with suitable elements.
c) Conceptualize the Finite Element Analysis (FEA) procedure.
d) Apply FEA procedure to 1-dimensional structures bars, trusses, plane stress and plane strain conditions using triangular and rectangular elements.
e) Evaluating the suitability of type of element and methods of discretization.
f) Set up and solve 1-D, 2-D, and 3-D structural problems using contemporary finite element software.
g) Interpret results obtained from FEA software solutions, not only in terms of conclusions but also awareness of limitations.

UNIT –I **(12+4)**

INTRODUCTION: CONCEPTS OF FEM – Steps involved – merits & demerits – energy principles – Discretization – Rayleigh –Ritz method of functional approximation.

PRINCIPLES OF ELASTICITY: Equilibrium equations – strain displacement relationships in matrix form – Constitutive relationships for plane stress, plane strain and Axi-symmetric bodies of revolution with axi-symmetric loading.

UNIT –II **(11+3)**

ONE DIMENSIONAL FEM : Stiffness matrix for bar element - shape functions for one dimensional elements – one dimensional problems.

UNIT –III **(12+4)**

TWO DIMENSIONAL FEM : Different types of elements for plane stress and plane strain analysis – Displacement models –generalized coordinates – shape functions – convergent and compatibility requirements – Geometric invariance – Natural coordinate system – area and volume coordinates

UNIT –IV **(10+4)**

Generation of element stiffness and nodal load matrices for 3-node triangular element and four node rectangular elements.

ISOPARAMETRICFORMULATION:– Concepts of, isoparametric elements for 2D analysis -formulation of CST element, 4 –noded and 8-noded iso-parametric quadrilateral elements –Lagrangian and Serendipity elements.

Text Book:

1. Finite Elements Methods in Engineering by Tirupati.R. Chandrepatla and Ashok D. Belegundu - Pearson Education Publications.
2. Finite element analysis by S.S. Bhavakatti-New age international publishers
3. .Finite element analysis by David V Hutton, Tata Mcgraw Hill, New Delhi

References:

1. Concepts and Applications of Finite Element Analysis by Robert D.Cook, David S. Malkus and Michael E.Plesha. Jhon Wiley & Sons.
2. Finite Element analysis – Theory & Programming by C.S.Krishna Murthy- Tata Mc.Graw Hill Publishers.
3. Text book of Finite Element analysis by P.Seshu – Prentice Hall of India.

Department of Civil Engineering
B.Tech- 5th Semester

SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: BUILDING TECHNOLOGY(Elective-I) **Course Code:**
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to:

i). Get an idea about building drawing standards in various phases of a project.
ii). Know the detailing in building construction.
iii). Understand about planning of various buildings like residential, educational, office buildings and hospital buildings.
iv). To know about the project planning and management techniques.

OUTCOMES:

At the end of the course the learners will be able to

a) Know the various building bye-Laws laid by town planning authorities and local regulatory bodies for planning various buildings like residential, educational, office buildings and hospital buildings.
b) Know about the techniques for project planning and management.
c) Understand the building drawing standards in various phases of a project.
d) Understand the detailing in building construction.

UNIT – I:

BUILDING BYELAWS AND REGULATIONS: Introduction – Terminology – Objectives of building byelaws.Principles underlying building byelaws.Classification of buildings.Floor Area Ratio (FAR). Floor Space Index (FSI). Open space requirements. Builtup area limitations.Height of Buildings.Wall thickness.Lighting and ventilation requirement.

UNIT – II:

PLANNING OF CONSTRUCTION PROJECTS: Planning scheduling and monitoring of building construction projects, Bar chart, CPM and PERT Network planning.Computation of times and floats – their significance.

UNIT – III

RESIDENTIAL BUILDINGS: Minimum standards for various parts of buildings. Requirementsof different rooms and their grouping.Characteristicsof various types of residential buildings.

UNIT – IV:

PUBLIC BUILDINGS: Planning of Educational institutions, hospitals, dispensaries, office buildings, banks, industrial buildings, hotels and motels, buildings for recreation.

Text Books:

1. Construction Planning, Equipment and methods by R.L. Peurifoyetal. – Tata Mc. Graw Hill Publications.
2. PERT and CPM – Project planning and control with by Dr.B.C.Punmia&Khandelwal – Laxmi publications.
3. 'A' Series & 'B' Series of JNTU Engineering College, Anantapur,

References:

1.Building by laws by state and Central Governments and Municipal corporations
2. Planning, Designing and scheduling – Girescharan Singh &Jagadish Singh.

Department of Civil Engineering
B.Tech- 5th Semester

SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: BULIDING PLANNING AND AUTO CAD LAB **Course Code:**
L: T: P: C:: 0:0:3:2

OBJECTIVES:
The course content enables students to:

i). Plot the layout of building for a given details
ii). Create multi-view drawings (orthographic projections).
iii). iii)Draw section views.
iv). iv)Create shapes and symbols for different uses.
v). Create and manage symbols libraries.

OUTCOMES:
At the end of the course student will be able to

a) Create, display, and plot working drawings.
b) Use layering techniques.
c) Construct technical drawings using a standard computer aided drafting program.
d) Identify, operate and adjust input and output devices.
f) Demonstrate file management techniques.

1. Using CAD software draw & print the following drawings.

4.6 Draw conventional signs as per I.S. standards , symbols used in civil engineering drawing.

4.7 Draw the important joinery components of the building like elevation of fully panelled double leaf door, elevation of partly glazed and partly panelled window.

4.8 Prepare the king post & Queen post truss and lable the various parts.

2. Residential buildings.

a. Plan, Elevation, Section of single roomed building

b. Single storied Two bed room residential building.

3. Structural detailing drawings

a. Lintel cum Sunshade
b. Continuous Beam.
c. Isolated Column with square footing

4. Drawings to be submitted for approval to corporation or municipality showing required details in one sheet such as

a. Plan – Showing Dimensions of all rooms.
b. Section – showing Specifications and Typical Foundation Details.
c. Elevation.
d. Site Plan – Showing Boundaries of Site and Plinth Area
e. Key plan – Showing the location of Building.
f. Title Block – Showing signature of Owner & Licensed surveyor's.

Department of Civil Engineering
B.Tech- 5th Semester

SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: TRANSPORTATION ENGINEERING LAB

Course Code:

L: T: P: C:: 0:0:3:2

OBJECTIVES:
The course content enables students to:
i). Conduct tests and Evaluate the quality of aggregates used in the road construction
ii). Conduct tests and Evaluate the quality of bitumen used in the road construction
iii). Analyze and comprehend he data pertaining to traffic volume studies.

OUTCOMES:
At the end of course student will be able to
a) Know the behavior of Road Aggregates
b) Know the behavior of Bituminous materials
c) Know the Traffic volume counts

LIST OF EXERCISES:

I. ROAD AGGREGATES:
1. Aggregate Crushing value
2. Aggregate Impact Test.
3. Specific Gravity and Water Absorption.
4. Attrition Test
5. Abrasion Test.
6. Shape tests

II. BITUMINOUS MATERIALS:
1. Penetration Test.
2. Ductility Test.
3. Softening Point Test.
4. Flash and fire point tests.

III. TRAFFIC VOLUME STUDIES:
1. Traffic volume study at mid blocks and intersection.
2. Spot Speed Studies.
3. Parking Studies.

Department of Civil Engineering
B.Tech- 6th Semester
SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: DESIGN OF STEEL STRUCTURES **Course Code:**
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to:

i). Understand the fundamental principles and procedures of structural steel design;
ii). Understand the versatility of Steel structures based on requirement
iii). Apply the principles of steel design to real world problems;
iv). Design basic steel members subjected compression, tension and bending as per IS 800 codal
v). Provisions

OUTCOMES:

At the end of the course the learners will be able to

a) Apply the basic requirements of the IS design specifications.
b) Apply the concepts of strain compatibility and equilibrium concepts to determine the strength of members made of steel
c) Design for welded connections between steel members
d) Design simple steel members subjected compression, tension bending and their combinations

UNIT – I

MATERIALS AND CONNECTIONS: (11+4)

Properties of Structural Steel, I. S. Rolled Sections, I. S. Specifications,

Welded connections: Introduction, Advantages and disadvantages of welding- Strength of welds-Butt and fillet welds: Permissible stresses – IS Code requirements. Design of welds fillet weld subjected to moment acting in the plane and at right angles to the plane of the joints, beam to beam and beam to Column connections only.

DESIGN OF TENSION MEMBERS :

Introduction to different modes of failures – gross section yielding, Net Section rupture and block shear failure. Determines the design strength due to yielding of gross section, rupture of critical section and block shear. Design procedure of tension members.(simple problems)

COMPRESSION MEMBERS: Effective length of columns. Slenderness ratio – permissible stresses. Design procedure of compression members – problems on simple sections only (no builtup sections).

UNIT – II (11+4)

BEAMS: Allowable stresses, design requirements as per IS Code-Design of simple and compound beams, check for deflection, shear, buckling, check for bearing, laterally supported beams only.

DESIGN OF BUILT UP COLUMNS: Necessity & design of built up columns, laced and battened columns including the design of lacing and battens.

FOUNDATIONS: Column bases: Slab base, Gusset base.

UNIT–III (11+4)

PLASTIC ANALYSIS: Introduction, plastic hinge concept, plastic modulus, shape factor, upper and lower hound theorems, collapse mechanisms, combined mechanism, plastic analysis of beams and portal frames by equilibrium and mechanism methods.

PLATE GIRDER: Introduction, elements of plate girder, design steps of a plate girder, necessity of stiffeners in plate girder, various types of stiffeners, web and flange splices (only introduction),

UNIT – IV (11+4)

GANTRY GIRDERS: Introduction, various loads, specifications, design of gantry girder.

DESIGN OF MEMBERS OF ROOF TRUSS: Design of purlins ONLY. Introduction to pre-engineered structures, concepts and advantages, disadvantages.

Note: All the designs should be taught in the limit state design method as per IS 800-2007.weilding connections to be used.

DRAWINGS: 1. Detailing of built up columns, laced and battened columns
2. Detailing of Plate girder including curtailment, splicing and stiffeners.
3.Detailing of Gantry girder including curtailment, splicing and stiffeners
4. Roof truss.

These codes and steel tables are permitted in the examinations.

IS Codes:

1) IS -800 – 2007
2) IS – 875 – Part III
3) Steel Tables.

Text Books:

1.Design of Steel structures – N. Subramanian, Oxford University Press.
2. Design of steel structures by S.K. Duggal, Tata Mcgraw Hill, New Delhi
3. Design of steel structures – Ramchandra (Vol. I & II)
4. Structural Design and Drawing by N.KrishnaRaju; University Press, KAKINADA

References:

1. Limit State Design of steel structures IS: 800-2007-V.L. Shah and Veena Gore, Structures Publications, Jai – Tarang, 36 Parvati, Pune.
2..Design of steel structures by Limit State Method as per IS: 800-2007 – S.S. Bhavikatti IK Internatinoal Publishing House, Bangalore – 560 001..
3. Structural design in steel by SarwarAlamRaz, New Age International Publishers, New Delhi
4. Design of Steel Structures by P.Dayaratnam; S. Chand Publishers
5. Design of Steel Structures by M.Raghupathi, Tata Mc. Graw-Hill.

Department of Civil Engineering
B.Tech- 6th Semester
SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: HYDROLOGY AND IRRIGATION ENGINEERING

Course Code:
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to:

i). Understand Hydrology and hydrologic cycle, Classification of Precipitation, estimation of missing rain fall data,
ii). Learn about unit hydrograph, estimation of hydrograph of different storm durations by using unit hydrograph and Synthetic hydrograph.
iii). Learn about the Geological formation of the aquifers radial flow to wells in confined and unconfined aquifers.
iv). Understand the Necessity and Impotence of irrigation, types of Irrigation, methods of application of irrigation water, duty and delta, Soil-water-plant relationship.
v). Know about Classification of canals and design irrigation canals by Kennedys and Laceys methods and also discussed about flood routing.

OUTCOMES:

At the end of the course students will be able to

a) Identify components of hydraulic structures
b) Estimate direct run off from total rain fall, ground water recharges potential, base flow and flood discharge in the catchment area.
c) Construct Hydrograph at a particular location on the stream.
d) Calculate the inflow quantity in to the confined and unconfined wells and seepage characteristics of the ground.
e) Calculate duty and delta, depth and frequency of irrigation to improve the irrigation efficiency and design of irrigation canals suitable for different type of soils.

UNIT – I:

INTRODUCTION: Engineering hydrology and its applications, Hydrologic cycle.

PRECIPITATION: Types and forms of precipitation, rainfall measurement, types of rain gauges, rain gauge network, average rainfall over a basin, consistency of rainfall data, frequency of rainfall, intensity-duration-frequency curves, probable maximum precipitation

ABSTRACTIONS:

EVAPORATION- factors affecting evaporation, measurement of evaporation, evaporation reduction,

EVAPOTRANSPIRATION- factors affecting evapotranspiration, measurement of evapotranspiration

INFILTRATION- factors affecting infiltration, measurement of infiltration, infiltration indices.

UNIT – II:

RUNOFF: Factors affecting runoff, components of runoff, computation of runoff-rational and SCS methods, separation of base flow,

UNIT HYDROGRAPH : Definition of Unit Hydrograph, assumptions, derivation of Unit Hydrograph, unit hydrographs of different durations, principle of superposition and S-hydrograph methods, limitations and applications of UH, Synthetic Unit Hydrograph,

FLOODS AND FLOOD ROUTING: Stream gauging, direct and indirect methods, floods-causes and effects, flood frequency analysis-Gumbel's method, log Pearson type III method, flood control methods

FLOOD ROUTING-hydrologic routing, channel and reservoir routing-Muskingum and Pulse method of routing.

UNIT – III:

GROUND WATER: Occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, types of wells, Darcy's law, Dupuit's equation steady radial flow to wells in confined and unconfined aquifers, yield of a open well-recuperation test.

IRRIGATION

Necessity and Importance of Irrigation, advantages and ill effects of Irrigation, types of Irrigation, methods of application of Irrigation water, water logging and drainage, standards of quality for Irrigation water, principal crops and crop seasons, crop rotation.

UNIT – IV:

SOIL-WATER-PLANT RELATIONSHIP: vertical distribution of soil moisture, soil moisture tension, consumptiveuse, estimation of consumptive use,

DUTY AND DELTA- factors affecting duty, depth and frequency of Irrigation, irrigation efficiencies.

CANALS: Classification of canals, design of canals by Kennedy's and Lacey's theories, balancing depth of cutting, canal lining, design of lined canal, economics of canal lining.

Text Books:

1. Engineering Hydrology by K. Subramanya, TATA McGraw-HILL Education Private
    a. Limited.
2. Engineering Hydrology P. Jayaram Reddy, Laxmi publications pvt. Ltd., New Delhi
3. Irrigation and water power engineering by B.C. Punmia&Lal, Laxmi publications pvt.Ltd.,New Delhi

References:

1. Hand book of applied hydrology by VenTe Chow, Tata-McGraw Hill.
2. Hydrology by HM Raghunath, New Age International Publishers.
3. Irrigation and Water Resources & Water Power by P.N.Modi, Standard Book House.
4. Irrigation and Hydraulic structures by SK Garg, Khanna Publishers.

Department of Civil Engineering
B.Tech- 6th Semester
SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: SOIL MECHANICS

Course Code:
L: T: P: C:: 3:1:0:4

OBJECTIVES:

i). Creating awareness to student about soils and their engineering importance.
ii). Helping students in aquatinting various procedures and tests for classifying soils and develop relationships among various properties.
iii). Imparting knowledge for students about behavior of soils under various drainage Conditions.
iv). Making students to perform computations for determination of strength parameters of soil with using various theories.
v). Developing knowledge about conduct of different lab tests for determining engineering properties by simulating field conditions.

OUTCOMES:

At the end of the course student will be able to

a. Understand soil as a building material and load bearing member.
b. Understand different procedures for classifying soils.
c. Asses the influence of soil water relationship and analyze engineering behaviour of soils under different load/ drainage conditions
d. Analyze the influence of field conditions on strength and consolidation properties of soils.

UNIT-I.:

INTRODUCTION **(10 + 4)**

Introduction to Soil Mechanics and Soil Engineering; Complexity of soil nature; Soil formationand soil types.

SOIL STRUCTURE: Basic concepts of clay minerals; Soil structure and fabric.

SIMPLE SOIL PROPERTIES AND CLASSIFICATION

Basic definitions; Phase relations; Index properties; Grain size distribution; Soil aggregate properties.Indian standard soil classification system.

UNIT-II :

PRINCIPLE OF EFFECTIVE STRESS AND RELATED PHENOMENA **(12+4)**

Principle of effective stress; Capillarity; Seepage force and quicksand condition; Total, effective and neutral pressures.

PERMEABILITY: One-dimensional flow; Darcy's law; Laboratory methods for permeability determination; Field pumping tests for permeability determination; Permeability as a function of soil type, permanent, void ratio, soil fabric, and effective stress.

SEEPAGE THROUGH SOILS: Two-dimensional flow; Flow nets and their characteristics; Uplift pressure, exit gradient, and piping; Criteria for filters.

UNIT-III:

COMPACTION AND STRESS DISTRIBUTION **(10+3)**

Laboratory compaction tests; Factors affecting compaction; Structure and engineering behaviour of compacted cohesive soils; Field compaction; Compaction specifications and field control.

INTRODUCTION TO STRESS DISTRIBUTION: 2 to 1 method, Boussinesq's theory for point, circular loads and Newmarks' chart.

UNIT-IV:

CONSOLIDATION AND SHEAR STRENGTH **(13 +4)**

COMPRESSIBILITY AND CONSOLIDATION BEHAVIOUR

Components of total settlement; Effects of soil type, stress history, and effective stress on compressibility; Normally consolidated and over-consolidated soils; Terzaghi's theory of onedimensional consolidation; Time-rate of consolidation; Evaluation of compressibility and consolidation parameters from consolidometer data.

SHEAR STRENGTH: Mohr's stress circle; Mohr-Coulomb failure criterion; Laboratory tests for shear strength determination; Effective and total stress shear strength parameters; Shear strength characteristics of clays and sands.

Text Books:

1. A text book of Geotechnical Engineering by C.V.Ramaiah
2. Soil Mechanics and Foundation Engineering by B.C.Punmia

Reference Books:

1. Basics of applied soil mechanics - GopalRanjan, ASR Rao
2. Geotechnical engineering by S.K.Gulhati and ManojDatta

Department of Civil Engineering
B.Tech- 6th Semester
SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: AIR AND NOISE POLLUTION CONTROL (Elective-II) **Course Code:**
L: T: P: C:: 3:1:0:4

OBJECTIVES: The course content enables students to:

i). To study the fundamentals of air pollution and its global implication
ii). To study the various mechanisms involved in meteorological aspects of air pollution dispersion
iii). To understand the models available for predicting the air pollution dispersion
iv). To understand the principles of design of particulate control devices
v). To understand the principles of design of gaseous emission control devices
vi). To study the concepts of noise pollution and its control aspects

OUTCOMES:

At the end of the course the learners will be able to

a) learn the concepts of air pollution and its associated problems on a global scale
b) learn the influence of meteorological aspects on air pollution and its dispersion
c) design the different components of particulate and gaseous control equipment
d) understand problems of noise pollution
e) learn the basics of noise pollution and its control measures

UNIT – I: **(10+3)**

Air Pollution – Definitions, Scope, Significance and Episodes, Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary, point and Non- Point, Line and Areal Sources of air pollution- stationary and mobile sources- Effects of Air pollutants on man, material and vegetation: Global effects of air pollution – Green House effect, Heat Islands, Acid Rains, Ozone Holes – Carbon trading

UNIT – II: **(12+4)**

Meteorology and plume Dispersion; properties of atmosphere; Heat, Pressure, Wind forces, Moisture and relative Humidity, Influence of Meteorological phenomena on Air Quality-wind rose diagrams-Lapse Rates, Pressure Systems, Winds and moisture plume behaviour and plume Rise Models; Gaussian Model for Plume Dispersion.

UNIT – III: **(12+4)**

Control of particulates – Control at Sources, Process Changes, Equipment modifications, Design and operation of control Equipment's – Settling Chambers, Centrifugal separators, filters Dry and Wet scrubbers, Electrostatic precipitators.

UNIT – IV: **(11+4)**

General Methods of Control of NOx and SOx emissions, Air Quality Management – Measurement and monitoring of SPM, SO; NO and CO Emissions- Standards-Air quality Index- Noise Pollution – effects of noise and control methods

Text Books:

1. Environmental Engineering, by H S Peavy, L Rowe and G Tchobanoglous, McGraw Hill Publications.
2. Air pollution by M.N.Rao and H.V.N.Rao – Tata Mc.Graw Hill Company

References:

1. Sewage disposal and air pollution Engineering by S K Garg, Khanna Publishers
2. An introduction to Air pollution by R.K. Trivedy and P.K. Goel, B.S. Publications
3. Environmental Pollution and Control, by Dr H.S. Bhatia – Galgotia Publication (P) Ltd, Delhi
4. Air pollution and control by KVSG Muralikrishna

Department of Civil Engineering
B.Tech- 6th Semester
SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: AIRPORT AND HARBOUR ENGINEERING (Elective-II)

Course Code:
L: T: P: C:: 3:1:0:4

OBJECTIVES: The course content enables students to:

i). Build knowledge on airport planning and design considerations
ii). Build knowledge on runway design and its considerations
iii). Understand the requirements to plan the docks and harbors
iv). Build knowledge on design and maintain considerations of docks and harbors

OUTCOMES: At the end of the course the learners will be able to

a) Model the airport layout with all features
b) Design runway based on terrain
c) Model the docks and harbors layout
d) Design structures and non-structures and their maintenance in docks and harbors

UNIT-I

AIRPORT PLANNING AND DESIGN: Airport site selection – Air craft characteristics – Zoning laws – Airport classification

AIRPORT DESIGN: Runway orientation – Wind rose diagram – Runway length – Taxiway design – Terminal area and Airport layout – Visual aids and Air traffic control.

UNIT- II

RUNWAY DESIGN: Various Design factors – Design methods for Flexible pavements – Design methods for Rigid pavements – LCN system of Pavement Design

RUNWAYFAILURES AND MAINTENANCE: Airfield Pavement Failures – Maintenance and Rehabilitation of Airfield pavements – Evaluation &Strenthening of Airfield pavements – Airport Drainage – surface and subsurface drainage.

UNIT- III

PLANNING AND LAYOUT SHORE STRUCTURES: Definition of Terms - Harbors, Ports, Docks, Tides and Waves,Dredging, Littoral Drift, Sounding, Area, Depth, Satellite Ports-Requirements and Classification of Harbors.

Site Selection & Selection Investigation, Shore Considerations- Proximity to Towns/Cities, Utilities, Construction Materials, Coast Lines, Dry and Wet Docks

PLANNING AND LAYOUT OFF SHORE STRUCTURES: Planning and Layouts. Terminal Facilities – Port Buildings, Warehouse, Transit Sheds, Inter-modal Transfer Facilities, Mooring Accessories

UNIT-IV

CONSTRUCTION OF DOCKS & HARBOURS: Coastal Structures- Piers, Breakwaters, Wharves, Jetties, Quays, Spring Fenders Coastal Shipping, Inland Water Transport and Container Transportation. Pipe Ways, Rope Ways

MAINTENANCE OF DOCKS &HARBOURS: Maintenance of Ports and Harbors – Navigational aids.

Text Books:

1. Airport Enginnering- Khanna&Arora- nemchand Bros, new Delhi
2. Airport engineering Virendrakumar , , DhanpathiRai Publishers, new Delhi
3. Docks and HarbourEngineering,Bindra S.P- DhanpathiRai& Sons, New Delhi

References:

1. **Ashford, N. J., Mumayiz, S. A.,** and **Wright, P. H.** Airport Engineering: Planning,
    a. Design and Development of 21st Century Airports, Fourth Edition, John Wiley & Sons, New Jersey, USA, 2011.
2. **Kumar, V.,** and **Chandra, S.** Air Transportation Planning and Design, Galgotia Publications Pvt. Ltd., New Delhi, India, 1999.
3. Seetharaman, S. Dock and Harbour Engineering, Umesh Publications, New Delhi, India,
4. 1999.
5. Srinivasan, R., Harbour, Dock and Tunnel Engineering, Charotar Publishing House,
6. Anand, India, 2009.

Department of Civil Engineering
B.Tech- 6th Semester
SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: SOLID WASTE AND ENVIRONMENTAL MANAGEMENT (Elective-II)

Course Code:

L: T: P: C:: 3:1:0:4

OBJECTIVES: The course content enables students to:

i). Develop insight into the collection, transfer, and transport of municipal solid waste.
ii). Explain the design and operation of a municipal solid waste landfill.
iii). Examine the design and operation of a resource recovery facility.
iv). Summarize the design and operation of a waste-to-energy facility

OUTCOMES:

At the end of the course students are able to :

a) Understand the implications of the production, resource management and environmental impact of solid waste management;
b) Assimilate the significance of recycling, reuse and reclamation of solid wastes;
c) be familiar with relationships between inappropriate waste management practices and impacts on water, soil and sediment quality;
d) Appreciate the current practices available and implement the systems available in solid waste management;
e) be capable of carrying out an assessment of the relationships between environmental guidelines, human activities and environmental quality of impacted soils and water;
f) Integrate technical solid waste management options and imposed environmental legislation and guidance to develop legal and safe solutions.

UNIT-I **(13)**

SOLID WASTE MANAGEMENT: – sources, composition and properties of solid waste – collection and handling – separation and processing

SOLID WASTE DISPOSAL METHODS: Land filling – Incineration composting

UNIT-II **(10)**

ENVIRONMENTAL IMPACT ASSESSMENT: Hazardous Waste –Biomedical wastes –Control methods-Impact Assessment - Methodologies-Impacts on water-air-soil-biological environments-Quality indices

UNIT-III **(13)**

AUDIT AND LEGISLATIONS: Environmental Audit & Environmental legislation objectives of Environmental Audit, Types of environmental Audit, Audit-protocol, stages of Environmental Audit, onsite activities, evaluation of Audit data and preparation of Audit report - Post Audit activities

UNIT – IV **(9)**

POLLUTION ACTS AND REGULATORY BODIES: The Environmental pollution Act, The water Act, The Air (Prevention & Control of pollution Act.), Bio medical waste Rules, Solid Waste Management Rules, Hazardous Waste Management Rules, ISO 14000 series – Quality management – case studies on EIA, Audit and ISO series

Text Books:

1. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B.S. Publication, Sultan Bazar, KAKINADA.

2. Environmental Science and Engineering, by Suresh K. Dhaneja – S.K.,Kataria& Sons Publication., New Delhi.

References:

1. Environmental Engineering, by H S Peavy, L Rowe and G Tchobanoglous, McGraw Hill Publications.
2.Environmental Pollution and Control, by Dr H.S. Bhatia – Galgotia Publication (P) Ltd, Delhi

Department of Civil Engineering
B.Tech- 6th Semester
SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: DISASTER MANAGEMENT (Open Elective) **Course Code:**
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to :

i). Demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response

ii). Understand and appreciate the specific contributions of the Red Cross/Red Crescent movement to the practice and conceptual understanding of disaster management and humanitarian response and their significance in the current context

iii). Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives

iv). Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations
Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in, and

v). Respond to disaster risk reduction initiatives and disasters in an effective, humane and sustainable manner.

OUTCOMES:

At the end of the course the learners will be able to Integrate knowledge and to analyze, evaluate and manage the different public health aspects of disaster events at a local and global levels, even when limited information is available.

a) Describe, analyze and evaluate the environmental, social, cultural, economic, legal and organizational aspects influencing vulnerabilities and capacities to face disasters.
b) Work theoretically and practically in the processes of disaster management (disaster risk reduction, response, and recovery) and relate their interconnections, particularly in the field of the Public Health aspects of the disasters.
c) Manage the Public Health aspects of the disasters.
d) Obtain, analyze, and communicate information on risks, relief needs and lessons learned from earlier disasters in order to formulate strategies for mitigation in future scenarios with the ability to clearly present and discuss their conclusions and the knowledge and arguments behind them.
e) Design and perform research on the different aspects of the emergencies and disaster events while demonstrating insight into the potential and limitations of science, its role in society and people's responsibility for how it is used.
f) Analyze and evaluate research work on the field of emergencies and disaster while demonstrating insight into the potential and limitations of science, its role in society and people's responsibility for how it is used.

UNIT-1:

DISASTER MANAGEMENT AN OVER VIEW: Introduction of DM- inter disciplinary – nature of the subject – Hyogo frame of work of action (HFA) (2005-2015) – Five priorities for action

NATURAL HAZARDS AND DISASTER AND THEIR MANAGEMENT: Case study methods of the following: floods, droughts, - Earthquakes – global warming, cyclones & Tsunamis – Post Tsunami hazards along the Indian coast – landslides

UNIT-II:

MANMADE DISTRE AND THEIR MANAGEMENT ALONG WITH CASE STUDY METHODS OF THE FOLLOWING: Fire hazards – transport hazard dynamics – solid waste management – post disaster – bio terrotirism -threat in mega cities, rail and air craft's accidents, and Emerging infectious diseases & Aids and their management.

RISK AND VULNERABILITY: BUILDING codes and land use planning-social vulnerability – environmental vulnerability – Macroeconomic management and sustainable development, Climate change risk rendition-financial management of disaster – related losses.

UNIT – III

ROLE OF TECHNOLOGY IN DISASTER MANAGEMENTS: Disaster management for infra structures, taxonomy of infrastructure treatment plants and process facilities – electrical substations – roads and bridges – mitigation programme for earth quakes – flowchart, geospatial information in agriculture drought assessment – multimedia technology in disaster risk management and training – transformable indigenous knowledge in disaster reduction.

EDUCATION AND COMMUNITY PREPAREDNESS: Education in disaster risk reduction – Essentials of school disaster education – community capacity and disaster resilience – Community based disaster recovery - Community based disaster management and social capital – Designing resilience – building community capacity for action

UNIT-IV

MULTI – SECTIONAL ISSUES: Impact of disaster on poverty and deprivation - Climate change adaptation and human health – Exposure, health hazards and environmental capacity in disaster management - the red cross and red crescent movement - Corporate sector and disaster risk reduction A community focused approach

FIELD VISIT: visit to a loccal area / site where natural or manmade hazard has occurred and prepare a report with the following details i) location of site, ii) nature of the hazard (natural or manmade), iii) details of loss of life and property iv) response from the government / NGO etc. v) whether the response is adequate or not vi) the role of technology in risk reduction vii) suggestion for improvement of disaster response / preventive measures viii) Conclusions

Text Books:

1. Disaster management - Global Challenges and local solution, Edited by Rajibshash and R.R.Krishnamurthy (2009) published by universities press
2. Disaster management - future challenges and opportunities (2007) editor by Jagbirsingh. Published by I K international publishing house pvt. Ltd.

Reference Book:

1. Disaster management edited by H K Gupta (2003) published by universities press.

Department of Civil Engineering
B.Tech- 6th Semester
SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: ENVIRONMENTAL ENGINEERING LAB **Course Code:**

L: T: P: C:: 0:0:3:2

OBJECTIVES:

i). The course content enables students to:
ii). Determine of pH and Electrical Conductivity
iii). Estimate total Hardness
iv). Determine of Alkalinity, Acidity of given water sample
v). Determine chlorides, Iron, total solids, dissolved solids in water
vi). Determine D.O B.O.D/COD.

OUTCOMES:

At the end of course student will be able to

a) know how to perform relevant tests in the laboratory to determine the major characteristics of water and wastewater
b) Get hands on experience in operating the various equipment/methods available for examining water and wastewater
c) understand the practical significance of the characteristics, the relevant codes of practice for examination and permissible limits for the characteristics of water and wastewater

LIST OF EXERCISES:

1. Determination of pH and Electrical Conductivity
2. Determination and estimation of total Hardness
3. Determination of Calcium and Magnesium hardness
4. Determination of Alkalinity
5. Determination of Acidity
6. Determination of chlorides in water and soil.
7. Determination and estimation of total solids, dissolved solids
8. Determination of Iron
9. Determination of dissolved oxygen with D.O Meter &Winklers Method
10. Physical parameters-Temperature, Turbidity
11. Determination of B.O.D/COD
12. Determination of chlorine demand
13. Determination of optimum coagulant dose

Department of Civil Engineering
B.Tech- 6th Semester
SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: SOIL MECHANICS LAB **Course Code:**

L: T: P: C:: 0:0:3:2

OBJECTIVES:

i). To make the student learn, apply his ability of knowledge with hands of practice to determine index and engineering properties of soils.
ii). To have an exposure for determining various properties of soils in field and through simulating in lab.

OUTCOMES:

a) Identify tools, equipment required and familiarity with experimental procedures for determining index and engineering properties of soils
b) Perform field tests for soil investigations.
c) Apply field conditions for computing and analyzing the experimental data.
d) Infer the results and compare.

LIST OF EXERCISES:

1. Determination of Consistency Limits (Liquid, plastic and Shrinkage limit) for soil.
2. Determination of Field density with Core cutter method & Sand replacement method.
3. Determination of particle size distribution through mechanical and hydrometer analysis.
4. Determination of Optimum Moisture content and Maximum Dry Density for given soil with Proctor Compaction Tests.
5. Determination of coefficient Permeability of soil with constant head and variable head Tests.
6. Determination of strength parameters of given soil with Unconfined Compression strength (UCS) test.
7. Determination of Consolidation characteristics of given cohesive soil by performing consolidation test.
8. Determination of Free swell index for soil.
9. Determination of Strength parameters of given soil under different drainage conditions with Triaxial Test.
10. Determination of strength parameter of given cohesion-less soil by performing Direct shear test.
11. Determination of C.B.R Value of given soil with Laboratory CBR Test. (Any eight shall be conducted.)

Department of Civil Engineering
B.Tech- 7th Semester

SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: FOUNDATION ENGINEERING **Course Code:**
L: T: P: C:: 3:1:0:4

OBJECTIVES:

Leaner is expected to

i). Conceptualize the necessity of site investigations for soil sampling.
ii). Understand the essence of engineering properties in design of various structures constructed on and with soil.
iii). Ascertain the stability of earthen structures.
iv). Know the importance of foundation and different types with their design concepts.

OUTCOMES:

At the end of the course student will be able to

a) Learn various types and methods of undisturbed and disturbed soil sampling.
b) Perform computations for stability of earthen structures.
c) Use the various properties of soils to design the shallow foundations for different loading conditions.
d) Extend the theory of foundation design for special foundation types namely deep foundations.

UNIT – I **(12+ 4)**

SOIL EXPLORATION: Methods of soil exploration – Boring and Sampling methods – Field tests – Penetration Tests – Plate load test – planning of Programme- preparation of soil investigation report.

EARTH SLOPE STABILITY: Infinite and finite earth slopes – types of failures – factor of safety of infinite slopes: stability analysis- Bishop's Simplified method – Taylor's Stability Number- Stability of slopes of earth dams under different conditions.

UNIT – II **(10+ 3)**

EARTH PRESSURE THEORIES: Rankine's theory of earth pressure – earth pressures in layered soils – Coulomb's earth pressure theory – Culmann's graphical method.

RETAINING WALLS: Types of retaining walls – stability of retaining walls.

UNIT – III **(10 + 4)**

SHALLOW FOUNDATIONS: Types - choice of foundation – Location of depth – Safe Bearing Capacity – and IS Methods Safe bearing pressure based on N- value

Allowable bearing pressure; safe bearing capacity and settlement from plate load test – allowable settlements of structures

UNIT –IV **(13 + 4)**

PILE FOUNDATION: Types of piles – Load carrying capacity of piles based on static pile formulae – Dynamic pile formulae – Pile load tests - Load carrying capacity of pile groups.

WELL FOUNDATIONS: Types – Different shapes of wells – Components of wells – functions- construction of well foundations- Sinking of wells – Tilts and shifts.

Text Books:

1. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt. Ltd, (2004).
2. Foundation Engineering by Varghese,P.C., Prentice Hall of India., New Delhi.
3. Soil Mechanics and Foundations by - by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

References:

1. Das, B.M., - (1999) Principles of Foundation Engineering –6th edition (Indian edition) Thomson Engineering
2. Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill Publishing company, Newyork.
3. Analysis and Design of Substructures – Swami Saran, Oxford and IBH Publishing company Pvt Ltd (1998).
4. Geotechnical Engineering by S. K.Gulhati & Manoj Datta – Tata Mc.Graw Hill Publishing company New Delhi. 2005.
5. Teng,W.C – Foundation Design , Prentice Hall, New Jersy

Department of Civil Engineering
B.Tech- 7th Semester

SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: HYDRAULIC STRUCTURES **Course Code:**

L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to

i). Relate the head works constructed at the head of the canal and types and different components and their purposes.
ii). Understand different theories behind the design of impervious floor in permeable soils.
iii). Identify canal regulation structures and cross drainage structures come in the alignment of the channels.
iv). Analyze for the forces to be considered in the in the stability Gravity dams
v). Distinguish between earthen embankments and Causes of its failures and seepage theories

OUTCOMES:

At the end of the course students will be able to

a) Design the different water retaining structures.
b) Analyze the parameters needed in the design of weirs/barrages in permeable soils.
c) Analyze and design the Gravity dams and Earth dams with available foundation strata.
d) Design the canal regulation structures and cross drainage structure
e) Understand the design principles of canal fall and Spillway and able to design various components.

UNIT-I

DIVERSION HEAD WORKS: Types of Diversion head works-diversion and storage head works, weirs and barrages, layout of diversion head works, components. Causes and failure of hydraulic structures on permeable foundations, Bligh's creep theory, Khosla's theory, determination of uplift pressure, impervious floors using Bligh's and Khosla's theory, exit gradient, functions of U/s and d/s sheet piles.

DAMS: Types of dams, merits and demerits, factors affecting selection of type of dam, factors governing selecting site for dam, types of reservoirs, selection of site for reservoir, zones of storage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve.

UNIT-II

EARTH DAMS: types of Earth dams, causes of failure of earth dam, criteria for safe design of earth dam, seepage through earth dam-graphical method, measures for control of seepage.

GRAVITY DAMS: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile and practical profile of a gravity dam, limiting height of a low gravity dam, stability analysis, drainage galleries.

UNIT-III

SPILLWAYS: types of spillways, design principles of Ogee spillways, types of spillway gates.

CANAL FALLS: types of falls and their location, design principles of Sarda type fall, trapezoidal notch fall and straight glacis fall.

UNIT-IV

CANAL REGULATION WORKS: Head regulator and cross regulator, design principles of Cross regulator and head regulators, canal outlets, types of canal modules, proportionality, sensitivity and flexibility.

CROSS DRAINAGE WORKS: types, selection of site, design principles of aqueduct, siphon aqueduct and super passage.

Text Books:

1. Irrigation engineering and hydraulic structures by S.K Garg, Khanna publishers.
2. Irrigation engineering by K.R.Arora
3. Irrigation Engineering by R.K. Sharma and T.K. Sharma, S. Chand Publishers

References:

1. Irrigation and water resources engineering by G.L. Asawa, New Age International Publishers
2. Concrete dams by Varshney.
3. Theory and Design of Hydraulic structures by Varshney, Gupta & Gupta
4. Water resources engineering by Satyanarayana Murthy. Challa, New Age International Publishers.

Department of Civil Engineering
B.Tech- 7th Semester

SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: DESIGN OF REINFORCED CONCRETE STRUCTURES (Elective-IV)
Course Code:
L: T: P: C:: 3:1:0:4

OBJECTIVES:

Leaner is expected to

i). Design continuous beams and slabs as per IS: 456-2000
ii). Design flat slab as per IS:456- 2000
iii). Analyze and design the combined footings.
iv). Design water tanks as per working stress philosophy
v). Understand principle in various methods of pre stressing systems

OUTCOMES:

At the end of the course student will be able to

a) Design the cross section and evaluate the amount of reinforcement required in the continuous beam as per IS: 456 codal recommendations for all practical loadings.
b) Design the amount of reinforcement required in the continuous slab and stair case as per IS: 456 codal recommendations for all practical loadings.
c) Design flat slab as per the recommendations of code IS: 456:2000
d) Evaluate the governing forces and design the combined footings and water tanks as per the recommendations of code IS: 456:2000.
e) Evaluate the suitability of a particular prestressing system based on the practical requirements.
f) Relate with professional and contemporary issues in the design and fabrication of prestressed concrete members.

UNIT – I **(12+4)**

BEAMS: Design examples in simply supported and continuous beams, detailing.

SLABS: Design of continuous slab Using IS Coefficients, detailing, Design of stair case.

UNIT – II **(11+4)**

FLAT SLABS: Direct design method, Design of interior and exterior panels, reinforcement detailing.

COMBINED FOOTINGS: Combined slab footing, Combined beam slab footing.

UNIT–III **(11+4)**

DESIGN OF RCC WATER TANKS: Design of RCC rectangular and Circular types

UNIT – IV **(11+3)**

INTRODUCTION TO PSC: Historic development – General principles of prestressing pretensioning and post tensioning – Advantages and limitations of prestressed concrete – Materials – High strength concrete and high tensile steel their characteristics.

ANALYSIS OF PRESTESS & METHODS OF PRESTESSING: I.S.Code provisions, Methods and Systems of Prestressing; Pre-tensioning and post tensioning methods -Different systems of prestressing like Hoyer System, Magnel System Freyssinet system and Gifford – Udall System.

Note: The students should prepare the following plates using Auto-Cad

Plate 1 Detailing of Continuous beams

Plate 2 Detailing of Continuous slabs and stair case

Plate 3 Detailing of flat slab

Plate 4 Detailing of combined footing

Text Books:

1. Structural Design and Drawing (Concrete and Steel) by N. Krisna Raju, University press publications
2. Design of R.C.C structural elements by S.S Bhavikatti, New age International publications.
3. Reinforced Concrete Design by N. Krishna Raju and R. N Pranesh, New age international Publishers Pvt.Ltd
4. Prestressed Concrete by Krishna Raju; - Tata Mc.Graw Hill Publications.

References:

1. Reinforced concrete Design by S.N Sinha, Tata Mc. Hill publications
2. Fundamentals of Reinforced concrete design by M.L. Gambhir, Prentice Hall of India
3. Design of Prestressed concrete structures (Third Edition) by T.Y. Lin & Ned H.Burns, John Wiley & Sons.

Department of Civil Engineering
B.Tech- 7th Semester
SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: EARTHQUAKE RESISTANT DESIGN (Elective – IV) **Course Code:**
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The student is expected to:

i). Create a strong understanding on application of single degree and multi-degree of freedom systems.
ii). Impart the knowledge on causes and effects of earthquakes.
iii). Formulate and analyze structures subjected to earthquake excitation.
iv). Familiarize with seismic codal and detailing provisions.

OUTCOMES:

On successful completion of this course, it is expected that students should be able to;

a) Analyze the free and forced vibration response of single-degree and multi-degree of freedom and continuous systems.
b) Distinguish between earthquake magnitude and earthquake damage (intensity),
c) Understand why earthquakes occur, how they are measured and categorized and the effect they may have on engineering structures. Predict the Dynamic Behavior of simple structural systems,
d) Develop an understanding of structural dynamics of simple systems subject to harmonic, impulse and/or arbitrary loading,
e) Employ the Response Spectrum Analysis Method for Earthquake resistant R/C Buildings,
f) Apply the Basic Principles of Conceptual Design for Earthquake resistant R/C Buildings. Understand the concepts and implementation of IS codes in relation to earthquake design.

UNIT – I **(9+4)**

INTRODUCTION TO STRUCTURAL DYNAMICS: – Theory of vibrations – Lumped mass and continuous mass systems –Single Degree of Freedom (SDOF) Systems – Formulation of equations of motion – Un damped and damped free vibration –Damping – Response to harmonic excitation – Concept of response spectrum.

UNIT – II **(9+4)**

MULTI-DEGREE OF FREEDOM (MDOF) SYSTEMS: - Formulation of equations of motion – Free vibration –Determination of natural frequencies of vibration and mode shapes – Orthogonal properties of normal modes – Mode superposition method of obtaining response.

UNIT – III **(13+4)**

EARTHQUAKE ANALYSIS : - Introduction – Rigid base excitation – Formulation of equations of motion for SDOF and MDOF Systems – Earthquake response analysis of single and multi-storyed buildings – Use of response spectra.

EARTHQUAKE ENGINEERING: - Engineering Seismology – Earthquake phenomenon – Causes and effects of earthquakes – Faults – Structure of earth – Plate Tectonics – Elastic Rebound Theory – Earthquake Terminology – Source, Focus, Epicenter etc - Earthquake size – Magnitude and intensity of earthquakes – Classification of earthquakes – Seismic waves – Seismic zones – Seismic Zoning Map of India – Seismograms and Accelegrams.

UNIT – IV **(10+3)**

CODAL DESIGN PROVISIONS : - Review of the latest Indian seismic code IS:1893 – 2002 (Part-I) provisions for buildings Earthquake design philosophy – Assumptions – Design by seismic coefficient and response spectrum methods – Displacements and drift requirements – Provisions for torsion.

CODAL DETAILING PROVISIONS: - Review of the latest Indian Seismic codes IS:4326 and IS:13920 provisions for ductile detailing of R.C buildings – Beam, column and joints

Text Books:

1. Dynamics of Structures – Clough & Penzien, McGraw Hill – International Edition.
2. Earthquake Resistant Design of Structures – Pankaj Agarwal & Manish Shrikhande – Printice Hall of India, New Delhi

References:

1. Dynamics of Structures by A.K.Chopra – Pearson Education, Indian Branch, Delhi.
2. Earthquake Tips by C.V.R.Murty, I.I.T. Kanpur.
3. Structural Dynamics by Mario Paaz.

IS Codes: IS: 1893, IS: 4326 and IS:13920

Department of Civil Engineering
B.Tech- 7th Semester

SYLLABUS
(Applicable for 2013 and 2014 admitted batches)

Course Title: RETROFITING AND REHABILITATION OF STRUCTURES (Elective-IV)

Course Code:

L: T: P: C: 3:1:0:4

OBJECTIVES:

The student is expected to:

vi) Recognize the mechanisms of degradation of concrete structures and conduct preliminary forensic assessment of deteriorated concrete structures;
vii) Learn how to conduct field monitoring and non-destructive evaluation of concrete structures;
viii) Assess alternative repair strategies for deteriorated concrete structures including repairing with composites;
ix) Evaluate stabilizing and strengthening techniques of reinforced concrete structural elements;
x) Carry out a study on a topic related to the durability and repair of concrete structures, author a technical paper on the study and present it verbally.

OUTCOMES:

At the end of the course the learners will be able to

f) Identify the probable reasons for the deterioration of various structural members
g) Able to assess the severity of damage in the structural members
h) Choose materials and appropriate technologies for repair.
i) Identify the appropriate method for strengthening of existing members.
j) Plan for the monitoring of the new buildings by using sensor technology.

UNIT – I: **(9+4)**

STRUCTURAL DISTRESS: Introduction – Deterioration of Structures – Distress in Structures – Causes and prevention.

STRUCTURAL DAMAGE: Mechanism of Damage – Types of Damage.

UNIT – II: **(11+4)**

CORROSION AND FIRE DAMAGE: Corrosion of Steel Reinforcement – Causes – Mechanism and Prevention. Damage of Structures due to Fire – Fire Rating of Structures – Phenomena of Desiccation.

DIAGNOSIS AND DAMAGE ASSESSMENT: Inspection and Testing – Symptoms and Diagnosis of Distress - Damage assessment – NDT.

UNIT – III: **(13+4)**

DAMAGE REPAIRS: Repair of Structure – Common Types of Repairs – Repair in Concrete Structures – Repairs in Under Water Structures – Guniting – Shot Create – Underpinning.

RETROFITTING: Strengthening of Structures – Strengthening Methods – Retrofitting – Jacketing.

UNIT – IV: **(7+3)**

MONIT ORING: Health Monitoring of Structures – Use of Sensors

BUILDING INSTRUMENTATION: Various instruments used in for monitoring structural behavior of building.

Text Books:

1. Concrete Technology by A.R. Santakumar, Oxford University press
2. Defects and Deterioration in Buildings, E F & N Spon, London
3. Non-Destructive Evaluation of Concrete Structures by Bungey - Surrey University Press
4. Maintenance and Repair of Civil Structures, B.L. Gupta and Amit Gupta, Standard Publications.

References:

1. Concrete Repair and Maintenance Illustrated, RS Means Company Inc W. H. Ranso, (1981)
2. Building Failures : Diagnosis and Avoidance, EF & N Spon, London, B. A. Richardson, (1991)

Department of Civil Engineering
B.Tech- 7th Semester

SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: GEOMATICS LAB **Course Code:**
L: T: P: C: 0:0:3:2

OBJECTIVES

i). Megascopic identification of Rock forming, Ore forming minerals and rocks based on physical properties.
ii). Interpretation of geological maps showing tilted beds, faults, unconformities etc.
iii). Solving Structural Geology problems.
iv). To orient them towards usage of spatial technologies
v). To give exposure on the state of the art technologies in Geomatics

OUCOMES
At the end of course student will be able to

a) Identify the various rocks and minerals based on the physical properties
b) Interpret different geological maps
c) Solve the various strike and dip problems
d) Work independently on various spatial technologies
e) Understand state of the art technologies in Geomatics

LIST OF EXERCISES:

ENGINEERING GEOLOGY

1. Physical properties of minerals: Megascopic identification of
a) Rock forming minerals – Quartz group, Feldspar group, garnet group, mica group & talc, Chlorite, olivine, kyanite, asbestos, tourmelene, calcite, gypsum, etc…
b) Ore forming minerals – magnetite, hematite, pyrite, pyralusite, graphite, chromite, etc…
2. Megascopic description and identification of rocks.
a) Igneous rocks – Types of granite, pegmatite, gabbro, dolerite, syenite, Granite poryphery, Basalt, etc…
b) Sedimentary rocks – sand stone, ferrugineous sand stone, lime stone, shale, laterite, Conglomerate, etc…
c) Metamorphic rocks – biotite – granite gneiss, slate, muscovite & biotite, schist, marble, khondalite etc…
3. Interpretation of geological maps
4. Simple Structural Geology problems.

GIS

1. Georeferencing
2. Projection of Map
3. Digitization of Map/Toposheet
4. Creation of thematic maps.
5. Study of features estimation
6. Generation of Digital Elevation model
7. Generation of LULC

8. Watershed Delineation

Department of Civil Engineering
B.Tech- 7th Semester
SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: SOFTWARE APPLICATIONS IN CIVIL ENGINEERING **Course Code:**
L: T: P: C:: 0:0:3:2

OBJECTIVES:
Learner is expected to

i). Model, analyze and design simple steel frames subjected practical loads.
ii). Model, analyze and design steel trusses of various shapes used in the field
iii). Model, analyze the given multi storied structure.
iv). Design the reinforcement in beams, slabs and stair cases.
v). Design the reinforcement in retaining walls and water tanks.

OUTCOMES:

At the end of the course the student will be able to

a) Validate the results of analysis and design of portal frame
b) Analyze and Interpret of results of analysis of Steel trusses used in practice
c) Model, analyze and design the components of multi storied RCC framed structure
d) Interpret and cross check the reinforcement provided in the construction sites of buildings.
e) Interpret and cross check the reinforcement provided in the construction sites of retaining walls and water tanks.

EXPERIMENTS TO BE PERFORMED (MIN 8 EXPERIMENTS)
ANALYSIS AND DESIGN USING STAAD

1. Analysis and design of portal frame

2. Analysis and Interpretation of Results of Analysis of Steel trusses

3. Analysis and Interpretation of Results of Analysis of RCC Frame.

RCC WORKING DRAWINGS

Plate 1 Detailing of Continuous beams
Plate 2 Detailing of Continuous slabs and stair case
Plate 3 Detailing of flat and grid slab
Plate 4 Detailing of combined footing and retaining wall
Plate 5 Detailing of rectangular and circular water tanks

SOFTWARE REQUIRED: STAAD PRO.
All experiments are compulsory.

Department of Civil Engineering
B.Tech- 8th Semester

SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: CONSTRUCTION COSTING AND MANAGEMENT **Course Code:**
L: T: P: C: 3:1:0:4

OBJECTIVES:

i). Learn the quantity estimation of the different components of the civil engineering structures
ii). Learn the cost estimate of the different components of the civil engineering structures.
iii). Organize and schedule of estimating work.
iv). Clearly understand the cost management discipline and process.
v). Use a cost management estimation and control plan

OUTCOMES:

At the end of the course the learners will be able to

a) Identify, analyze and solve the complex problems that deal with estimation of buildings and pavements.
b) Perform cost analysis of Civil Engineering projects.
c) Establish relationship between cost and quality of the construction process.
d) Manage and administer construction contracts.
e) Estimate the value of existing infrastructure.

PART-A

UNIT – I **(12+3)**

GENERAL ITEMS OF WORK IN BUILDING: Standard Units. Principles of working out quantities for detailed and abstract estimates. Approximate method of Estimating.
RATE ANALYSIS: Working out data for various items of work over head and contingent charges. Standard specifications for different items of building construction.

UNIT – II **(10+4)**

REINFORCEMENT BAR BENDING SCHEDULES: Reinforcement bar bending and bar requirement schedules.
VALUATION OF BUILDINGS: Valuation of various components of buildings

UNIT – III **(11+3)**

CONTRACTS: Types of contracts - Contract Documents - Conditions of contract.
PLANNING OF CONSTRUCTION PROJECTS: Planning scheduling and monitoring of building construction projects, Bar chart, CPM and PERT Network planning. Computation of times and floats – their significance.

PART-B **(12+5)**

DETAILED ESTIMATES OF BUILDINGS: Individual wall method and center line method.

TEXT BOOKS:

1. Estimating and Costing by B.N. Dutta, UBS publishers, 2000.
2. Estimating and Costing by G.S. Birdie
3. PERT and CPM – Project planning and control with by Dr.B.C.Punmia & Khandelwal – Laxmi publications.

REFERENCES:

1. Standard Schedule of rates and standard data book by public works department.
2. I. S. 1200 (Parts I to XXV - 1974/ method of measurement of building and Civil Engineering works - B.I.S.)
3. Estimation, Costing and Specifications by M. Chakraborthi; Laxmi publications.
4. National Building Code.

Department of Civil Engineering
B.Tech- 8th Semester

SYLLABUS
(Applicable for 2012-13 admitted batch)

Course Title: DESIGN AND DRAWING OF IRRIGATION STRUCTURES **(Elective-V)**
Course Code:
L: T: P: C: 3:1:0:4

OBJECTIVES:

The leaner is expected to

iii). Study the design and drawing of hydraulic Structures such as Surplus weir, Tank sluices with tower head, Canal drop, Canal regulator, under tunnel and siphon aqueduct.

iv). Relate substructure components of irrigation canals and irrigation head works.

OUTCOMES:

At the end of the course the learners will be able to

a) Identify design components of various irrigation structures
b) Create the drawings of various irrigation structures.
c) Illustrate the component parts of Hydraulic structures
d) Summarize the requirements of irrigation design engineers in large and small consulting firms, and at all levels of government and Private sectors

SYLLABUS:

1. SURPLUS WEIR.
2. TANK SLUICE WITH TOWER HEAD
3. TYPE III SYPHON AQUEDUCT.
4. TRAPEZOIDAL NOTCH FALL.
5. CANAL REGULATOR.
6. UNDER TUNNEL

Final Examination pattern: Any two questions of the above six designs may be asked out of which the candidate has to answer one question. The duration of examination will be three hours.

REFERENCES:

1. Design of minor irrigation and canal structures by C.Satyanarayana Murthy, Wiley eastern Ltd.
2. Irrigation engineering and Hydraulic structures by S.K.Garg, Standard Book House.
3. Irrigation and Water Resources & Water Power by P.N.Modi, Standard Book House.
4. Irrigation Water Management by D.K. Majundar Printice Hall of India.

Department of Civil Engineering
B.Tech- 7th Semester

SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: GROUND IMPROVEMENT TECHNIQUES (Elective-V) **Course Code:**
L: T: P: C: 3:1:0:4

OBJECTIVES:

i). Understand the modern methods of treating soils in order to improve their engineering properties.
ii). Explain the underlying principles of the different methods of ground treatment
iii). identify when such treatment may be necessary what results can be expected in different soil types

OUTCOMES:

At the end of the course the learners will be able to

a) Interpret the concepts behind a range of ground improvement and soil remediation techniques.
b) Find out the advantages, disadvantages, limitations for each ground improvement method discussed.
c) Choose appropriate techniques for a range of ground and site conditions.
d) Identify criteria to determine the applicability of each ground improvement method for a specific project and soil condition under consideration.

UNIT – I **(11+3)**

DEWATERING: Methods of de-watering - sumps and interceptor ditches - single, multi stage well points - vacuum well points - Horizontal wells - foundation drains - blanket drains - criteria for selection of fill material around drains - Electro-osmosis.

GROUTING: Objectives of grouting - grouts and their properties - grouting methods - ascending, descending and stage grouting - hydraulic fracturing in soils and rocks - post grout test.

UNIT – II **(12+5)**

IN – SITU DENSIFICATION METHODS IN GRANULAR SOILS: Vibration at the ground surface, Impact at the Ground Surface, Vibration at depth, Impact at depth.

IN – SITU DENSIFICATION METHODS IN COHESIVE SOILS: Preloading or dewatering, Vertical drains – Sand Drains, Sand wick geodrains – Stone and lime columns – thermal methods.

UNIT – III **(13+5)**

STABILISATION: Methods of stabilization – mechanical – cement – lime – bituminous - chemical stabilization with calcium chloride - sodium silicate and gypsum

EXPANSIVE SOILS: Problems of expansive soils – tests for identification – methods of determination of swell pressure - Improvement of expansive soils – Foundation techniques in expansive soils – under reamed piles.

UNIT – IV **(9+2)**

GEOSYNTHETICS : Geotextiles- Types, Functions and applications – geogrids and geomembranes – functions and applications.

REINFORCED EARTH: Principles – Components of reinforced earth – factors governing design of reinforced earth walls – design principles of reinforced earth walls.

Text Books:

1. Hausmann M.R. (1990), Engineering Principles of Ground Modification, McGraw-Hill International Edition.
2. Purushotham Raj. Ground Improvement Techniques, Laxmi Publications, New Delhi

References:

1. Moseley M.P. (1993) Ground Improvement, Blackie Academic and Professional, Boca Taton, Florida, USA.
2.Xanthakos P.P, Abramson, L.W and Brucwe, D.A (1994) Ground Control and Improvement, John Wiley and Sons, New York, USA.
3. Robert M. Koerner, Designing with Geosynthetics, Prentice Hall New Jercy, US

Department of Civil Engineering
B.Tech- 7th Semester
SYLLABUS
(Applicable for 2013-14 admitted batch)

Course Title: PAVEMENT ANALYSIS AND DESIGN (Elective-V) **Course Code:**
L: T: P: C:: 3:1:0:4

OBJECTIVES:

i). To understand the various factors affecting in pavement design
ii). To build knowledge on design aspects and methods for flexible pavement design
iii). To build knowledge on design aspects and methods for rigid pavement design
iv). To build knowledge on types of pavement failures and maintenance solutions

OUTCOMES:

At the end of the course the learners will be able to

a) Build knowledge on the various factors affecting in pavement design
b) Design flexible pavement considering sub grade condition and axle loads
c) Design rigid pavement considering sub grade condition and axle loads
d) Discover pavement failures and their remedies

UNIT-I

ROAD FACTORS IN PAVEMENT DESIGN: Variables Considered in Pavement Design, Types of Pavements, Functions of Individual Layers, Classification of Axle Types of Rigid Chassis and Articulated Commercial Vehicles, Legal Axle and Gross Weights on Single and Multiple Units, Tire Pressure, Contact Pressure, EAL and ESWL Concepts

TRAFFIC FACTORS IN PAVEMENT DESIGN: ADT, AADT, Truck Factor, Growth Factor, Lane Distributions & Vehicle Damage Factors, Effect of Transient & Moving Loads.

UNIT- II

REQUIREMENTS AND FUNCTIONS OF FLEXIBLE PAVEMENT DESIGN: Objects and requirements of pavements-Types-Functions of pavement components

DESIGN FACTORS AND METHODS OF FLEXIBLE PAVEMENT: Flexible pavement Design methods-CBR method-IRC method-Bur mister method -IRC Method for volume Flexible Pavements

UNIT- III

RIGID PAVEMENTS DESIGN CONSIDERATIONS: Design considerations-wheel load stresses-Temperature stresses-frictional stresses-combination of stresses

DESIGN ELEMENTS AND METHODS OF FLEXIBLE PAVEMENT: Design of slabs-Design of joints-IRC method for low volume roads-Continuously Reinforced cement concrete pavements-Roller Compacted Concrete Pavements

UNIT-IV

PAVEMENT FAILURES:

Causes of pavement failures-failures in flexible pavements-alligator cracking-consolidation of pavement failures-shear failure-longitudinal cracking-frost heaving-reflection cracking-formation of waves and corrugation

REMEDIES FOR PAVEMENT FAILURES: alligator cracking-consolidation of pavement failures-shear failure-longitudinal cracking-frost heaving-reflection cracking-formation of waves and corrugation

Text Books:

1. Highway engineering by khanna & justo
2. Yoder and Witczak, Priniciples of Pavement Design, John Wiley and Sons
3. Yang. H. Huang, Pavement Analysis and Design, Second Edition, Prentice Hall Inc.
4. IRC:37 & 58 Codes for Flexible and Rigid Pavements Design.

References:

1. Rajib B. Mallick and Tahar El-Korchi, Pavement Engineering – Principles and Practice,
   a. CRC Press (Taylor and Francis Group)
2. W.Ronald Hudson, Ralph Haas and Zeniswki , Modern Pavement Management, Mc Graw Hill and Co .
3. Shell Pavement Design Manual – asphalt pavements and overlays for road traffic, by Nilanjan Sarkar, Ooms Avenhorn Holding India Pvt.Ltd;
4. Relevant IRC Codes

Department of Civil Engineering
B.Tech- 7th Semester

SYLLABUS
(Applicable for 2012-13 admitted batch)

Course Title: ENVIRONMENTAL HYDRAULICS AND ADVANCED WASTEWATER TREATMENT
(Elective-VI)

Course Code:
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to:

i). Learn about the horizon of the waste, like the hazardous waste from various industries and its characteristics and to get thorough knowledge of waste water treatment.
ii). Understand treatment processes adopted by industries
iii). Analyze the relative merits and economy of different waste treatment processes
iv). Learns about requirements of distribution systems
v). Identifies the merits and merits of sewerage systems.

OUTCOMES:

At the end of the course students are able to:

a) Comprehends the importance of treatment of Liquid waste from various industries.
b) Identifies liquid waste and characteristics at difference stages in various types of industries.
c) Learn about the manufacturing process of various products in industries and how the waste is treated in various industries.
d) Identifies the design requirements of distribution systems
e) Identifies the suitability of sewerage system for a given site conditions.

UNIT-I **(15)**

BASIC THEORIES OF INDUSTRIAL WASTE WATER MANAGEMENT – Volume reduction – Strength reduction – Neutralization – Equalization and proportioning. Joint treatment of industrial wastes and domestic sewage – consequent problems-

SPECIAL TREATMENT METHODS – Adsorption – Reverse Osmosis – Defluoridation – Ion exchange – Ultra Filtration- Quality requirements of boiler and cooling waters – Industrial waste water discharges into streams. Lakes and oceans and problems - Quality requirements of process water for Textiles – Food processing - and Brewery Industries – Boiler and Cooling water treatment methods.

UNIT-II **(10)**

WASTEWATER TREATMENT OF INDUSTRIAL EFFLUENTS: Textiles, Paper and Pulp industries, Tanneries, Fertilizers, Distilleries, Dairy, Sugar Mills, Steel Plants -Common Effluent Treatment Plants – Advantages and Suitability, Limitations, Effluent Disposal Methods.

UNIT-III **(10)**

DISTRIBUTION SYSTEMS: requirements – methods and layouts-Design procedures- Hardy Cross and equivalent pipe methods service reservoirs – joints, valves such as sluice valves, air valves, scour valves and check valves water meters – laying and testing of pipe lines – pump house.

UNIT-IV **(10)**

SEWAGE SYSTEM : Storm water estimation – time of concentration – storm water overflows combined flow – Design of sewers – shapes and materials – sewer appurtenances manholes –inverted siphon – catch basins – flushing tanks – ejectors, pumps and pump houses – house drainage – components requirements – sanitary fittings-traps – one pipe and two pipe systems of plumbing

Text Books:

1. Waste Water Treatment by M.N. Rao and Dutta, Oxford & IBH, New Delhi.
2. Sewage disposal and air pollution Engineering by S K Garg,
3. Water supply engineering by S K Garg, Dhanpat Rai Publishing

References:

1. Water Supply Engineering, Vol. 1, waste water Engineering, Vol. II, B.C.Punmia, Ashok Jain & Arun Jain, Laxmi Publications Pvt.Ltd, New Delhi.

Department of Civil Engineering
B.Tech- 8th Semester

SYLLABUS
(Applicable for 2012-13 admitted batch)

Course Title: PRESTRESSED CONCRETE DESIGN (Elective-VI) **Course Code:**
L: T: P: C:: 3:1:0:4

OBJECTIVES:

The course content enables students to:

i). Compute the losses in PSC members
ii). Design PSC members subjectd to flexure and shear
iii). Analyze and Design for anchorage forces

OUTCOMES:

At the end of the course students are able to:

a) Describe the basic properties of prestressed concrete constituents.
b) Analyse the flexural behaviour of simple beams
c) Calculate prestress losses for simple prestressed concrete girders.
d) Design prestressed concrete girders for flexure using current design procedures
e) Recognize the effects of transfer and development length on flexural and shear strengths.
f) Construct moment-curvature and load-deflection curves for a prestressed concrete beam.
g) Analyse and design prestressed concrete members for shear.

UNIT – I

LOSSES OF PRESTRESS: Loss of prestress in pre-tensioned and post-tensioned members due to various causes like elastic shortage of concrete, shrinkage of concrete, creep of concrete, Relaxation of steel, slip in anchorage bending of member and frictional losses.

UNIT – IV

ANALYSIS OF SECTIONS FOR FLEXURE:

Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons.

UNIT – V

DESIGN OF SECTIONS FOR FLEXURE AND SHEAR: Allowable stress, Design criteria as per I.S.Code – Elastic design of simple rectangular and I-section for flexure, shear, and principal stresses – design for shear in beams – Kern – lines, cable profile.

UNIT – VI

ANALYSIS OF END BLOCKS: Guyon's method and Mugnel method, Anchorage zone strusses – Approximate method of design – Anchorage zone reinforcement – Transfer of prestress pre-tensioned members.

Text books:

1. Prestressed Concrete by Krishna Raju; - Tata Mc.Graw Hill Publications.
2. Prestressed Concrete by N.Rajasekharan; - Narosa publications.

Reference:

1. Prestressed Concrete by Ramamrutham; Dhanpatrai Publications.
2. Design of Prestressed concrete structures (Third Edition) by T.Y. Lin & Ned H.Burns, John Wiley & Sons.

Codes: BIS code on prestressed concrete, IS 1343.

Department of Civil Engineering
B.Tech- 8th Semester

SYLLABUS
(Applicable for 2012-13 admitted batch)

Course Title: TRAFFIC ENGINEERING (Elective-VI) **Course Code:**
L: T: P: C:: 3:1:0:4

OBJECTIVES:

i). To understand the traffic characteristics and relations
ii). To build knowledge on traffic capacity and flow
iii). To build knowledge on parking problems and measures to accidents
iv). To learn signal design and traffic relation with environment

OUTCOMES:

At the end of the course the learners will be able to

a) identify traffic stream characteristics and studies
b) Build knowledge on traffic capacity and level of service
c) Discover parking problems and measures to accidents
d) Design traffic signal cycle and learn the measures for the traffic-environment problems

UNIT – I

TRAFFIC CHARACTERISTICS:

Basic traffic characteristics - Speed, volume and concentration. Relationship between Flow, Speed and Concentration

TRAFFIC MEASUREMENT AND ANALYSIS:

Volume Studies - Objectives, Methods; Speed studies - Objectives: Definition of Spot Speed, time mean speed and space mean speed; Methods of conducting speed studies.

UNIT – II

SPEED AND GAP ACCEPTANCE STUDIES:

Methods of conducting speed studies-Presentation of speed study data. Head ways and Gaps-Critical Gap-Gap acceptance studies.

HIGHWAY CAPACITY AND LEVEL OF SERVICE:

Basic definitions related to capacity-Level of service concept-Factors affecting capacity and level of Service-Computation of capacity and level of service for two lane highways Multilane highways and Freeways.

UNIT – III

PARKING STUDIES:

Types of parking facilities-on street parking and off street Parking -Parking studies and analysis.
Accident studies and analysis.

ACCIDENTS MEASURES: Causes of accidents - The Road, The vehicle, the road user and the Environment; Engineering, Enforcement and Education measures for the prevention of accidents

Unit – IV

TRAFFIC REGULATION: Traffic Signals - Design of Isolated Traffic Signal by Webster method, IRC Method Warrants for signalization, Signal Coordination methods, Simultaneous, Alternate, Simple progression and Flexible progression Systems.

TRAFFIC AND ENVIRONMENT: Detrimental effects of Traffic on Environment; Air pollution; Noise Pollution; Measures to curtail environmental degradation due to traffic.

Text Books:

1. Traffic Engineering and Transportation Planning - L.R. Kadiyali, Khanna Publishers.
2. Highway Engineering- S. K. Khanna & C.E.G Justo, Nem Chand & Bros., Publisher

Reference Books:

1. Traffic Engineering - Theory & Practice - Louis J. Pignataro, Prentice Hall Publication.
2. Transportation Engineering - An introduction - C. Jotin Khistry, Prentice Hall Publication