

2010-11
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
Kakinada

B.TECH. CIVIL ENGINEERING
COURSE STRUCTURE AND SYLLABUS

II Year

II Year I Sem				II Year II Sem			
S.No.	Subject	P	C	S.No.	Subject	P	C
1	Mathematics – III	4	4	1	Probability & Statistics	4	4
2	Electrical and Electronics Engineering	4	4	2	Managerial Economics and Financial Analysis	4	4
3	Mechanics of Materials	4	4	3	Strength of Materials	4	4
4	Construction Materials and Management	4	4	4	Hydraulics and Hydraulic Machinery	4	4
5	Surveying	4	4	5	Engineering Geology	4	4
6	Fluid Mechanics	4	4	6	Structural Analysis - I	4	4
7	Computer aided Engineering Drawing Practice	3	2	7	Fluid Mechanics and Hydraulic Machinery Lab	3	2
8	Strength of materials Lab	3	2	8	Surveying Field work	3	2
9	English communication Practice	2	0	9	English communication Practice	2	2
Total Credits			28	Total Credits			30

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**Kakinada****II YEAR B. TECH. C.E. I –SEM****MATHEMATICS – III****UNIT – I**

Bessel functions – properties – Recurrence relations – Orthogonality. Legendre polynomials – Properties – Rodrigue's formula – Recurrence relations – Orthogonality.

UNIT-II

Functions of a complex variable – Continuity – Differentiability – Analyticity – Properties – Cauchy-Riemann equations in Cartesian and polar coordinates. Harmonic and conjugate harmonic functions – Milne – Thompson method.

UNIT-III

Elementary functions: Exponential, trigonometric, hyperbolic functions and their properties – General power Z^c (c is complex), principal value.

UNIT-IV

Complex integration: Line integral – evaluation along a path and by indefinite integration – Cauchy's integral theorem – Cauchy's integral formula – Generalized integral formula.

UNIT-V

Complex power series: Radius of convergence – Expansion in Taylor's series, Maclaurin's series and Laurent series. Singular point – Isolated singular point – pole of order m – essential singularity.

UNIT-VI

Residue – Evaluation of residue by formula and by Laurent series - Residue theorem. Evaluation of integrals of the type

$$(a) \text{ Improper real integrals } \int_{-\infty}^{\infty} f(x)dx \quad (b) \int_c^{c+2\pi} f(\cos \theta, \sin \theta)d\theta$$

$$(c) \int_{-\infty}^{\infty} e^{imx} f(x)dx \quad (d) \text{ Integrals by identification.}$$

UNIT-VII

Argument principle – Rouche's theorem – determination of number of zeros of complex polynomials - Maximum Modulus principle - Fundamental theorem of Algebra, Liouville's Theorem.

UNIT-VIII

Conformal mapping: Transformation by e^z , $\ln z$, z^2 , z^n (n positive integer), $\sin z$, $\cos z$, $z + a/z$. Translation, rotation, inversion and bilinear transformation – fixed point – cross ratio – properties – invariance of circles and cross ratio – determination of bilinear transformation mapping 3 given points .

Text book

1. A text Book of Engineering Mathematics, Shahnaz Bathul, Prentice Hall of India.
2. A text Book of Engineering Mathematics, Vol-1 T. K. V. Iyengar, B. Krishna Gandhi and Others, S. Chand & Company.

Reference

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

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II YEAR B. TECH. C.E. I –SEM

ELECTRICAL AND ELECTRONICS ENGINEERING
Part-A Electrical Engineering

UNIT - I

ELECTRICAL CIRCUITS: Basic definitions, Types of network 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.

TEXT BOOKS:

1. Basic Electrical Engineering by Nagsarkar, Sukhija, Oxford Publications, 2nd edition

REFERENCE BOOKS:

1. Basic Electrical Engineering by M.S.Naidu and S.Kamakshiah, TMH Publications
2. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI Publications, 2nd edition

Part – B Electronics Engineering

UNIT V

DIODE AND ITS CHARACTERISTICS: PN Junction Diode, Symbol, V-I Characteristics, Diode Applications, Rectifiers – Half wave, Full wave and Bridge Rectifiers (Problems)

UNIT VI

TRANSISTORS: PNP and NPN Junction Transistor, Transistor as an Amplifier, Single Stage CE Amplifier, Frequency Response of CE Amplifier, Concepts of Feedback Amplifier, Necessary conditions for Oscillators, SCR Characteristics and applications

UNIT VII

INDUCTION HEATING: Theory of Induction Heating, Application to Industries

DIELECTRIC HEATING: Theory of Dielectric Heating and its Industrial Applications

ULTRASONICS: Generation, Flow detection and other Applications

UNIT VIII

TRANSDUCERS AND MEASURING INSTRUMENTS: Principles of Strain Gauge, LVDT, Thermocouples, Thermistors, Piezo-electric transistors, CRO Principles and application, Voltage, Current and Frequency Measurements, Digital Multimeters.

TEXT BOOKS:

1. Electronic Devices and Circuits, R.L. Boylestad and Louis Nashelsky, 9th edition, PEI/PHI 2006.
2. Industrial Electronics by G.K. Mittal, PHI

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II YEAR B.TECH. C.E. I –SEM

MECHANICS OF MATERIALS

UNIT – I

Introduction of Engineering Mechanics – Basic concepts System of Forces- Coplanar Concurrent Forces – Components in Space – Resultant- Moment of Forces and its Application – Couples and Resultant of Force System - Equilibrium of System of Forces- Free body diagrams- Equations of Equilibrium of Coplanar Systems and Spatial Systems.

UNIT – II

Friction: Types of friction – Limiting friction – Laws of Friction – static and Dynamic Frictions – Motion of Bodies – Wedge, Screw jack and differential Screw jack.

UNIT – III

Transmission of Power: Belt Drivers – Open, Crossed and compound belt drives –length of belt – tensions - tight side - slack side - Power transmitted and condition for maximum power.

UNIT – IV

Centroid and Center of Gravity: Centroids – Theorem of Pappus- Centroids of Composite figures – Centre of Gravity of Bodies - Area moment of Inertia: – Polar Moment of Inertia – Transfer – Theorems - Moments of Inertia of Composite Figures - product of Inertia - Transfer Formula for product of Inertia.

Mass Moment of Inertia: Moment of Inertia of Masses - Transfer Formula for Mass Moments of Inertia - Mass moment of inertia of composite bodies.

UNIT – V

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 – VI

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 – VII

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 – VIII

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

TEXT BOOKS:

- (1) Strength of Materials Vol. I by D.S. Prakasa Rao University Press
- (2) Engineering Mechanics by R.K. Bansal, Laxmi Publications(p) Ltd., New Delhi

REFERENCES:

1. Engineering Mechanics by S. Timashenko, D.H. Young and J.V. Rao
2. Strength of Materials by S.S. Rattan, Tata McGraw Hill Education Pvt., Ltd.,
3. Strength of materials by R.K. Rajput, S. Chand & Co, New Delhi.

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II YEAR B. TECH. C.E. I – SEM

CONSTRUCTION MATERIALS AND MANAGEMENT

UNIT – I

STONES, BRICKS AND TILES:

Properties of building stones – relation to their structural requirements. Classification of stones – Stone quarrying – precautions in blasting, Dressing of stone, Composition of good brick earth, various methods of manufacture of bricks. Comparison between clamp burning and kiln burning. Qualities of a good brick. Characteristics of good tile – manufacturing methods, Types of tiles. Use of Materials like aluminium, gypsum, glass and bituminous materials – their quality.

UNIT-II

MASONARY: Types of masonry, English and Flemish bonds, Rubble and Ashlar masonry, cavity and partition walls.

WOOD: Structure – properties – Seasoning of timber. Classification of various types of woods used in buildings – Defects in timber. Alternative materials for wood, Galvanized Iron, Fiber-reinforced plastics, steel, Aluminum.

UNIT – III

LIME AND CEMENT:

Lime: Various ingredients of lime – Constituents of lime stone – classification of lime – various methods of manufacture of lime.

Cement: Portland cement – Chemical Composition - hydration, Setting and Fineness of cement. Various types of cement and their properties. Various field and laboratory tests for Cement. Various ingredients of Cement concrete and their importance – various tests for concrete.

UNIT-IV

BUILDING COMPONENTS: Lintels, Arches, Vaults - stair cases – Types. Different types of floors-Concrete, Mosaic, Terrazzo floors, Pitched, flat and curved Roofs. Lean-to-Roof, Coupled Roofs, Trussed roofs- King and Queen Post Trusses. RCC Roofs, Madras Terrace/Shell Roofs.

FINISHINGS: Proofing Damp and water proofing- materials used. Plastering, pointing, white washing and distempering – Painting – Constituents of a paint – Types of paints – Painting of new/old Wood – Varnish – Form work and scaffolding.

UNIT - V

Aggregates: Classification of aggregate – Coarse and fine aggregates – Particle shape and Texture – Bond and strength of Aggregate – Specific gravity – Bulk density porosity and

Absorption – Moisture content of Aggregate – Bulking of sand- Sieve analysis – Grading curves – Fineness modulus- Grading requirements – Practical Grading – Road Note. No.4 method Grading of Fine and Coarse Aggregates – Gap graded aggregate.

Highway Materials – Soil, Aggregate and Bitumen- Tests on aggregates – Aggregate Properties and their Importance - Tests on Bitumen – Bituminous Concrete- Requirements of Design Mix- Marshall's Method of Bituminous Mix design.

UNIT – VI

GEOSYNTHETICS: Introduction, Functions and their Applications-tests on geo-textiles, geo-grids, geo-membranes and geo-composites

CONSTRUCTION EQUIPMENT: Crashing for optimum cost – Resources leveling and Resource allocation.

UNIT –VII

Planning of construction projects – scheduling, monitoring and controlling – Bar chart – CPM Network planning –computation of times and floats – their significance.

UNIT – VIII

PERT Networks – time estimates – event slack – probability of achieving project targets - comparison between CPM and PERT – network updating.

TEXT BOOKS:

1. Building material by S K Duggal – New Age International Publishers
2. Building Construction by B.C. Punmia, A.K. Jain and A.K. Jain - Laxmi Publications

REFERENCES:

1. PERT and CPM – Project planning and control with by Dr. B.C. Punmia & Khandelwal – Laxmi publications.
2. Construction and Geotechnical Methods in Foundation Engineering, - ROBERT M. KOERNER McGraw Hill.
3. Construction Planning, Equipment and methods by R.L. Peurifoy etal. – Tata McGraw Hill.

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II YEAR B. TECH. C.E. I –SEM

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 & 3), Tata McGraw Hill Publishing Co. Ltd. New Delhi.

REFERENCES:

1. Surveying and levelling by R. Subramanian, Oxford university press, New Delhi
2. Arora, K R “Surveying Vol 1, 2 & 3), Standard Book House, Delhi, 2004
3. Chandra A M, “Higher Surveying”, New Age International Pvt. Ltd., New Delhi.

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II YEAR B. TECH. C.E. I –SEM

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, non-uniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity for one, two , three dimensional flows – stream and velocity potential functions, flow net 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

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

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 McGraw Hill Pvt. Ltd.

REFERENCES:

1. Fluid Mechanics by Merie C. potter and David C. Wiggert, Cengage learning
2. Introduction to Fluid Machines by Edward J. Shaughnessy, Jr, Ira M. Katz and James P. Schaffer, Oxford University Press, New Delhi
3. Fluid Mechanics by A.K. Mohanty, Prentice Hall of India Pvt. Ltd., New Delhi

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II YEAR B. TECH. C.E. I –SEM

COMPUTER AIDED ENGINEERING DRAWING PRACTICE

PART A:

UNIT – I

PROJECTIONS OF PLANES & SOLIDS : Projections of Regular Solids inclined to both planes – Auxiliary Views. Sections and Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views.

UNIT – II

DEVELOPMENT AND INTERPENETRATION OF SOLIDS: Development of Surfaces of Right

Regular Solids – Prisms, Cylinder, Pyramid Cone and their parts.

Interpenetration of Right Regular Solids – Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone.

UNIT – III

ISOMETRIC PROJECTIONS : Principles of Isometric Projection – Isometric Scale – Isometric Views

– Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric

Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts.

TRANSFORMATION OF PROJECTIONS: Conversion of Isometric Views to Orthographic Views – Conventions.

UNIT – IV

PERSPECTIVE PROJECTIONS: Perspective View: Points, Lines, Plane Figures and Simple Solids,

Vanishing Point Methods(General Method only).

PART B:

UNIT – V

Introduction to Computer aided Drafting: Generation of points, lines, curves, polygons, dimensioning.

UNIT – VI

Types of modeling : object selection commands – edit, zoom, cross hatching, pattern filling, utility commands, 2D wire frame modeling, 3D wire frame modeling,.

UNIT – VII

View points and view ports: view point coordinates and view(s) displayed, examples to exercise different options like save, restore, delete , joint , single option.

UNIT-VIII

Computer aided Solid Modeling: Isometric projections, orthographic projections of isometric projections, Modeling of simple solids, Modeling of Machines & Machine Parts.

TEXT BOOKS :

1. Engineering Graphics, K.C. John, PHI Publications
2. Machine Drawing, K.L.Narayana, P. Kanniah and K. Venkata Reddy / New Age International Publishers.

References:

1. AutoCAD 2009, Galgotia Publications, New Delhi
2. Text book of Engineering Drawing with Auto-CAD, K. Venkata Reddy/B.S. Publications.
3. Engineering Drawing by N.D. Bhatt, Charotar Publications.

Mode of examination for Computer Aided Engineering Graphics Practice

The syllabus in respect of the subject "Computer Aided Graphics Practice" for II B Tech I sem (Mech, Civil, Automobile, Aeronautical, Mining Engg) students consists of two major portions

Part A: Unit I to IV - conventional drawing pattern

Part B: Unit V to VIII - computer lab pattern using any drafting packages

Classwork - 6 hrs per week & Credits - 4

Max Marks - 100 Internal Marks: 25 & External Marks: 75

It is suggested that the examination in respect of the above may be conducted on par with lab by the concerned college with the following pattern:

Mid Exam: I Mid Exam from Part A (first Four Units) - Conventional Drawing Exam

II Mid Exam Part B (from last Four Units) - In Computer Lab

End Exam: Duration - 4 hrs

Part A - Conventional Drawing test in Drawing Hall from Part A (first FOUR Units) - 2 hrs duration.

Part B - Exam in Computer Lab using any drafting package Part B (last four units) - 2 hrs duration.

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II YEAR B. TECH. C.E. I –SEM

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.

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II YEAR B. TECH. C.E. II –SEM

PROBABILITY AND STATISTICS

UNIT-I

Probability: Sample space and events – Probability – The axioms of probability – Some Elementary theorems - Conditional probability – Baye's theorem.

UNIT-II

Random variables – Discrete and continuous distributions - Distribution function.

UNIT-III

Binomial, Poisson, normal distribution – related properties. Moment generating function, Moments of standard distributions – properties.

UNIT-IV

Population and samples. Sampling distribution of mean (with known and unknown variance), proportion, variances. - Sampling distribution of sums and differences. Point and interval estimators for means, variances, proportions.

UNIT-V

Statistical Hypothesis – Errors of Type I and Type II errors and calculation. One tail, two-tail tests. Testing hypothesis concerning means, proportions and their differences using Z-test.

UNIT-VI

Tests of hypothesis using Student's t-test, F-test and χ^2 test.. Test of independence of attributes - ANOVA for one-way and two-way classified data.

UNIT-VII

Statistical Quality Control methods – Methods for preparing control charts – Problems using x-bar, p, R charts and attribute charts – Simple Correlation and Regression.

UNIT-VIII

Queuing Theory: Pure Birth and Death Process M/M/1 Model and Simple Problems.

TEXT BOOK

1. Probability and Statistics for Engineers, Miller and John E. Freund, Prentice Hall of India.
2. Probability and Statistics, D. K. Murugeson & P. Guru Swamy, Anuradha Publishers.

REFERENCE

1. Probability, Statistics and Random processes. T. Veerrajan, Tata Mc.Graw Hill, India.
2. Probability, Statistics and Queuing theory applications for Computer Sciences 2 ed, Trivedi, John Wiley.

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II YEAR B. TECH. C.E. II –SEM

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
Common to all Branches

Unit I

Introduction to Managerial Economics:

Introduction to Managerial Economics & Demand Analysis: Definition of Managerial Economics, Characteristics and Scope – Managerial Economics and its relation with other subjects- Basic economic tools in Managerial Economics

Demand Analysis: Meaning- Demand distinctions- Demand determinants- Law of Demand and its exceptions.

Unit-II

Elasticity of Demand & Demand Forecasting: Definition -Types of Elasticity of demand - Measurement of price elasticity of demand: Total outlay method, Point method and Arc method- Significance of Elasticity of Demand.

Demand Forecasting: Meaning - Factors governing demand forecasting - Methods of demand forecasting (survey of buyers' Intentions, Delphi method, Collective opinion, Analysis of Time series and Trend projections, Economic Indicators, Controlled experiments and Judgmental approach) - Forecasting demand for new products- Criteria of a good forecasting method.

Unit-III

Theory of Production and Cost Analysis: Production Function- Isoquants and Isocosts, MRTS, Law of variable proportions- Law of returns to scale- Least Cost Combination of Inputs, Cobb-Douglas Production function - 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.-Determination of Break-Even Point (simple problems) - Managerial Significance and limitations of BEP.

UNIT-IV

Introduction to Markets, Managerial Theories of the Firm & Pricing Policies: Market structures: Types of competition, Features of Perfect Competition, Monopoly and Monopolistic Competition. Price-Output Determination under Perfect Competition, Monopoly, Monopolistic Competition and Oligopoly Managerial theories of the firm - Marris and Williamson's models.

Pricing Policies: Methods of Pricing-Marginal Cost Pricing, Limit Pricing, Market Skimming Pricing, Penetration Pricing, Bundling Pricing, and Peak Load Pricing. Internet Pricing Models: Flat rate pricing, Usage sensitive pricing, Transaction based pricing, Priority pricing, charging on the basis of social cost, Precedence model, Smart market mechanism model.

Unit V

Types of Industrial Organization & Introduction to business cycles: Characteristic features of Industrial organization, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, State/Public Enterprises and their types.

Introduction to business cycles: Meaning-Phases of business cycles- Features of business cycles.

Unit VI

Introduction to Financial Accounting: Introduction to Double-entry system, Journal, Ledger, Trial Balance- Final Accounts (with simple adjustments)- Limitations of Financial Statements.

Unit VII

Interpretation and analysis of Financial Statement: Ratio Analysis – Liquidity ratios, Profitability ratios and solvency ratios – Preparation of changes in working capital statement and fund flow statement.

Unit VIII

Capital and Capital Budgeting: Meaning of capital budgeting, Need for capital budgeting – Capital budgeting decisions (Examples of capital budgeting) - Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR), IRR and Net Present Value Method (simple problems)

Text Books:

1. **J.V.Prabhakar Rao:** Managerial Economics and Financial Analysis, Maruthi Publications, 2011
2. **N. Appa Rao. & P. Vijaya Kumar:** ‘Managerial Economics and Financial Analysis’, Cengage Publications, New Delhi, 2011

References:

1. A R Aryasri - Managerial Economics and Financial Analysis, TMH 2011
2. Suma damodaran- Managerial Economics, Oxford 2011
3. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age International Publishers, 2011.

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II YEAR B. TECH. C.E. II –SEM

Strength of Materials

UNIT – I

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 – II

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.

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.

UNIT III

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.

THEORIES OF FAILURES: Introduction – 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 – IV

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 – V

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. Laterally loaded struts – subjected to uniformly distributed and concentrated loads – Maximum B.M. and stress due to transverse and lateral loading.

UNIT – VI

DIRECT AND BENDING STRESSES: Stresses under the combined action of direct loading and B.M. 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 B.M. about both axis.

UNIT – VII

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.

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 – VIII

ANALYSIS OF PIN-JOINTED PLANE FRAMES: Determination of Forces in members of plane, pin-jointed, perfect trusses by (i) method of joints and (ii) method of sections. Analysis of various types of cantilever and simply supported trusses by method of joints, method of sections.

TEXT BOOKS:

- (1) Mechanics of Materials- by B.C. Punmia, Lakshmi Publications, New Delhi.
- (2) Analysis of Structures-Vol.- I & II by V.N. Vazirani & M.M. Ratwani, Khanna Publications, New Delhi

REFERENCES:

1. Fundamentals of Solid Mechanics M.L. Gambhir, PHI Learning 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

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
KAKINADA**

II YEAR B. TECH. C.E. II –SEM

Hydraulics and Hydraulic Machinery

UNIT – I

OPEN CHANNEL FLOW: 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 G.V.F., 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-cavitation.

UNIT – VII

CENTRAIFUGAL-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- Cavitation.

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. Subramanya, Tata McGraw Hill Publishers
2. A text of Fluid mechanics and hydraulic machines by Dr. R.K. Bansal - Laxmi Publications (P) Ltd., New Delhi

REFERENCES:

1. Fluid mechanics and fluid machines by Rajput, S. Chand & Co.
2. Hydraulic Machines by Banga & Sharma Khanna Publishers.
3. Fluid Mechanics & Fluid Power Engineering by D.S. Kumar Kataria & Sons.

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II YEAR B. TECH. C.E. II –SEM

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 drawbacks. 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: Feldspar, Quartz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite. Study of other common economic minerals such as Pyrite, Hematite, Magnetite, Chlorite, 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 metamorphic rocks. Their distinguishing features, Megascopic study of Granite, Dolerite, Basalt, Pegmatite, Laterite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate.

UNIT – IV

STRUCTURAL GEOLOGY: Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults unconformities, and joints - their important types. Their importance In-situ and drift soils, common types of soils, their origin and occurrence in India, Stabilisation of soils.

UNIT – V

Ground water, Water table, common types of ground water, springs, cone of depression, geological 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, their causes and effect; measures to be taken to prevent their occurrence. Importance of study of ground water, earth quakes and land slides.

UNIT – VI

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 – VII

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. Factor's Contributing to the success of a reservoir. Geological factors influencing water Lightness and life of reservoirs.

UNIT – VIII

TUNNELS: Purposes of tunneling, Effects of Tunneling on the ground Role of Geological Considerations (ie. Tithological, structural and ground water) in tunneling over break and lining in tunnels.

TEXT BOOKS:

- 1) Principals of Engineering Geology by K.V.G.K. Gokhale – B.S publications
- 2) Engineering Geology by N. Chennkesavulu, McMillan, India Ltd. 2005.

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,

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
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II YEAR B. TECH. C.E. II –SEM

STRUCTURAL ANALYSIS – I

UNIT – I

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

UNIT – II

FIXED BEAMS – Introduction to statically indeterminate beams with U.D.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 – III

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-IV

Slope-Deflection Method: Introduction, derivation of slope deflection equation, application to continuous beams with and without settlement of supports.

UNIT – V

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.

UNIT – VI

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 – VII

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 sections, single point load, U.D. load longer than the span, U.D. load shorter than the span- Influence lines for forces in members of Pratt and Warren trusses.

UNIT –VIII

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

TEXT BOOKS:

1. Structural Analysis by V.D. Prasad Galgotia publications, 2nd Editions.
2. Analysis of Structures by T.S. Thandavamoorthy, Oxford University Press, New Delhi

REFERENCES:

1. Theory of Structures by Gupta, Pandit & Gupta; Tata McGraw Hill, New Delhi.
2. Theory of Structures by R.S. Khurmi, S. Chand Publishers
3. Structural analysis by R.C. Hibbeler, Pearson, New Delhi.

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II YEAR B.TECH. C.E. II –SEM

FLUID MECHANICS AND HYDRAULIC MACHINERY LAB

SYLLABUS:

1. Calibration of Venturimeter & Orifice meter
2. Determination of Coefficient of discharge for a small orifice by a constant head method.
3. Determination of Coefficient of discharge for an external mouth piece by variable head method.
4. Calibration of contracted Rectangular Notch and /or Triangular Notch
5. Determination of Coefficient of loss of head in a sudden contraction and friction factor.
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. Efficiency test on centrifugal pump.
12. Efficiency test on reciprocating pump.

LIST OF EQUIPMENT:

1. Venturimeter setup.
2. Orifice meter setup.
3. Small orifice setup.
4. External mouthpiece setup.
5. Rectangular and Triangular notch setups.
6. Friction factor test setup.
7. Bernoulli's theorem setup.
8. Impact of jets.
9. Hydraulic jump test setup.
10. Pelton wheel and Francis turbines.
11. Centrifugal and Reciprocating pumps.

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II YEAR B. TECH. C.E. II –SEM

SURVEYING LAB

LIST OF EXERCISES:

Part – I

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. Fly leveling (differential leveling)
8. One exercises on contouring.
9. Trigonometric Leveling - Heights and distance problem
10. Heights and distance using Principles of tachometric surveying

Part – II

11. Curve setting – different methods.
12. Determine of area using total station
13. Traversing using total station
14. Contouring using total station
15. Determination of remote height using total station
16. Distance, gradient, Diff, height between tow inaccessible points using total stations

LIST OF 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.
6. Theodolites, and leveling staffs.
7. Tachometers.
8. Total stations.

Note: Two experiments from part – I should be conducted in a one session. One experiment from Part – II should be conducted in one session.