

2007-2008

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD

B.TECH. CIVIL ENGINEERING

II YEAR II SEMESTER

SUBJECT	T	P/D	C	
Probability and Statistics	4+1*	0	4	
Building Planning and Drawing	2+1*	3	4	
Strength of Materials – II	4+1*	0	4	
Hydraulics and Hydraulic Machinery	4+1*	0	4	
Environmental Studies	4+1*	0	4	
Structural Analysis – I	4+1*	0	4	
Surveying Lab - II	0	3	2	
Fluid Mechanics and Hydraulic Machinery Lab	0	3	2	
TOTAL	28	6	3	28

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II YEAR B.TECH. C.E.II –SEM

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4+1* 0 4

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 – Distribution – Distribution function. Distribution

UNIT-III

Binomial and poisson distributions Normal distribution – related properties.

UNIT-IV

Sampling distribution: Populations and samples - Sampling distributions of mean (known and unknown) proportions, sums and differences.

UNIT-V

Estimation: Point estimation – interval estimation - Bayesian estimation.

UNIT-VI

Test of Hypothesis – Means– Hypothesis concerning one and two means– Type I and Type II errors. One tail, two-tail tests.

UNIT-VII

Tests of significance – Student's t-test, F-test, χ^2 test. Estimation of proportions.

UNIT-VIII

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

Text Books:

1. Probability & Statistics, T. K. V. Iyengar, B. Krishna Gandhi and Others, S. Chand & Company.
2. A text book of Probability & Statistics, Shahnaz Bathul, V. G. S. Book Links.

References:

1. Probability & Statistics, Arnold O. Allen, Academic Press.
2. Probability & Statistics for Engineers, Miller and John E. Freund, Prentice Hall of India.
3. Probability & Statistics, Mendan Hall, Beaver Thomson Publishers.
4. Probability & Statistics, D. K. Murugeson & P. Guru Swamy, Anuradha Publishers.

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BUILDING PLANNING AND DRAWING

PART-A

UNIT – I

Building Byelaws and Regulations:

Introduction – Terminology – Objectives of building byelaws – Floor area ratio (FAR) – Floor space Index (FSI) – Principles underlying building byelaws – classification of bye buildings – Open space requirements – built up area limitations – Height of Buildings – Wall thickness – lighting and ventilation requirement.

UNIT – II

Residential Buildings: Minimum standards for various parts of buildings – requirements of different rooms and their grouping – characteristics of various types of residential buildings.

UNIT – III

Public Buildings: Planning of Educational institutions, hospitals, dispensaries, Office buildings, banks, industrial buildings, hotels and motels, buildings for recreation.

UNIT – IV

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

PART-B

UNIT – V

SIGN CONVENTIONS AND BONDS: Brick, Stone, Plaster, Sand filling, Concrete, Glass, Steel, Cast iron, Copper alloys, Aluminium alloys etc., Lead, Zinc, tin, white lead etc., Earth, Rock, Timber and Marble. English bond & Flemish bond odd & even courses for one, one and half, two and two and half brick walls in thickness at the junction of a corner.

UNIT - VI

DOORS WINDOWS, VENTILATORS AND ROOFS: Panalled Door – paneled and glazed door, glazed windows – paneled windows – Swing ventilator – Fixed ventilator-Couple roof – Collar roof – Kind Post truss – Queen post truss.

UNIT – VII

SLOPED AND FLAT ROOF BUILDINGS

UNIT - VIII

Given line diagram with specification to draw, plan, sections section and elevation

FINAL EXAMINATION PATTERN:

The end examination paper should consist of Part A and Part B. Part A consist of five questions in planning portion out of which three questions are to be answered. Part B should consist of two questions from drawing part out of which one is to be answered in drawing sheet. Weight age for Part – A is 60% and Part- B is 40%.

TEXT BOOKS:

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

REFERENCE:

1. Building by laws bye state and Central Governments and Municipal corporations.

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STRENGTH OF MATERIALS – II

UNIT I

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 – II

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 – III

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 - IV

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

UNIT – V

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 – VI

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 – VII

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. A Text book of Strength of materials by R.K.Bansal –Laxmi Publications (P) ltd., New Delhi
2. Introduction to Strength of Materials by U.C. Jindal, Galgotia publications.
3. Strength of Materials by B.C. Punmia

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. Graw hill 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. Mechanics of Structures, by S.B. Junnarkar, Charotar Publishing House, Anand, Gujrat.

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HYDRAULICS AND HYRAULIC 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 speedmultistage 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 Mc.Grawhill Publishers
2. A text of Fluid mechanics and hydraulic machines by Dr. R.K. Bansal - Laxmi Publications (P) Ltd., New Delhi
3. Fluid Mechanics & Fluid Power Engineering by D.S. Kumar Kataria & Sons.

REFERENCES :

1. Fluid Mechanics, Hydraulic and Hydraulic Machines by Modi & Seth, Standard book house.
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. Hydraulic Machines by Banga & Sharma Khanna Publishers.

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ENVIRONMENTAL STUDIES

UNIT - I

Multidisciplinary nature of Environmental Studies: Definition, Scope and Importance – Need for Public Awareness.

UNIT - II

Natural Resources : Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems - Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, 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, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT - III

Ecosystems : Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the following ecosystem:

- a. Forest ecosystem
- b. Grassland ecosystem
- c. Desert ecosystem
- d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT - IV

Biodiversity and its conservation : Introduction - Definition: genetic, species and ecosystem diversity. - Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - Biodiversity at global, National and local levels. - India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. - Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT - V

Environmental Pollution : Definition, Cause, effects and control measures of :

- a. Air pollution
- b. Water pollution
- c. Soil pollution
- d. Marine pollution
- e. Noise pollution
- f. Thermal pollution
- g. Nuclear hazards

Solid waste Management : Causes, effects and control measures of urban and industrial wastes. - Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management: floods, earthquake, cyclone and landslides.

UNIT - VI

Social Issues and the Environment : From Unsustainable to Sustainable development -Urban problems related to energy -Water conservation, rain water harvesting, watershed management -Resettlement and rehabilitation of people; its problems and concerns. Case Studies -Environmental ethics: Issues and possible solutions. -Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. -Wasteland reclamation. – Consumerism and waste products. -Environment Protection Act. -Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution) Act -Wildlife Protection Act -Forest Conservation Act -Issues involved in enforcement of environmental legislation. -Public awareness.

UNIT - VII

Human Population and the Environment : Population growth, variation among nations. Population explosion - Family Welfare Programme. -Environment and human health. -Human Rights. -Value Education. -HIV/AIDS. -Women and Child Welfare. -Role of information Technology in Environment and human health. –Case Studies.

UNIT - VIII

Field work : Visit to a local area to document environmental assets River /forest grassland/hill/mountain -Visit to a local polluted site-Urban/Rural/industrial/ Agricultural Study of common plants, insects, birds. -Study of simple ecosystemspond, river, hill slopes, etc.

TEXT BOOK:

- 1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
- 2 Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE:

- 1 Textbook of Environmental Sciences and Technology by M. Anji Reddy, BS Publication.

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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.

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 section 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. Analysis of Structures-Vol I & Vol II by V.N. Vazirani & M.M.Ratwani, Khanna Publications, New Delhi.
2. Structural Analysis by V.D.Prasad Galgotia publications, 2nd Editions.
3. Analysis of Structures by T.S. Thandavamoorthy, Oxford University Press, New Delhi
4. Comprehensive Structural Analysis-Vol.I&2 by Dr. R. Vaidyanathan & Dr. P.Perumal- Laxmi publications pvt. Ltd., New Delhi
5. Basic structural Analysis by C.S. Reddy, Tata Mcgrawhill, New Delhi

REFERENCES:

1. Mechanics of Structures by S.B.Junnarkar, Charotar Publishing House, Anand, Gujrat
2. Theory of Structures by Gupta, Pandit & Gupta; Tat 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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SURVEYING LAB – 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 Leveling - 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. Det 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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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.