Inspiring Education for Aspiring Engineers

G. Pulla Reddy Engineering College
(Autonomous)
KURNOOL – 518 007.

Accredited by NBA of AICTE and NAAC of UGC
An ISO 9001 : 2008 Certified Institution
Affiliated to JNTUA, Anantapur.
Sponsored and Managed by Gunampalli Pulla Reddy Charities Trust

SCHEME – 2010

Scheme & Syllabus For II, III & IV Years of Four Year B.Tech. Degree Course

(With effect from the batch admitted in 2010 – 2011)

FOUR YEAR B. Tech. DEGREE COURSE
Scheme of Instruction and Examination
(Effective from 2010–11)

II B. Tech (CE) – I Semester
Scheme : 2010

S. No	Subject	Abbreviation	Credits	Scheme of Instruction periods/week			Duration of end Exam (Hours)	Scheme of Examination Maximum Marks		
				L	D/T	P		End Exam	Internal Assessment	Total
I	*Theory*									
1.	Engineering Mechanics	EGM	4	3	1	–	3	70	30	100
2.	Surveying–I	SUR1	5	4	1	–	3	70	30	100
3.	Fluid Mechanics	FM	5	4	1	–	3	70	30	100
4.	Building Materials and Building Construction	BMBC	4	4	–	–	3	70	30	100
5.	Building Planning and Drawing	BPD	5	3	2	–	3	70	30	100
6.	Hydrology	HGY	4	4	–	–	3	70	30	100
7.	Soft Skills	SS	2	1	2	–	–	–	100	100
II	*Practical*									
8.	Surveying–I Lab	SUR1(P)	2	–	–	3	3	70	30	100
9.	Fluid Mechanics Lab	FM(P)	2	–	–	3	3	70	30	100
	Total		**33**	**23**	**7**	**6**		**560**	**340**	**900**

ENGINEERING MECHANICS (EGM)
(For II B. Tech. CE – I Semester)

Scheme: 2010	**Internal Assessment : 30**
Contact Periods: 3L+1T / Week	**End Exam Marks : 70**
Credits: 4	**End Exam Duration : 3 hrs**

Unit–I
Forces and Force Systems: Types of force systems – Resultant of coplanar, concurrent and non concurrent force systems – Concept of moment – Varignon's theorem.

Unit–II
Equilibrium of Systems of Forces: Equilibrium concept in mechanics – Free body diagram - Equilibrium of coplanar force systems – Types of members and supports – Support reactions.

Unit– III
Static Analysis of Simple Plane Trusses: Analysis of simple trusses by method of joints and method of sections.

Unit–IV
Central Points: Concept of first moment – Definition of centroid and centre of gravity – Centroid of composite areas.

Unit–V
Area Moment of Inertia: Moment of inertia for areas – Parallel and perpendicular axis theorems – Moment of inertia of compound sections – Radius of gyration.

Unit–VI
Mechanics of Deformable Solids: Mechanical properties of materials –Simple stresses and strains – Types of stresses – Hooke's law – Stress–strain curve for ductile material – Factor of safety and working stress.

Unit–VII
Relation Between Elastic Constants: State of simple shear – Complimentary shear stress – Relation between Young's modulus, Rigidity modulus, Bulk modulus and Poisson's ratio.

Unit–VIII
Compound Bars: Stresses in compound bars –Temperature stresses in simple members.

Text Books:
1. R.K. Bansal, *A text book of Engineering Mechanics,* Laxmi Publiations.
2. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Mechanics of materials,* Laxmi Publication.

Reference Books:
1. Thimoshenko & Young, *Engineering Mechanics,* Tata McGraw–Hill Publications.
2. Bhavikatti and Rajasekharappa, *Engineering Mechanics,* New Age Intl. Publications.

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

SURVEYING–I (SUR1)
(For II B. Tech. CE – I Semester)

Scheme: 2010   Internal Assessment : 30
Contact Periods: 4 L + IT / week   End Exam Marks   : 70
Credits: 5   End Exam Duration : 3 hrs

Unit – I

Introduction: Definition, objectives, principles and classification of surveying – Plan and map.

Chain Surveying: Principles of chain survey – Methods of measuring distance – Direct and indirect ranging – Metric chains – Chaining on plane and sloping ground – Instruments for setting out right angles – Basic problems in chaining – Chaining past obstacles – Cross–staff survey – Plotting of chain survey – Errors.

Unit – II

Compass Surveying: Bearing – Designation of bearings – W.C.B and R.B – Fore and back bearings – Construction, working of prismatic and surveyor compass – Measurement of bearings of lines –Traversing calculations – Plotting of a traverse – Distribution of closing error by Bowditch's method –Magnetic declination, dip, local attraction – Errors.

Unit – III

Levelling–1: Definitions and terms used in levelling – Types of levels – Types of staves – Temporary adjustments – Booking of staff readings – Different methods of levelling – Calculation of reduced levels by height of instrument and rise & fall methods – Fly levelling and reciprocal levelling – Longitudinal & cross sectioning – Plotting of profiles.

Unit – IV

Levelling–2: Errors – Levelling difficulties – Correction for curvature and refraction.

Contouring: Definition of contour – Contour interval – Characteristics of contours – Direct and indirect methods of contouring – Applications of contour maps.

Unit – V

Theodolite: Parts of transit theodolite –Terms used – Temporary adjustments – Measurement of horizontal and vertical angles, deflection angles, bearings – Other uses of theodolite – Errors in theodolite work.

Unit – VI

Theodolite Traversing: Traverse survey by included angles & bearings –Checks in traverse plotting – Traverse computations – Coordinate system – Balancing the traverse – Degree of accuracy in traversing – Omitted measurements.

Unit – VII

Trigonometric Levelling: Heights and distances problems for accessible and inaccessible stations (For same and different planes).

Unit – VIII

Areas & Volumes: Determination of area by chain survey – Computation of areas by mid ordinate rule, trapezoidal rule, average ordinate rule and Simpson's rule– Volume by trapezoidal and prismoidal rule – Volume of reservoir by using contours.

Text books:

1. B.C. Punmia, A.K. Jain and A.K. Jain, *Surveying vol. I & II*, Laxmi Publications (P) Ltd, New Delhi.
2. R. Agor, *A text book of surveying & Levelling*, Khanna Publishers, New Delhi.
3. R. Subramanyam, *Surveying and Levelling*, Oxford University Press, New Delhi.

Reference books:

1. S.K. Roy, *Fundamentals of surveying*, Prentice Hall of India (P) Ltd., New Delhi.
2. Dr. A.M. Chandra, *Plane Surveying*, New Age International (P) Ltd. Publishers, New Delhi.
3. N.N. Basak, *Surveying and Levelling*, Tata McGraw Hill Publishers, New Delhi

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

FLUID MECHANICS (FM)
(For II B. Tech. CE – I Semester)

Scheme: 2010   **Internal Assessment : 30**
Contact Periods: 4 L + IT / week   **End Exam Marks   : 70**
Credits: 5   **End Exam Duration : 3 hrs**

Unit – I
Fluid Properties: Definition of a fluid – Density – Specific weight – Specific volume – Specific gravity – Compressibility –Vapour pressure – Surface tension and capillarity –Viscosity.

Unit – II
Fluid Statics: Pascal's law – Pressure variation in a static fluid – Atmospheric, gauge and absolute pressures – Measurement of pressure – Piezometer – U–tube and inverted U–tube manometers – Bourdon's pressure gauge – Hydrostatic forces on plane and curved surfaces

Unit – III
Buoyancy and Floatation: Buoyancy – Buoyant force and centre of buoyancy – Metacentre and metacentric height – Stability of submerged and floating bodies – Determination of metacentric height
Liquids in Relative Equilibrium: Fluid mass subjected to uniform linear acceleration – Liquid containers subjected to constant horizontal and vertical accelerations and constant rotation.

Unit – IV
Fluid Kinematics: Types of flow – Streamline – Streak line – Path line – Stream tube – Control volume and control surface – General control volume equation – Continuity equation in one and three dimensional forms – Stream function and velocity potential function – Flow net – Acceleration of a fluid particle – Local and convective accelerations – Tangential and normal accelerations.

Unit – V
Fluid Dynamics: Euler's equation of motion along a streamline – Bernoulli's energy equation – Energy correction factor – Impulse–momentum equation – Momentum correction factor – Force on a bend – Energy gradient line – Hydraulic gradient line – Analysis of free liquid jets – Forced vortex and free vortex .

Unit – VI
Flow Measurement: Velocity measurement by Pitot tube and Pitot static tube – Discharge measurement by Venturimeter and orifice meter – Orifices and mouthpieces – Notches and weirs.

Unit – VII
Pipe Flow: Reynolds' experiment – Regimes of flow, laminar flow, turbulent flow, transitional flow – Reynolds' number – Laminar flow through circular pipes – Hagen Poiseuille equation – Laminar flow through parallel plates.

Unit – VIII
Turbulent Flow: Minor losses in pipe flow – Pipes in series – Pipes in parallel – Siphon – Pipe networks –Velocity distribution for turbulent flow in pipes – Rough and smooth pipes – Darcy–Weisbach equation – Variation of friction Factor – Moody's chart.

Text Books:

1. P.N. Modi & S.M. Seth, *Hydraulics and Fluid Mechanics including Hydraulic Machines*, Standard Book House, New Delhi.
2. R.K.Bansal, *A text book of Fluid Mechanics and Hydraulic machinery*, Laxmi Publications (P) Ltd.

Reference Books:

1. Streeter & Wylie, *Fluid Mechanics*, Mc Graw Hills Publications.
2. C.M. White, *Fluid Mechanics*, Mc Graw Hills Publications.
3. Bernard Massey, *Mechanics of Fluids*, Taylor & Francis.

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

BUILDING MATERIALS AND BUILDING CONSTRUCTION (BMBC)
(For II B.Tech. CE – I Semester)

Scheme: 2010	**Internal Assessment : 30**
Contact Periods: 4 L / week	**End Exam Marks : 70**
Credits: 4	**End Exam Duration : 3 hrs**

Unit – I
Introduction: Importance – Objectives of study of building materials – Classification of construction materials – Properties of materials.
Stones : Properties of building stones – Relation to their structural requirements – Classification of stones – Dressing of stones – Natural bed.
Bricks : Composition of good brick earth – Methods of manufacture of bricks – Comparison between clamp burning and kiln burning – Qualities of a good brick.
Tiles: Characteristics of a good tile – Manufacturing methods – Types of tiles.

Unit – II
Lime: Technical terms – Constituents of lime stone – Classification of lime – Manufacturing of lime.
Cement : Functions of ingredients of cement – Manufacturing of Portland cement – Properties of cement – Types of cements.

Unit – III
Wood: Structure – Properties – Seasoning of timber – Classification of various types of wood used in buildings – Defects in timber – Galvanized iron, fiber–reinforced plastics, steel, aluminum.
Miscellaneous Materials: Use of materials like iron, steel, aluminum, glass, plastic, rubber.

Unit – IV
Foundations: Shallow foundations – Spread, combined, strap and mat footings.
Masonry: Types of masonry, English and Flemish bonds, rubble and ashlar masonry– Cavity and partition walls.

Unit – V
Floors: Materials used – Different types of floors – Concrete, mosaic, terrazzo, tiled floors.

Unit – VI
Roofs: Pitched, flat and curved roofs – Lean–to–roof, couple roofs, trussed roofs – King and queen post trusses– RCC roofs.

Unit – VII
Surface Finishes: Plastering pointing – White washing and distempering - Damp proofing – Painting – Constituents of paint – Types of paints – Processing and defects of painting.
Miscellaneous Topics: Form work and scaffolding.

Unit – VIII
Building Services:
Ventilation: Necessity – Functional requirements – Natural and mechanical ventilation.
Lighting: Day and artificial lighting – Types of lighting in working places
Fire Protection: Causes – Fire load – General fire safety requirements – Fire resistant construction.

Test Books:
1. S.C.Rangwala, K.S. Rangwala and P.S. Rangwala, *Engineering materials*, Charotar Publishers, Anand.
2. Dr. B.C. Punmia, *Building construction*, Laxmi Publications (P) Ltd., New Delhi.

Reference Books:
1. S.K. Duggal, *Building materials*, New Age international (P) Ltd., New Delhi.
2. N.L. Arora and B.L. Gupta, *Building construction*, Satya prakshan publications, New Delhi.
3. S.V. Deodhar, *Building science and planning*, Khanna Publishers, New Delhi.
4. Bureau of Indian Standards, *National Building Code of India – 2005*, New Delhi.

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

BUILDING PLANNING AND DRAWING (BPD)
(For II B. Tech. CE – I Semester)

Scheme : 2010   **Internal Assessment : 30**
Contact Periods: 3 L + 2 D/ week   **End Exam Marks   : 70**
Credits: 5   **End Exam Duration : 3 hrs**

Unit – I
Principles of Building Planning: Introduction – Selection of site – Aspect, prospect, furniture requirements, roominess, grouping, circulation, privacy, sanitation, elegance, economy, flexibility and practical considerations.

Unit – II
Building Bye–laws and Regulations: Introduction – Objectives of building bye–laws – Principles underlying building bye laws – Terminology – Floor area ratio (FAR), Floor space index (FSI) – Classification of buildings – Open space requirements – Built up area limitations – Height of the buildings – Wall thickness – Lighting and ventilation requirements.
Planning of Residential Buildings: Introduction – Minimum standards for various parts of the buildings – Requirements of different rooms and their grouping – Verandah – Drawing room– Bed room – Kitchen – Dining room – Store room – Bath room – Water closet – Staircase – Garrage.

Unit – III
Planning of Public Buildings: Introduction – Educational buildings – Hospitals and dispensaries – Office buildings – Banks – Industrial buildings – Hotels and motels – Buildings for recreation.

Unit – IV
Drawing Exercises:
   1   a) Conventional signs used in building drawing
           b) Doors, windows and ventilator
   2   Single storied residential building with RCC Roof (Copying Exercise)
   3   Drawing plan, elevation and section of a single storied residential building for the given line sketch and specifications
   4   Multi–storied residential building with RCC roof
   5   Drawing plan, elevation and section of an industrial building for the given line sketch and specifications
   6   Planning and drawing of plan, elevation and section of a single storied residential building with RCC roof for the given site and accommodation details
   #Subject to the availability of classes, there shall be 10 (Ten) drawing classes of two periods each.

Text Books:
1.   Dr. N. Kumara Swamy & A. Kameswara Rao, *Building Planning & Drawing*, Charotar Publishers, Anand.
2.   Gurucharan Singh and Jagdish Singh, *Building Planning Designing and scheduling*, Standard publishers Distributors.
3.   Bureau of Indian Standards, *National Building Code of India*, New Delhi.

Reference Books:
1.   S.C. Rangwala, *Civil Engineering Drawing*, Charotar Publishing House.
2.   Y.S. Sane, *Planning and Designing of Buildings*, Third Edition, Allies Book Stall.
3.   M. Chakraborty, *Civil Engineering Drawing*, Third Edition, Bhakti Vedanta Book Trust.

Note:

For End Examination: The question paper shall consist of *Four* questions. The first *Three* questions (from the syllabus of the Units I , II & III). Student   shall answer any two questions. Each question carries 15 marks. *Fourth* question is compulsory (From the syllabus of Unit IV) for 40 marks.

For Sessional Examination: The question paper shall consist of *Three* questions (From the syllabus of Unit I, II & III). Student shall answer any *Two* questions with 25% of the marks for each question. *Fourth* question is compulsory (From the syllabus of Unit IV) with 50% marks.

HYDROLOGY (HGY)
(For II B. Tech. CE – I Semester)

Scheme: 2010	**Internal Assessment : 30**
Contact Periods: 4 L / week	**End Exam Marks : 70**
Credits: 4	**End Exam Duration : 3 hrs**

Unit – I
Introduction: Scope and definition of hydrology – Hydrologic cycle – Practical applications and historical development.
Hydrometeorology: Formation of precipitation – Types and forms of precipitation – Weather – Seasons in India – Meteorological observations.

Unit – II
Precipitation: Measurement – Recording and non recording type of rain gauges – Errors in measurement – Analysis and interpretation of rain fall data – Mass curve of rain fall – Hyetograph – Intensity – Duration analysis – Average depth of precipitation – Depth–Area–Duration analysis, Double mass curve – Missing records – Network of rain gauges.

Unit – III
Abstractions from Precipitation: Evaporation and evapotranspiration**:** Process – Factors affecting – Estimation and measurement – Reducing evaporation – Transpiration – Evapotranspiration.
Infiltration: Definition – Factors affecting – Infiltration equations and indices – Measurement.

Unit – IV
Streamflow: Discharge measurement – Area velocity method – Moving boat method – Stage – discharge relations.
Runoff: Components – Factors affecting – Rain fall – Runoff relationships – Flow mass curve.

Unit – V
Hydrograph Analysis: Features of hydrograph – Separation of base flow – Unit hydrograph (UH theory – Derivation – UH from complex storms – UH for various durations) – S–Curve hydrograph – Use and application of unit hydrograph

Unit – VI
Synthetic and Instantaneous Unit Hydrographs: Synthetic Unit Hydrograph – Dimensionless Unit Hydrograph – Convolution integral – Derivation of IUH from S–Curve – Relationship between IUH and DUH – Derivation of IUH by other methods.

Unit – VII
Flood Routing: Introduction – Reservoir routing – Modified puls' method – Channel routing
Design Flood: Introduction – Methods – Envelope curves – Empirical formulae – Rational method – Unit hydrograph application – Frequency analysis – Regional flood frequency analysis.

Unit – VIII
Flood Control: Introduction – Classification of methods for flood control – Flood control reservoirs – Levees and flood walls – Channel improvement – Land management and flood control – Economics of flood control.

Text Books:
1. P. Jaya Rami Reddy, *A Text book of Hydrology (3rd Edition*, 2011), Laxmi Publications, New Delhi.
2. K.Subramanya, *Engineering Hydrology*, Tata Mc Graw Hill Publishing Co. Ltd, New Delhi.

Reference Books:
1. Linsley, Kohler and Phaulus, *Hydrology for Engineers*, Tata Mc Graw Hill Publishing Co. Ltd, New Delhi.
2. Vijay Singh, *Engineering Hydrology*, John Wiley & Sons, Ltd.

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

SOFT SKILLS (SS)
(Common to II B. Tech. I Semester All Branches)

Scheme: 2010   **Internal Assessment: 100**
Contact Periods: 1L + 2T / week
Credits: 2

Self Awareness: Importance of self awareness – Johari window in self awareness – Four quadrants of Johari window – Open or arena quadrant – Blind spot quadrant – Hidden or facade quadrant – Unknown quadrant.

Goal Setting: Importance of goal setting – Difference between goals and dreams – Importance of writing goals – S.M.A.R.T Goals – Intermediate or short term goals – Medium term goals – Long term goals – How to achieve goals.

Time Management: Importance of time – What's your style – A few myths – Prioritize – Procrastination – The thief of time – Carving the cock – How to delegate effectively – The art of anticipating – Learning to say NO – Plugging time leaks power – Tools for time management – Scheduling.

Inter Personal Behavioral Styles: Importance of interpersonal skills – Identifying yourself – Characteristics of socializer, relater, director, thinker – Identifying others – Communication with others – Adapting yourself to others

Strokes: Importance of strokes – Art of giving strokes – Your style – Conditional and unconditional strokes – Positive and negative strokes – Giving strokes – Taking strokes – Asking for strokes – Refuse to give strokes.

Assertiveness: Understanding assertiveness – Three styles passive, assertive, aggressive – Importance of self awareness – Self confidence – Ability to say NO – Assertive communication – Body language – Behavior – Benefits of being assertive

Team Roles: Importance of teams in organizations – Your style – Three different types cerebral, action, people – 8 roles coordinator, finisher, innovator, shaper, team worker, resource investigator, organizer, evaluator – The role of shaper.

Presentation Skills: Importance of presentation skills – Knowledge of the audience – Body language – The impact of voice – Overcoming stage fear / nervousness – Stage etiquettes – Importance of content – Introduction, body, conclusion – Creating an impact.

Creativity: Importance of creativity – What is creativity – Out of the box thinking – Lateral thinking – Critical thinking – Blocks in creativity – Being creative – Tossing ideas.

Problem Solving and Decision Making: Problem solving as skill – Out of the box thinking – Thinking styles – Steps in problem solving – Steps in decision making – Types of decisions.

References:
1. Dr. Stephen R. Covey, Simon and Schuster (1992), *The 7 Habits of Highly Effective People,* Pocket Books Publishers, London.
2. Marc Mancini, (2005), *Time Management,* TMH Publishers, New Delhi.
3. Infosys Campus Connect Portal – http://campusconnect.infosys.com

4. Stephen R. Covey, A.Roger Merrill and Rebecca R. Merrill (2002), *First Things First,* Pocket Books Publishers, London.
5. Norman Vincent Peale (1990), *The Power of Positive Living, Ballantine Books,* New York.
6. Napoleon Hill and W. Clement Stone (1987), *Success Through a Positive Mental Attitude,* Pocket Books Publishers, New York.
7. Stuart R. Levine, CEO & Michael. CROM (1993), *The Leader in You, Dale Carnegie & Associates Inc.* Pocket Books, New York.
8. Shiv Khera (2006), You Can Win, MacMillan India Publishers, New Delhi.

SURVEYING–I LAB (SUR1(P))
(For II B. Tech. CE – I Semester)

Scheme: 2010   **Internal Assessment : 30**
Contact Periods: 3 P / week   **End Exam Marks   : 70**
Credits: 2   **End Exam Duration : 3 hrs**

List of Experiments:

I. Chain Surveying:
1. To find the area of the given plot using chain, tape & cross–staff.
2. To find the distance between inaccessible points.

II. Compass Surveying:
3. Traversing using prismatic compass.
4. To find the distance between inaccessible points.

III. Levelling:
5. Fly levelling, reduction of levels by rise and fall method.
6. Differential leveling, reduction of levels by height of collimation method.
7. Profile leveling: L.S. and C.S.
8. Preparation of contour map by using grid contouring.

IV. Theodolite Surveying:
9. Measurement of horizontal angle by repetition method
10. a) Measurement of horizontal angle by reiteration method
    b) Measurement of vertical angle
11. Demonstration of digital level.

V. Plotting:
1. Conventional signs and symbols used in surveying.
2. Plotting of closed traverse compass surveying and adjusting error by Bowditch method.
3. Plotting of L.S. & C.S.

FLUID MECHANICS LAB (FM(P))
(For II B. Tech. CE – I Semester)

Scheme: 2010
Contact Periods: 3 P / week
Credits: 2

Internal Assessment : 30
End Exam Marks   : 70
End Exam Duration : 3 hrs

List of Experiments:

1. Determination of coefficient of discharge, velocity and contraction for a small orifice by 'Constant head method'.
2. Determination of coefficient of discharge of an external mouthpiece by 'Constant head method'.
3. Calibration of a rectangular notch.
4. Calibration of a triangular notch.
5. Losses in pipe lines due to bends and elbows (Minor losses).
6. Determination of friction factor for a given pipe.
7. Calibration of Venturimeter.
8. Calibration of Orificemeter.
9. Determination of loss coefficient for sudden contraction and sudden expansion (Minor losses).
10. Verification of Bernoulli's equation.

FOUR YEAR B. Tech. DEGREE COURSE
Scheme of Instruction and Examination
(Effective from 2010–11)

II B. Tech (CE) – II Semester
Scheme : 2010

S. No	Subject	Abbreviation	Credits	Scheme of Instruction periods/week			Duration of end Exam (Hours)	Scheme of Examination Maximum Marks		
				L	D/T	P		End Exam	Internal Assessment	Total
I	*Theory*									
1.	Managerial Economics and Principles of Accountancy	MEPA	4	4	–	–	3	70	30	100
2.	Strength of Materials–I	SM1	5	4	1	–	3	70	30	100
3.	Surveying–II	SUR2	5	4	1	–	3	70	30	100
4.	Hydraulics	HYD	4	3	1	–	3	70	30	100
5.	Concrete Technology	CT	4	4	–	–	3	70	30	100
6.	Engineering Geology	EGL	5	5	–	–	3	70	30	100
7.	Aptitude & Reasoning Skills	ARS	2	1	2	–	–	–	100	100
II	*Practical*									
8.	Surveying–II Lab	SUR2(P)	2	–	–	3	3	70	30	100
9.	Computer Aided Drafting Lab	CAD(P)	2	–	–	3	3	70	30	100
10	Strength of Materials Lab	SM(P)	2	–	–	3	3	70	30	100
	Total		**35**	**25**	**5**	**9**		**630**	**370**	**1000**

MANAGERIAL ECONOMICS & PRINCIPLES OF ACCOUNTANCY (MEPA)
(Common to II B. Tech. II Semester CE & EEE)

Scheme: 2010   Internal Assessment : 30
Contact Periods: 4L/ week   End Exam Marks   : 70
Credits: 4   End Exam Duration : 3hrs

Unit – I
Introduction to Managerial Economics: Definition – Nature and scope of managerial economics – Demand analysis – Types of demand – Demand determinants – Law of demand – Its assumptions and exceptions.

Unit – II
Elasticity of Demand: Definition –Types – Price – Income – Cross elasticities of demand – Practical significance of price elasticity of demand – Measurement of price elasticity of demand – Demand forecasting – Importance – Factors – Methods of demand forecasting.

Unit – III
Theory of Production and Cost Analysis: Meaning of production function – Isoquants – Isocosts – Practical importance – The law of diminishing marginal returns – Internal and external economies of scale.
Cost Analysis – Cost concepts – Fixed and variable costs – Cost output relationship – Break even analysis – Importance – Limitations and managerial uses of break even analysis.

Unit – IV
Market Structures: Types of competitions – Features of perfect competition – Monopoly – Monopolistic competition – Price output determination in case of perfect competition and monopoly.

Unit – V
Capital and its Significance: Types of capital – Estimation of fixed and working capital requirements – Methods and sources of raising fixed and working capital.
Capital Budgeting: Importance – Methods – Pay back method – Accounting rate of return method (ARR) and Net present value method (NPV) – (Simple problems only).

Unit – VI
Business Environment: Types of business organizations – Formation and evaluation of sole trader – Partnership firm – Partnership deed – Joint stock companies – Features – Private and public limited Companies formation – Merits – Demerits – Differences – Prospectus.
Features of Ideal Business Unit

Unit – VII
Principles of Accountancy: Introduction to accountancy – Double entry system of book keeping – Meaning – Scope – Advantages – Journal entries – Ledger – Subsidiary books – Preparation of trial balance.

Unit – VIII
Preparation of Final Accounts: Trading account – Profit & Loss account – Balance sheet with adjustments – (Final accounts problems should be given)

Text Books:
1) Varshiney and Maheswari, *Managerial Economics*, Sultan Chand & Co, New Delhi
2) Y.K Bhushan, *Business Organization & Management*, S Chand & Co., New Delhi.
3) S.P Jain and K.L Narang, *Financial Accounting – B.com First Year Andhra Pradesh Universities*, Kalyani Publishers, New Delhi.

Reference Books:
1) Shukla & Grewal, *Advanced Accountancy*, S.Chand & Co., New Delhi
2) M.C Shukla, *Business Organization and Management*, S.Chand & Co., New Delhi.

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

STRENGTH OF MATERIALS–I (SM1)
(For II B. Tech. CE – II Semester)

Scheme : 2010

Contact Periods: 4 L + IT / week

Credits: 5

Internal Assessment : 30

End Exam Marks : 70

End Exam Duration : 3 hrs

Unit – I

Shear Force and Bending Moments: Types of supports – Types of beams – Shear force and bending moment diagrams for simply supported, cantilever and over hanging beams with point loads, uniformly distributed load, uniformly varying loads and couples – Relationship between shear force and bending moment.

Unit – II

Theory of Simple Bending: Assumptions made in the theory of simple bending – Equation for simple bending – Bending stresses in beams – Efficiency of various cross sections of beams.

Unit – III

Shear Stress Distribution: Derivation of formula – Shear stress distribution in rectangular, triangular, circular, I and T sections.

Unit – IV

Deflections of Beams I: Slope, deflection and radius of curvature and their relationship – Strength and stiffness of beams – Double integration method, Macaulay's method.

Unit – V

Deflections of Beams II: Moment area method for finding slopes and deflections in determinate beams.

Unit – VI

Direct and Bending Stresses: Combined direct and bending stresses – Eccentric loading – Limit of eccentricity and core of section.

Unit – VII

Columns and Struts: Introduction, slenderness ratio – Euler's formulae for long columns with different end conditions – Rankine's and I.S. Code formulae

Unit – VIII

Torsion of Circular Shafts: Torsion – Torsional theory applied to circular shafts – Power transmission.

Strain Energy: Strain energy in tension, compression, bending and torsion – Strain energy due to impact loading.

Text Books:
1. B.C Punmia, Ashok Kumar Jain & Arun Kumar Jain, *Mechanics of Materials,* Laxmi Publications.

Reference Books:
1. F.L. Singer and A.Y. Pytel, *Strength of materials*, Harper & Row Publications.
2. Junnarkar & Adavi, *Mechanics of structures Vol–1*, Charotor Publications.
3. Bhavikatti, *Strength of materials*, S.Chand & Co., New Delhi.
4. Timoshenko & Young, *Elements of Strength of materials*, Eastern Wiley Publications.

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

SURVEYING–II (SUR2)
(For II B. Tech. CE – II Semester)

Scheme: 2010   **Internal Assessment : 30**
Contact Periods: 4 L + 1 T/ week   **End Exam Marks   : 70**
Credits: 5   **End Exam Duration : 3 hrs**

Unit – I
Tacheometry: Principle of stadia method – Determination of constants – Determination of distances and elevations for horizontal and inclined line of sight for staff vertical and inclined positions – Tangential tachometry – Errors in stadia surveying.

Unit – II
Simple Curves: Types of curves – Definitions & Notations of curve – Elements of simple circular curve – Setting out the simple circular curves by using linear and angular methods.

Unit – III
Compound Curves: Elements of compound curve – Transition curve – Types – Methods for determination of length – Characteristics and elements of transition curve – Vertical curve – Types and length of vertical curve.
Setting Out Works: Setting out of foundation trench of a building, culverts and bridges.

Unit – IV
Hydrographic Surveying: Purpose of hydrographic surveying – Soundings, sounding equipment, methods of locating sounding, plotting of soundings by range lines, two angles from a boat.
Photogrammetry: Principles of photogrammetry – Types of photographs – Branches of photogrammetry – Scale of photographs – Technical terms used in aerial photography – Photo interpretation.

Unit – V
Remote Sensing: Concept of remote sensing – Principles of remote sensing–Components of remote sensing – Elements in remote sensing – Platforms for remote sensing – Types of remote sensing – Remote sensing systems – The principle steps used to analyze remotely sensed data – Data reception, transmission and processing.

Unit – VI
Electronic Distance Measurements (EDM) and Total station: Measurement principle of EDM instrument – EDM instrument characteristics – Accuracy in EDM – Field procedure of EDM – Total station – Introduction – Advantages – Types of total stations – Applications of total station.

Unit – VII
Geographic Information Systems (GIS): Definition – Objectives of GIS – Components of GIS – GIS architecture – Data – Raster and vector data processing methods – Data input – Data storage and retrieval – Data manipulation and analysis – Data output – Basics of projection systems, cartography, maps (small and large scale) and generalization.

Unit – VIII
Global Positioning System (GPS): Introduction, working principle, GPS receivers – Types, applications of GPS.

Text books:

1. B.C. Punmia, Ashok kumar Jain and Arun kumar Jain, *Surveying Vol.I & II*, Laxmi Publications (P) Ltd., New Delhi.
2. R. Agore, *A test book of Advanced Surveying*, Khanna Publishers, New Delhi.
3. Satheesh Gopi, R. Sathi Kumar & N. Madhu, *Advanced Surveying*, Pearson Education, Dorling Kindersley (India) Pvt. Ltd, New Delhi.
4. Satheesh Gopi, *Global Positioning System – Principles and Applications*, Tata McGraw Hill Pub. Comp. Ltd.,

Reference books:
1. M. Anji Reddy, *A text book of Remote Sensing and Geographical Information Systems*, B.S. Publications, Hyderabad.

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

HYDRAULICS (HYD)
(For II B. Tech. CE – II Semester)

Scheme: 2010	**Internal Assessment : 30**
Contact Periods: 3 L + IT / week	**End Exam Marks : 70**
Credits: 4	**End Exam Duration : 3 hrs**

Unit – I
Forces on Submerged Bodies: Drag and lift over a submerged body – Pressure drag – Friction drag – Total drag at small and large Reynolds' number over cylinder and sphere – Circulation and Magnus effect.

Unit – II
Boundary Layer Theory: Boundary layer – Definition – Growth over a flat plate – Boundary layer thickness – Nominal, displacement, momentum and energy thickness – Laminar sub layer – Separation of boundary layer

Unit – III
Dimensional Analysis and Similitude: Units and dimensions – Dimensional homogeneity – Rayleigh's method – Buckingham π theorem – Superfluous and omitted variables – Geometric, kinematic and dynamic similarities – Dimensionless numbers – Model and prototype relations – Distorted models.

Unit – IV
Basics of Flow in Open Channels: Introduction – Differences between pipe flow and open channel flow – Types of flow in channels – Geometrical properties of channel section – Velocity distribution in channel section

Unit – V
Uniform Flow in Open Channels: Chezy's and Manning's formulae – Most economical section of channels – Rectangular, trapezoidal, triangular and circular shapes – Constant velocity open channel section – Computation of uniform flow.

Unit – VI
Critical Flow: Specific energy – Critical depth – Momentum in open channel flow – Specific force – Critical flow and its computation – Froude number – Application of specific energy and discharge diagrams to channel transitions – Metering flumes – Determination of mean velocity of flow in channel – Practical channel sections.

Unit – VII
Non – Uniform Flow in Open Channels (GVF): Gradually varied flow – Dynamic equation – Classification of channel bottom slopes – Classification and characteristics of surface profiles – Integration of varied flow equation

Unit – VIII
Non – Uniform Flow in Open Channels(RVF): Rapidly varied flow – Hydraulic jump – Specific force – Types of hydraulic jump – Jump in rectangular channels – Loss of energy in hydraulic jump – Applications of hydraulic jump.

Text Books:
1.   P.N. Modi & S.M. Seth, *Hydraulics and Fluid Mechanics including Hydraulic Machines*,

Standard Book House, New Delhi.
2. K.Subramanya, *Flow in open channels,* Tata Mc Graw Hill Publishing Co. Ltd, New Delhi.
3. Dr. R.K. Bansal, *A Text book of Fluid Mechanics and Hydraulic Machinery,* Laxmi Publications (P) Ltd.

Reference Books:
1. Ven Te Chow, *Open channel Hydraulics,* Tata Mc Graw Hill Publishing Co. Ltd, New Delhi.

Note: The question paper shall consist of ***Eight*** questions with ***One*** question from each unit. The student shall answer any ***Five*** questions.

CONCRETE TECHNOLOGY (CT)
(For II B. Tech. CE – II Semester)

Scheme: 2010   **Internal Assessment : 30**
Contact Periods: 4L / week   **End Exam Marks   : 70**
Credits: 4   **End Exam Duration : 3 hrs**

Unit – I
Cement : Portland cement – Chemical composition – Hydration – Setting and fineness of cement – Structure of hydrated cement – Mechanical strength of cement gel – Water held in hydrated cement paste – Heat of hydration – Influence of compound composition and properties of cement – Tests on cements – Types of cements.

Unit – II
Aggregates: Classification of aggregates – Particle shape & texture – Bond, strength & other mechanical properties of aggregate – Specific gravity, bulk density, porosity, absorption & moisture content of aggregate – Bulking of sand – Deleterious substances in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse aggregates – Gap graded aggregates – Maximum size of aggregate.

Unit – III
Types of Admixtures: Mineral admixtures – Chemical admixtures – Plasticizers – Super plasticizers – Retarding plasticizers – Accelerating plasticizers –   Air entraining admixtures – Puzzolonic or mineral admixtures.

Unit – IV
Fresh Concrete: Workability – Factors affecting workability – Measurement of workability – Slump test, Compaction factor test, flow test, Vee–Bee test and ball penetration test – Effect of time and temperature on workability – Segregation and Bleeding.

Unit – V
Hardened Concrete: Water/Cement ratio – Abrams' law – Gel space ratio – Effective water in the mix – Strength in tension and compression – Factors affecting strength of concrete – Effect of age and temperature on strength of concrete – Relationship between compressive and tensile strengths – Curing of concrete – Methods – Quality of mixing water – Tests on hardened concrete**.**

Unit – VI
Elasticity, Creep & Shrinkage: Modulus of elasticity – Dynamic modulus of elasticity – Poisson's ratio – Creep of concrete – Factors influencing creep – Relation between creep & time – Nature of creep – Effects of creep – Shrinkage – Types of shrinkage.

Unit – VII
Mix Design: Proportioning of concrete mix by IS Method – Relation between mean and maximum strengths – Durability – Workability – Maximum size of aggregate – Grading and type of aggregate – Aggregate/Cement ratio – Mix proportions and weights per batch.

Unit – VIII
Special Concretes: Ready mix concrete – Pumped concrete – Pre–Packed concrete – Vacuum processed concrete – Light weight aggregate concrete – Cellular concrete – Fiber reinforced concrete – Fly ash concrete – High density concrete – High performance concrete – Self compacting concretes.

Text Books:

1. A.M.Neville, *Properties of Concrete*, Pearson Education.
2. A.M.Neville, *Concrete Technology*, Pearson Education, New Delhi.
3. M.S.Shetty, *Concrete Technology*, S.Chand Company Ltd.

Reference Books:

1. P.D. Kulkarni, R.K.Ghosh and Y.R.Phaul, *Text Book of Concrete Technology,* New Age International.
2. M.L.Gambhir, *Concrete Technology*, TATA McGraw Hill Publishers,

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

ENGINEERING GEOLOGY (EGL)
(For II B. Tech. CE – II Semester)

Scheme: 2010	**Internal Assessment : 30**
Contact Periods: 5L/ week	**End Exam Marks : 70**
Credits: 5	**End Exam Duration : 3 hrs**

Unit – I
Introduction: Branches of geology – Scope and importance of geology from Civil Engineering point of view – Brief study of case histories of failure of some civil engineering constructions due to geological drawbacks.
Physical Geology: Weathering of rocks – Susceptibility of rocks to weathering – Significance of weathering
Soils : Genesis, profile – Geological classification –Soil erosion and conservation.
Geological Agents: Wind, river, ocean and their Civil Engineering significance.

Unit – II
Mineralogy: Definition – Physical properties for identification of minerals – Study of common rock forming minerals.

Unit – III
Petrology: Civil Engineering importance – Geological classification of rocks –Rock cycle.
Igneous – Sedimentary – Metamorphic Rocks: Formation, classification, structures, textures of the above rock groups – Study of common rock types of each group.

Unit – IV
Structural Geology: Strike, dip, outcrop – Study of folds, faults, joints, unconformities and their importance in Civil Engineering works.

Unit – V
Ground Water Geology: Origin, occurrence, advantages, types, zones – Ground water exploration – Potentiality of various rocks – Geological action and Engineering significance of ground water.

Unit – VI
Geological Hazards:
Earth Quakes : Terminology, Causes, Classification, Earthquake waves, Seismograph, Locating Epicenter, Determination of depth of focus, Intensity, Magnitude, Prediction, Effects, Seismic belts, Shield areas – Seismic zones of India – Civil Engineering considerations in seismic areas – Safety measures for buildings and dams – Reservoir induced seismicity.
Landslides: Causes, effects, preventive measures

Unit – VII
Engineering Geology: Geological – Geophysical (Electrical & Seismic surveys only) – Interpretation of geological maps – Core logging etc for site selection to Civil Engineering projects – Site improvement methods

Unit – VIII
Civil Engineering Projects: Geology of dams – Reservoirs – Tunnels

Text Books:
1. N.Chenna Kesavulu, *Text book of Engineering Geology*, MacMillan India Ltd, Hyderabad.

2. D.Venkat Reddy, *Engineering Geology for Civil Engineers*, Oxford & IBH Publishing Co. Pvt. Ltd, NewDelhi

Reference Books:

1. K.V.G.K. Gokhale, *Principles of Engineering Geology*, B.S. Publications, Hyderabad.
2. S.K.Garg, *A Text book of Geology*, Khanna Publishers, New Delhi.
   3. B.S.Sathyanarayana Swamy, *Structural Geology*, Dhanpat Rai & Sons, Delhi.

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

APTITUDE & REASONING SKILLS (ARS)
(Common to II B. Tech. I Semester All Branches)

Scheme: 2010   **Internal Assessment: 100**
Contact Periods: 1L + 2T / week
Credits: 2

Quantitative Aptitude
- Number Systems, Averages, Problems on ages, Allegations, Percentages, Profit and Loss, Simple interest and Compound Interest, Ratio and Proportions and Variation, Time and Work, Time and Distance, Mensuration, Functions, Set Theory, Permutation and Combinations, Probability, Progressions, Inequalities, Coordinate Geometry, quadratic Equations, Logarithms

- HCF and LCM, Decimal Fractions, Simplification, Square Roots and Cube Roots, Surds and Indices, Pipes and Systems, Area, Volume and Surface Areas, Races and Games, Calendar, Clocks, Stocks and Shares, True Discount, Banker's Discounts

- Data Interpretation – Tabulation – Bar Graphs – Pie Charts – Line Graphs.

Reasoning
   Directions, Blood Relations, Problems on cubes, Series and sequences, odd man out, Coding and decoding, Data Sufficiency, logical deductions, Arrangements and Combinations, Groups and Teams, General Mental Ability, Puzzles to puzzle you, More Puzzles, Brain Teasers, Puzzles and Teasers.

References:
1. Arun Sharma (2003), *How to Prepare for Quantitative Aptitude*, TMH Publishers, New Delhi.
2. R.S. Aggarwal (2005), *Quantitative Aptitude,* S.Chand Publishers, New Delhi.
3. Sharon Weiner–Green, Ira K.Wolf (2006), *Barron's GRE,* Galgotia Publications, New Delhi.
4. R.S Aggarwal (1998), *Verbal and Non–Verbal Reasoning,* S.Chand Publishers, New Delhi.
5. Shakuntala Devi (2005), *Puzzles to Puzzle You,* Orient Paper Backs Publishers, New Delhi.
6. Shakuntala Devi (2006), *More Puzzles,* Orient Paper Backs Publishers, New Delhi.
7. Ravi Narula (2005), *Brain Teasers,* Jaico Publishing House, New Delhi.
8. George J Summers (2005), *Puzzles and Teasers,* Jaico Publishing House, Mumbai.

SURVEYING–II LAB (SUR2(P))
(For II B. Tech. CE – II Semester)

Scheme: 2010
Contact Periods: 3P / week
Credits: 2

Internal Assessment : 30
End Exam Marks   : 70
End Exam Duration : 3 hrs

List of Experiments:

I. Trigonometrical Levelling (Heights & Distances problems):
1. a) Base of the object is accessible
   b) Base of the object inaccessible and instrument stations and the elevated object are in the same vertical plane.
2. Base of the object inaccessible and instrument stations and the elevated object are not in the same vertical plane

II. Tacheometric Surveying:
3. a) Determination of the gradient of the line.
   b). Determination of the horizontal distances and vertical heights by using tangential tacheometry.

III. Setting Out Works:
4. Setting out the simple circular curve by using offsets from the long chord method.
5. Setting out the simple circular curve by using Rankine's method.
6. Setting out the foundation trench of a building/ culvert.

IV. Exercises Using Electronic Total station:
7. a) Determination of remote height /elevation.
   b) Missing line measurement.
8. a) Determination of gradient of a line joining two inaccessible points.
   b) Determination of area of a given traverse.
9. Data collection.
10. Demonstration of hand held GPS.

COMPUTER AIDED DRAFTING LAB (CAD(P))
(For II B. Tech. CE – II Semester)

Scheme: 2010   **Internal Assessment : 30**
Contact Periods: 3P / week   **End Exam Marks   : 70**
Credits: 2   **End Exam Duration : 3 hrs**

List of Experiments:

1.   Introduction to various commands with simple explanation.
2.   Line diagram of office building
3.   Line diagram of health Center
4.   Line diagram of library
5.   Plan, section and elevation of residential building
6.   Plan, section and elevation of public building
7.   Plan and sectional elevation of staircase including reinforcement details.
8.   Longitudinal and cross section of beam, lintel cum sunshade.
9.   Plan and cross section of footing.
10. a) Calculation of area of closed traverse.
    b) Quantity of earth work in excavation and cutting of a road in two level section.

STRENGTH OF MATERIALS LAB (SM(P))
(For II B. Tech. CE – II Semester)

Scheme: 2010   **Internal Assessment : 30**
Contact Periods: 3 P / week   **End Exam Marks   : 70**
Credits: 2   **End Exam Duration : 3 hrs**

List of Experiments:

1. To study the stress–strain characteristics of mild steel rod using universal testing machine.
2. To find the compressive strength of wood and the direct shear strength of rod using compressive testing machine.
3. To find the modulus of elasticity of given material by measuring deflection in beams
   a) Simply supported beam.
   b) Over hanging beam.
4. To find the modulus of elasticity of rolled steel joist by measuring deflection using universal testing machine.
5. To find the modulus of rigidity of given material using torsion testing machine.
6. To find the modulus of rigidity of given material using spring testing machine.
7. To find tensile, compressive and shear strengths of given materials using tensometer.
8. To find Brinnell's hardness & Rock well hardness numbers of given material.
9. To find impact strength (Izod and Charpy) using impact testing machine.
10. To find modulus of elasticity by conducting flexural test on carriage spring.

FOUR YEAR B. Tech. DEGREE COURSE
Scheme of Instruction and Examination
(Effective from 2010–11)

III B. Tech (CE) – I Semester

Scheme : 2010

S. No	Subject	Abbreviation	Credits	Scheme of Instruction periods/week			Duration of end Exam (Hours)	Scheme of Examination Maximum Marks		
				L	D/T	P		End Exam	Internal Assessment	Total
I	***Theory***									
1.	Strength of Materials–II	SM2	4	3	1	–	3	70	30	100
2.	Water Resource Engineering–I	WRE1	5	5	–	–	3	70	30	100
3.	Design and Detailing of Reinforced Concrete Structures	DDRS	5	4	1	–	3	70	30	100
4.	Transportation Engineering–I	TE1	5	4	1	–	3	70	30	100
5.	Soil Mechanics	SMECH	5	4	1	–	3	70	30	100
6.	Hydraulic Machinery	HM	4	3	1	–	3	70	30	100
II	***Practical***									
7.	Hydraulics and Hydraulic Machinery Lab	HHM(P)	2	–	–	3	3	70	30	100
8.	Concrete Technology Lab	CT(P)	2	–	–	3	3	70	30	100
9.	Transportation Engineering Lab	TE(P)	2	–	–	3	3	70	30	100
	Total		**34**	**23**	**5**	**9**		**630**	**270**	**900**

STRENGTH OF MATERIALS–II (SM2)
(For III B. Tech. CE – I Semester)

Scheme: 2010	**Internal Assessment : 30**
Contact Periods: 3 L + 1 T/ week	**End Exam Marks : 70**
Credits: 4	**End Exam Duration : 3 hrs**

Unit – I
Springs: Close and open coiled helical springs under axial loads and axial twist – Carriage springs.

Unit – II
Analysis of Plane Stress at a Point: Analysis of two dimensional stress at a point – Principal planes – Principal stresses and strains – Mohr's circle of stress.

Unit – III
Thin Cylinders: Thin cylindrical and thin spherical shells – Wire wound thin pipes.

Unit – IV
Thick Cylinders: Thick cylinders – Lame's equation – Design of thick cylindrical shells – Compound cylinders – Shrink fit allowance – Initial difference of radii at the junction.

Unit – V
Elastic Theories of Failure: Introduction – Maximum principal stress theory – Maximum principal strain theory – Maximum shear stress theory – Maximum strain energy theory – Maximum distortion energy theory – Application to shafts and thick cylinders.

Unit –VI
 Indeterminate Structures: Introduction
Propped Cantilever: Analysis of propped cantilever beams for bending moments, shear forces, slopes and deflections.
Fixed Beams: Analysis of fixed beams for bending moments, shear forces, slopes and deflections with and without sinking of supports for point loads, uniformly distributed loads and uniformly varying loads.

Unit –VII
Continuous Beams : Clapeyron's theorem of three moments – Derivation of theorem – Application to continuous beams – Effect of sinking of supports – Shear force and bending moment diagrams.

Unit –VIII
Unsymmetrical Bending of Beams: Centroidal principal axes of bending – Moment of inertia about the principal axes – Resolution of bending moment into two components along principal axes – Determination of stresses.

Text books:
1. B.C Punmia, Ashok Kumar Jain & Arun Kumar Jain, *SMTS –2, Theory of structures*, Laxmi Publications.

Reference Books:
1. F.L. Singer and A.Y. Pytel, *Strength of materials*, Harper Collins Publications.
2. Junnarkar & Adavi, *Mechanics of structures –1*, Charotor Publications.
3. C.S.Reddy, *Basic structural analysis*, TATA Mc. Graw Hill.
4. Timoshenko & Young, *Elements of Strength of materials*, TATA Mc. Graw Hill

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

WATER RESOURCES ENGINEERING–I (WRE1)
(For III B. Tech. CE – I Semester)

Scheme: 2010   **Internal Assessment : 30**
Contact Periods: 5 L/ week   **End Exam Marks   : 70**
Credits: 5   **End Exam Duration : 3 hrs**

Unit – I
Introduction: Definition of irrigation – Necessity – Scope – Benefits – Ill-effects – Types – History of development in India.
Methods of Irrigation: Methods of applying water to crops – Flooding – Contour laterals – Strip method – Basin flooding – Sprinkler irrigation – Subsurface irrigation – Contour farming.

Unit – II
Soil–Water Plant Relationship: Introduction – Composition of soil, soil texture and soil structure – water holding capacity of soil – Classification of soil water – Availability of soil water – Soil moisture tension – Soil moisture constants – Essential elements for plant growth – Maintaining soil fertility.

Unit – III
Water Requirements of Crops: Functions of irrigation water – Depth and frequency of irrigation – Duty – Delta – definitions – Factors affecting duty – Methods of improving duty – Duty delta relationship – Consumptive use of water – Irrigation efficiencies – Crop rotation – Principal crops – Assessment of irrigation water.

Unit – IV
Groundwater: Occurrence of groundwater – Aquifer, aquiclude, aquifuge and aquitard – Types of aquifers – Specific yield, retention – Velocity of ground water – Movement of ground water –Darcy's law – Permeability, transmissibility, storage coefficient – Thiem's equilibrium formula – Dupuit's formula – Unsteady radial flow.

Unit – V
Well Irrigation: Hydraulics of wells – Pumping test and recovery test – Well losses – Specific capacity – Efficiency of a well – Types of wells – Open wells – Tube wells – Selection of suitable site for tube well – Yield of wells – Advantages and disadvantages of well Irrigation.

Unit – VI
Diversion Headworks: Introduction – Components – Weir – Causes of failures of weirs – Remedies – Design of impervious floor – Bligh's creep theory – Lane's weighted creep theory Khosla's theory – Method of independent variables – Design of vertical drop weir – Location of head works – Effect of construction of weir on the regime of river.

Unit – VII
Flow Irrigation: Canals – Classification – Alignment of canals
Silt Theories: Kennedy's theory – Method of channel design – Silt supporting capacity – Drawbacks – Lacey's regine theory – Channal design – Comparison of Lacey's and Kennedy's theory – Defects in Lacey's theory – Longitudinal section of canal – Balancing depth .

Unit – VIII

Water Logging and Canal Lining: Water logging – Effects – Causes – Remedial measures – Losses in canals – Lining of irrigation channels – Types of lining– Economics of canal lining – Advantages of canal lining.

Text Books:
1. Dr. B.C. Punmia & B.B. Lal, *Irrigation and Water power Engineering,* , Laxmi Publications (P) Ltd.
2. Dr. P.N. Modi, *Irrigation and water Resources Engineering*, Standard Book House

Reference Books:
1. K.B. Khushalani & M. Khushalani, Irrigation Practice and Design, Oxford & IBH.

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

DESIGN AND DETAILING OF REINFORCED CONCRETE STRUCTURES (DDRS)

(For III B. Tech. CE – I Semester)

Scheme: 2010
Contact Periods: 4 L + 1 T/ week
Credits: 5

Internal Assessment : 30
End Exam Marks   : 70
End Exam Duration : 3 hrs

Unit – I
Introduction to Limit State Design: Concepts of limit state design – Recommendation in IS 456 –2000 – Basic concepts – Assumptions in limit state design – Characteristic values – Partial safety factors – Stress block – Reinforcement and its significance characteristics – Types of reinforcement – Permissible stresses – Stress–strain curves for cold worked deformed bars and mild steel bars. Limit state of collapse – Ultimate flexural strength – Analysis of singly reinforced rectangular beam – Concept of under reinforced, over reinforced and balanced section.

Unit – II
Analysis of Beams: Analysis of doubly reinforced and flanged beams.

Unit – III
Shear, Torsion and Bond: Limit state design of section for shear and torsion – Concept of bond, anchorage and development length, I.S. code provisions.

Unit –IV
Limit State of Serviceability: Limit state design of serviceability for deflection, cracking and codal provisions.

Unit – V
Design of Beams: Design of simply supported (rectangular and flanged), cantilever and continuous beams.

Unit – VI
Design of Slabs: Design of one way, two way and continuous slabs.

Unit – VII
Design of Columns: Design of columns – Axially loaded & eccentrically loaded columns – Uniaxial moment – Biaxial moment.

Unit – VIII
Design of Footings: Types of footings – Design of isolated square and rectangular footings.

Note: Following plates should be prepared by the students
1. Reinforcement particulars of Rectangular and Flanged beams.
2. Reinforcement detailing of continuous beams.
3. Reinforcement particulars of columns and footings.
4. Detailing of one way, two way and continuous slabs.

Text Books:

1. N. Krishna Raju and R. N. Pranesh, *Reinforced Concrete Design IS:456–2000 Principles and Practice*, New Age International (P). Limited.
2. Ashok K. Jain, *Reinforced Concrete Limit State Design*, New Chand & Bros.
3.   M.L. Gambhir, *Fundamentals of Reinforced concrete design*, Printice Hall of India Private Ltd., New Delhi.
4. P.C.Varghese, *Limit state design of Reinforced concrete*, Printice Hall of India Private Ltd., New Delhi.
5. N. Krishna Raju, *Structural Design and Drawing*, University press, Hyderabad.

Reference books:
1. Dr. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Limit state design of Reinforced Concrete (As per IS 456:2000)*, Laxmi Publications (P) Ltd.

Note:
For End examination:
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 on design out of which three are to be answered. Weightage for Part – A is 40% and Part-B is 60%.

For Sessional examination:
The Sessional 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 *Three* questions on design out of which *Two* are to be answered. Weightage for Part – A is 40% and Part- B is 60%.

TRANSPORTATION ENGINEERING – I (TE1)

(For III B. Tech. CE – I Semester)

Scheme: 2010	**Internal Assessment : 30**
Contact Periods: 4L+1T / week	**End Exam Marks : 70**
Credits: 5	**End Exam Duration : 3 hrs**

Unit –I
Highway Development and Planning: Importance of transportation – Classification of roads – Road patterns – Highway planning in India.

Unit – II
Highway Alignment: Highway alignment – Basic requirements – Controlling factors – Engineering surveys for highway location – Drawings and report – Points considered in a new highway project and realignment of a project.

Unit – III
Geometric Design of Streets and Highways: Introduction – Parameters controlling geometric design – Cross sectional elements – Sight distances – Horizontal alignment – Vertical alignment –Intersections – Rotary intersection – Grade separated intersections (interchanges).

Unit –IV
Traffic Engineering: Introduction – Road user and vehicle characteristics – Traffic studies – Speed studies, traffic volume counts, origin and destination surveys, parking surveys, accident studies.

Unit V
Highway Materials: Aggregates and bitumen – Desirable properties – Tests – Aggregate bitumen mixes – Mix design by Marshall stability method.

Unit –VI
Flexible Pavement Design: Pavement types – Components and their functions – Design factors – Flexible pavement design – IRC method based on CBR only.

Unit – VII
Rigid Pavement Design: Calculation of stresses – Design of joints, dowel bars, tie bars – Thickness of pavement by IRC procedures.

Unit – VIII
Highway Construction: Construction of water bound macadam roads – Construction of bituminous pavements, concrete pavements, joints in cement concrete pavements.

Text Books:
1.   Justo and S.K. Khanna, *Highway Engineering*, Nemchand & Bros Roorkee
2.   G.V. Rao, *Principles of Transportation and Highway Engineering*, Tata Mc Grew Hill

Reference Books:
1. Jotin Khisty, *Introduction to Transportation Engineering*, Prentice Hall Publications.
2. L.R. Kadiyali, *Principles of Highway Engineering*, Khanna Publications.
3. S.K. Sharma, *Principles, Practice and design of Highway Engineering*, Prentice Hall Publications, New Delhi.

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The

student shall answer any *Five* questions.

SOIL MECHANICS (SMECH)
(For III B. Tech. CE – I Semester)

Scheme: 2010   **Internal Assessment : 30**
Contact Periods: 4L+1T / week   **End Exam Marks   : 70**
Credits: 5   **End Exam Duration : 3 hrs**

Unit – I
Introduction: Origin of soils – Formation of soils – Transported and residual soils – Soil deposits of India.
Clay Mineralogy and Soil Structure: Structure of kaolonite, illite and montmorillonite – Soil fabric and structure – Diffuse double layer – Effect of soil structure on soil properties – Structure of coarse grained soils.

Unit – II
Basic Definitions and Functional Relations: Soil as a 3–phase system – Basic definitions – Volumetric relationships – Water content – Volume–mass relationships – Volume–weight relationships – Interrelationship between mass and weight units – Specific gravity – Three phase diagram in terms of void ratio – Three phase diagram in terms of porosity – Functional relations in terms of volume, mass and weight.

Unit – III
Physical Properties of Soils: Determination of specific gravity, water content, in–situ density and relative density – Grain size analysis by sieve and hydrometer – Grain size distribution curve – Gradation characteristics of soils – Consistency limits – Determination of liquid limit, plastic limit and shrinkage limit – Plasticity, liquidity and consistency indices – Flow index – Toughness index – Use of consistency limits.

Unit – IV
Soil Classification: Particle size classification – AASHTO classification system – Unified soil classification system – Indian Standard classification system – Plasticity chart – Field identification tests – Suitability of soil groups for various Engineering purposes.

Unit – V
Permeability: Darcy's law – Factors affecting permeability – Laboratory methods for determination of permeability – Average permeability of stratified soils.

Unit – VI
Effective Stress Principle: Total, neutral and effective stress in soil deposits – Unsaturated, saturated and submerged soils – Soil deposits subject to capillary action.

Seepage through Soils: Flow net – Construction of flow net by graphical method – Calculation of seepage quantities using flow net – Seepage pressure – Critical hydraulic gradient – Quick sand condition – Phreatic line in an earth dam with a downstream toe filter.

Unit – VII

Stresses Due to Applied Loads: Boussinesq's theory – Vertical stress due to concentrated load – Isobar diagram – Vertical stress due to line load and strip load – Vertical stress below uniformly loaded circular and rectangular areas – Equivalent point load method – Newmark's influence chart – Westergaard's theory – Comparison of Boussinesq and Westergaard theories – Approximate methods – Contact pressure beneath foundations.

Unit – VIII

Compaction: Theory of compaction – Optimum moisture content – Standard Proctor test – Modified Proctor test – Compaction of sands – Factors affecting compaction – Effect of compaction on soil properties – Field compaction equipment – Field compaction control.

Text Books:

1. K.R. Arora [2008], *Soil Mechanics and Foundation Engineering*, Standard Publishers Distributors.
2. Gopal Ranjan and A.S.R.Rao [2000], *Basic and Applied Soil Mechanics*, New Age International Publishers.

Reference Books:

1. C. Venkataramaiah [2009], *Geotechnical Engineering*, New Age International.
2. V.N.S. Murthy [2006], *A Text book of soil mechanics and foundation engineering*, Saikripa Technical consultants.
3. A.V. Narasimha Rao and C. Venkataramaiah [2000], *Numerical Problems, Examples and Objective Questions in Geotechnical Engineering*, University Press.
4. P. Purushothama Raj [1995], *Geotechnical Engineering*, Prentice Hall of India.

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

HYDRAULIC MACHINERY (HM)
(For III B. Tech. CE – I Semester)

Scheme: 2010   **Internal Assessment : 30**
Contact Periods: 3 L + IT / week   **End Exam Marks : 70**
Credits: 4   **End Exam Duration : 3 hrs**

Unit – I
Basics of Fluid Machinery: Impact of free jets – Force exerted by fluid jet on stationary and moving plates – Flat, inclined and curved vanes – Velocity triangles at inlet and outlet of the vane – Angular momentum equation – Evaluation of torque exerted on a wheel with curved vanes.

Unit – II
Hydraulic Turbines I: Elements of hydroelectric power plants – Heads and efficiencies of turbines – Classification of turbines – Pelton wheel – Main components and working principle – Expressions for work done and efficiency – Working proportions and design.

Unit – III
Hydraulic Turbines II: Radial flow reaction turbines – Modern Francis turbine – Work done and efficiency – Working proportions and design – Draft tube theory – Kaplan turbine – Working proportions – Governing of turbines – Runaway speed.

Unit – IV
Performance of Turbines: Performance under unit head – Unit quantities – Performance under specific conditions – Specific speed – Expressions for specific speed – Performance characteristic curves – Model testing of turbines – Cavitation in turbines – Selection of turbines.

Unit – V
Centrifugal Pumps–I: Advantages of centrifugal pumps over reciprocating pumps – Classification and types of pumps – Components and working of a centrifugal pump – Work done by the impeller– Heads and efficiencies – Net positive suction head(NPSH)

Unit – VI
Centrifugal Pumps–II: Priming – Priming devices – Minimum starting speed – Multistage pumps – Pumps in series and parallel – Submersible pumps – Limiting suction head – Cavitation – Expression for specific speed – Model testing – Performance characteristics.

Unit – VII
Reciprocating Pumps: Main components – Working of a Reciprocating Pump – Types of reciprocating pumps – Work done by single acting and double acting pumps – Coefficient of discharge, slip, percentage slip – Negative slip – Acceleration head – Indicator diagrams – Air vessels – Operating characteristics.

Unit – VIII
Miscellaneous Hydraulic Machines: Principle of working of hydraulic accumulator – Intensifier – Crane – Lift – Hydraulic ram – Fluid coupling and torque converter and air lift pump.

Text Books:
1. P.N. Modi & S.M. Seth, *Hydraulics and Fluid Mechanics including Hydraulic Machines*, Standard Book House, New Delhi.
2. R.K. Bansal, *A text book of Fluid Mechanics and Hydraulic machinery*, Laxmi Publications (P) Ltd.

Reference Books:
1. Jagadish Lal, *Hydraulic Machines*, Metropolitan Book Company Pvt. Ltd.
2. Nachleba, *Hydraulic Turbines,* Tata Mc Graw Hill Publishing Co. Ltd, New Delhi.

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

HYDRAULICS & HYDRAULIC MACHINERY LAB (HHM(P))
(For III B. Tech. CE – I Semester)

Scheme: 2010   **Internal Assessment : 30**
Contact Periods: 3P / week   **End Exam Marks   : 70**
Credits: 2   **End Exam Duration : 3 hrs**

List of Experiments:

1. Impact of jet on vanes.
2. Performance test on single stage centrifugal pump.
3. Performance test on multi stage centrifugal pump.
4. Performance test on submersible pump.
5. Performance test on centrifugal pump. (Variable speed).
6. Performance test on reciprocating pump.
7. Open channel roughness.
8. Performance and specific speed test on Pelton wheel.
9. Performance and specific speed test on Francis turbine.

Demonstration:
10. Performance and specific speed test on Kaplan turbine.
11. Study of hydraulic jump

CONCRETE TECHNOLOGY LAB (CT(P))
(For III B. Tech. CE – I Semester)

Scheme: 2010   **Internal Assessment : 30**
Contact Periods: 3P / week   **End Exam Marks : 70**
Credits: 2   **End Exam Duration : 3 hrs**

List of Experiments:

1. a) Fineness of cement by dry–sieving method & Blairs air permeability apparatus.
    b) Specific gravity of cement
2. a) Standard consistency of cement paste.
    b) Soundness of cement (By Lechatelier method)
3. Initial and final setting of cement
4. Compressive strength of cement.
5. a) Grain size distribution of fine aggregate.
    b) Specific gravity of fine aggregate.
6. a) Grain size distribution of coarse aggregate.
    b) Specific gravity of coarse aggregate
7. Bulking of sand.
8. a) Workability of fresh concrete by slump cone method.
    b) Workability of fresh concrete by compaction factor method.
9. a) Compressive strength of concrete.
    b) Split tensile strength of concrete.
    c) Modulus of rupture of concrete.
10. Demonstration of rebound test hammer

TRANSPORTATION ENGINEERING LAB (TE(P))
(For III B. Tech. CE – I Semester)

Scheme: 2010   **Internal Assessment : 30**
Contact Periods: 3P / week   **End Exam Marks   : 70**
Credits: 2   **End Exam Duration : 3 hrs**

List of Experiments:

Tests on Aggregates:
1.   Determination of strength of the aggregate by crushing test using compression testing machine
2.   a) Determination of toughness value of aggregate by impact test
      b) Determination of water absorption value of aggregate by using water absorption test.
3.   Determination of flakiness index and elongation index by shape test using thickness gauge and length gauge.

Tests on Bitumen:
4.   a) Determination of grade of bitumen by penetration test using penetrometer.
      b) Determination of stripping value of aggregate by using stripping value test
5.   Determination of ductile value of bitumen using ductility testing machine
6.   Determination of viscous value of bitumen by viscosity test using viscometer.
7.   Determination of softening value of the bitumen using ring and ball test
8.   Determination of flash point and fire point by using Penskey Martin's testing machine.

Demonstration:
9.   Determination of Marshall stability value and flow value of prepared sample by using Marshall stability testing machine.
10.   Determination of separation of bitumen from aggregate by using bitumen extraction test.

FOUR YEAR B. Tech. DEGREE COURSE
Scheme of Instruction and Examination
(Effective from 2010–11)

III B. Tech (CE) − II Semester   Scheme : 2010

S. No	Subject	Abbreviation	Credits	Scheme of Instruction periods/week			Duration of end Exam (Hours)	Scheme of Examination Maximum Marks		
				L	D/T	P		End Exam	Internal Assessment	Total
I	***Theory***									
1.	Analysis of Structures	AS	5	4	1	–	3	70	30	100
2.	Water Resources Engineering–II	WRE2	5	5	–	–	3	70	30	100
3.	Design and Detailing of Steel Structures	DDSS	5	4	1	–	3	70	30	100
4.	Environmental Engineering–I	EE1	5	4	1	–	3	70	30	100
5.	Transportation Engineering–II	TE2	5	4	1	–	3	70	30	100
6.	Foundation Engineering	FE	5	4	1	–	3	70	30	100
7.	Open Elective–I		2	2	–	–	–	–	100	100
II	***Practical***									
8.	Geographical Information Systems & Engineering Geology Lab	GIS&EGL(P)	2	–	–	3	3	70	30	100
9.	Soil Mechanics Lab	SMECH(P)	2	–	–	3	3	70	30	100
	Total		**36**	**27**	**5**	**6**		**560**	**340**	**900**

ANALYSIS OF STRUCTURES (AS)
(For III B. Tech. CE – II Semester)

Scheme: 2010   **Internal Assessment : 30**
Contact Periods: 4L+1T / week   **End Exam Marks   : 70**
Credits: 5   **End Exam Duration : 3 hrs**

Unit – I
Moving Loads: Maximum shear force and bending moment for loads on simply supported beams – Curves for maximum bending moment and shear force for single point load, two point loads, UDL longer than span and several point loads – Enveloping parabola and EUDL.

Unit – II
Influence Lines: Influence lines for reaction, bending moment and shear force in simply supported beams – Influence line diagram for the forces in members of simple trusses

Unit – III
Energy Methods–I: Castigliano's theorem – Analysis of determinate beams and determinate pin joined trusses

Unit – IV
Energy Methods–II: Analysis of statically indeterminate beams and trusses up to two degree of indeterminacy by Castigliano's theorem of minimum strain energy.

Unit –V
Slope Deflection Method: Slope deflection equation – Application to continuous beams (with and without sinking of supports).

Unit –VI
Moment Distribution Method: Stiffness and carry over factors – Distribution factors – Analysis of continuous beams – Effect of yielding of supports – Analysis of single bay and single storey portal frames with and without sway.

Unit –VII
Kani's Method: Kani's method of analysis applied to continuous beams up to three spans with and without settlement of supports.

Unit – VIII
Application of Kani's Method: Analysis of single bay single storey portal frames with and without side sway.

Text Books:
3.   B.C. Punmia, A.K Jain & A.K.Jain, SMTS–2, *Theory of Structures*, Laxmi Publications.
4.   C.S.Reddy, *Basic Structural Analysis*, TATA Mc. Graw Hill.
5.   C.K.Wang, *Indeterminate Structural Analysis*, Standard Publication House.

Reference Books:
1.   Timoshenko & Young, *Theory of Structures*, TATA Mc. Graw Hill.
2.   Wilbur and Norri's, *Elementary Structural Analysis*, TATA Mc. Graw Hill.
3.   Vazirani & Ratwani, *Analysis of Structures–Vol.II*, Khanna Publishers.
4.   Ramamrutham, *Theory of Structures*, Dhapat Rai Publications.

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The

student shall answer any *Five* questions.

WATER RESOURCES ENGINEERING–II (WRE2)
(For III B. Tech. CE – II Semester)

Scheme: 2010   **Internal Assessment : 30**
Contact Periods: 5 L/ week   **End Exam Marks   : 70**
Credits: 5   **End Exam Duration : 3 hrs**

Unit – I
Planning for Water Resources Development: Purpose – Classification of water resources development projects – Functional requirements in multipurpose projects – Financial analysis of a project – Augmentation of water supplies.

Unit – II
Reservoir Planning: Introduction – Investigations for reservoir planning – Selection of site – Zones of storage – Storage capacity and yield – Sedimentation of reservoirs – Control of sedimentation – Single purpose flood control reservoirs – Multipurpose reservoirs – Determination of yield – Fixation of storage capacity – Relation between capacity and yield – Density currents – Trap efficiency – Capacity – Inflow ratio.

Unit – III
Dams – General: Classification – Factors governing selection of type of dam – Selection of site for a dam.
Arch and Buttress Dams: Types of arch dams – Forces on an arch dam – Design methods for arch dams – The elastic theory – Buttress dam – Types of buttress dams.

Unit – IV
Gravity Dams: Forces acting – Modes of failure – Stability requirements – Principal and shear stresses – Stability analysis – Elementary and practical profiles – Limiting height – Galleries – Keys, joints and water seals – Control of cracking in concrete dams.

Unit – V
Earth and Rockfill Dams: Types of earth dams – Causes of failures – Criteria for safe design – Earth dam section – Downstream drainage system – Seepage analysis – Stability analysis – Stability of D/S slope during steady seepage – Sudden drawdown condition – Stability during construction – Stability against shear – Slope protection – Seepage control measures – Rockfill dams – Compaction.

Unit – VI
Spillways: Introduction – Straight drop spillway – Ogee spillway – Side channel spillway – Chute spillway – Syphon spillway – Shaft spillway – Dynamic force on spillway – Energy dissipation below spillways – Indian standards on criteria for design of hydraulic jump type stilling basins – Horizontal and sloping aprons – Crest gates – Outlet works.

Unit – VII
Cross Drainage Works: Types – Selection of suitable type – Classification – Features of design of cross drainage works – Aqueducts – Syphon aqueduct.

Unit – VIII
Canal Outlets: Types of outlets – Definitions – Non–modular, semimodule, rigid module outlets.
Canal Regulation Works: Necessity and location – Classification – Sarda type fall design – Head regulator and cross regulator.

Text Books:
1. Dr. B.C. Punmia & B.B. Lal, *Irrigation and Water power Engineering,* , Laxmi Publications (P) Ltd.

2. Dr. P.N. Modi, *Irrigation and water Resources Engineering*, Standard Book House

Reference Books:
1. K.B. Khushalani & M.Khushalani, Irrigation Practice and Design, Oxford & IBH .
2. S.K. Garg, *Irrigation and Hydraulic structures,* Khanna Publishers

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

DESIGN AND DETAILING OF STEEL STRUCTURES (DDSS)
(For III B. Tech. CE – II Semester)

Scheme: 2010

Contact Periods: 4L+1T / week

Credits: 5

Internal Assessment : 30

End Exam Marks   : 70

End Exam Duration : 3 hrs

Unit – I
Properties of Standard Sections: Selection of stresses as per I.S. Code
Welded Joints: Introduction – Advantages and disadvantages of welding – Strength of welds –permissible stresses–IS Code requirements – Welded connections with butt and fillet welds – Eccentric welded connections – Beam to beam and beam to column connections.

Unit – II
Bolted Connections: Introduction – Behaviour of bolted joints – Design strength of ordinary black bolts – Design strength of high strength friction grip bolts – Simple connections – Lap and butt joints.

Unit – III
Tension Members: Types of sections – Net effective section for angles and tees in tension – Lug angles – Tension splices.

Unit – IV
Compression Members: Plain and built up compression members – Assumptions regarding end conditions – Design of built up columns with battens and laces – Splicing of column.

Unit –V
Design of Slab and Gusseted bases for Columns

Unit – VI
Beams: Allowable stresses – Design requirements as per IS Code – Design of beams with restrained and unrestrained compression flanges – Built up sections.

Unit –VII
Roof Trusses: Types of trusses – Loads on roof trusses – Design of Simple roof trusses involving design of purlin members and joints – Design of tubular trusses.

Unit –VIII
Welded Plate Girders: Design of welded plate girders – Flange curtailment – Stiffeners – Connections

Note: The students should prepare the following plates.
Plate 1 Detailing of simple beams
Plate 2 Detailing of Compound beams including curtailment of flange plates.
Plate 3 Detailing of Column including lacing and battens.
Plate 4 Detailing of Column bases – slab base and gusseted base
Plate 5 Detailing of steel roof trusses including particulars at joints.
Plate 6 Detailing of Plate girder.

Note: All designs should be in accordance with IS 800 – 2007

Text books:

1. Dr. Ramachandra & Virendra Gehlot , *Limit state Design of steel structures Vol.1*, Scientific Publishers (India), Jodhpur
2. N. Subramanian, *Design of steel structures*, Oxford university press
3. N. Krishna Raju, *Structural Design and Drawing*, University press, Hyderabad.

Reference books:
1. S.K.Duggal, *Limit State design of Steel structures,*Tata, Mc Grawhill, New Delhi.
2. S.S.Bhavikatti, *Design of Steel Structures,* New age International, New Delhi.

Note:
For End examination:
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 on design out of which three are to be answered. Weightage for Part – A is 40% and Part-B is 60%.

For Sessional examination:
The Sessional 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 *Three* questions on design out of which *Two* are to be answered. Weightage for Part – A is 40% and Part- B is 60%.

ENVIRONMENTAL ENGINEERING–I (EE1)
(For III B. Tech. C.E. - II Semester)

Scheme: 2010　　　　　　　　　　　　　　　**Internal Assessment : 30**
Contact Periods: 4L+1T / week　　　　　　**End Exam Marks   : 70**
Credits: 5　　　　　　　　　　　　　　　　**End Exam Duration : 3 hrs**

Unit– I
Introduction: Need for protected water supply – Objectives of water supply systems – Water borne diseases and their control.

Unit–II
Quantity: Design period – Population forecast – Rate of consumption for various purposes – Fluctuations in demand – Factors governing the rate of demand – Fire demand.

Unit–III
Quality: Impurities in water – Sampling – Routine water analysis for physical, chemical and bacteriological characteristics and their significance – Standards for drinking water.

Unit–IV
Sources of Water Supply: Classification, choice of source – Suitability of sources with reference to quantity and quality.
Collection and Conveyance: Infiltration galleries and wells – Intake structures – Lake, canal, river and reservoir intake – Types of conduits – Hydraulic design of pressure pipes – Materials for pipes – Pipe joints – Laying and testing of pipes.

Unit–V
Treatment of Water: Layout and general outline of water treatment units – Principles and design of plain sedimentation and coagulation tanks – Dosage and feeding of coagulants.

Unit–VI
Filtration: Working and design of slow sand filters, rapid sand filters and pressure filters.
Disinfection – Different methods disinfections – Chlorination practices – Chlorine demand – Breakpoint chlorination
Other Treatments – Aeration – Softening – Defluoridation – Iron and manganese removal.

Unit–VII
Distribution System: Water supply systems – Pumping, gravity and dual systems – Layouts of distribution system – Dead end, grid iron, ring and radial systems – Analysis of water distribution system using Hardy – Cross method – Mass curve application to calculate the storage capacity of the distribution reservoir – Appurtenances in the distribution system – Different types of valves and fire hydrants.

Unit–VIII
House Fittings: House drainage – Components and requirements – Sanitary fittings – Water closets – Flushing tanks – Wash basins – Sinks – Traps – Plumbing systems.

Text Books:
1. S.K.Hussain [1994], *Water supply and sanitary Engineering*, Oxford & IBH.
2. Santosh Kumar Garg [1992], *Environmental Engineering Vol.1*, Khanna Publications.

Reference Books:

1. E.W. Steel [1985], *Water supply and Sewerage,* TATA Mc. Graw Hill.
2. Sawyer and Mc Carthy [2003], *Chemistry for Environmental engineering*, TATA Mc. Graw Hill.
3. CPHEEO, Ministry of Urban development, [1996], *"Manual on water supply and Treatment"* ,New Delhi.
4. Mark J. Hammer & Mark J. Hammer Jr [1986], *Water and Waste Water Technology*, John Wiley Publications.

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

TRANSPORTATION ENGINEERING –II (TE2)
(For III B. Tech. CE – II Semester)

Scheme: 2010
Contact Periods: 4L+1T / week
Credits: 5

Internal Assessment : 30
End Exam Marks   : 70
End Exam Duration : 3 hrs

Unit –I
Highway Maintenance: Introduction – Pavement failures – Failures in flexible and rigid pavements – Maintenance of highways – WBM roads, Flexible pavements (including special repairs), and CC Pavements – Overlay design by Benkelman beam method.

Unit –II
Highway Drainage: Importance of highway drainage – Surface drainage – Sub Surface drainage – Drainage of slopes and erosion control – Road construction in water logged areas.
.
Unit – III
Traffic Control and Management: Introduction – Traffic control devices – Signs, markings – Highway capacity concepts – Elements of traffic stream – Speed, density and flow, level of services – Traffic signal design.

Unit – IV
Railway Track: Requirements of an ideal permanent way – Gauges in India – Selection of gauge.

Unit – V
Rails: Functions and requirements – Corrugated or roaring rails – Hogged rails – Kinks in rails –Buckling of rails – Wear on rails – Coning of wheels.

Unit – VI
Sleepers and Ballast: Functions and requirements, types of sleepers – Spacing of sleepers – Sleeper density – Ballast – Functions and requirements, types – Subgrade – Functions of sub grade or formation – Sub grade materials and its improvement.

Unit – VII
Track Alignment: Basic requirements – Factors controlling alignment – Gradients – Types of gradient – Grade compensation on curves.

Unit – VIII
Geometric Design of the Track: Speed of the train – Speed on curves – Radius or degree of curvature – Superelevation or cant – Types of transition curve – Length of transition curve –Widening of gauge on curves – Shift of the curve

Text Books:
1. L.R. Kadiyali, *Traffic Engineering and Transport Planning*, Khanna Publishers, Delhi
2. C. Saxena and S.P. Arora, *Railway Engineering*, Dhanpat Raj Publications.
3. Justo and S.K. Khanna, *Highway Engineering*, Nemchand & Bros Roorkee
Reference Books:
1. Jotin Khisty, *Introduction to Transportation Engineering*, Prentice Hall Publications.
2. S.K. Sharma, *Principles, Practice and design of Highway Engineering*, Prentice Hall Publications, New Delhi.

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

FOUNDATION ENGINEERING (FE)
(For III B. Tech. CE – II Semester)

Scheme: 2010
Contact Periods: 4L+1T / week
Credits: 5

Internal Assessment : 30
End Exam Marks : 70
End Exam Duration : 3 hrs

Unit – I
Consolidation: Mechanism of consolidation – Pressure–void ratio curve – Consolidation settlement – Terzaghi's theory of one–dimensional consolidation – Laboratory consolidation test – Coefficient of consolidation – Time fitting methods – Initial and primary compression – Secondary consolidation – Compression ratios – Normally and over–consolidated soils – Determination of pre–consolidation pressure.

Unit – II
Shear Strength: Mohr–Coulomb failure criterion – Shear parameters – Direct shear test – Triaxial compression test – Types of shear tests based on drainage conditions – Unconfined compression test – Shear strength characteristics of cohesive and cohesionless soils – Pore pressure parameters.

Unit – III
Soil Investigation : Sampling: Planning and execution of soil exploration – Reconnaissance – Depth of exploration – Methods of soil exploration – Test pits – Auger, wash, percussion and rotary borings – Soil samples – Borehole logs – Soil investigation report.

Unit – IV
Lateral Earth Pressure: Active and passive earth pressure – Earth pressure at rest – Rankine's theory – Active earth pressure for cohesionless and cohesive soils – Passive earth pressure for cohesionless and cohesive soils – Coulomb's theory – Rebhann's and Culmann's graphical method .

Unit – V
Stability of Slopes: Types of slope failures – Stability analysis of infinite slopes – Swedish circle method – Bishop's simplified method of slices – Stability analysis of slopes of earth dams – Friction circle method – Taylor's stability number.

Unit – VI
Bearing Capacity of Soils: Definition of bearing capacity – Theories of Terzaghi, Meyerhof, Vesic and Hansen for bearing capacity – Bearing capacity of square, circular and rectangular footings – Effect of water table on bearing capacity – I.S. code recommendations for bearing capacity.

Unit – VII
Pile Foundations: Single Pile: Classification of piles – Pile driving methods – Load carrying capacity of single pile – Dynamic formulae – Static formulae as per IS 2911 – Load test on piles.

Unit – VIII
Pile Foundations: Group of Piles: Pile groups – Spacing of piles – Terzaghi's block shear failure criterion – Negative skin friction – Settlement of pile groups – Under reamed piles.

Text Books:
1. K.R. Arora[2008], *Soil Mechanics and Foundation Engineering*, Standard Publishers.
2. P.Purushothama Raj[1995], *Geotechnical Engineering*, Prentice Hall of India

Reference Books:
1. Joseph E. Bowles[1997], *Foundation analysis and design*, McGraw Hill
2. V.N.S.Murthy[2006], *A Text book of soil mechanics and foundation engineering*, Saikripa Technical consultants.
3. C.Venkataramaiah[2009], *Geotechnical Engineering*, New Age International
4. Alam Singh[200], *Soil Mechanics and Foundation Engineering*

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

GEOGRAPHICAL INFORMATION SYSTEMS & ENGINEERING GEOLOGY LAB

(GIS&EGL(P))
(For III B. Tech. CE – II Semester)

Scheme: 2010   **Internal Assessment : 30**
Contact Periods: 3P / week   **End Exam Marks   : 70**
Credits: 2   **End Exam Duration : 3 hrs**

List of Experiments:

GEOGRAPHICAL INFORMATION SYSTEM (GIS)
1. Introduction to GeoMedia.
2. Building queries.
3. Using buffer zones for querying.
4. Basics of Arc View.
5. Attribute data analysis and classification (Entering data in tables, linking & joining tables) using ArcView.
6. Making choropleth map, adding symbols & labels in Arc View

ENGINEERING GEOLOGY (EGL)
1. Megascopic identification of minerals.
2. Megascopic identification of common igneous rocks.
3. Megascopic identification of common sedimentary rocks.
4. Megascopic identification of common metamorphic rocks.
5. Structural geology problems.
6. Study and interpretation of geological maps.

SOIL MECHANICS LAB (SMECH(P))
(For III B. Tech. CE – II Semester)

Scheme: 2010   **Internal Assessment : 30**
Contact Periods: 3P / week   **End Exam Marks   : 70**
Credits: 2   **End Exam Duration : 3 hrs**

List of Experiments:

1. (a) Grain size distribution by sieve analysis
   (b) Specific gravity by density bottle
2.   Liquid limit and plastic limit
3. (a) Shrinkage limit
   (b) Free swell index
4.   Permeability by constant head method
5.   Permeability by falling head method
6.   Field density by core cutter method and sand replacement method
7.   Shear parameters by direct shear test
8.   Unconfined compressive strength
9.   OMC and MDD using I.S. light compaction
10.   C.B.R.value

Demonstration:
11.   Grain size distribution by hydrometer analysis
12.   Shear parameters by triaxial compression test
13.   Consolidation properties by consolidation test

FOUR YEAR B. Tech. DEGREE COURSE
Scheme of Instruction and Examination
(Effective from 2010–11)

IV B. Tech (CE) – I Semester   **Scheme : 2010**

S. No	Subject	Abbreviation	Credits	Scheme of Instruction periods/week			Duration of end Exam (Hours)	Scheme of Examination Maximum Marks		
				L	D/T	P		End Exam	Internal Assessment	Total
I	*Theory*									
1.	Advanced Structural Design	ASD	5	3	2	–	3	70	30	100
2.	Construction Planning and Management	CPM	4	4	–	–	3	70	30	100
3.	Water Resources Engineering–III	WRE3	4	2	2	–	3	70	30	100
4.	Estimation, Costing and Valuation	ECV	5	3	2	–	3	70	30	100
5.	Environmental Engineering II	EE2	5	4	1	–	3	70	30	100
6.	Professional Elective–I		4	3	1	–	3	70	30	100
II	*Practical*									
7.	Structural Analysis and Design Lab	STAAD(P)	2	–	–	3	3	70	30	100
8.	Environmental Engineering Lab	EE(P)	2	–	–	3	3	70	30	100
9.	Mini Project & Comprehensive Viva	MPCV(P)	3	–	–	4	–	70	30	100
	Total		**34**	**19**	**8**	**10**		**630**	**270**	**900**

ADVANCED STRUCTURAL DESIGN (ASD)
(For IV B. Tech. CE – I Semester)

Scheme: 2010	**Internal Assessment : 30**
Contact Periods: 4L+1T/ week	**End Exam Marks : 70**
Credits: 5	**End Exam Duration : 3 hrs**

1. Stair Cases: Types of stair cases, design of dog legged and open well types by limit state method.

2. Combined Footing: Design of rectangular combined footing by limit state method.

3. Retaining Walls: Design of cantilever and counterfort retaining walls by limit state method.

4. Design of flat slab (Interior panel only)

5. Design of Grid floor

6. Concept of Working Stress Method

   R.C. Water Tanks: Design of circular water tank resting on ground with rigid and flexible bases.

7. R.C. Bridges: I.R.C. loading and impact factor – Deck slab bridges by effective width method for Class AA Tracked vehicle.

8. Bridge bearings: Types of bearings – Design of R.C. bearings and neoprene bearings.

Text Books:
1. N. Krishna Raju and R. N. Pranesh, *Reinforced Concrete Design IS:456–2000 Principles and Practice*, New Age International (P) Limited.
2. Ashok K.Jain, *Reinforced Concrete Limit State Design*, New Chand & Bros.
3. Dr. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, *Limit state design of Reinforced Concrete (As per IS 456:2000)*, Laxmi Publications (P) Ltd.

Reference books:
1. N.Krishnaraju, *Design of Bridges*, Oxford IBH.
2. H.J.Shah, *R.C.Structures*, Charoter Publications.
3. I.C.Syal and Goel, *Reinforced Concrete Structures*, S. Chand & Co.
4. S.S.Bhavikatti, *Advanced R.C.C. Design–RCC Vol. II*, New Age International.
5. N.Krishnaraju, *Advanced RCC,* CBS Publications, New Delhi.
6. M.L. Gambhir, *Design of RCC structures,* PHI Publishers, New Delhi.

Note:
For End examination:

   The question paper shall consist of *Six* questions. The student shall answer any *Four* questions.

For Sessional examination:

   The question paper shall consist of *Three* questions. The student shall answer any *Two* questions.

CONSTRUCTION PLANNING & MANAGEMENT (CPM)
(For IV B. Tech. CE – I Semester)

Scheme: 2010   **Internal Assessment : 30**
Contact Periods: 4L / week   **End Exam Marks : 70**
Credits: 4   **End Exam Duration : 3 hrs**

Unit – I
Introduction to Construction Management: Significance – Objectives and functions of construction management – Types – Resources – Stages – Team of construction unit
Construction Planning and Scheduling: Objectives of planning – Stages of planning – Scheduling – Advantages and classification of schedules – Methods of planning and scheduling – Bar charts – Milestone charts.

Unit – II
Network Techniques in Construction management: Elements of network – Network techniques – Breakdown structures – Representation and specifying of activities and events – Rules for Network–Numbering of network – Development of network – Types of networks.

Program Evaluation and Review Technique (PERT): Introduction, time estimates, slack, critical path – Network analysis and computation problems.

Unit – III
Critical Path Method (CPM): Introduction – Difference between CPM and PERT – Time estimates – Float – Critical path – Network analysis and computation problems.

Cost–Time Analysis in Net Work Planning: Importance of time – Project cost analysis in network planning – Updating – Resources allocation

Unit – IV
Organisation and System of Accounts of P.W.D.: Principles of organization – Types of organization – Organisation for construction firm – Organisation of Engineering department – Classification of work – Methods of carrying of works – Measurement book – Stores – Tools and plants.

Unit – V
Contracts: Definition – Essentials – Types – Documents – Conditions of contracts – Rights of a contractor – Remedies for termination of contract – Departmental procedure for execution of Civil Engineering works.
Arbitration: Definition – Arbitrator – Arbitration agreement – Qualification of arbitrator – Different kinds of arbitration – Procedure of settlement of dispute – Advantages of arbitration.

Unit – VI
Tenders: Type of tenders – Principles of tendering – Notice inviting tender.

Unit – VII
Construction Safety Management: Importance of safety – Causes – Classification – Measurement – cost of accidents – Accident report – General safety programmes – Safety measures for different construction works.

Unit – VIII

Inspection and Quality Control: Inspection of construction work – Principles of inspection –Technical service for inspection – Importance of quality – Elements of quality – Organisation for quality control – Quality assurance techniques.

Text Books:
1. Dr. B.C. Punmia & K.K. Kandelwal, *Project Planning & Control with PERT & CPM*, Laxmi Publications (P) Ltd, New Delhi.
2. J.L. Sharma, *Construction Management and Accounts*, Satya Prakasan (P) New Delhi.

Reference Books:
1. Dr. U.K. Shrivastava, *Construction planning and Management*, Galgotia (P), New Delhi.
2. S. Seetha Raman, *Construction Engineering and Management*, Umesh (P), New Delhi.
3. Chitkara, *Construction project management – Planning, Scheduling and Control*, Tata Mc. Graw Hill (P), Noida (UP).

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

WATER RESOURCES ENGINEERING–III (WRE3)
(For IV B. Tech. CE – I Semester)

Scheme: 2010   **Internal Assessment : 30**
Contact Periods: 2 L + 2D / week   **End Exam Marks   : 70**
Credits: 4   **End Exam Duration : 3 hrs**

Unit – I
Design of
Surplus Weir: Introduction – Estimation of flood discharge – Selection of type of work – Length of surplus Weir – Crest width – Base width – Abutments – Wings – Returns – Aprons.
Tank Sluice with Tower Head: Ventway design – Sluice barrel – R.C. Slab – Earth pressure – Stability analysis – Tower head design – Cistern.
Canal drop (Notch type): Trapezoidal notch – Length of drop wall between abutments – Profile of drop wall – Notch pier – Protective works.

Canal regulator cum Road Bridge: Ventway design – Drowning ratio method – Roadway – Piers – Shutters – Abutments – Wing Walls – Return walls – Solid apron for regulator – Revetments – Energy dissipation.
Under Tunnel: Design of barrel roof – Abutment pressure under Pier – Fixing maximum flood levels – Tail channel – Afflux over drop wall – Loss of head calculation – Depth of foundations of returns – Wing walls and returns - Uplift – Creep lost in percolation.

Unit – II
Design and Drawing of
1) Surplus weir
2) Tank sluice with tower head
3) Canal drop (Notch type)
4) Canal regulator cum road bridge
5) Under tunnel

Text Books:
1. C.Satyanarayana Murthy, *Water Resources Engineering Principles and practice*, New Age International Publishers, New Delhi.

Note:
For End Examination :
1. The question paper shall consist of *TWO* units with *TWO* questions in each unit. The student shall answer any *ONE* question from each unit.
2. First unit shall have questions related to theory and design aspects only for 25 marks from the Unit I of the syllabus. Second unit shall have design and drawing question from Unit II of the syllabus for 45 marks.

For Sessional Examination :
1. The Question paper shall consists of *TWO* questions related to Design and drawing.
    Student shall answer *ONE* question.

ESTIMATION, COSTING AND VALUATION (ECV)
(For IV B. Tech. CE – I Semester)

Scheme: 2010   **Internal Assessment : 30**
Contact Periods: 3L+2T / week   **End Exam Marks   : 70**
Credits: 5   **End Exam Duration : 3 hrs**

Unit – I
Introduction – Purpose of estimation – Rules and methods of measurement of works – Units of measurements for various items of works. Types of estimates – Preliminary estimate – Plinth area estimate – Cube rate estimate – Detailed estimate – Revised estimate – Supplementary and revised estimate – Annual repair or maintenance estimate – Contingencies – L.S.Item.

Unit – II
Earth work Computations: Earth work computations in banking and cutting for roads and canals.

Unit – III
Specification Writing for the following items of works: Earth work excavation in foundation of a building – Plain cement concrete– R.C.C. – Brick masonry – Stone masonry – Plastering with C.M – White washing – Colour washing – Painting to steel and iron work – First class building – Second class building.
Reinforcement Estimation: Reinforcement – Bar bending and bar requirement schedule – Example problems on beams, lintel cum sunshade and one way slab.

Unit – IV
Analysis of Rates: Definition – Purpose of rates – Factors affecting rate analysis – Standard schedule of rates.
Preparation of Rates for the Following Items of Work for Building:
Cement mortar (1:4) – Cement concrete (1:4:8) – Reinforced cement concrete: Lintels – Slabs – Beams – Columns in 1:1½:3 – Brick work using first class bricks in CM(1:6) – Stone masonry: C.R.S in CM (1:6) – Flooring – Plastering – Painting – White washing and colour washing – Painting for iron and wood work .

Unit – V
Valuation: Definition and purpose of valuation – Different kinds of Properties for which valuation is required – Different methods of valuation – Cost of land – Factors affecting the value of plot – Factors affecting the value of building – Rent Fixation – Mortgage – Depreciation – Valuation of residential building.

Unit – VI
Preparation of Detailed Estimates for Items of Construction: Simple residential buildings – R.C.C. Slab culvert and box culvert – Septic tank and soak pit.

Text Books:
1. B.N. Dutta, *Text book of Estimating and Costing in Civil Engineering*, UBS Publishers – New Delhi..
2. M. Chakraborthy, *Estimating, Costing, Specifications and valuation in Civil Engineering*, Khanna Publications.
3. V.V.Vazirani and S.P.Chandola, *Estimating & Costing in Civil Engineering*, Khanna publishers Delhi .

Reference Books:

1.   Agarwal, Kumar, Chaudary, Civil Estimating, Costing, and Valuation in Civil Engineering, Dhanpat Rai Publications.
    2. G.S.Biridie, Estimation and costing, Dhanpat Rai Publications.
    3. Mahajan, Text book of Estimating and costing, UBS Publications.
4. AP Dept, Standard Specifications and Standard schedule of rates – Public work department .
5. Rangwala, Estimation and costing, UBS Publications.

Note:

For End Examinations: The question paper shall consist of *SIX* questions. First *FIVE* questions shall be from the syllabus of the units I to V with *ONE* question from each unit with 15 marks for each question. The student shall answer any *THREE* questions. *SIXTH* question is a compulsory question for 25 marks from the syllabus of unit VI.

For Sessional Examinations: The question paper shall consist of *FOUR* questions. First *THREE* questions shall be from the syllabus of unit I to V with 25% of the marks for each question. The student shall answer any *TWO* questions. *FOURTH* question is a compulsory question with 50% of the marks from the syllabus of unit VI.

ENVIRONMENTAL ENGINEERING–II (EE2)
(For IV B. Tech. CE – I Semester)

Scheme: 2010
Contact Periods: 4L+1T / week
Credits: 5

Internal Assessment : 30
End Exam Marks   : 70
End Exam Duration : 3 hrs

Unit–I
Introduction: Aim and objectives of sanitation – Conservancy and water carriage systems –Classification of sewerage systems – Separate, combined and partially combined systems.

Unit–II
Estimation of Sewage: Estimation of quantity of sewage – Fluctuations in quantity of sewage – Storm water quantity estimation by rational method – Time of concentration and its significance in the design of storm sewer.

Unit–III
Design of Sewerage System: Preliminary survey and preparation of plans for a sewerage scheme – Selection of site for out fall – Design of sewers – Hydraulics of partially flowing sewer – Self cleaning velocity, shield expression for self cleaning velocity, permissible velocities and gradients –Shapes and materials of sewers – Sewer appurtenances, pumps and pumping stations – Testing and maintenance of sewers.

Unit–IV
Characteristics of Domestic Waste Water: Cycles of decomposition – Sampling and analysis of domestic waste water for Physical and chemical Characteristics – B.O.D equation and population equivalent.

Unit–V
Primary Treatment: Layout and general outline of various units in a domestic waste water treatment plant – Principle, working and design of screens, grit chambers, sedimentation tanks.

Unit–VI
Biological Treatment: Principle, working and design of trickling filters (standard and high rate), activated sludge process, oxidation ditch, oxidation ponds, aerated lagoons – Working and design of Septic tank – Sludge digestion tank.

Unit–VII
Disposal of Domestic Waste Water: Dilution – Self purification of water bodies – Dissolved oxygen sag curve and its significance – On land disposal, sewage farming, choice of method of disposal – Sewage sickness.

Unit–VIII
Urban Solid Waste Management: Types, sources, quantity and composition of urban solid waste – Collection, transportation, recovery & reuse – Disposal methods such as composting, incineration, sanitary land fill.

Text Books:
1. S.K.Hussain [1994], *Water supply and sanitary Engineering*, Oxford & IBH.
2. Santosh Kumar Garg [2002], *Environmental Engineering Vol.2*, Khanna Publishers.

Reference Books :

1. Metcalf and Eddy [2003], *Waste Water treatment, Disposal and Reuse*, TATA Mc. Graw Hill.
2. Sawyer and Mc Carthy [2003], *Chemistry for Environmental Engineering*, TATA Mc. Graw Hill.
3. *CPHEEO*, Ministry of Urban development, [1999], *"Manual on Sewerage and Sewage Treatment"*   New Delhi.
4. H.W.Peavy, D.G. Rowe and George Tchobanoglaus [1985], *Environmental Engineering* , TATA Mc. Graw Hill
5. Mark J. Hammer & Mark J. Hammer Jr. [2004], *Water and Waste Water Technology*, Prentice Hall India (P) Ltd, New Delhi.

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

STRUCTURAL ANALYSIS AND DESIGN LAB (STAAD(P))
(For IV B. Tech. CE – I Semester)

Scheme: 2010   **Internal Assessment : 30**
Contact Periods: 3P / week   **End Exam Marks   : 70**
Credits: 2   **End Exam Duration : 3 hrs**

List of Experiments:

1. Introduction to STAAD Pro and basic commands of STAAD Pro. (2 classes)
2. Analysis of simply supported and fixed beams subjected to member forces.
3. Analysis and design of continuous beam subjected to member forces.
4. Analysis of plane truss subjected to different types of forces.
5. Analysis and design of plane frame subjected to member and joint loads.
6. Analysis and design of space frame subjected to gravity forces.
7. Analysis and design of space frame subjected to wind forces.
8. Analysis of beam subjected to moving loads.
9. Analysis of gantry girder subjected to moving loads.
10. Analysis and design of an industrial structure.
11. Analysis and design of a retaining wall.

ENVIRONMENTAL ENGINEERING LAB (EE(P))
(For IV B. Tech. CE – I Semester)

Scheme: 2010   **Internal Assessment : 30**
Contact Periods: 3P / week   **End Exam Marks   : 70**
Credits: 2   **End Exam Duration : 3 hrs**

List of Experiments:

To determine the characteristics of the following parameters of given water / waste water sample
1. a) Acidity.
    b) Alkalinity.
2. a) Total hardness.
    b) Temporary & Permanent hardness.
    c) Calcium & Non – calcium hardness.
3.   Chlorides
4.   Sulphates
5.   Dissolved oxygen
6. a) Total solids
    b) Dissolved & Suspended solids
    c) Volatile & Non –Volatile solids
    d) Settleable solids
7. a) Turbidity
    b) Conductivity
    c)   pH
8.   Optimum dose of coagulant
9. a) Chlorine demand and break point chlorination.
    b) Residual chlorine by orthotolidine method.
10.   Fluorides

Demonstration:
11.   Bio chemical oxygen demand (BOD) of waste water.
12.   Chemical oxygen demand (COD) of waste water.

FOUR YEAR B. Tech. DEGREE COURSE
Scheme of Instruction and Examination
(Effective from 2010–11)

IV B. Tech (CE) – II Semester #   Scheme : 2010

S. No	Subject	Abbreviation	Credits	Scheme of Instruction periods/week			Duration of end Exam (Hours)	Scheme of Examination Maximum Marks		
				L	D/T	P		End Exam	Internal Assessment	Total
I	*Theory*									
1.	Professional Elective–II		4	3	1	–	3	70	30	100
2.	Professional Elective–III		4	3	1	–	3	70	30	100
3.	Open Elective–II		2	2	–	–	–	–	100	100
II	**Practical**									
4	Project Work	PW(P)	10	–	–	6	–	70	30	100
	Total		**20**	**8**	**2**	**6**		**210**	**190**	**400**
	OR									
I	Practice School / Internship	PS	10	–	–	–	–	–	100*	100
II	Project Work	PW(P)	10	–	–	–	–	70	30	100
	Total		**20**	**–**	**–**	**–**	**—**	**70**	**130**	**200**

\#   A student either to study 3 subjects (2 professional electives and one open elective) in IV B.Tech–II semester of Scheme 2010 or to attend practice school/internship to be arranged by the Training and Placement cell of the College.

*   Out of 100 marks, 70 marks will be evaluated by the external supervisor of the concerned company based on their attendance and day–to–day performance. 30 marks will be evaluated by the concerned department of the college based on the report submitted by the student and viva–voice.

LIST OF OPEN ELECTIVES

OPEN ELECTIVE – I

1. PROFESSIONAL ETHICS AND HUMAN VALUES   (PEHV)

2. INTELLECTUAL PROPERTY RIGHTS   (IPR)

3. ENTREPRENEURSHIP DEVELOPMENT   (EDP)

OPEN ELECTIVE – II

1. INDIAN CONSTITUTION AND SOCIETY   (ICTS)

2. RESEARCH METHODOLOGY   (RM)

3. GENERAL PSYCHOLOGY   (GPY)

PROFESSIONAL ETHICS AND HUMAN VALUES (PEHV)
(Open Elective I – for III B.Tech – II Semester all branches)

Scheme: 2010   **Internal Assessment: 100**
Contact Periods: 2L / week
Credits: 2

Unit – I
Human Values: Morals – Values – Ethics – Integrity–Work ethic – Respect for others – Peaceful Life – Honesty – Courage Valuing Time – Empathy – Character – Spirituality

Unit – II
Engineering Ethics: Senses of engineering ethics– Variety of morals –Types of inquiry –Kohlberg's theory – Gilligan's theory – Consensus & controversy – Models of professional roles – Customs and religion – Uses of ethical theories

Unit – III
Safety, Responsibilities & Rights: Safety and risk – Risk benefit analysis – Risk reward benefits and reducing risk – Collegiality and loyalty – Respect for authority
Confidentiality – Occupational crime – Professional rights – Employee rights – Intellectual Property Rights (IPR) – it's discrimination

Unit – IV
Global Issues: Multinational Corporations – Environmental ethics – Computer ethics – Engineer as manager – Consulting engineer – Moral leadership – Sample code of ethics like ASME, ASCE, IEEE, Institute of Engineers, Indian Institute of Materials Management, IETE etc.,

Text Books:
1. M.P. Raghavan[2006], *Professional Ethics And Human Values*, Scitech Publications, Chennai.
2. Jayashree Suresh and B.S.Raghavan[2007], *Human Values and Professional Ethics*, S.Chand Publishers, New Delhi.

Reference Books:
1. Mike Martin and Roland Schinzinger[1966], *Ethics in Engineering*, McGraw Hill Publishers, NewYork.
2. Charles D.Fleddermann[1999], *Engineering Ethics*, Prentice Hall Publishers, New Mexico.
3. S. Dinesh Babu[2007], *Professional Ethics & Human Values*, Laxmi Publications, Hyderabad.

INTELLECTUAL PROPERTY RIGHTS (IPR)
(Open Elective I – for III B.Tech – II Semester all branches)

Scheme: 2010   **Internal Assessment: 100**
Contact Periods: 2L / week
Credits: 2

Unit – I
Basics of IPR: Introduction to IPR–IPR Systems – Benefits of IPR – Various types of IPR –Violation of IPR

Unit – II
Patents: Introduction to Patents – Various kinds of patents – Patenting process–Copy right –Remedies against infringement

Unit – III
Method of Designing Registrations: Designing registrations – How chart for registration –Trademark – Geographical indications
Integrated circuits –Trade secrets

Unit – IV
IPR Policy and Management: IP in various sectors like Government and Nation–R &D organizations–IT, media, entertainment
Chemical engineering & services sector – industries & small scale industry

Text Books:
1. Bainbridge David[2003], *Intellectual Property Rights: Key to New Wealth,* National Research Development Corporation, Pearson Education, New Delhi**.**
2. Prabuddha Ganguli[2006], *Intellectual Property Rights*, TMH Publishers, New Delhi.

ENTREPRENEURSHIP DEVELOPMENT (EDP)
(Open Elective I – for III B.Tech – II Semester all branches)

Scheme: 2010   **Internal Assessment: 100**
Contact Periods: 2L / week
Credits: 2

Unit – I
Introduction: Concept of an entrepreneur – Definition of an entrepreneur – Types of entrepreneurs – Characteristics of an entrepreneur.
Entrepreneurship: Definitions – Theories of entrepreneurship – Key elements of entrepreneurship – Six important segments of entrepreneurship environment – Advantages of entrepreneurship – Barriers to entrepreneurship – Role of entrepreneurship in economic development.

Unit – II
Rural Entrepreneurship: Meaning – Need – Retrospection of rural industrialization in India – Problems of rural entrepreneurship – Development plan for rural entrepreneurship.
Small Enterprises: Definition of SSI – Types – Characteristics of SSI – Role of SSI in economic development – Problems faced by SSI.

Unit – III
Project Planning: Project identification – Project selection – Project report – Contents & Formulation – Methods of project appraisal.
Ownership Structures: Sole proprietorship – Partnership – Company – Co–operative – Selection of appropriate ownership structure.

Unit – IV
Institutional Finance: Types of financiers – Commercial banks – Other financial institutions – IDBI, IFCI, ICICI, IRBI, SFC, SIDC, SIDBI & EXIM bank.
Institutional Support: Need – Support to small entrepreneurs – NSIC, SIDO, SSIB, SSIDC, SISI, DICs.

Text Books:
1. Prof. Satish C. Ailawadi & Mrs. Romy Banerjee[2007], *Principles of Entrepreneurship*, Everest Publishing House, Pune.
2. S.S. Khanka and V.G. Patel[2007], *Entrepreneurial Development*, S. Chand Publishers, New Delhi.

INDIAN CONSTITUTION AND SOCIETY (ICTS)
(Open Elective II – for IV B.Tech – II Semester all branches)

Scheme: 2010   **Internal Assessment: 100**
Contact Periods: 2L / week
Credits: 2

Unit – I
Historical back ground – Preamble to the constitution of India – Fundamental rights–Derivative principles of state policy – Elections in India– Indian judiciary

Unit – II
Union Executive: Structures of union Government   – Functions – President –Vice President–Prime Minister – Cabinet
Parliament–Supreme Court of India
State Executive: Structures and Functions – Governor – Chief Minister – Cabinet – State legislature – High courts & subordinate courts

Unit – III
Central – State relations – President's rule – Constitutional amendments [42, 44, 74, 76, 86 & 91] – Constitutional functionaries – Working of parliamentary system in India

Unit – IV
Nature, meaning & definition, Indian social structure – Language in India – Political parties & pressure groups – Right of women – S.C's, S.T's & other weaker sections.

Text Books:
1. Durga   Das Basu[2006], *Introduction to the Constitution of India,* Wedwe and Co. Publishers, New Delhi.
   2. Macivel and Page, *Society – An Introduction Analysis.*
3. M.V. Pylee[2006], *India's Constitution*, S.Chand Publishers, New Delhi.

RESEARCH METHODOLOGY (RM)
(Open Elective II – for IV B.Tech – II Semester all branches)

Scheme: 2010   **Internal Assessment: 100**
Contact Periods: 2L / week
Credits: 2

Unit – I
Research Methodology: Introduction – Objectives of research – Types of research – Research methods (Vs) methodology
Researching process – Technique involved in defining a problem

Unit – II
Research Design and Sampling Design: Need for research design – Features of good design –Concepts related to research design – Different research designs – Basic principles of experimental Designs – Steps in sampling design – Characteristics of good sample design –Various types of sample designs – Complex random sampling designs

Unit – III
Data Collection and Processing:
Data collection through observation method & interview method – Data collection through questionnaires & schedules – Collection of secondary data
Processing: Measures of central tendency – Measures of dispersion – Measures of asymmetry –Measures of relationship – Simple regression analysis – Chi–square test for comparing valiance

Unit – IV
Sampling Fundamentals & Report Writing: Central limit theorem – Sampling theory –Concept of standard error – Estimating population – Mean sample size & determination –Technique for interpretation – Significance of report writing – Types of reports – Mechanics of writing a research report

Text Books:
1. C.R. Kothari[2004], *Research Methodology (Methods & Techniques),* NAI Publishers, New Delhi.
2. R. Cauvery, U.K Sudha Nayak and M.Girija[2007], *Research Methodology*, S.Chand Publishers, New Delhi.

GENERAL PSYCHOLOGY (GPY)
(Open Elective II – for IV B.Tech – II Semester all branches)

Scheme: 2010   **Internal Assessment: 100**
Contact Periods: 2L / week
Credits: 2

Unit – I
Introduction: Defining psychology & behavior – Branches and fields of psychology – Utility of psychology

Methods of Psychology: Introspection method – Naturalistic observation – Experimental method – Differential method – Clinical method – Psycho physical methods

Unit – II
Physiological Basis of Behavior: The Neuron–Central nervous system – Brain and localization of brain functions – Spinal chord
Influence of nervous system on human behavior – Endocrine system and it's impact – The role of heredity and environment in the development of personality

Unit – III
Instincts, Emotions Senses and Sensitivity: Instincts and reflex actions – Emotion & it's characteristics – Physiology of emotions – Sensation and sensitivity
Thinking, Reasoning and Problem solving: Nature of thinking – Elements of thoughts – Tools of thinking – Rigidity – Types of thinking – Reasoning & types – Problem solving and it's methods

Unit – IV
Motivation and Behavior & Attention & Learning: Biological and socio psychological Needs – Drives and incentives – Motives and types of motives – Types & effect of attention – Types of learning – Problem solving – Mechanism of memorization
Intelligence – Aptitude – Personality: Nature of intelligence – Concept of mental age and IQ –Constantly of IQ–IQ classification – Aptitude ability & achievement – Measurement of aptitude – Features and characteristics of personality – Personality assessment – Walters social learning theory

Text Books:
1. S.K. Mangal[2005], *General Psychology*, Sterling Publishers, New Delhi.

Reference Book:
1. Saundra K. Ciccarelli and Glenn E. Meyer[2007], *Psychology*, Pearson Education, New Delhi.

LIST OF PROFESSIONAL ELECTIVES

1. GROUND WATER HYDROLOGY (GWH)

2. HYDRO POWER ENGINEERING (HPE)

3. WATER RESOURCES SYSTEMS ENGINEERING (WRSE)

4. NATURAL DISASTER MITIGATION & MANAGEMENT (NDMM)

5. ADVANCED STRUCTURAL ANALYSIS (ASA)

6. PRESTRESSED CONCRETE   (PSC)

7. EARTHQUAKE RESISTANT DESIGN (ERD)

8. ADVANCED FOUNDATION ENGINEERING (AFE)

9. SOIL DYNAMICS AND MACHINE FOUNDATIONS (SDMF)

10. TRANSPORTATION PLANNING AND DESIGN (TPD)

11. ENVIRONMENTAL IMPACT ANALYSIS OF CIVIL ENGINEERING PROJECTS (EIACEP)

12. INTRODUCTION TO REMOTE SENSING AND G.I.S.   (IRSGIS)

13. INFTRASTRUCTURE ENGINEERING (IE)

GROUND WATER HYDROLOGY (GWH)
(Professional Elective for IV B. Tech. CE)

Scheme: 2010   **Internal Assessment : 30**
Contact Periods: 4L / week   **End Exam Marks   : 70**
Credits: 4   **End Exam Duration : 3 hrs**

Unit – I

Introduction: Scope – Utilisation of ground water in hydrologic cycle – Ground water potential in India

Occurrence of Ground water: Origin – Rock properties affecting groundwater – Geological formation of aquifers – Types of aquifers – Vertical distribution of subsurface water – Porosity – Specific yield – Specific retention – Storage coefficient – Compressibility of aquifers.

Unit – II

Movement of Ground Water: Darcy's law – Derivation – Validity of Darcy's law – Velocity – Permeability – Hydraulic conductivity – Transmissibility – Equation of conservation of mass – Homogeneous and isotropic aquifers – Laplace equation – Hydrodynamic equation – Analysis of an isotropic aquifers.

Unit – III

Well Hydraulics (Steady flow): Drawdown curve, radius of influence – Steadystate flow (Equilibrium condition) in to a well – Steady radial flow in to an unconfined aquifer – Dupuit' s equation – Steady radial flow in to a confined aquifer – Theim's Equation.

Unit – IV

Well Hydraulics (Unsteady Flow): Unsteady radial flow in a confined aquifer – Determination of formation constants – Theis, Cooper – Jacob and Chow's method of analysis – Recovery test – Unsteady radial flow in leaky aquifers – Well flow near aquifer boundaries – Image wells – Characteristic well losses and well efficiency – Partially penetrating wells.

Unit – V

Water Wells: Dug, bored, driven and jetted wells – Methods of drilling deep wells – Well casings and screens – Gravel packs – Well development methods – Open wells – Yield determination – Protection of wells – Infiltration galleries and collector wells.

 Unit – VI

Groundwater Management: Water management – Concepts of basin management – Hydrological equilibrium equation – Basin yield – Evaluation of perennial yield – Conjunctive use – Basin management by conjunctive use – Problems and remedial measures.

Unit – VII

Artificial Recharge of Groundwater: Concept – Methods – Recharge for reuse – Induced recharge – Recharge for energy purposes.

Unit – VIII

Saline Water Intrusion: Occurrence of Saline Water intrusion– Relation between fresh and saline waters – Ghyben–Herzberg equation – Shape and structure of fresh–salt water interface – Upcoming of saline water – Control of saline water intrusion – Examples of seawater intrusion.

Text Books:
1. D.K. Todd, *Groundwater Hydrology*, John Wiley & Sons, Singapore.
2. H.M. Raghunath, *Groundwater*, Wiley Eastern Ltd.

Reference Books:
1. H. Bouwer, *Groundwater Hydrology*

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

HYDRO POWER ENGINEERING (HPE)
(Professional Elective for IV B. Tech. CE)

Scheme: 2010	**Internal Assessment : 30**
Contact Periods: 4L / week	**End Exam Marks : 70**
Credits: 4	**End Exam Duration : 3 hrs**

Unit – I
Introduction: Different sources of energy – Hydro power – Its advantages and disadvantages – Role of hydel power in the power system – Development of water power in India with particular reference to south India – Estimation of water power potential.

Unit – II
River Basin Development: Selection of site – Assessment of power potential.

Unit – III
Basic Concepts: Loads – Load curves – Load factor – Capacity factor – Diversity factor – Utilisation factor – Load duration curve – Efficiencies – Firm and secondary power – Prediction of load.

Unit – IV
Storage and Pondage: Definitions – Mass curve – Flow and power duration curves – Hydrograph analysis – Storage and pondage – Pondage factor.

Unit – V
Classification of Power Plants: Classification on the basis of head and plant capacity – Runoff river plants and their general arrangement – Storage plants – Diversion canal plants – Underground power plants – Principles of layout – Some typical layouts of Indian projects – Pumped storage plants – Basic features – Advantages – Types – Two unit, three unit and four unit installations – Merits and demerits – Reversible pump turbines – Efficiency of pumped storage plants.

Unit – VI
Water Conducting Systems: Intakes – Power canals – Tunnels - penstocks – Economical diameter – Anchorages – Expansion joints – Other accessories – Water hammer – Rigid and elastic column theories – Surge tanks.

Unit –VII
Power Houses: Types – Layouts – Relative merits and design principles for surface power stations and underground power stations.

Unit – VIII
Turbines: Types of turbines – Selection of sizes and number of units setting of turbines – Cavitation in turbines – Governing of turbines.
Tidal Power: Basic principles – Location of tidal power plants – Components.

Text Books:
1. M.M. Dandekar and K.N. Sharma, *A Text Book of Water Power Engineering*, Vikas Publications.
2. R.K.Sharma and T.K.Sharma, *A Text book of Water Power Engineering*, S.Chand Company Ltd., New Delhi–110 055

Reference Books:
1. W.K.Barrows, *Water Power Engineering*.

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

WATER RESOURCES SYSTEMS ENGINEERING (WRSE)
(Professional Elective for IV B. Tech. CE)

Scheme: 2010
Contact Periods: 4L / week
Credits: 4

Internal Assessment : 30
End Exam Marks   : 70
End Exam Duration : 3 hrs

Unit – I
Introduction: Concepts of systems analysis – Definition – Systems approach to water resources planning and management – Role of optimization models – Objective function and constraints – Types of optimization techniques.

Unit – II
Linear Programming –I: Formulation of linear programming models – Graphical method – Simplex method – Application of linear programming in water resources.

Unit – III
Linear Programming – II: Revised simplex method – Duality in linear programming – Sensitivity and post optimality analysis.

Unit – IV
Dynamic Programming: Belman's principles of optimality – Forward and backward recursive dynamic programming – Case of dimensionality – Application of dynamic programming for resource allocation.

Unit – V
Non–Linear Optimatization Techniques: Classical method of optimization – Kun–Tecker – Gradient based research techniques for simple unconstrained optimization.

Unit – VI
Simulation: Application of simulation techniques in water resources.

Unit – VII
Water – Resources Economics: Principles of Economics analysis – Benefit cost analysis – Socio economic intuitional and pricing of water resources.

Unit – VIII
Water Resources Management: Planning of reservoir system – Optimal operation of single reservoir system – Allocation of water resources – Optimal cropping pattern – Conjunctive use of surface and sub–surface water resources.

Text Books:
1. Vedula & Mujumdar [2005], *Water Resources System Ana*lysis, Tata Mc.Graw Hill Company Ltd.
2. James & Lee [2005], *Water Resources Economics* – Oxford Publishers.
3. S.S.Rao , *Optimisation technique*s.

Reference Books:
1. P.R.Bhave [2003], *Optimal design of water distribution networks*, Narosa Publishing house.

2. P.Sankar Iyer, *Operations research*, TMH Publications, New Delhi.
3. N.Ramanathan, *Operations research*, TMH Publications, New Delhi.

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

NATURAL DISASTER MITIGATION & MANAGEMENT (NDMM)
(Professional Elective for IV B. Tech. CE)

Scheme: 2010   **Internal Assessment : 30**
Contact Periods: 4L / week   **End Exam Marks   : 70**
Credits: 4   **End Exam Duration : 3 hrs**

Unit – I
Introduction: Types of disasters – Natural disasters – Impact of disasters on environment – Infrastructure and development – Concepts of hazards and vulnerability analysis – Guidelines for hazard assessment and vulnerability analysis.

Unit – II
Management of Disasters: Basic principles and elements of disaster mitigation – Disaster management organization and methodology – Disaster management cycle – Disaster management in India.

Unit – III
Earthquakes: Introduction to earthquakes – Intensity scale (MSK–64) – Seismic activity in India – Seismic zones of India – Earthquakes in A. P. – Action plan for earthquake disaster preparedness – Elements at risk – Recovery and rehabilitation after earthquake – Earthquake resistant design and construction of buildings.

Unit – IV
Tsunami Hazards and Disasters: Onset – Types and causes – Warning and elements at risk – Typical effects – Specific preparedness and mitigation strategies.

Unit – V
Floods and Cyclones: Onset – Types – Warning and elements at risk – Typical effects – Indian floods and cyclones – Hazard zones – Potential for reducing hazards– Mitigation strategies and community based mitigation.

Unit – VI
Landslide Hazards and Disasters: Onset – Types – Warning – Causes of landslides – Elements at risk – Indian land slides – Hazards zones – Typical effects – Mitigation strategies and community based mitigation.

Unit – VII
Drought Hazards and Disasters: Onset – Types – Warning – Kinds of droughts – Causes of droughts – Impact of droughts – Early warning and response mechanisms – Mitigation strategies – Droughts in India.

Unit – VIII
Cost Studies: Typical cases – Cost–benefit analysis with respect to various disaster management programmes implemented by NGOs and Government of India.

Text Books:
1. V. K. Sharma, *Disaster Management*, National Centre for Disaster Management, IIPE, Delhi,
2. A Status Report Publication of the Govt. of India, Ministry of Home Affairs, National Disaster Management Division, *Disaster Management in India*.
3. A. S. Arya, Anup Karanth, and Ankush Agarwal, *Hazards, Disasters and Your Community; A*

Primer for Parliamentarians, GOI–UNDP Disaster Risk Management Programme.

Reference Books:

1. web site: www.empowerpoor.org, *Drought in India: Challenges and Initiatives; Poorest Areas in Civil Society (PACS) Programme*. [2001–2008]
2. website: www.odihpn.org:, *Disaster Preparedness Programme in India. A Cost Benefit Analysis*, Commissioned and Published by the Humanitarian Practice Network 'at ODI HPN.

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

ADVANCED STRUCTURAL ANALYSIS (ASA)
(Professional Elective for IV B. Tech. CE)

Scheme: 2010
Contact Periods: 3L + 1T/ week
Credits: 4

Internal Assessment : 30
End Exam Marks   : 70
End Exam Duration : 3 hrs

Unit – I
Three Hinged Arches: Linear arches – Eddy's theorem – Analysis of three hinged arches for static and moving loads – Influence lines for horizontal thrust, bending moment and radial shear.

Unit – II
Two Hinged Arches: Analysis of two hinged arches for static and moving loads – Influence lines for horizontal thrust, bending moment and radial shear.

Unit – III
Cables and Suspension Bridges: Stress in suspended cables with the supports at same level and different levels – Simple suspension bridges with three hinged stiffening girders – Influence lines for horizontal tension, bending moment and shear force.

Unit – IV
Approximate Methods of Analysis of Frames: Substitute frame method for vertical loads – Portal and cantilever methods for horizontal loads – Assumptions and limitations

Unit –V
Plastic Analysis: Basic concepts – Elastic and plastic stress – Strain relationships – Plastic bending – Moment curvature relations – Plastic hinges – Collapse mechanisms – Fundamental theorems of plastic analysis – Plastic analysis of propped and fixed beams.

Unit –VI
Applications of Plastic Analysis: Applications of plastic analysis of continuous beams and single bay, single storey portal frame – Methods of combined mechanism

Unit – VII
Introduction to Matrix Methods of Structural Analysis: Static and kinematic indeterminacy of structures – Equilibrium and compatibility conditions
 Flexibility Method: Flexibility methods – Applications to continuous beams (degree of static indeterminacy not exceeding three)

Unit–VIII
Stiffness Method: Introduction – Application to continuous beams (degree of kinematic indeterminacy not exceeding three)

Text Books:
1. B.C.Punmia, A.K. Jain, A.K. Jain *SMTS 2, Theory of Structures*, Laxmi Publications.
2. C.K. Wang, *Indeterminate Structural Analysis*, Standard Publishers.
3. C.S. Reddy, *Basic Structural Analysis* TATA Mc Graw Hill.

Reference Books:

1. Ramachandra, *Design of steel structures Vol.2*, Scientific Publishers (India), Jodhpur.
2. Vazirani & Ratwani, *Design of steel structures*, Khanna Publications
3. Pandit & Gupta, *Structural Analysis– A Matrix Approach*, TATA Mc Graw Hill.

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

PRESTRESSED CONCRETE (PSC)
(Professional Elective for IV B. Tech. CE)

Scheme: 2010	**Internal Assessment : 30**
Contact Periods: 3L + 1T/ week	**End Exam Marks : 70**
Credits: 4	**End Exam Duration : 3 hrs**

Unit – I
Introduction: Historical development – General principles of prestressing – Pre tensioning and post tensioning – Advantages and limitations of prestressed concrete – Materials – High strength concrete and high tensile steel and their characteristics – I.S. Code provisions.

Unit – II
Methods and Systems of Prestressing: Pre tensioning and post tensioning methods – Systems of prestressing – Hoyer system, magnel system, freyssinet system and gifford – udall system.

Unit – III
Analysis of Sections for Flexure: Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons – Kern lines – Cable profile.

Unit – IV
Losses of Prestress: Losses of presrtress in pre tensioned and post tensioned members due to various causes like elastic shortening of concrete, shrinkage of concrete, creep of concrete, relaxation of stress in steel , slip in anchorage and frictional losses.

Unit – V
Design of Sections for Flexure: Design criteria as per I.S. Code – Design of simple rectangular and I–sections for flexure.

Unit – VI
Design of Sections for Shear: Shear and principal stresses – Design for shear.

Unit – VII
Deflections of Prestressed Concrete Beams: Importance of control of deflections – Factors influencing deflections – Short term deflections of uncracked members – Prediction of long term deflections.

Unit – VIII
Composite Sections: Introduction – Analysis for stresses – Differential shrinkage.

Text Books:
N. Krishna Raju, *Prestressed Concrete*, Fourth Edition, Tata McGraw–Hill Publishing Company Limited.

Reference Books:
E. G. Nawy, *Prestressed Concrete: A fundamental approach*, Prentice Hall.

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

EARTHQUAKE RESISTANT DESIGN (ERD)
(Professional Elective for IV B. Tech. CE)

Scheme: 2010	**Internal Assessment : 30**
Contact Periods: 3L + 1T/ week	**End Exam Marks : 70**
Credits: 4	**End Exam Duration : 3 hrs**

Unit – I
Introduction to Structural Dynamics: Theory of vibrations – Lumped mass and continuous mass systems – Single Degree of Freedom (SDOF) Systems – Formulation of equations of motion – Undamped and damped free vibration – Damping – Response of harmonic excitation – Concept of response spectrum.

Unit – II
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
Earthquake Analysis: Introduction – Rigid base excitation – Formulation of equations of motion for SDOF and MDOF Systems – Earthquake response analysis of single and multi–storeyed buildings – Use of response spectra.

Unit – IV
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 – V
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.

Unit – VI
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.

Unit – VII
Aseismic Planning: Plan configurations – Torsion irregularities – Re–entrant corners – Non parallel systems – Diaphragm discontinuity – Vertical discontinuities in load path – Irregularity in strength and stiffness – Mass irregularities – Vertical geometric irregularity – Proximity of adjacent buildings.

Unit – VIII
Shear Walls: Types – Design of shear walls as per IS: 13920 – Detailing of reinforcements.

Text Books:
1. Clough & Penzien, *Dynamics of Structures,* McGraw Hill – International Edition
2. Agarwal Pankaj & Manish Shrikhande, *Earthquake Resistant Design of Structures,* Printice Hall of India, New Delhi
3. S.K.Duggal, *Earth quake resistant design of structures*, Oxford University Press, New Delhi.

Reference Books:
1. A.K. Chopra, *Dynamics of Structures,* Pearson Education, Indian Branch, Delhi.
2. Mario Paaz, *Structural Dynamics (Theory and Computation),* CBS Publish
3. C.V.R.Murthy, *Earthquake Tips*, I.I.T, Kanpur.
4. R.Ayothiraman & Hemanth Hazarika, I.K., *Earthquake Hazardous Mitigation,* International Publishing House Private Limited, New Delhi.

Codes /Tables.
IS codes: IS: 1893,   IS: 4326 and IS: 13920 to be permitted into the examination hall.

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

ADVANCED FOUNDATION ENGINEERING (AFE)
(Professional Elective for IV B. Tech. CE)

Scheme: 2010   **Internal Assessment : 30**
Contact Periods: 3L + 1T/ week   **End Exam Marks   : 70**
Credits: 4   **End Exam Duration : 3 hrs**

Unit – I
Soil Exploration Field Tests: Soil samples – Soil samplers – Design features of soil samplers – Rock core sampling – Recovery ratio & RQD – Location of ground water table – Standard penetration test – Static & dynamic cone penetration tests – Pressuremeter test – Plate load test – Geophysical exploration – Soil investigation report.

Unit – II
Foundation Design Considerations: Types of foundations – Choice of foundation – Depth and spacing of footing – Displaced soil effects – Water table fluctuation – Foundations in sands and clays – Environmental considerations

Unit – III
Settlement Analysis: Components of settlements – Allowable settlements – Allowable bearing pressure – Raft foundation – Bearing capacity and settlement of mat foundation.

Unit – IV
Foundations In Expansive Soils: Cause of swelling in expansive soil – Differential free swell – Swelling pressure – Effects of swelling on buildings and canals – Activity – Swell potential – Foundation techniques in expansive soils – CNS layer technique.

Unit – V
Ground Improvement Techniques: Dewatering – Densification methods in granular soils and cohesive soils – Preloading with sand drains – Stone columns – Grouting.

Unit – VI
Geosynthetics: Geotextiles – Types, functions and applications – Geogrids and geomembranes – Functions and applications.
 Reinforced Earth: Principles – Components of reinforced earth.

Unit – VII
Caissons : Types of caissons – Construction of open & pneumatic caissons – Comparison of caisson types – Design aspects of caissons.

Unit – VIII
Well Foundations: Shapes of wells – Components of a well foundation – Grip length – Forces acting on well foundation – Lateral stability – Sinking of wells – Tilting of wells and rectification.

Text Books:
1.   K.R. Arora[2008], *Soil Mechanics and Foundation Engineering*, Standard Publishers.
2.   P. Purushothama Raj[1995], *Geotechnical Engineering*, Prentice Hall of India.

Reference Books:

1. Joseph E. Bowles[1997], *Foundation analysis and design*, McGraw Hill.
2. VNS. Murthy[2006], *A Text book of soil mechanics and foundation engineering*, Saikripa Technical consultants.
3. C. Venkataramaiah[2009], *Geotechnical Engineering*, New Age International.
4. A.V. Narasimha Rao and C. Venkataramaiah[2000], *Numerical Problems, Examples and Objective Questions in Geotechnical Engineering*, University Press.

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

SOIL DYNAMICS AND MACHINE FOUNDATIONS (SDMF)
(Professional Elective for IV B. Tech. CE)

Scheme: 2010
Contact Periods: 3L + 1T/ week
Credits: 4

Internal Assessment : 30
End Exam Marks   : 70
End Exam Duration : 3 hrs

Unit – I
Types of machine foundations – General requirements of machine foundations – Dimensional criteria – Design data, dynamic loads induced in simple crank mechanisms – Permissible amplitudes – Permissible bearing pressures.

Unit–II
Resonance and its effect – Free and forced vibrations with and without damping – Constant force and rotating mass type excitation – Magnification factor – Phase difference between forces and displacements for steady state vibrations – Logarithmic decrement.

Unit–III
Natural frequency of foundation soil system – Barkan's and I.S. methods of determining natural frequency – Tachehotarioff's reduced natural frequency.

Unit–IV
Elastic properties of soil for dynamics purpose and their experimental determination – Elastic waves and their characteristics – Experimental determination of shear modulus from wave theory.

Unit–V
Theory of elastic half space – Lamb and the dynamic Boussinesq's problem – Relsner's solution and its limitations – Quinlan and Sungs modification – Hsiegh's equation for vertical vibration.

Unit–VI
Apparent soil mass – Bulb of pressure concept – Pauw's analogy of foundation – Soil systems.

Unit – VII
Principles of design of foundations for reciprocating and impact type of machines as per I.S. code.

Unit – VIII
Vibration isolation – Types and methods of isolation – Isolating materials and their properties.

Text books:
1. Srinivasulu and Vidyanathan, *Handbook of machine foundations*, M/s.Tata McGraw Hill Publications.
2. B.C.Punmia, *Soil Mechanics and Foundation Engineering*, M/s Lakshmi Publishing Co.
3. Relevant I.S. Codes

Reference books:
1. Barkan,D.D, *Dynamics of Bases and Foundations*, McGraw Hill Co.
2. Richart, Hall and Woods, *Vibrations of soils and Foundations*, Prentice Hall Inc.

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

TRANSPORTATION PLANNING AND DESIGN (TPD)
(Professional Elective for IV B. Tech. CE)

Scheme: 2010	**Internal Assessment : 30**
Contact Periods: 3L + 1T/ week	**End Exam Marks : 70**
Credits: 4	**End Exam Duration : 3 hrs**

Unit – I
Concept of Travel Demand: Travel Characteristics – Origin, destination, route mode, purpose – Travel demand as a function of independent variables – Assumptions in Demand Estimation – Relation between land use and Travel – Four step process of transportation planning.

Unit – II
Transportation Planning Process: General concept of Trip – Trip generation – Trip distribution – Traffic assignment and mode – Split – Aggregate and disaggregate models – Direct demand models – Sequential and recursive models.

Unit – III
Data Collection and Inventories: Definition of study area – Zoning Principles – Types and sources of data – Home interview surveys – Road side interview surveys – Goods taxi, IPT surveys – Sampling techniques – Expansion factors and accuracy check – Desire line diagram and use.

Unit – IV
Trip Generation Models: Factors governing trip generation and attraction – Multiple linear regression models – Category analysis.

Unit – V
Trip Distribution Models: Methods of trip distribution – Growth factor models – Uniform growth factor method – Average growth factor method – Fraton method – Furnes method – Limitations of growth factor models – Concept of gravity model.

Unit –VI
Traffic Assignment and Mode Split: Purpose of assignment – General principles – Assignment techniques – All – or – nothing assignment – Multiple route assignment – Capacity restraint method – Minimum path trees – Diversion curves – Factors affecting mode split – Probit, logit and descriminant analysis.

Unit – VII
Transportation and Environment: Detrimental effect of traffic on environment – Noise pollution – Air pollution – Vibrations – Visual intrusion – Effects and remedial measures.

Unit – VIII
Economic Evaluation of Transportation Plans: Costs and benefits of transportation projects – Vehicle operating cost – Time saving accident costs – Methods of economic evaluation – Benefit cost ratio method – Net present value method – Internal rate of return method.

Text Books:
1. L.R. Kadiali, *Traffic Engineering and Transportation Planning*
2. Papa Costas. C.S, *Fundamentals of Transportation Engineering*, Prentice Hall Publications.

Reference Books:
1. Bruton M.J, *Introduction to Transportation Planning*
2. Khistory C.J, *Transportation Engineering–An Introduction*, Prentice Hall Publications.
3. G. Venkatappa Rao, *Transportation and Highway Engineering*, TATA Mc Graw Hill.

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

ENVIRONMENTAL IMPACT ANALYSIS OF CIVIL ENGINEERING PROJECTS
(EIACEP)
(Professional Elective for IV B. Tech. CE)

Scheme: 2010   Internal Assessment : 30
Contact Periods: 3L + 1T/ week   End Exam Marks   : 70
Credits : 4   End Exam Duration : 3 hrs

Unit – I
Concepts of E.I.A – Define sustainable development and the significance of environmental ethics for Civil Engineers – General aspects of pollution – Causes, effects and preventive measures – Frame work of E.I.A – Description of environmental setting – List of environmental parameters – Concepts of environmental auditing – Carrying capacity.

Unit – II
The concepts of environmental impact assignment notification, 1994 – Ministry of environment and forests, Government of India – Different acts related to environment and their methods of implementation – Understanding of the relation of the acts, implementing agencies and the citizenery.

Unit – III
Different environmental parameters to be considered in EIA – Air, water, land, noise, ecology, culture, and socio–economic conditions – Their management, attributes, standards, modeling –The significance of impact – Prediction and assessment of impact of each environmental parameter.

Unit – IV
Impact Assessment Methodologies: Estimation of supportive and assimilative capacity – Criteria for choosing a methodology – Different methodologies of E.I.A – Adhoc, overlays, check list, network, matrices, and combination – Computer aided – Follow–up of EIA.

Unit – V
Review of EIA: Comparison of project alternatives – Delphi, pair wise comparison – Graphical and weighted ranking methods – Cost–benefit analysis – Renew of control measures – Application of latest methods – Recycling – Resource management – Industrial accidents – Identification and assessment of damage – Environmental quality index – Processes for reviewing EIA – Public participation in decision making.

Unit – VI
Environmental Acts (Protection and Prevention)
Post audit activities – Environmental protection act – Water prevention act – Air act – Wild life act.

Unit – VII
Public Involvement and Decision Making: The rationale and the need for public involvement – Principles for structuring public involvement programs – Institutional implementations and constraints – Public involvement techniques and methods – Evaluation of public involvement programs.

Unit – VIII
Case studies: Social and environmental impact of large dams – Watershed management schemes – Mining, oil refinery, national highways and port projects – Computer applications in EIA.

Text Books:
1. L.Canter, *Environmental Impact Analysis*, Mc–Grawhill Book Co.
2. R.E.Munn, *Environmental Impact Assessment*, John Wiely & sons.

Reference Books:
1. *Public Involvement and Dispute Resolution – Volume–1*. Institute for Water resources, U.S. Army corps of Engineers, Alexandria, VA–22315USA, IWR Research report 82–R1, 1998.Copies available from the national Technical Information Services, 5285 Port Royal Road, Spring Field, VA–22161, USA.
2. Environmental Impact Assessment Methodologies, by Y.Anjaneyulu, B.S. Publication, Sulthan Bazar

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

INTRODUCTION TO REMOTE SENSING AND G.I.S. (IRSGIS)
(Professional Elective for IV B. Tech. CE)

Scheme: 2010	**Internal Assessment : 30**
Contact Periods: 3L + 1T/ week	**End Exam Marks : 70**
Credits: 4	**End Exam Duration : 3 hrs**

Unit – I

Definition of remote sensing – Merits of RS over field surveys – Electro magnetic spectrum – Atmospheric windows – Interaction of EMS with earth surface features – Spectral signature – Spectral signatures of vegetation, water and soil.

RS Platforms – Satellites and sensors – Resolution – Characteristics of sensors of IRS, LANDSAT & SPOT satellites – Image interpretation techniques – Elements of interpretation.

Unit – II

Pre–processing – Rectification –Registration – Enhancement techniques – Spatial filtering – Band combination.

Classification techniques – Selection of bands – Supervised classification – Classification scheme – Training sets – Unsupervised classification.

Unit – III

Applications of remote sensing – Agriculture land use/ land cover Soil mapping – Crop acreage estimation – Crop yield forecasting – Hydrology – Soil moisture – Runoff – Forestry – Geology.

Unit – IV

Cartography – Map scale – Classes of maps – Plane coordinate systems and transformations – Geographic coordinate system of earth – Map projections – Shape of earth – Ellipsoid and geoid models – Geodetic and vertical datums – Relationship between coordinate systems and map projections – Universal transverse mercator coordinate system.

Unit – V

Introduction to G.I.S. – Definition of G.I.S. – Components of G.I.S. – Evolution of G.I.S. – Acquisition of spatial data – Land surveying – Aerial and satellite photogrammetry – Global positioning system.

Unit – VI

Digital representation of geographic data – Representing geographical space – Spatial relationships – Temporal relationship – Raster geographic data representation – Vector data representation – Object oriented geographic data representation.

Unit – VII

Raster based G.I.S. – Data processing – Characteristics of raster data – File formats – Data processing – Advantages and disadvantages of raster based G.I.S. – Acquisition of raster data – Geo–referencing – Preprocessing and editing – Mosaicking – Data analysis – Analysis techniques – Overlay – Spatial aggregation – Filtering – Determining slopes and aspects – Distance, proximity and connectivity – Buffering.

Unit – VIII

Vector Based G.I.S. – Data processing – Methods of data processing – Data input – Digitizing – scanning and vectorization – Importing vector data – Graphical data editing – Attribute data conversion – Data analysis – Attribute query – Thematic mapping – Address geocoding – Calculation of area, perimeter and distances – Topological analysis – Overlay – Buffering – Network analysis

Text Books:
1. Prithvish Nag & M. Kudrat, *Digital Remote Sensing*, Concept Publishing Company, New Delhi.
2. C.P.Lo and Albert KW Yeung, *Concepts and Techniques of G.I.S.*, Prentice Hall of India, New Delhi.

Reference Books:
1. Ian Heywood, Sarah Cornelius & Steve Carver, *An Introduction to Geographical Information Systems*, Pearson Education Pte. Ltd., Delhi.
2. DeMers, M.N, *Fundamentals of Geographic Information Systems*, 2nd Edition, John Wiley& Sons
3. Burrough, P.A. and McDonnel, R.A., *Principles of Geographic Information Systems*, Oxford University Press.

Notes:
1. No in–depth knowledge should be expected from the Student. It is only to give the student an overview of Remote Sensing and G.I.S.
2. The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.

INFRASTRUCTURE ENGINEERING (IE)
(Professional Elective for IV B. Tech. CE)

Scheme: 2010	**Internal Assessment : 30**
Contact Periods: 3L + 1T/ week	**End Exam Marks : 70**
Credits: 4	**End Exam Duration : 3 hrs**

Unit – I
Planning for Social Infrastructure: Basic need – Approach, health, education, religion, recreation – Cultural planning standards – Spatial standards – Hierarchy of provision – Different types of units and scales.

Unit – II
Infrastructure Development: Critical issues in public and private development – Ownership management and maintenance – Provisions in infrastructure development enabling act of A.P.UIDSSMT and infrastructure.

Unit – III
Financing Urban Infrastructure: Financing mechanisms in addition to tax and grant financing – User charges – Public private partnerships like BOT, BOLT, BOOT etc., – Impact fee – Municipal bonds – Subsidies and social aspects in the planning.

Unit – IV
Maintenance of Infrastructure: Operation and maintenance of infrastructure with special reference to the urban poor – Capacity building of organizations for infrastructure development and services – Review of multinational and bilateral activities and programs such as DFID and FIRE programs in India – Overview of world bank programs in India.

Unit – V
Infrastructure Development: Telecommunication – Cable T.V. – Wireless communications – Digital communications – Internet and intranet – Regional poverty and basic needs – Regional infrastructure network systems.

Unit – VI
Regional Development: Physical (roads, irrigation system, water supply, sanitation, drainage, watershed management, fire services, telecommunication, energy, electricity, solid waste disposal etc.), social (Health and education) & economics (banking, marketing and public distribution systems), environmental – Social and economic impacts of infrastructure network system – Role of district planning committee.

Unit – VII
Airport Engineering: Factors affecting selection of site for airport – Aircraft characteristics – Geometric design of runway – Computation of runway length – Correction for runway length – Orientation of runway – Wind rose diagram – Runway lighting system.

Unit – VIII
Docks and Harbour Engineering: Water transportation – Harbours and types of harbours – Site selection – Ports – Classification of ports – Docks – Types – Shapes of docks – Dock entrances, repair of docks – Break water – Types of break waters – Fender systems – Aprons – Transit sheds and ware houses – Dredging.

Text Books:
  1. Veerendra Kumar & Sathish Chandra, *Air Transportation planning and Design,* Gal Gotia publications
  2. S.P.Bindra, *Docks and Harbour Engineering*, Dhanapat Rai & Sons publications
  3. R.Srinivasan, *Harbour Dock and Tunnel Engineering*, Charotar publishing house.

Reference Books:
  1. Reports and research studies by Human Settlement Management Institute (HSMI)
  2. Reader volumes by Institute of Town Planners, India (ITPI)

Note: The question paper shall consist of *Eight* questions with *One* question from each unit. The student shall answer any *Five* questions.