MALLA REDDY ENGINEERING COLLEGE
(AUTONOMOUS)
B. TECH. CIVIL ENGINEERING

I YEAR COURSE STRUCTURE

Code	Subject	L	T/P/D	C
EN1Y1101	English	2	-	4
MR12U0M1	Mathematics - I	3	-	6
CM1Y1103	Engineering Mechanics	3	-	6
PH1Y1104	Engineering Physics	2	-	4
CH1Y1105	Engineering Chemistry	2	-	4
CS1Y1106	Computer Programming & Data Structures	3	-	6
CM1Y1107	Engineering Drawing	2	3	4
CS1Y1108	Computer Programming Lab	-	3	4
PCH1Y1109	Engineering Physics/ Engineering Chemistry	-	3	4
EN1Y1110	English Language Communication Skills Lab	-	3	4
MC1Y1111	Engineering Workshop / Computer Aided Drafting	-	3	4
	Total	17	18	50

MALLAREDDY ENGINEERING COLLEGE
(Autonomous)
B.Tech Civil Engineering

II YEAR   **I SEMESTER**

COURSE STRUCTURE

Code	Subject	L	T/P/D	C
MRI2U0M3	Mathematics –II	4	1	4
MR11U248	Basic Electrical & Electronics Engineering	4	1	4
MR11U101	Strength of Materials –I	4	1	4
MR11U102	Surveying	3	1	3
MR11U103	Fluid Mechanics	3	1	3
MR11U104	Building Materials, Construction & Planning	3	1	3
MR11U105	Surveying Lab- I	0	3	2
MR11U106	Strength of Materials Lab	0	3	2
	Total	**21**	**12**	**25**

II YEAR   **II SEMESTER**

COURSE STRUCTURE

Code	Subject	L	T/P/D	C
MRI2U0M5	Probability & Statistics	3	1	3
MR11U107	Strength of Materials - II	4	1	4
MR11U108	Hydraulics & Hydraulic Machines	3	1	3
MR11U154	Environmental Studies	3	0	3
MR11U109	Structural Analysis –I	4	1	4
MR11UB01	Managerial Economics and Financial Analysis	4	-	4
MR11U110	Computer Aided Drafting of Buildings	-	3	2
MR11U111	Surveying Lab- II	0	3	2
	Total	**21**	**11**	**25**

III YEAR   **I SEMESTER**

COURSE STRUCTURE

Code	Subject	L	T/P/D	C
MR11U112	Concrete Technology	3	1	3
MR11U113	Design of Reinforced Concrete Structures	4	1	4
MR11U114	Geotechnical Engineering –I	4	1	4
MR11U115	Water Resources Engineering-I	3	1	3
MR11UB02	Management Science	3	-	3
	Elective-I	**4**	**-**	**4**
MR11U116	Waste Management			
MR11U117	Environmental Impact Assessment and Management			
MR11U118	Advanced Structural Analysis			
MR11U119	Fluid Mechanics & Hydraulic Machines Lab	-	3	2
MR11U10E1	Advanced English Communication Skills Lab	-	3	2
	Total	**21**	**10**	**25**

III YEAR   **II SEMESTER**

COURSE STRUCTURE

Code	Subject	L	T/P/D	C
MR11U120	Design of Steel Structure	3	2	3
MR11U121	Geotechnical Engineering –II	4	1	4
MR11U122	Water Resources Engineering-II	4	1	4
MR11U123	Transportation Engineering	3	1	3
MR11U124	Engineering Geology	3	-	3
	Open Elective	**4**	**-**	**4**
MR11U125	Construction technology and project management			
MR11U126	Urban disaster Intelligent controls			
MR11U127	System intellectual Property rights			
MR11U128	Geotechnical Engineering Lab	-	3	2
MR11U129	Engineering Geology lab	-	3	2
	Total	**21**	**11**	**25**

IV YEAR   **I SEMESTER**

COURSE STRUCTURE

Code	Subject	L	T/P/D	C
MR11U130	Advanced Foundation Engineering	4	1	4
MR11U131	Estimating and costing	3	1	3
MR11U132	Pavement Design	3	1	3
MR11U133	Environmental Engineering	3	1	3
	Elective-II	**4**	**-**	**4**
MR11U134	Ground Water Development and Management			
MR11U135	Advanced structural Design			
MR11U136	Elements of earth quake engineering			
MR11U137	Watershed Management			
	Elective-III	**4**	**1**	**4**
MR11U138	Water resources Planning and management			
MR11U139	Finite Element methods			
MR11U140	Disaster management and mitigation			
MR11U141	Concrete and Highway materials lab	-	3	2
MR11U142	Environmental engineering lab	-	3	2
	Total	**21**	**11**	**25**

COURSE STRUCTURE

Code	Subject	L	T/P/D	C
MR11U143	Prestressed Concrete structures	3	1	3
MR11U144	GIS and Remote Sensing	3	1	3
	Elective-IV	**3**	**1**	**3**
MR11U145	Ground Improvement Techniques			
MR11U146	Design and Drawing Irrigation Structures			
MR11U147	Airport Planning and Design			
MR11U148	Rehabilitation and retrofitting of structures			
MR11U149	Industry oriented mini project	-	-	2
MR11U150	Seminar	-	6	2
MR11U151	Project	-	15	10
MR11U152	Comprehensive viva	-	-	2
	Total	**9**	**24**	**25**

Note: All End Examinations (Theory and Practical) are of three hours duration.
T-Tutorial   L – Theory   P – Practical   D-Drawing   C-credits

MALLA REDDY ENGINEERING COLLEGE
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II YEAR B.TECH. C.E. I –SEM	L	T/P/D	C
	4	1/-/-	4

MATHEMATICS – II

UNIT – I: Solution for linear systems

Matrices: Elementary row transformations-Rank-Echelon form, Consistency- Solution of System of simultaneous linear homogeneous equations.

UNIT – II: Eigen Values & Eigen Vectors

Eigen values, Eigen vectors – properties, Cayley-Hamilton Theorem - Inverse and powers of a matrix by Cayley-Hamilton theorem – Diagonolization of matrix. Calculation of powers of matrix – Modal and spectral matrices, singular value decomposition and its applications.

UNIT – III: Real matrices – Symmetric, skew - symmetric, orthogonal, Linear Transformation – Orthogonal Transformation. Complex matrices: Hermitian, Skew-Hermitian and Unitary – Eigen values and Eigen vectors Quadratic forms- Reduction of quadratic form to canonical form – Rank - Positive, negative definite - semi definite - index - signature - Sylvester law.

UNIT – IV :Fourier Series

Determination of Fourier coefficients-Fourier series-even and odd functions – Fourier series in an arbitrary interval-even and odd periodic continuation-Half-range Fourier sine and cosine expansions.

UNIT – V : Partial differential equations

Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation and nonlinear (Standard type) equations.

UNIT – VI : Partial Differential Equations of Higher Order

Method of separation of variables-classification of second order partial differential equations, solutions of one dimensional heat equation ,wave equation and Two- dimensional Laplace's Equation under initial and boundary conditions.

UNIT – VII : Fourier Transforms

Fourier integral theorem-Fourier sine and cosine integrals. Fourier transforms- Fourier sine and cosine transforms-properties-inverse transforms-finite Fourier transforms.

UNIT – VIII : Z-transforms

Z-transforms - inverse Z-transform-properties-Damping rule-Shifting rule-Initial and final Value theorem. Convolution theorem – solution of difference equations by Z-transforms.

TEXT BOOKS:

1. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi & Others, S. Chand.
2. Mathematical Methods by B.V.Ramana,Tata Mcgrawhill publications

REFERENCES:

1. Mathematical Methods by E.Rukmangadachari, Pearson Education Ltd.

2. Mathematical Methods by P.B.Bhaskara Rao, S.K.V.S. Rama Chary, M.Bhujanga Rao,

   B.S.Publications.

3. Mathematical Methods by G.Shankar Rao, I.K. International Publications, N.Delhi

4. Mathematical Methods by V. Ravindranath, Etl, Himalaya Publications. 2009-2010

5. A text book of KREYSZIG'S Mathematical Methods, Dr .A. Ramakrishna Prasad. WILEY publications

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II YEAR B.TECH. C.E.I –SEM   L   T/P/D   C
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BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

UNIT-I : ELECTRICAL CIRCUITS: Basic definitions, Types of elements, Ohm's Law, Resistive networks, Kirchhoff's Laws, Inductive networks, Capacitive networks, Series, Parallel circuits and Star-delta and delta-star transformations.

UNIT II : DC MACHINES: Principle of operation of DC Generator – EMF equation - types – DC motor types – torque equation – applications – three point starter.

UNIT III : TRANSFORMERS: Principle of operation of single phase transformers – EMF equation – losses – efficiency and regulation

UNIT IV : AC MACHINES: Principle of operation of alternators – regulation by synchronous impedance method – Principle of operation of induction motor – slip – torque characteristics – applications.

UNIT V : INSTRUMENTS: Basic Principle of indicating instruments – permanent magnet moving coil and moving iron instruments.

UNIT VI : DIODE AND IT'S CHARACTERISTICS:P-N junction diode, symbol, V-I Characteristics, Diode Applications, Rectifiers – Half wave, Full wave and Bridge rectifiers (simple Problems)

UNIT VII : TRANSISTORS: P-N-P and N-P-N Junction transistor, Transistor as an amplifier, SCR characteristics and applications.

UNIT VIII : CATHODE RAY OSCILLOSCOPE: Principles of CRT (Cathode Ray Tube), Deflection, Sensitivity, Electrostatic and Magnetic deflection, Applications of CRO - Voltage, Current and frequency measurements.

TEXT BOOKS:
1. Essentials of Electrical and Computer Engineering by David V. Kerns, JR. J. David Irwin
2. Principles of Electrical and Electronics Engineering by V.K.Mehta, S.Chand & Co.

REFERENCES:
1. Introduction to Electrical Engineering – M.S Naidu and S. Kamakshaiah, TMH Publ.
2. Basic Electrical Engineering by Kothari and Nagarath, TMH Publications, 2nd Edition.

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II YEAR B.TECH. C.E.I –SEM   L   T/P/D   C
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STRENGTH OF MATERIALS – I

UNIT – I

SIMPLE STRESSES AND STRAINS: Elasticity and plasticity – Types of stresses and strains – Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of varying section – composite bars – Temperature stresses.

STRAIN ENERGY – Resilience – Gradual, sudden, impact and shock loadings – simple applications.

UNIT – II
SHEAR FORCE AND BENDING MOMENT: Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, u.d.l., uniformly varying loads and combination of these loads – Point of contraflexure – Relation between S.F., B.M and rate of loading at a section of a beam.

UNIT – III
FLEXURAL STRESSES: Theory of simple bending – Assumptions – Derivation of bending equation: $M/I = f/y = E/R$, Neutral axis – Determination of bending stresses – section modulus of rectangular and circular sections (Solid and Hollow), I,T,Angle and Channel sections – Design of simple beam sections.

UNIT – IV
SHEAR STRESSES: Derivation of formula – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections.

UNIT – V

DEFLECTION OF BEAMS: Bending into a circular arc – slope, deflection and radius of curvature – Differential equation for the elastic line of a beam – Double integration and Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, U.D.L. Uniformly varying load.Mohr's theorems – Moment area method – application to simple cases including overhanging beams.

UNIT – VI
PRINCIPAL STRESSES AND STRAINS:
Introduction – Stresses on an inclined section of a bar under axial loading – compound stresses – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear – Mohr's circle of stresses – Principal stresses and strains – Analytical and graphical solutions – Various Theories of failures like Maximum Principal stress theory – Maximum Principal strain theory – Maximum shear stress theory – Maximum strain energy theory – Maximum shear strain energy theory

UNIT – VII
THIN CYLINDERS: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and volumetric strains – changes in diameter and volume of thin cylinders – Thin spherical shells.

UNIT – VIII
THICK CYLINDERS: Introduction Lame's theory for thick cylinders – Derivation of Lame's formulae – distribution of hoop and radial stresses across thickness – design of thick cylinders – compound cylinders –Necessary difference of radii for shrinkage – Thick spherical shells.

TEXT BOOKS:
1. Introduction to text book of Strength of materials by R.K.Bansal – Laxmi publications Pvt. Ltd., New Delhi.
2. Introduction to text book of Strength of Material by U.C. Jindal, Galgotia publications.
3. Strength of materials by R. Subramanian, Oxford university press, New Delhi

REFERENCES:
1. Mechanics of Solid, by Ferdinandp Beer and others – Tata Mc.Grawhill Publications 2000.
2. Strength of Materials by Schaum's out line series – Mc. Grawhill International Editions.
3. Strength of Materials by S. Ramakrishna and R.Narayan – Dhanpat Rai publications.
4. Strength of materials by R.K.Rajput, S.Chand & Co, New Delhi.
5. Strength of Materials by A.R.Basu, Dhanpat Rai & Co, Nai Sarah, New Delhi.
6. Strength of Materials by L.S.Srinath et al., Macmillan India Ltd., Delhi.
7. Strength of Materials by BhaviKatti.

Code: MR11U102

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

II YEAR B.TECH. C.E.I –SEM	L	T/P/D	C
	3	1/-/-	3

SURVEYING

UNIT – I
INTRODUCTION: Overview of plane surveying (chain, compass and plane table), Objectives, Principles and classifications.

UNIT – II:
DISTANCES AND DIRECTION: Distance measurement conventions and methods; use of chain and tape, Electronic distance measurements, Meridians, Azimuths and Bearings, declination, computation of angle.

UNIT – III
LEVELLING AND CONTOURING: Concept and Terminology, Temporary and permanent adjustments- method of leveling. Characteristics and Uses of contours- methods of conducting contour surveys and their plotting.

UNIT – IV
COMPUTATION OF AREAS AND VOLUMES: Area from field notes, computation of areas along irregular boundaries and area consisting of regular boundaries. Embankments and cutting for a level section and two level sections with and without transverse slopes, determination of the capacity of reservoir, volume of barrow pits.

UNIT - V
THEODOLITE: Theodolite, description, uses and adjustments – temporary and permanent, measurement of horizontal and vertical angles. Principles of Electronic Theodolite. Trigonometrical leveling, Traversing.

UNIT – VI
TACHEOMETRIC SURVEYING: Stadia and tangential methods of Tachometry. Distance and Elevation formulae for staff vertical position.

UNIT – VII
CURVES: Types of curves, design and setting out – simple and compound curves.
UNIT - VIII
Introduction to geodetic surveying, Total Station and Global Positioning System, Introduction to Geographic Information System (GIS).

TEXT BOOKS:
1. "Surveying (Vol – 1, 2 & 3), by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi
2. .Duggal S K, "Surveying (Vol – 1 & 2), Tata Mc.Graw Hill Publishing Co. Ltd. New Delhi, 2004.
3. Surveying and levelling by R. Subramanian, Oxford university press, New Delhi

REFERENCES:
1. Arthur R Benton and Philip J Taety, Elements of Plane Surveying, McGraw Hill – 2000
2. Arora K R "Surveying Vol 1, 2 & 3), Standard Book House, Delhi, 2004
3. Chandra A M, "Plane Surveying", New age International Pvt. Ltd., Publishers, New Delhi, 2002.
4. Chandra A M, "Higher Surveying", New age International Pvt. Ltd., Publishers, New Delhi, 2002.

Code: MR11U103

MALLA REDDY ENGINEERING COLLEGE
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II YEAR B.TECH. C.E.I –SEM   L   T/P/D   C
                                                                      3   1/-/-   3

FLUID MECHANICS

UNIT I
INTRODUCTION: Dimensions and units – Physical properties of fluids, specific gravity, viscosity, surface tension, vapour pressure and their influences on fluid motion, Pressure at a point, Pascal's law, Hydrostatic law - atmospheric, gauge and vacuum pressure- measurement of pressure. Pressure gauges, Manometers: differential and Micro Manometers.

UNTI – II
HYDROSTATIC FORCES: Hydrostatic forces on submerged plane, horizontal, vertical, inclined and curved surfaces – Center of pressure,derivations and problems.

UNTI – III
FLUID KINEMATICS: Description of fluid flow, Stream line, path line,streak lines and stream tube. Classification of flows : Steady, unsteady, uniform, nonuniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity for one, two and three dimensional flows – stream and velocity potential functions, flownet analysis.

UNIT – IV
FLUID DYNAMICS: Surface and body forces – Euler's and Bernoulli's equations for flow along a stream line for 3-D flow, (Applications of Bernoulli's Equation) (Navier – stokes equations (Explanation) Momentum equation and its applications – forces on pipe bend.

UNIT – V
BOUNDARY LAYER THEORY : Approximate Solutions of Navier Stoke's Equations – Boundary layer – concepts, Pandtl contribution, Characteristics of boundary layer along a thin flat plate, Vonkarmen momentum integral equation, laminar and turbulent Boundary layers, Boundary layer in transition, separation of Boundary layer, control of Boundary layer flow around submerged objects- Drag and Lift- Magnus effect.

UNIT – VI

LAMINAR AND TURBULENT FLOW: Reynold's experiment – Characteristics of Laminar & Turbulent flows, flow between parallel plates, flow through long tubes, flow through inclined tubes.

UNIT – VII

CLOSED CONDUIT FLOW: Laws of Fluid friction – Darcy's equation, Minor losses – pipes in series – pipes in parallel – Total energy line and hydraulic gradient line, Pipe network problems, variation of friction factor with Reynold's number – Moody's Chart.

UNIT – VIII

MEASUREMENT OF FLOW: Pitot tube, Venturimeter and Orifice meter – classification of Orifices, flow over rectangular, triangular and trapezoidal and Stepped notches - –Broad crested weirs.

TEXT BOOKS:
1. Fluid Mechanics by Modi and Seth, Standard book house.
2. Introduction to Fluid Machines by S.K.Som & G.Biswas (Tata Mc.Grawhill publishers Pvt. Ltd.)
3. Introduction to Fluid Machines by Edward J. Shaughnessy, Jr, Ira M. Katz and James P. Schaffer , Oxford University Press, New Delhi

REFERENCES:
1. Fluid Mechanics by J.F.Douglas, J.M. Gaserek and J.A.Swaffirld (Longman)
2. Fluid Mechanics by Frank.M. White (Tata Mc.Grawhill Pvt. Ltd.)
3. Fluid Mechanics by A.K. Mohanty, Prentice Hall of India Pvt. Ltd., New Delhi
4. A text of Fluid mechanics and hydraulic machines by Dr. R.K. Bansal - Laxmi Publications (P) ltd., New Delhi.

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IIYEARB.TECH.C.E.I–SEM   L   T/P/D   C

                                                  3   1/-/-   3

BUILDING MATERIALS, CONSTRUCTION AND PLANNING

UNIT – I
STONES AND BRICKS, TILES: Building stones – classifications and quarrying – properties – structural requirements – dressing .Bricks – Composition of Brick earth – manufacture and structural requirements.

UNIT-II
CEMENT & ADMIXTURES: Ingredients of cement – manufacture – field & lab tests. Admixtures – mineral & chemical admixtures – uses.

UNIT – III
WOOD, ALUMINUM, GLASS AND PAINTS: Wood - structure – types and properties – seasoning – defects; alternate materials for wood – GI / fibre –reinforced glass bricks, steel & aluminum.

UNIT-IV
BUILDING COMPONENTS: Lintels, Arches, walls, vaults – stair cases – types of floors, types of roofs – flat, curved, trussed ;Foundations – types ; Damp Proof Course ; Joinery – doors – windows – materials – types.

UNIT - V
MASONRY AND FINISHINGS: Brick masonry – types – bonds ; Stone masonry – types; Composite masonry – Brick-stone composite ; Concrete, Reinforced brick. Finishes : Plastering, Pointing, Painting, Claddings – Types – Tiles – ACP.

UNIT – VI
FORM WORK: Requirements – Standards – Scaffolding – Design ; Shoring, Underpinning.

UNIT –VII
BUILDING SERVICES: Plumbing Services: Water Distribution, Sanitary – Lines & Fittings; Ventilations: Functional requirements, systems of ventilations. Air-conditioning - Essentials and Types; Acoustics – characteristic – absorption –Acoustic design; Fire protection – Fire harzards – Classification of fire resistant materials and constructions.

UNIT – VIII

BUILDING PLANNING: Principles of Building Planning, Classification of buildings and Building by laws.

TEXT BOOKS:
1. Building Materials and Construction – Arora & Bindra, Dhanpat Roy Publications
2. Building Construction by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi.

REFERENCES:
1. Building Materials by S.K.Duggal, New Age Internationsl
2. Building Construction by PC Verghese PHI.
3. Construction Technology – Vol – I & II by R. Chuddy, Longman UK
4. Building Materials by Rangawala.

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II YEAR B.TECH. C.E.I –SEM   L   T/P/D   C
                                                  0   -/3/-   2

SURVEYING LAB – I

LIST OF EXERCISES:
    1. Survey of an area by chain survey (closed traverse) & Plotting
    2. Chaining across obstacles.
    3. Determination of distance between two inaccessible points with compass.
    4. Surveying of a given area by prismatic compass (closed traverse) and plotting after adjustment.
    5. Radiation method, intersection methods by plane table survey
    6. Two point and three point problems in plane table survey
    7. Traversing by plane table survey
    8. Fly levelling (differential levelling)
    9. An exercise of L.S and C.S and plotting
    10. Two exercises on contouring.

LIST OF MAJOR EQUIPMENT:
    1. Chains, tapes, Ranging rods, cross staff, arrows
    2. Compasses and Tripods, Optical square.
    3. Plane tables, Alidade, Plumbing fork, trough compasses
    4. Leveling instruments and leveling staves
    5. Box sextants, planimeter.

MALLA REDDY ENGINEERING COLLEGE
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II YEAR B.TECH. C.E.I –SEM   L   T/P/D   C
                                                  0   - /3/-   2

STRENGTH OF MATERIALS LAB

    1. Tension test
    2. Bending test on (Steel / Wood) Cantilever beam.
    3. Bending test on simply supported beam.
    4. Torsion test
    5. Hardness test
    6. Spring test
    7. Compression test on wood or concrete
    8. Impact test
    9. Shear test
    10. Verification of Maxwell's Reciprocal theorem on beams.
    11. Use of electrical resistance strain gauges
    12. Continuous beam – deflection test.

LIST OF EQUIPMENT:
    1. UTM for conducting tension test on rods
    2. Steel beam for flexure test
    3. Wooden beam for flexure test
    4. Torsion testing machine
    5. Brinnell's / Rock well's hardness testing machine
    6. Setup for spring tests
    7. Compression testing machine
    8. Izod Impact machine
    9. Shear testing machine
    10. Beam setup for Maxwell's theorem verification.
    11. Continuous beam setup
    12. Electrical Resistance gauges.

Code: MRI2U0M5

MALLA REDDY ENGINEERING COLLEGE
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II Year B.Tech. C.E. II Sem

L	T/P/D	C
3	1/-/-	3

PROBABILITY AND STATISTICS

UNIT-I: **Probability:**

Sample space and events – Probability – The axioms of probability – Addition, Multiplication theorems - Conditional probability – Baye's theorem. and problems.

UNIT-II: **Random variables:**

Discrete and continuous – Distribution – Distribution function, expectation and covariance

Distribution - Binomial, Negative Binomial, Poisson, Uniform, Normal, exponential , geometric, Beta and Gamma distributions – related properties and computation of Mean and variance, Central limit theorem (without proof).

UNIT-III: **Sampling distribution: [large sample tests]**

Definition of population and sample - Sampling distributions of mean (known and unknown) proportions, sums and differences.

Estimation: Point estimation – interval estimation - Bayesian estimation.

UNIT-IV: **Test of Hypothesis:[sample tests]**

Means and proportions – Hypothesis concerning one and two means – Type I and Type II errors. One tail, two-tail tests calculation of P-Value .Tests of significance – Student's t-test, F-test, Z test.,χ^2 goodness of fit .

UNIT-V: **Curve fitting:**

The method of least squares –Straight line, parabola, goodness of fit, power curve, exponential curve. Inferences based on the least squares estimations .

UNIT- VI: **Correlation and Regression:**

Coefficient of correlation –Regression Coefficient – the lines of regression – the rank correlation Curvilinear regression, multiple regressions for three variables– correlation for bivariate distributions.

UNIT-VII: **Queuing Theory:**
Introduction to queuing problem, Poisson process, Arrival and departure distributions- Pure Birth and Death Process M/M/1 Model and Simple Problems.

UNIT-VIII: Stochastic Process:

Introduction to stochastic process- Markov process classification of states – Examples of Markov Chains, Stochastic matrix, limiting probabilities.

TEXT BOOKS:

1. Probability and statistics for engineers (Erwin Miller And John E.Freund), R A Johnson And C.B.Gupta.. 7th edition, Pearson Education / PHI.

2. Introduction to Probability and Statistics, 12th edition, W.Mendenhall, R.J.Beaver and B.M.Beaver, Thomson. (Indian edition).

3. Mathematical statistics by VK Kapoor & Guptha

4. OR by Manmohan & VK Kapoor & Guptha

REFERENCE BOOKS:
1. Text book of Probability and Statistics Dr.Shahnaz Bathul, V.G.S.Publishers 2003.

2. Probability and Statistics in Engineering, 4th Edition, William W.Hines, Douglas C.Montgomery, David M.Goldsman, Connie M.Borror, Wiley Student Edition.

3. Probability, Statistics and Queuing Theory, 2nd Edition, Trivedi, John Wiley and Sons

4. Introduction to Probability and Statistics, J.S.Milton, Jesse C.Arnold, 4th edition, TMH.

5. Robability,Statistics and Random Processes,Dr.K.Murugesan, P.Guruswamy,Anuradha Agencies, Deepti Publications.

Code: MR11U107

MALLA REDDY ENGINEERING COLLEGE
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II Year B.Tech. C.E. II Sem

L	T/P/D	C
4	1/-/-	4

STRENGTH OF MATERIALS – II

UNIT – I
TORSION OF CIRCULAR SHAFTS :Theory of pure torsion – Derivation of Torsion equations : $T/J = q/r = N\theta/L$ – Assumptions made in the theory of pure torsion – Torsional moment of resistance – Polar section modulus – Power transmitted by shafts – Combined bending and torsion and end thrust – Design of shafts according to theories of failure.

SPRINGS: Introduction – Types of springs – deflection of close and open coiled helical springs under axial pull and axial couple – springs in series and parallel – Carriage or leaf springs.

UNIT – II
COLUMNS AND STRUTS: Introduction – Types of columns – Short, medium and long columns – Axially loaded compression members – Crushing load – Euler's theorem for long columns- assumptions- derivation of Euler's critical load formulae for various end conditions – Equivalent length of a column – slenderness ratio – Euler's critical stress – Limitations of Euler's theory – Rankine – Gordon formula – Long columns subjected to eccentric loading – Secant formula – Empirical formulae – Straight line formula – Prof. Perry's formula.

UNIT - III
BEAM COLUMNS: Laterally loaded struts – subjected to uniformly distributed and concentrated loads – Maximum B.M. and stress due to transverse and lateral loading.

UNIT – IV
DIRECT AND BENDING STRESSES: Stresses under the combined action of direct loading and bending moment, core of a section – determination of stresses in the case of chimneys, retaining walls and dams – conditions for stability – stresses due to direct loading and bending moment about both axis.

UNIT – V
UNSYMMETRICAL BENDING: Introduction – Centroidal principal axes of section – Graphical method for locating principal axes – Moments of inertia referred to any set of rectangular axes – Stresses in beams subjected to unsymmetrical bending – Principal axes – Resolution of bending moment into two rectangular axes through the centroid – Location of neutral axis - Deflection of beams under unsymmetrical bending.

UNIT – VI
BEAMS CURVED IN PLAN: Introduction – circular beams loaded uniformly and supported on symmetrically placed columns – Semi- circular beam simply-supported on three equally spaced supports.

UNIT – VII

ARCHES: Types of arches- three and two hinged arches- Circular and parabolic arches- Yielding of supports- Effect of shortening of rib - Effect of temperature changes - Tied and Linear arch.

UNIT - VIII

ENERGY THEOREMS: Introduction-Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces - Castigliano's first theorem- Deflections of simple beams and pin jointed trusses.

TEXT BOOKS:
1. A Text book of Strength of materials by R.K.Bansal –Laxmi Publications (P) ltd., New Delhi
2. Strength of materials by Basavarajaiah and Mahadevappa, University press
3. Strength of Materials by Bhavikatti, Vikas Publications

REFERENCES:
1. Mechanics of Solid, by Ferdinandp Beer and others – Tata Mc.Grawhill Publications 2000.
2. Strength of Materials by S. Ramakrishna and R.Narayan – Dhanpat Rai publications.
3. Strength of materials by R.K.Rajput, S.Chand & Co, New Delhi.
4. Strength of Materials by A.R.Basu, Dhanpat Rai & Co, Nai Sarah, New Delhi.
5. Strength of Materials by L.S.Srinath et al., Macmillan India Ltd., Delhi.

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II Year B.Tech. C.E. II SEM   L   T/P/D   C
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HYDRAULICS AND HYRAULIC MACHINERY

UNIT – I
OPEN CHANNEL FLOW I: Types of flows - Type of channels – Velocity distribution – Energy and momentum correction factors – Chezy's, Manning's and Bazin formulae for uniform flow – Most Economical sections. Critical flow: Specific energy-critical depth – computation of critical depth – critical sub-critical and super critical flows.

UNIT II
OPEN CHANNEL FLOW II: Non uniform flow-Dynamic equation for Gradually varied flow., Mild, Critical, Steep, Horizontal and Adverse slopes-surface profiles-direct step method- Rapidly varied flow, hydraulic jump, energy dissipation.

UNIT - III
HYDRAULIC SIMILITUDE: Dimensional analysis-Rayleigh's method and Buckingham's pi theorem-study of Hydraulic models – Geometric, kinematic and dynamic similarities-dimensionless numbers – model and prototype relations.

UNIT – IV
BASICS OF TURBO MACHINERY: Hydrodynamic force of jets on stationary and moving, flat, inclined and curved vanes, jet striking centrally and at tip, velocity triangles at inlet and outlet, expressions for work done and efficiency-Angular momentum principle, Applications to radial flow turbines.

UNIT - V
HYDRAULIC TURBINES – I: Layout of a typical Hydropower installation – Heads and efficiencies-
Classification of turbines-Pelton wheel-Francis turbine-Kaplan turbine-working, working proportions, velocity diagram, work done and efficiency, hydraulic design, draft tube – theory and function efficiency.

UNIT – VI
HYDRAULIC TURBINES – II: Governing of turbines-surge tanks-unit and specific turbines-unit speed-unit quantity-unit power-specific speed performance characteristics-geometric similarity-cavitations.

UNIT – VII
CENTRIFUGAL PUMPS: Pump installation details-classification-work done- Manometric head-minimum starting speed-losses and efficiencies-specific speed, multistage pumps-pumps in parallel- performance of pumps-characteristic curves- NPSH-cavitations.

UNIT – VIII

HYDROPOWER ENGINEERING: Classification of Hydropower plants – Definition of terms – load factor, utilization factor, capacity factor, estimation of hydropower potential.

TEXT BOOKS:
1. Open Channel flow by K,Subramanyam . Tata Mc.Grawhill Publishers.
2. Fluid Mechanics, Hydraulic and Hydraulic Machines by Modi & Seth, Standard book house.
3. Fluid Mechanics & Fluid machines by Narayana Pillai, Universities press.

REFERENCES:
1. A text of Fluid mechanics and hydraulic machines by Dr. R.K. Bansal - Laxmi Publications (P) ltd., New Delhi
2. Elements of Open channel flow by Ranga Raju, Tata Mc.Graw Hill, Publications.
3. Fluid mechanics and fluid machines by Rajput, S.Chand &Co.
4. Open Channel flow by V.T.Chow, Mc.Graw Hill book company.
5. Fluid Mechanics and Machinery by D. Ramdurgaia New Age Publications.

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ENVIRONMENTAL STUDIES

UNIT-I : ECOSYSTEMS: Definition, Scope and Importance of ecosystem, Concept of ecosystem, Classification of ecosystems, Structure and Structural Components of an ecosystem, Functions of ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles, Homeostasis / Cybernetics, Food chain concentration, Biomagnification, ecosystems value, services and carrying capacity.

UNIT-II: NATURAL RESOURCES: Classification of Resources:Living   and   Non-Living resources, Renewable and non-renewable resources. Water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources – case studies. Energy resources: growing energy needs, renewable and non renewable energy sources, use of alternate energy sources – case studies. Land resources: land as a resource, land degradation, man induced landslides and land use / land cover mapping.

UNIT-III: BIODIVERSITY AND BIOTIC RESOURCES: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and intrinsic values. Hot spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man- wildlife conflicts, conservation of biodiversity: In-Situ and Ex-situ conservation. Food and fodder resources, Timber and non-timber forest products.

UNIT-IV: ENVIRONMENTAL POLLUTION AND CONTROL: Classification of pollution and pollutants, causes, effects and control technologies. Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. Water pollution: Point and non-point sources of pollution, Major pollutant of water and their sources, drinking water quality standards, Waste water treatment methods: Effluent Treatment Plants (ETP), Sewage Treatment Plants (STP), Common and Combined Effluent Treatment Plants (CETP).Soil Pollution: Soil as sink for pollutants, Impact of modern agriculture on soil, degradation of soil. Marine Pollution: Misuse of International water for dumping of hazardous waste, coastal pollution due to sewage and marine disposal of industrial effluents. Noise Pollution: Sources, Industrial Noise- Occupational Health hazards, standards, Methods of control of Noise. Thermal Pollution: Thermal Comforts, Heat Island effect, Radiation effects. Nuclear Pollution: Nuclear power plants, nuclear radiation, disasters and impacts, genetical disorders. Solid waste: types, Collection processing and disposal of industrial and municipal solid wastes composition and characteristics of e-Waste and its management.

UNIT-V: GLOBAL ENVIRONMENTAL PROBLEMS AND GLOBAL EFFORTS : Green house effect, Green House Gases (GHG), Global Warming, Sea level rise, climate change and their impacts   on   human environment. Ozone depletion and Ozone depleting substances (ODS).Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol,

UNIT-VI: ENVIRONMENTAL IMPACT ASSESSMENT (EIA) AND ENVIRONMENTAL MANAGEMENT PLAN: Definition of Impact: classification of impacts, Positive and Negative, Reversible and irreversible, light, moderate and severe, methods of baseline data acquisition. Impacts on different components: such as human health resources, air, water, flora, fauna and society. Prediction of impacts and impact assessment methodologies.   Environmental Impact Statement   (EIS).   Environmental   Management   Plan   (EMP): Technological Solutions, preventive methods, Control technologies, treatment technologies: green-belt- development, rain water harvesting, Remote sensing and GIS methods.

UNIT-VII: ENVIRONMENTAL POLICY, LEGISLATION, RULES AND REGULATIONS
National Environmental Policy, Environmental Protection act, Legal aspects Air (Prevention and Control of pollution) Act- 1981, Water(Prevention and Control of pollution) Act-1974, Water pollution Cess Act-1977, Forest Conservation Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules .

UNIT: VIII -- TOWARDS SUSTAINABLE FUTURE
Concept of Sustainable   Development, Threats to Sustainability,   Population and its explosion, Crazy
Consumerism,   Over-exploitation of resources, Strategies for Achieving Sustainable development, Environmental Education, Conservation of Resources, Urban Sprawl, Sustainable Cities and Sustainable Communities, Human health, Role of IT in Environment, Environmental Ethics, Environmental Economics, Concept of Green Building, Clean Development Mechanism (CDM).

SUGGESTED TEXT BOOKS:
1. Environmental studies, from crisis to cure by R.Rajagopalan, 2005.

2.Text book of Environmental Science and Technology by M.Anji Reddy   2007
3.Environmental studies by Erach Bharucha 2005, University Grants Commission, University Press.

REFERENCE BOOKS:
1.   Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning
Private Ltd. New Delhi
2.   Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela .2008 PHI
Learning Pvt. Ltd.

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II Year B.Tech. C.E. II Sem   **L   T/P/D   C**
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STRUCTURAL ANALYSIS –I

UNIT – I

PROPPED CANTILEVERS: Analysis of propped cantilevers-shear force and   bending moment diagrams- Deflection of propped cantilevers.

FIXED BEAMS – Introduction to statically indeterminate beams with uniformly distributed load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads - Shear force and Bending moment diagrams-Deflection of fixed beams effect of sinking of support, effect of rotation of a support.

UNIT – II

SLOPE-DEFLECTION METHOD: Introduction, derivation of slope deflection equation, application to continuous beams with and without settlement of supports.

UNIT – III

MOMENT DISTRIBUTION METHOD: Introduction, applications to continuous beams with and without settlement of supports.

UNIT – IV

CONTINUOUS BEAMS : Introduction-Clapeyron's theorem of three moments- Analysis of continuous beams with constant moment of inertia with one or both ends fixed-continuous beams with overhang, continuous beams with different moment of inertia for different spans-Effects of sinking of supports-shear force and Bending moment diagrams.

UNIT – V

MOVING LOADS : Introduction maximum SF and BM at a given section and absolute maximum S.F. and B.M due to single concentrated load, U.D load longer than the span, U.D load shorter than the span, two point loads with fixed distance between them and several point loads-Equivalent uniformly distributed load- Focal length.

UNIT – VI

INFLUENCE LINES: Definition of influence line for SF, Influence line for BM- load position for maximum SF at a section-Load position for maximum BM at a section - Point loads, UDL longer than the span, UDL shorter than the span- Influence lines for forces in members of Pratt and Warren trusses.

UNIT –VII

INDETERMINATE STRUCTURAL ANALYSIS: Indeterminate Structural Analysis – Determination of static and kinematic indeterminacies –Solution of trusses with upto two degrees of internal and external indeterminacies –Castigliano's theorem.

UNIT –VIII

MATRIX METHODS OF ANALYSIS: Introduction - Different approached to matrix methods - Static and Kinematic Indeterminacy-Flexibility and Stiffness methods for beams and simple frames.

TEXT BOOKS:
1. Analysis of Structures-Vol I & Vol II by V.N. Vazirani & M.M.Ratwani, Khanna Publications, New Delhi.
2. Analysis of Structures by T.S. Thandavamoorthy, Oxford University Press, New Delhi
3. Structural Analysis by S S Bhavikatt Vikas Publishing House.

REFERENCES:
1. Mechanics of Structures by S.B.Junnarkar, Charotar Publishing House, Anand, Gujrat
2. Theory of Structures by Pandit & Gupta; Tata Mc.Graw – Hill Publishing Co.Ltd., New Delhi.
3. Theory of Structures by R.S. Khurmi, S. Chand Publishers
4. Strength of Materials and Mechanics of Structures- by B.C.Punmia, Khanna Publications, New Delhi.
5. Introduction to structural analysis by B.D. Nautiyal, New age international publishers, New Delhi.

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MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Unit I: Introduction to Managerial Economics:
Definition, Nature and Scope of Managerial Economics–Demand Analysis: Demand Determinants, Law of Demand and its exemptions

Unit II *Elasticity of Demand*: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

Unit III Theory of Production and Cost Analysis: Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale.

Cost Analysis: Cost concepts, Opportunity cost, Fixed vs. Variable costs, Explicit costs Vs. Implicit costs,Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)-Determination of Break-Even Point (Simple problems)- Managerial Significance and limitations of BEA.

Unit IV Introduction to Markets & Pricing Policies:
Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly.

Objectives and Policies of Pricing- **Methods of Pricing:** Cost Plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, Limit Pricing, Market Skimming Pricing, Penetration Pricing, Two-Part Pricing, Block Pricing, Bundling Pricing, Peak Load Pricing, Cross Subsidization.

Unit V Business & New Economic Environment: Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Changing Business Environment in Post-liberalization scenario.

Unit VI Capital and Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance. Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems)

Unit VII Introduction to Financial Accounting: Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

Unit VIII Financial Analysis through ratios: Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt- Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Profit Ratio, P/E Ratio and EPS).

TEXT BOOKS:
1. Aryasri: Managerial Economics and Financial Analysis, TMH, 2009.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.

REFERENCES:
1. Raghunatha Reddy & Narasimhachary: Managerial Economics& Financial Analysis, Scitech, 2008.
2. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi, 2009
3. H. Craig Peterson & W. Cris Lewis, Managerial Economics, PHI, 2009.
4. Suma Damodaran, Managerial Economics, Oxford University Press, 2009.
5. Lipsey & Chrystel, Economics, Oxford University Press, 2009.
6. Domnick Salvatore: Managerial Economics In a Global Economy, 4th Edition, Thomson, 2009.
7. Narayanaswamy: Financial Accounting—A Managerial Perspective, PHI, 2008.
8. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2008.
9. Truet and Truet: Managerial Economics:Analysis, Problems and Cases, Wiley, 2009.
10. Dwivedi: Managerial Economics, Vikas, 2009.

Prerequisites: Nil

Objective: To explain the basic principles of managerial economics, accounting and current business environment underlying business decision making.

Codes/Tables: Present Value Tables need to be permitted into the examinations Hall.
Question Paper Pattern: 5 Questions to be answered out of 8 questions.
                    Each question should not have more than 3 bits.

MALLA REDDY ENGINEERING COLLEGE
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II Year B.Tech. C.E. II –Sem

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COMPUTER AIDED DRAFTING OF BUILDINGS

1. Introduction to computer aided drafting
2. Software for CAD – Introduction to different software's
3. Practice exercises on CAD software
4. Drawing of plans of buildings using software
   a) Single storeyed buildings   b) multy
   storyed buildings
5. Developing sections and elevations for
   a) Single storeyed buildings   b) multy storyed buildings
6. Detailing of building components like Doors, Windows, Roof Trusses etc. using CAD software
7. Exercises on development of working of buildings

Text Books:

1. Computer Aided Design Laboratory by M. N. Sesha Prakash & Dr. G. S. Servesh – Laxmi Publications.
2. Engineering Graphics by P. J. Sha – S. Chand & Co.

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II Year B.Tech. C.E. II Sem

L	T/P/D	C
0	- /3/-	2

SURVEYINGLAB – II

LIST OF EXERCISES:

1. Study of theodolite in detail - practice for measurement of horizontal and vertical angles.
2. Measurement of horizontal angles by method of repetition and reiteration.
3. Trigonometric Levelling - Heights and distance problem (Two Exercises)
4. Heights and distance using Principles of tacheometric surveying (Two Exercises)
5. Curve setting – different methods. (Two Exercises)
6. Setting out works for buildings & pipe lines.
7. Determine of area using total station
8. Traversing using total station
9. Contouring using total station
10. Determination of remote height using total station
11. State-out using total station
12. Distance, gradient, Diff, height between tow inaccessible points using total stations

LIST OF EQUIPMENT:
1. Theodolites, and leveling staffs.
2. Tachometers.
3. Total station.

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III Year B.Tech. C.E. I Sem

L	T/P/D	C
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CONCRETE TECHNOLOGY

UNIT I

CEMENT : Portland cement – chemical composition – Hydration, Setting of cement – Structure of hydrate cement – Test on physical properties – Different grades of cement.

UNIT – II

ADMIXTURES : Types of admixtures – mineral and chemical admixtures – properties – dosages – effects - usage.

UNIT - III

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

UNIT – IV

FRESH CONCRETE: Workability – Factors affecting workability – Measurement of workability by different tests – Setting times of concrete – Effect of time and temperature on workability – Segregation & bleeding – Mixing and vibration of concrete – Steps in manufacture of concrete – Quality of mixing water.

UNIT - V

HARDENED CONCRETE : Water / Cement ratio – Abram's Law – Gel space ratio – Nature of strength of concrete – Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compression & tensile strength - Curing.

UNIT – VI

TESTING OF HARDENED CONCRETE: Compression tests – Tension tests – Factors affecting strength – Flexure tests – Splitting tests – Pull-out test, Nondestructive testing methods – codal provisions for NDT.

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: Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Statistical methods – Acceptance criteria – Proportioning of concrete mixes by various methods – BIS method of mix design.

UNIT – VIII

SPECIAL CONCRETES: Light weight aggregates – Light weight aggregate concrete – Cellular concrete – No-fines concrete – High density concrete – Fiber reinforced concrete – Polymer concrete – Types of Polymer concrete – High performance concrete – Self compacting concrete.

TEXT BOOKS:

1. Properties of Concrete by A.M.Neville – Low priced Edition – 4th edition
2. Concrete Technology by M.S.Shetty. – S.Chand & Co. 2004

REFERENCES:

1. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi
2. Concrete Technology by A.R. Santha Kumar, Oxford university Press, New Delhi
3. Concrete: Micro structure, Properties and Materials – P.K.Mehta and
  J.M.Monteiro, Mc-Graw Hill Publishers

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DESIGN OF REINFORCED CONCRETE STRUCTURES

UNIT –I

Concepts of RC. Design – Limit State method – Material Stress- Strain Curves – Safety factors – characteristic values. Stress Block parameters – IS: 456 -2000 – Working Stress Method.

UNIT –II

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

UNIT – III

Shear, Torsion and Bond: Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length, I.S. code provisions. Design examples in simply supported and continuous beams, detailing.

UNIT - IV

Design of Two-way slabs, one way slab, continuous slab Using I S Coefficients

UNIT – V

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

UNIT – VI

Short and Long columns – under axial loads, uniaxial bending and biaxial bending – I S Code provisions.

UNIT –VII

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

UNIT – VIII

Miscellaneous design stair case design – Design of Canopy (Portico)

TEXT BOOKS:

1. Limit state designed of reinforced concrete – P.C.Varghese, Prentice Hall of India, New Delhi.

2. Reinforced concrete design by N. Krishna Raju and R.N. Pranesh, New age International Publishers, New Delhi

3. Reinforced concrete design by S.Unnikrishna Pillai & Devdas Menon, Tata Mc.Graw Hill, New Delhi.

4. Fundamentals of reinforced concrete by N.C. Sinha and S.K Roy, S. Chand publishers

REFERENCES :

1. Fundamentals of Reinforced concrete design by M.L. Gambhir, Printice Hall of India Private Ltd., New Delhi.

2. Reinforced concrete structural elements – behaviour, Analysis and design by P.Purushotham, Tata c.Graw-Hill, 1994.

3. Design of concrete structures – Arthus H.Nilson, David Darwin, and Chorles W. Dolar, Tata Mc.Graw-Hill, 3rd Edition, 2005.

4. Design of Reinforced Concrete Foundations – P.C. Varghese Prentice Hall of India, New Delhi.

5. Reinforced concrete structures, Vol.1, by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

6. Reinforced concrete structures – I.C. Syal & A.K.Goel, S.Chand Publishers 7. Limit State Design by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi.

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GEOTECHNICAL ENGINEERING – I

UNIT – I

INTRODUCTION: Soil formation – soil structure and clay mineralogy – Adsorbed water – Mass - volume relationship – Relative density.

UNIT - II

INDEX PROPERTIES OF SOILS: Grain size analysis – Sieve and Hydrometer methods – consistency limits and indices – I.S. Classification of soils.

UNIT –III

PERMEABILITY: Soil water – capillary rise – flow of water through soils – Darcy's law- permeability – Factors affecting permeability – laboratory determination of coefficient of permeability –Permeability of layered soils – In-situ permeability tests (Pumping in & Pumping out test).

UNIT - IV

EFFECTIVE STRESS & SEEPAGE THROUGH SOILS: Total, neutral and effective stress – principle of effective stress - quick sand condition – Seepage through soils – Flow nets: Characteristics and Uses.

UNIT – V

STRESS DISTRIBUTION IN SOILS: Boussinesq's and Westergaard's theories for point load, uniformly loaded circular and rectangular areas, pressure bulb, variation of vertical stress under point load along the vertical and horizontal plane, and Newmark's influence chart for irregular areas.

UNIT – VI

COMPACTION: Mechanism of compaction – factors affecting compaction – effects of compaction on soil properties – Field compaction Equipment – compaction quality control.

UNIT - VII

CONSOLIDATION: Types of compressibility – Immediate Settlement, primary consolidation and secondary consolidation - stress history of clay; e-p and e-log p curves – normally consolidated soil, over consolidated soil and under consolidated soil - preconsolidation pressure and its determination - Terzaghi's 1-D consolidation

theory – coefficient of consolidation: square root time and logarithm of time fitting methods.

UNIT - VIII

SHEAR STRENGTH OF SOILS: Importance of shear strength – Mohr's– Coulomb Failure theories – Types of laboratory strength tests – strength tests based on drainage conditions – Shear strength of sands - dilatancy – Critical Void Ratio – Liquefaction- shear strength of clays.

TEXT BOOKS:

1 Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New age International Pvt. Ltd, New Delhi

2. Principals of Geotechnical Engineering by Braja M.Das, Cengage Learning Publishers.

3. Geotechnical Engineering : Principles and practices of soil mechanics and foundation Engineering by VNS Murthy, Taylor & Francis Group**.**

REFERENCES:

1. Geotechnical Engineering by C. Venkataramiah, New age International Pvt .Ltd, (2002).

2. Soil Mechanics – T.W. Lambe and Whitman, Mc-Graw Hill Publishing Company, Newyork.

3. Geotechnical Engineering by Manoj Dutta & Gulati S.K – Tata Mc.Grawhill Publishers New Delhi.

4. Soil Mechanics and Foundation Engg. By K.R. Arora, Standard Publishers and Distributors, Delhi.

5. Soil Mechanics and Foundation by by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

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WATER RESOURCES ENGINEERING-I

UNIT I

Introduction to engineering hydrology and its applications, Hydrologic cycle, types and forms of precipitation, rainfall measurement, types of rain gauges, computation of average rainfall over a basin, processing of rainfall data - Adjustment of record - Rainfall Double Mass Curve. Runoff-Factors affecting Runoff – Runoff over a Catchment- Empirical and Rational Formulae.

UNIT-II

Abstraction from rainfall-evaporation, factors affecting evaporation, measurement of evaporation-transpiration- Penman and Blaney & Criddle Methods - Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices..

UNIT-III

Distribution of Runoff – Hydrograph Analysis,Flood Hydrograph – Effective Rainfall – Base Flow-Base Flow Separation - Direct Runoff Hydrograph - Unit Hydrograph, definition and limitations of applications of Unit hydrograph, derivation of Unit Hydrograph from Direct Runoff Hydrograph and vice versa - S-hydrograph,Synthetic Unit Hydrograph.

UNIT-IV

Ground water Occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, Darcy's law, radial flow to wells in confined and unconfined aquifers. Types of wells,- Well Construction – Well Development.

UNIT-V

Necessity and Importance of Irrigation, advantages and ill effects of Irrigation, types of Irrigation, methods of application of Irrigation water, Indian agricultural soils, methods of improving soil fertility –Crop Rotation, preparation of land for Irrigation, standards of quality for Irrigation water.

UNIT-VI

Soil-water-plant relationship, vertical distribution of soil moisture, soil moisture constants, soil moisture tension, consumptive use, Duty and delta, factors affecting duty- Design discharge for a water course. Depth and frequency of Irrigation, irrigation efficiencies-Water Logging.

UNIT-VII

Classification of canals, Design of Irrigation canals by Kennedy's and Lacey's theories, balancing depth of cutting, IS standards for a canal design, canal lining.

UNIT - VIII

Design Discharge over a catchment, Computation of design discharge-rational formula, SCS curve number method, flood frequency analysis- Introductory Part only. Stream Gauging – measurement and estimation of stream flow.

TEXT BOOKS:

1. Engineering Hydrology by Jayaram Reddy, Laxmi publications pvt. Ltd., New Delhi
2. Irrigation and water power engineering by B.C.Punmia & Lal, Laxmi publications pvt. Ltd., New Delhi

REFERENCES:

1. Elementary hydrology by V.P.Singh, PHI publications.
2. Irrigation and Water Resources & Water Power by P.N.Modi, Standard Book House.
3. Irrigation Water Management by D.K. Majundar, Printice Hall of India.
4. Irrigation and Hydraulic structures by S.K.Grag.
5. Applied hydrology by Ven Te Chow, David R. Maidment larry W. Mays Tata MC.Graw Hill.
6. Introduction to hydrology by Warren Viessvann, Jr, Garyl. Lewis, PHI

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III Year B.Tech. C.E. I –Sem	L	T/P/D	C
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MANAGEMENT SCIENCE

Unit I
Introduction to Management: Entrepreneurship and organization - Nature and Importance of Management, Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two- Factor Theory of Motivation, Systems Approach to Management, Leadership Styles, Social responsibilities of Management.

Unit II
Designing Organisational Structures: Departmentation and Decentralisation,Types of Organisation structures - Line organization, Line and staff organization, functional organization, Committee organization, matrix organization, Virtual Organisation, Cellular Organisation, team structure, boundaryless organization,inverted pyramid structure, lean and flat organization structure and their merits,demerits and suitability.

Unit III
Operations Management: Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement-Statistical Quality Control: X chart, R chart, c chart, p chart, (simple problems), Acceptance Sampling, Deming's contribution to quality.

Unit IV
A) Materials Management: Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records – Supply Chain Management

B) Marketing: Functions of Marketing, Marketing Mix, Marketing Strategies based on Product Life Cycle., Channels of distribution.

Unit V
Human Resources Management (HRM): Evolution of HRM, Concepts of HRM, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion,T ransfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.

Unit VI
Project Management (PERT/CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing. (simple problems)

Unit VII
Strategic Management: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives.

Unit VIII
Contemporary Management Practices: Basic concepts of Just-In-Time (JIT) System, Total Quality Management (TQM), Six sigma and Capability Maturity Model (CMM) Levels, Value Chain Analysis,Enterprise Resource Planning (ERP), Performance Management, Business Process outsourcing (BPO), Business
Process Re-engineering 5S Model, Deming's PDCA, Kaizen, Poka-Yoke, Muda, Benchmarking, Balanced Score Card.

TEXT BOOK:

1. Aryasri: *Management Science*, TMH, New Delhi, 2009

REFERENCE BOOKS:

1. Stoner, Management, Pearson, 2009
2. Kotler Philip & Keller Kevin Lane: Marketing Management PHI, 2009.
3. Koontz, Weihrich, & Aryasri: Principles *of Management*, TMH, 2009.
4. Thomas N.Duening & John M.Ivancevich *Management—Principles and Guidelines,* Cengage, 2009.
5. Kanishka Bedi, *Production and Operations Management*, Oxford University Press, 2009.
6. Memoria & S.V.Ganker, *Personnel Management*, Himalaya, 2009
7. Schermerhorn: *Management*, Wiley, 2009.
8. Parnell: Strategic Management, Biztantra, 2009.
9. L.S.Srinath: PERT/CPM,Affiliated East-West Press, 2009.
10. William J. Stevenson & Ceyhun Ozgur: Introduction to Management Science, TMH, 2007.

Pre-requisites: Managerial Economics

Objective: To familiarize with the process of management and to provide basic insights into select contemporary management practices.
Codes/Tables: Normal Distribution Function Table need to be permitted into the examination Hall.
Question Paper Pattern: 5 Questions to be answered out of 8 questions. The question paper should contain atleast 2 practical problems, one each from units –III & VI Each question should not have more than 3 bits.
Unit VIII will have only short questions, not essay questions.

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WASTE MANAGEMENT (ELECTIVE-I)

UNIT – I

Quality requirements of boiler and cooling waters – Quality requirements of process water for Textiles – Food processing and Brewery Industries – Boiler and Cooling water treatment methods.

UNIT – II

Basic Theories of Industrial Waste water Management – Volume reduction – Strength reduction – Neutralization – Equalization and proportioning. Joint treatment of industrial wastes and domestic sewage – consequent problems.

UNIT – III

Industrial waste water discharges into streams, Lakes and oceans and problems.

UNIT - IV

Recirculation of Industrial Wastes – Use of Municipal Waste Water in Industries.

UNIT – V

Manufacturing Process and design origin of liquid waste from Textiles, Paper and Pulp industries, Thermal Power Plants and Tanneries, Special Characteristics, Effects and treatment methods.

UNIT - VI

Manufacturing Process and design origin of liquid waste from Fertilizers, Distillers,and Dairy, Special Characteristics, Effects and treatment methods.

UNIT - VII

Manufacturing Process and design origin of liquid waste from Sugar Mills, Steel Plants, Oil Refineries, and Pharmaceutical Plants, Special Characteristics, Effects and treatment methods.

UNIT – VIII

Common Effluent Treatment Plants – Advantages and Suitability, Limitations, Effluent Disposal Methods.

TEXT BOOK:

1. Waste Water Treatment by M.N. Rao and Dutta, Oxford & IBH, New Delhi.

REFERENCES:

1. Liquid waste of Industry by Newmerow.

2. Water and Waste Water technology by Mark J. Hammer and Mark J. Hammer

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ENVIRONMENTAL IMPACT ASSESSMENT AND MANAGEMENT (ELECTIVE-I)

UNIT – I

Basic concept of EIA : Initial environmental Examination, Elements of EIA, - factors affecting E-I-A Impact evaluation and analysis, preparation of Environmental Base map, Classification of environmental parameters.

UNIT – II

E I A Methodologies: Introduction, Criteria for the selection of EIA Methodology, E I A methods, Ad-hoc methods, matrix methods, Network method, Environmental Media Quality Index method, overlay methods, cost/benefit Analysis.

UNIT – III

Impact of Developmental Activities and Land use: Introduction and Methodology for the assessment of soil and ground water, Delineation of study area, Identification of activities.

UNIT-IV

Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation – Causes and effects of deforestation.

UNIT-V

Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures.

UNIT - VI

E I A of surface water, Air and Biological environment: Methodology for the assessment of Impacts on surface water environment, Air pollution sources, Generalized approach for assessment of Air pollution Impact.

UNIT – VII

Environmental Audit & Environmental legislation, objectives of Environmental Audit, Types of environmental Audit, Audit protocol, stages of Environmental Audit, onsite activities, evaluation of Audit data and preparation of Audit report, Post Audit activities.

UNIT - VIII

The Environmental Protection Act, The water Act, The Air (Prevention & Control of pollution Act.), Motor Act, Wild life Act. Case studies and preparation of Environmental Impact assessment statement for various Industries.

TEXT BOOKS:

1. Environmental Impact Assessment & Management . **Publisher:** Daya **Author:** B B Hosetti, A Kumar

2. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B.S.Publication, Sultan Bazar, Hyderabad.

3. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke –Prentice Hall Publishers

REFERENCES:

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

2. Environmental Pollution and Control, by Dr H.S. Bhatia – Galgotia Publication (P) Ltd, Delhi

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ADVANCED STRUCTURAL ANALYSIS (ELECTIVE-I)

UNIT – I

Moment distribution method – Application to the analysis of portal frames with inclined legs and gable frames.

UNIT – II

Kani's method – application to continuous beam – portal frames (upto single bay two storages)

UNIT – III

Plastic analysis – I – Ductility – ultimate load – plastic hinge – shape factor –moment curvature relations – upper and lower band theory

UNIT – IV

Plastic Analysis – II – Plastic Analysis beam – portal frames – mechanism – portrait survey mechanics.

UNIT – V

Analysis of building frames by substitute frame – upto five bays method.

UNIT – VI

Analysis of frames for lateral force – portal and cantilever method.

UNIT – VII

Introduction to Finite Element Method – Application to one dimensional elements –shape function – Lagrangian serendipity elements.

UNIT – VIII

Introduction to Structural dynamics declaimer's principle – Free vibration – single degree of freedom – Eagleville – Eign vector.

TEXT BOOKS

1. Theory of Structures by B.C. Punmia, Jain, Ashok Kumar Jain Arun Kumar Jain.

2. Finite Element Analysis – S. S. Bhavikathi, New age International Publication, 2010

REFERENCES

1. Analysis of Structures – T. S. Thandavamurthy, Oxford University Press –2009.

2. Basic of Structural dynamics nad Seismic design/ S.R. Damodara swamy and S. Kavitha. – PHI, 2010

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FLUID MECHANICS & HYDRAULIC MACHINERY LAB

1. Calibration of Venturimeter & Orifice meter

2. Determination of Coefficient of discharge for a small orifice / mouthpiece by constant head method.

3. Calibration of contracted Rectangular Notch and / Triangular Notch

4. Determination of friction factor of a pipe.

5. Determination of Coefficient for minor losses.

6. Verification of Bernoulli's equation.

7. Impact of jet on vanes

8. Study of Hydraulic jump.

9. Performance test on Pelton wheel turbine

10. Performance test on Francis turbine.

11. Performance characteristics of a single stage/ multi-stage centrifugal pump.

12. Performance characteristics of a reciprocating pump.

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ADVANCED ENGLISH COMMUNICATION SKILLS LAB

1. Introduction

The introduction of the English Language Lab is considered essential at 3rd year level. At this stage the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be an integrated theory and lab course to enable students to use 'good' English and perform the following:

· Gather ideas and information, to organise ideas relevantly and coherently engage in debates.

· Participate in group discussions.

· Face interviews.

· Write project/research reports/technical reports.

· Make oral presentations.

· Write formal letters.

· Transfer information from non-verbal to verbal texts and vice versa.

· To take part in social and professional communication.

2. Objectives:

This Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

· To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.

Further, they would be required to communicate their ideas relevantly and coherently in writing.

3. Syllabus:

The following course content is prescribed for the Advanced Communication Skills Lab:

_ **Functional English** - starting a conversation – responding appropriately and relevantly – using the right body language – role play in different situations.

_ **Vocabulary Building** – synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, analogy, idioms and phrases.

_ **Reading Comprehension** – reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, Critical reading.

_ **Writing Skills** – structure and presentation of different types of writing – *Resume writing / e-correspondence/Technical report writing/Portfolio writing* – planning for writing – *research abilities/data collection/organizing data/tools/analysis* – improving one's writing.

_ **Group Discussion** – dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence.

_ **Presentation Skills** – Oral presentations (individual and group) through JAM sessions/seminars and written presentations through posters/projects/reports/PPTs/e-mails/assignments etc.

_ **Interview Skills** – concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and videoconferencing.

4. Minimum Requirement:

The English Language Lab shall have two parts:

i) **The Computer aided Language Lab** for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.

ii) **The Communication Skills Lab** with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo –audio & video system and camcorder etc.

System Requirement (Hardware component):

Computer network with Lan with minimum 60 multimedia systems with the following specifications:

i) P – IV Processor

a) Speed – 2.8 GHZ

b) RAM – 512 MB Minimum

c) Hard Disk – 80 GB

ii) Headphones of High quality

5. Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

Suggested Software:

· **Clarity Pronunciation Power** – part II

· **Oxford Advanced Learner's Compass**, 7th Edition

· **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**

· **Lingua TOEFL CBT Insider**, by Dreamtech

· **TOEFL & GRE**(KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)

· **The following software from 'train2success.com'**

_ **Preparing for being Interviewed,**

_ **Positive Thinking,**

_ **Interviewing Skills,**

_ **Telephone Skills,**

_ **Time Management**

_ **Team Building,**

_ **Decision making**

· **English in Mind**, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

6. Books Recommended:

1. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.

2. **Advanced Communication Skills Laboratory Manual** by Sudha Rani, D, Pearson Education 2011.

3. **English Language Communication : A Reader cum Lab Manual** Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.

4. **English Vocabulary in Use** series, Cambridge University Press 2008.

5. **Management Shapers Series** by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.

6. **Communication Skills** by Leena Sen, PHI Learning Pvt Ltd., New Delhi,2009.

7. **Handbook for Technical Writing** by David A McMurrey & Joanne BuckelyCENGAGE Learning 2008.

8. **Job Hunting** by Colm Downes, Cambridge University Press 2008.

9. **Master Public Speaking** by Anne Nicholls, JAICO Publishing House, 2006.

10. **English for Technical Communication for Engineering Students**, Aysha Vishwamohan, Tata Mc Graw-Hil 2009.

11. Books on **TOEFL/GRE/GMAT/CAT/ IELTS** by Barron's/DELTA/Cambridge University Press.

12. **International English for Call Centres** by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.

DISTRIBUTION AND WEIGHTAGE OF MARKS:

Advanced Communication Skills Lab Practicals:

1. The practical examinations for the English Language Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.

2. For the English Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

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DESIGN OF STEEL STRUCTURES

UNIT – I

Materials – Making of iron and steel – types of structural steel – mechanical properties of steel – Concepts of plasticity – yield strength. Loads – and combinations- local buckling behavior of steel. Concept of limit State Design – Limit States – Design Strengths- deflection limits – serviceability – stability check.

UNIT – II

Bolted connections – Riveted connections – IS :800 - 2007 - specifications – Design strength – efficiency of joint – prying action. Welded connections – Types of welded joints – specifications - design requirements.

UNIT – III

Design of tension members– Design strength – Design procedure splice - lug angle.

UNIT – IV

Design of compression members – Buckling class – slenderness ratio / strength design – laced – battened columns – splice – column base – slab

UNIT – V

Design of Beams – Plastic moment – Bending and shear strength / buckling – Builtup sections – laterally supported beams.

UNIT – VI

Design of eccentric connections – Framed – stiffened seat connection.

UNIT – VII

Design of plate girders – elements – economical depth – design of main section – connections between web and flange – design of stiffness bearing – intermediate stiffeners – Design of Web splice & Flange splice

UNIT – VIII

Design of roof trusses – Types of roof trusses, loads on trusses – purlin design – truss design, Design of joints and end bearings.

TEXT BOOKS :

1. Design of steel structures – N. Subramanian, Oxford University Press – 2009.

2. Limit State Design of steel structures, S.K. Duggal, Tata McGraw-Hill, 2010

REFERENCE BOOKS :

1. Design of Steel structures by K.S. Sai Ram, Person Education.

2. Design of Steel Structures Edwin H. Gaylord, Jr. Charles N. Gaylord and James Stallmeyer Tata McGraw-Hill Education pvt. Ltd.

3. Design of Steel Structures Vol. 1 & 2 – Ramchandra, Standard Publications.

4. Design of steel structures, Structures, S.S. Bhavikatti, IK int Publication House,New Delhi, 2010.

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GEOTECHNICAL ENGINEERING-II

UNIT – I

SOIL EXPLORATION: Need – Methods of soil exploration – Boring and Sampling methods – Penetration Tests – Plate load test – Pressure meter – planning of Programme and preparation of soil investigation report.

UNIT – II

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

UNIT – III

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

UNIT – IV

RETAINING WALLS: Types of retaining walls – stability of retaining walls against overturning, sliding, bearing capacity and drainage from backfill

UNIT – V

SHALLOW FOUNDATIONS - BEARING CAPACITY CRITERIA - Types - choice of foundation – Location of depth – Safe Bearing Capacity – Terzaghi, Meyerhof, Skempton and IS Methods

UNIT - VI

SHALLOW FOUNDATIONS - SETTLEMENT CRITERIA - Safe bearing pressure based on N-value – allowable bearing pressure; safe bearing capacity - plate load test – allowable settlements of structures.

UNIT -VII

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

UNIT - VIII

WELL FOUNDATIONS: Types – Different shapes of wells – Components of wells – functions and Design Criteria – Sinking of wells – Tilts and shifts.

TEXT BOOKS:

1. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt. Ltd, (2004).

2. Das, B.M., - (1999) Principles of Foundation Engineering –6th edition (Indian edition) Thomson Engineering

3. Geotechnical Engineering : Principles and practices of soil mechanics and foundation Engineering by VNS Murthy, Taylor & Francis Group.

REFERENCES:

1. Analysis and Design of Substructures – Swami Saran, Oxford and IBH Publishing company Pvt Ltd 1998

2. Geotechnical Engineering by S. K.Gulhati & Manoj Datta – Tata Mc.Graw Hill Publishing company New Delhi. 2005.

3. Teng,W.C – Foundation Design , Prentice Hall, New Jersy

4. Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill Publishing company, Newyork

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WATER RESOURCES ENGINEERING-II

UNIT-I

Storage Works-Reservoirs - Types of reservoirs, selection of site for reservoir, zones of storage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve- Reservoir Sedimentation –Life of Reservoir. Types of dams, factors affecting selection of type of dam, factors governing selection of site for a dam.

UNIT-II: Gravity dams: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile and practical profile of a gravity dam, limiting height of a low gravity dam, Factors of Safety - Stability Analysis, Foundation for a Gravity Dam, drainage and inspection galleries.

UNIT-III

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

UNIT-IV

Spillways: types of spillways, Design principles of Ogee spillways - Spillway gates. Energy Dissipaters and Stilling Basins Significance of Jump Height Curve and Tail Water Rating Curve - USBR and Indian types of Stilling Basins.

UNIT-V

Diversion Head works: Types of Diversion head works- weirs and barrages, layout of diversion head work - components. Causes and failure of Weirs and Barrages on permeable foundations,-Silt Ejectors and Silt Excluders

UNIT-VI

Weirs on Permeable Foundations – Creep Theories - Bligh's, Lane's and Khosla's theories, Determination of uplift pressure- Various Correction Factors – Design principles of weirs on permeable foundations using Creep theories - exit gradient, U/s and D/s Sheet Piles - Launching Apron.

UNIT-VII

Canal Falls - types of falls and their location, Design principles of Notch Fall and Sarada type Fall. Canal regulation works, principles of design of distributory and head regulators, Canal Cross Regulators -canal outlets, types of canal modules, proportionality, sensitivity and flexibility.

UNIT-VIII

Cross Drainage works: types, selection of site, Design principles of aqueduct, siphon aqueduct and super passage. Design of Type II Aqueduct (Under Tunnel)

TEXT BOOKS:

1. Irrigation engineering and hydraulic structures by S.K Garg, Khanna publishers.

2. Irrigation and water power engineering by Punmia & Lal, Laxmi publications pvt. Ltd., New Delhi

REFERENCES:

1. Irrigation and water resources engineering by G.L. Asawa, New Age International Publishers

2. Theory and Design of Hydraulic structures by Varshney, Gupta & Gupta

3. Irrigation engineering by K.R.Arora

4. Irrigation Engineering by R.K. Sharma and T.K. Sharma, S. Chand Publishers

5. Introduction to hydrology by Warren Viessvann, Jr, Garyl. Lewis, PHI

6. Engineering Hydrology by CS Pojha, R. Berndtsson and P. Bhunya, Oxford University Press

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TRANSPORTATION ENGINEERING

UNIT - I

HIGHWAY DEVELOPMENT AND PLANNING: Highway development in India – Necessity for Highway Planning- Different Road Development Plans.

UNIT – II

HIGHWAY PLANNING: Classification of Roads- Road Network Patterns – Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports, Road Projects initiation need based planning.

UNIT – III

HIGHWAY GEOMETIC DESIGN: Importance of Geometric Design- Design controls and Criteria- Highway Cross Section Elements- Sight Distance Elements- Stopping sight Distance, Overtaking Sight Distance and intermediate Sight Distance- Design of Horizontal Alignment- Design of Super elevation and Extra widening- Design of Transition Curves-Design of Vertical alignment- Gradients- Vertical curves. Typical cross sections for different types of roads.

UNIT – IV

TRAFFIC ENGINEERING: Basic Parameters of Traffic-Volume, Speed and Density- Traffic Volume Studies- Data Collection and Presentation-speed studies- Data Collection and Presentation- Parking Studies and Parking characteristics- Road Accidents-Causes and Preventive measures- Accident Data Recording – Condition Diagram and Collision Diagrams. Traffic, infrastructural and safety audits.

UNIT - V

TRAFFIC REGULATION AND MANAGEMENT: Road Traffic Signs – Types and Specifications – Road markings-Need for Road Markings-Types of Road Markings- Design of Traffic Signals –Webster Method –IRC Method, intelligent transportation systems typical architectures.

UNIT - VI

INTERSECTION DESIGN: Types of Intersections – Conflicts at Intersections- Types of At-Grade Intersections- Channelization : Objectives –Traffic Islands and Design criteria-Types of Grade Separated Intersections- Rotary Intersection – Concept of Rotary and Design Criteria- Impacts of Geometrics on intersection with reference safety, Operational capacity.

UNIT – VII

INTRODUCTION TO RAILWAY ENGINEERING: Permanent way components – Cross Section of Permanent Way - Functions of various Components like Rails, Sleepers and Ballast –Rail Fastenings – Creep of Rails- Theories related to creep – Ageing of Sleepers- Sleeper density.

GEOMETRIC DESIGN OF RAILWAY TRACK: Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve – Crossings and Turn outs .

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.

TEXT BOOKS:

1. Highway Engineering, S.K.Khanna & C.E.G.Justo, Nemchand & Bros., 7th edition (2000).

2. Railway Engineering, A text book of Transportation Engineering – S.P.chadula – S.Chand & Co. Ltd. 2001

3. Highway Engineering Design – L.R.Kadiyali and Lal- Khanna Publications.

4.Airport Planning and Design- S.K.Khanna and Arora,Nemchand Bros.

REFERENCES:

1. Highway Engineering – S.P.Bindra , Dhanpat Rai & Sons. – 4th Edition (1981)

2. Traffic Engineering & Transportation Planning – Dr.L.R.Kadyali, Khanna publications – 6th Edition 1997.

3. Railway Engineering – August – Prabha & Co., 15th Edition – 1994.

4. Air Transportation Planning & design – Virendhra Kumar & Statish Chandhra – Gal Gotia Publishers 1999

5. Principles of Traffic Engineering – Garber & Hoel, Cengage Learning.

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ENGINEERING GEOLOGY

UNIT – I INTRODUCTION: Importance of geology from Civil Engineering point of view. Brief study of case histories of failure of some Civil Engineering constructions due to geological draw backs. Importance of Physical geology, Petrology and Structural geology. weathering of rocks **:** Its effect over the properties of rocks importance of weathering with REFERENCE to dams, reservoirs and tunnels weathering of common rock like "Granite"

UNIT – II MINERALOGY : Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties.Role of study of physical properties of minerals in the identification of minerals. Study of physical properties of following common rock forming minerals: Feldsper , Quartz , Flint , Jasper, Olivine , Augite , Hornblende , Muscovite , Biotite , Asbestos, Chlorite , Kyanite , Garnet, Talc , Calcite. Study of other common economics minerals such as Pyrite, Hematite , Magnetite, Chrorite , Galena , Pyrolusite , Graphite, Magnesite, and Bauxite.

UNIT – III PETROLOGY : Definition of rock: Geological classification of rocks into igneous, Sedimentary and metamorphic rocks. Dykes and sills, common structures and textures of igneous. Sedimentary and etamorphic rocks. Their distinguishing features, Megascopic and microscopic study of Granite, Dolerite, Basalt, Pegmatite,

Laterite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate. Rock excavation, stone aggregates.

UNIT – IV STRUCTURAL GEOLOGY : Indian stratigraphy, and geological time scale**,** Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults unconformities, and joints - their important types.

UNIT – V GEOPHYSICAL STUDIES: Importance of Geophysical studies Principles of geophysical study by Gravity methods. Magnetic methods, Electrical methods. Seismic methods, Radio metric methods and Geothermal method. Special importance of Electrical resistivity methods, and seismic refraction methods. Improvement of competence of sites by grouting etc. Fundamental aspects of Rock mechanics and Environmental Geology.

UNIT – VI GEOLOGY OF DAMS AND RESERVOIRS : Types of dams and bearing of Geology of site in their selection, Geological Considerations in the selection of a dam site. Analysis of dam

failures of the past. actors Contributing to the success of a reservoir. Geological factors influencing water tightness and life of reservoirs, Geo hazards, ground subsidence.

UNIT – VII GROUND WATER: Water table, common types of ground water, springs, cone of depression, ecological controls of ground water movement, ground water exploration. Earth quakes, their causes and effects, shield areas and seismic belts. Seismic waves, Richter scale, precautions to be taken for building construction in seismic areas. Land slides, land slides hazards, water in land slides their causes and effect; measures to be taken to prevent their occurrence. Importance of study of ground water, Earthquake and landslides.

UNIT – VIII TUNNELS : Purposes of tunneling, Effects of Tunneling on the ground Role of Geological Considerations (lithological, structural and ground water) in tunneling over break and lining in tunnels, Tunnels in rock, subsidence over old mines , mining substances.

TEXT BOOKS:

1) Principals of Engineering Geology by K.V.G.K. Gokhale – B.S publications

2) Engineering Geology by N.Chennkesavulu, Mac-Millan, Publishers 2nd Edition India Ltd. 2010.

3) Engineering Geology by D. Venkat Reddy, Vikas Publications

REFERENCES:

1. F.G. Bell, Fundamental of Engineering Geology Butterworths, Publications, New Delhi, 1992.

2. Krynine & Judd, Principles of Engineering Geology & Geotechnics, CBS Publishers & Distribution,

3. Foundations of Engineering Geology – Tony Waltham – Spon press/ Cry press Taylor & Francis.

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                                                          4   0 /-/-   4

CONSTRUCTION TECHNOLOGY AND PROJECT MANAGEMENT
(OPEN ELECTIVE)

UNIT – I

Fundamentals of Construction Technology – Construction Activities – Process – Construction Schedule – Construction Records – Documents – Quality – Safety - Codes and Regulations.

UNIT – II

Construction Method – Earthwork – Piling – Concrete and Concreting – Form work – Fabrication and Erection.

UNIT – III

Mechanised Construction – Construction Equipment – Equipment Economics – Excavators - Rollers – Dozers – Scrapers – Handling Equipment – Concrete Equipment – Handling Equiipment – Cranes Draglines and Clamshalls.

UNIT – IV

Quality Control, Assurance and Safety – ISO – 9000 Quality Systems – Principles on Safety – Personnel, Fire and Electrical Safety – Environment Protection – Concept of Green Building.

UNIT – V

Contract Management – Project Estimation – Types of Estimation – Contract Document – Classification – Bidding – Procurement Process.

UNIT – VI

Construction Planning – Project Planning Techniques – Planning of manpower, Material, Equipment and Finance.

UNIT – VII

Project scheduling – PERT – CPM, Resource leveling.

UNIT – VIII

Construction Claims, Dispute and Project Closure – Source of Claim – Claim Management – Dispute Resolution – Arbitration – Construction Closure – Contract Closure – Documentation.

TEXT BOOK

1. Construction Technology by Subir K. Sarkar, Subhajit Saraswati / Oxford University Press, 2009.

2. Construction Project Management - Theory and Practice, Nirajjha, Pearson Education, 2010.

REFERENCES :

1. Construction Planning, Equipment and Methods by Peurifacy, Schexnayder, Shapira TMH, 2010.

2. Project Planning and Control with PERT and CPM – B.C. Punmia, K.K. Khandelwala – Laxmi Publication.

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                                                      4   0 /-/-   4

URBAN DISASTER – INTELLIGENT CONTROLS SYSTEMS (OPEN ELECTIVE)

UNIT – I

Disasters: Types of disaster, significant aspects of disasters, economic impact of disasters, Risk aspects, Hazards and disasters.

UNIT – II

Urban Disaster and their environmental impacts: Impact of earthquakes, floods, fires, droughts, land slides, Congestion pollution, accident risk on urban environment policies for remedial measures. Technology to forecast their impact.

UNIT – III

Technology to Track Urban Disasters: Monitoring profile – cameras, sensors and communication systems Engineering profiles – total station, terrestrial scanners, and other survey equipment.

UNIT - IV

Planning Profile – Impact on Urban Disasters: Planning profile – GPS, satellite technology and photographic technique.

UNIT – V

Information systems : Geography information systems – different packages and over view, MIS – Architecture, web enabled communication systems – over view.

UNIT – VI

Intelligent control system : Technology enabled online monitoring system, post evaluation multi criteria systems, fore casting approaches through decision supporting systems.

UNIT – VIII

Disasters – case studies on disaster mitigation measures.

REFERENCES & TEXT BOOKS:

1. Disasters – Global challenges and local solutions by Rajib Shaw. R.R. Krishna Murthy, University Press.

2. Sensor Technologies & Date requirement of ITS by Lawerence A. Klein.

3. Disaster mitigation – Experiences and reflections – Pradeep sahni, Alka Dhameja, Uma Medhuri, PHI.

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SYSTEM INTELLECTUAL PROPERTY RIGHTS (OPEN ELECTIVE)

UNIT – I

Introduction to Intellectual property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT – II

Trade Marks: Purpose and function of trade marks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT – III

Law of copy rights : Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

UNIT – IV

Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer

UNIT – V

Trade Secrets: Trade secretes law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.

UNIT – VI

Unfair competition: Misappropriation right of publicity, false advertising.

UNIT – VII

New development of intellectual property: new developments in trade mark law; copy right law, patent law, intellectual property audits.

UNIT – VIII

International overview on intellectual property, international – trade mark law, copy right law, international patent law, international development in trade secrets law.

References & Text Books :

1. Intellectual property right, Deborah. E. Bouchoux, cengage learing.

2. Intellectual property right – nleashmy the knowledge economy, prabuddha ganguli, Tate Mc Graw Hill Publishing company ltd.,

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GEOTECHNICAL ENGINEERING LAB

LIST OF EXPERIMENTS

1. Atterberg's Limits (LL & PL)

2. Field density-core cutter and sand replacement method

3. Grain size analysis (Sieve and Hydrometer analysis)

4. Permeability of soil, constant and variable head test

5. Compaction test

6. CBR Test

7. Consolidation test

8. Unconfined compression test

9. Tri-axial Compression test

10. Direct shear test.

11. Vane shear test

Note: Any eight experiments may be completed.

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                                                                          0   - /3/-   2

ENGINEERING GEOLOGY LAB

1. Study of physical properties and identification of minerals referred under theory.

2. Megascopic and microscopic description and identification of rocks referred under theory.

3. Megascopic and microscopic identification of rocks & minerals.

4. Interpretation and drawing of sections for geological maps showing tilted beds, faults, uniformities

etc.

5. Simple Structural Geology problems.

LAB EXAMINATION PATTERN:

1. Description and identification of SIX minerals

2. Description and identification of Six (including igneous, sedimentary and metamorphic rocks)

3. Interpretation of a Geological map along with a geological section.

4. Simple strike and Dip problems