

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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

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

(54001) PROBABILITY AND STATISTICS

UNIT-I : Probability

Sample space and events – Probability – The axioms of probability – Some Elementary theorems - Conditional probability – Baye's theorem, Random variables – Discrete and continuous.

UNIT-II: Distributions

Binomial, Poisson & normal distributions related properties. Sampling distributions – Sampling distribution of means (σ known and Unknown)

UNIT-III: Testing of Hypothesis I

Tests of hypothesis point estimations – interval estimations Bayesian estimation. Large samples, Null hypothesis – Alternate hypothesis type I, & type II errors – critical region confidential interval for mean testing of single variance. Difference between the mean.

UNIT-IV : Testing of Hypothesis II

Confidential interval for the proportions. Tests of hypothesis for the proportions single and difference between the proportions.

UNIT-V: Small samples

Confidence interval for the t- distribution – Tests of hypothesis – t- distributions, F- distributions, χ^2 distribution. Test of Hypothesis –.

UNIT-VI

Correlation & Regression

Coefficient of correlation – Regression Coefficient – The lines of regression – The rank correlation

UNIT-VII**Queuing Theory**

Arrival Theorem - Pure Birth process and Death Process M/M/1 Model.

UNIT-VIII**Stochastic processes**

Introduction to Stochastic Processes – Markov process classification of states – Examples of Markov Chains, Stochastic Matrix, limiting probabilities.

TEXT BOOKS:

1. Probability & Statistics by D.K. Murugesan & P.Guru Swamy, Anuradha Publications.
2. Probability & Statistics for Engineers by G.S.S.Bhisma Rao, Scitech Publications.

REFERENCES:

1. Probability & Statistics by T.K.V.Iyengar & B.Krishna Gandhi & Others, S.Chand.
2. Probability & Statistics by William Mendenhall & Others, Cengage Publications.
3. Higher Engineering Mathematics by B.S. Grewal, Khanna Publications.
4. Higher Engineering Mathematics by Jain & S.K.R. Iyengar, Narasa Publications.
5. A first course in Probability & Statistics by B.L.S. Prakasa Rao, World Scientific.
6. Probability & Statistics for Engineers, Miller and John E. Freund, Prentice Hall of India.

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(54002) STRENGTH OF MATERIALS – II

UNIT – I**TORSION OF CIRCULAR SHAFTS :**

Theory of pure torsion – Derivation of Torsion equations : $T/J = q/r = \tau/\rho$ – 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

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 - VIII

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.

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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(54003) 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. 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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(54004) 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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(54005) STRUCTURAL ANALYSIS – I

UNIT – I

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-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

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 – 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 Bhavikatti - 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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(54006) 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 Finishing's

Brick masonry - types - bonds ; Stone masonry - types ; Composite

masonry – Brick-stone composite ; Concrete, Reinforced brick.

Finishers : 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 Hazards – 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 Duggal, New Age International
2. Building Construction by PC Verghese PHI.
3. Construction Technology – Vol – I & II by R. Chuddy, Longman UK.

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(54600) COMPUTER AIDED DRAFTING OF BUILDINGS

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

Text Books :

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

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(54601) 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. 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.