

JNTU-HYDERABAD

B. TECH (R09) Civil Engineering

(2-1 Syllabus)

Civil Engineering

Regulation: R09
Year: II Semester: I

Code	Subject	Internal	External	Total	Credits
53001	Mathematics-II	25	75	100	4
53002	Basic Electrical and Electronics Engineering	25	75	100	4
53003	Strength of Materials - I		25	75	3
53004	Surveying	25	75	100	3
53005	Fluid Mechanics	25	75	100	3
53006	Managerial Economics and Financial Analysis		25	75	4
53600	Surveying Lab-I	25	50	75	2
53601	Strength of Materials Lab		25	50	2

Branch: CE

Subject Code: 53001

Regulation: R09

Year: II Semester: I

MATHEMATICS -II

UNIT - I: Linear Systems:

Matrices: Elementary row transformations Rank Normal form - Echelon form
Consistency Solution of system of simultaneous linear homogeneous and non-homogeneous equations.

UNIT - II; Eigen values, Eigen vectors :

Eigen values, Eigen vectors properties Cayley- Hamilton Theor em - Inverse and powers of a matrix by Cayley-Hamilton theorem Diagonalization of matrix. Calculation of powers of matrix Modal and spectral matrices.

UNIT-III: Linear Transformations:

Real matrices Symmetric, skew - symmetric, orthogonal, Linear Transformation - Orthogonal Transformation. Complex matrices: Hermitian, Skew-Hermitian and Unitary Eigen values and Eigen vectors of complex matrices and their properties

UNIT - IV: Quadratic forms:

Quadratic forms- Reduction of quadratic form to canonical form Rank - Positive, negative definite - semi definite - index - signature - Sylvester law. Applications of Quadratic forms

UNIT-V: Fourier Series:

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 - VI : Introduction to Partial Differential Equations

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

UNIT - VII: Solution to Partial Differential Equations

Classification of second order linear Partial Differential Equations, solutions of one dimensional heat equation, wave equation and two-dimensional Laplace s equation under initial and boundary conditions.

UNIT-VIII: Fourier transforms:

Fourier integral theorem Fourier sine and cosine integrals. Fourier transforms Fourier sine and cosine transforms properties inverse transforms Finite Fourier transforms.

Text Books:

1. A text Book of Engineering Mathematics, Vol-II T. K. V. Iyengar, B. Krishna Gandhi and Others, S. Chand & Company.
2. A text Book of Engineering Mathematics, C. Sankaraiah, V. G. S. Book Links.
3. A text Book of Engineering Mathematics, Shahnaz Bathul, Right Publishers.
4. A text Book of Engineering Mathematics, P. Nageshwara Rao, Y. Narasimhulu & N. Prabhakar Rao, Deepthi Publications.

References:

1. A text Book of Engineering Mathematics, B. V. Raman, Tata Mc Graw Hill.
2. Advanced Engineering Mathematics, Irvin Kreyszig, Wiley India Pvt. Ltd.
3. A text Book of Engineering Mathematics, Thomson Book Collection.

Branch: CE

Subject Code: 53002

Regulation: R09

Year: II Semester: I

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 deltastar transformations.

UNIT II DC MACHINES

Principle of operation of DC Gener ator 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.

Branch: CE

Subject Code: 53003

Regulation: R09

Year: II Semester: I

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 saf ety 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 cantilver, 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 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 o stresses- Principle stresses and strains- analytical and graphical solutions- various theories of

failures like maximum principle stress theory maximum principle strain theory max. shear stress theory max. strain energy theory- max . 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 dia, and volume of thin cylinders Thin spherical shells.

UNIT - VIII THICK CYLINDERS :

Introduction Lamé s theory for thick cylinders Derivation of Lamé 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 Sar ah, New Delhi.
6. Strength of Materials by L.S.Srinath et al., Macmillan India Ltd., Delhi.
7. Strength of Materials by Bhavi Katti.

Branch: CE

Subject Code: 53004

Regulation: R09

Year: II Semester: I

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

LEVELING 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 Tacheometry. 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. Aror 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.

Branch: CE

Subject Code: 53005

Regulation: R09

Year: II Semester: I

FLUID MECHANICS

UNIT I

INTRODUCTION : Dimensions and units Physical properties of fluids specific gravity, viscosity, surface tension, vapor 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.

UNIT - II

Hydrostatic forces on submerged plane, Horizontal, Vertical, inclined and curved surfaces
Center of pressure. Derivations and problems.

UNIT - III

FLUID KINEMATICS : Description of fluid flow, Stream line, path line and streak lines and stream tube. Classification of flows : Steady, unsteady, uniform, nonuniform, laminar, turbulent, rotational and irrotational flows Equation of continuity

for one, two , 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, (Navier stokes equations (Explanatory) Momentum equation and its application forces on pipe bend.

UNIT - V

Boundary layer Theory:

Approximate Solutions of Navier Stoke s Equations Boundary layer concepts, Prandtl contribution, Characteristics of boundary layer along a thin flat plate, Vonkarmen momentum integral equation, laminar and turbulent Boundary layers

no deviations BL in transition, separation of BL, control of BL, flow around submerged objects-Drag and Lift- Magnus effect.

UNIT - VI

LAMINAR & TURBULENT FLOWS:

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, Venturi meter 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.Swaffield (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

Branch: CE

Subject Code: 53006

Regulation: R09

Year: II Semester: I

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 exceptions.

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 Ratio, P/E Ratio and EPS).

TEXT BOOKS:

1. Aryasri: Managerial Economics and Financial Analysis, 2/e, TMH, 2005.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2003.

REFERENCES:

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

11. Dwivedi:Managerial Economics, 6th Ed., Vikas.

Prerequisites: Nil

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

Branch: CE

Subject Code: 53600

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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 leveling (differential leveling)
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.

Branch: CE

Subject Code: 53601

Regulation: R09

Year: II Semester: I

STRENGTH OF MATERIALS LAB

1. Tension test
2. Bending test on (Steel / Wood) Cantilever beam.
3. Bending test on simple support 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 Major 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.