

**BASICS OF ECONOMICS AND MANAGEMENT**  
**HUM – 201 E**

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Sessional      :    50 Marks  
Theory          :    100 Marks  
Total            :    150 Marks  
Duration of Exam.:    3 Hrs.

**UNIT-I**

Meaning of Industrial Economic, Production Function, its types, Least Cost Combination, Law of Variable Proportion, Laws of Return – Increasing, Constant & Diminishing.

Fixed & variable costs in short run & long run, opportunity costs, relation between AC & MC, U-shaped short run AC Curve.

Price & Output Determination under Monopoly in short run & long run. Price Discrimination, Price Determination under Discriminating Monopoly. Comparison between Monopoly & Perfect Competition.

**UNIT-II**

Meaning of Management, Characteristics of Management, Management Vs. Administration, Management – Art, Science & Profession, Fayol's Principles of Management, Human relations approach, functions of management

**UNIT-III**

**Planning & Organizing:**

Planning, steps in planning, Planning premises, difference between planning policy & strategy, Authority & responsibility, centralization & decentralization.

**UNIT-IV**

Staffing, Directing & Controlling- Manpower, planning, Recruitment & selection styles of leadership, communication process and barriers, control process and steps in controlling

**Note :** Eight questions are to be set taking two from each unit. The students are required to attempt five questions in all, taking at least one from each unit.

**TEXT BOOKS :**

1. "Modern Economic Theory" Dewett, K.K., S. Chand & Co.
2. "Economic Analysis" K.P. Sundharam & E.N. Sundharam (Sultan Chand & Sons).
3. "Micro Economic Theory" M.L. Jhingan (Konark Publishers Pvt. Ltd.).
4. "Principles of Economics" M.L. Seth (Lakshmi Narain Aggarwal Educational Publishers – Agra).
5. "An Introduction to Sociology", D.R. Sachdeva & Vidya Bhusan.
6. "Society – An Introductory Analysis", R.M. Maclver Charles H. Page.
7. "Principles and Practices of Management : R.S. Gupta; B.D. Sharma; N.S. Bhalla; Kalyani.

**REFERENCE BOOKS**

1. "Organization and Management : R.D. Aggarwal, Tata McGraw Hill.
2. Business Organization and Management : M.C. Shukla

**B. Tech. IV Semester (Civil)**  
**CE-202E STRUCTURAL ANALYSIS-II**

L T P/D Total  
3 2 - 5

Max. Marks: 150  
Theory: 100 marks  
Sessionals: 50 marks  
Duration: 3 hours

**UNIT-I**

**Statically Indeterminate Structures:**

Introduction, Static and Kinematic Indeterminacies, Castigliano's theorems, Strain energy method, Analysis of frames with one or two redundant members using Castigliano's 2<sup>nd</sup> theorem.

**UNIT-II**

**Slope deflection and moment Distribution Methods:**

Analysis of continuous beams & portal frames, Portal frames with inclined members.

**UNIT-III**

**Column Analogy Method:**

Elastic centre, Properties of analogous column, Applications to beam & frames.

**Analysis of Two hinged Arches:**

Parabolic and circular Arches, Bending Moment Diagram for various loadings, Temperature effects, Rib shortening, Axial thrust and Radial Shear force diagrams.

**UNIT-IV**

**Unsymmetrical Bending**

Introduction Centroidal principal axes of sections, Bending stresses in beam subjected to unsymmetrical bending, shear centre, shear centre for channel, Angles and Z sections.

**Cable and suspension Bridges:**

Introduction, uniformly loaded cables, Temperature stresses, three hinged stiffening Girder and two hinged stiffening Girder.

**Note for Paper-setter:** EIGHT questions are to set selecting at least TWO questions from each unit, covering entire syllabus. Students will be required to attempt FIVE questions selecting at least ONE question from each unit.

**BOOKS:**

1. Statically Indeterminate Structures, C.K. Wang, McGraw Hill Book Co., New York.
2. Advanced Structural Analysis, A.K. Jain, Nem Chand & Bros., Roorkee.
3. Indeterminate Structures, R.L. Jindal, S. Chand & Co., New Delhi.
4. Theory of Structures, Vol. I, S.P. Gupta & G.S.Pandit, Tata McGraw Hill, New Delhi.

**B Tech IV semester (civil)**  
**CE-204E DESIGN OF STEEL STRUCTURES-I**

L T P/D Total  
3 - 2 5

Max. Marks: 150  
Theory: 100 Marks  
Sessional : 50 Marks  
Duration 3 Hours

**UNIT-I**

**Introduction:**

Properties of structural steel. I.S. Rolled sections and I.S. specification.

**Connections:**

Importance, various types of connections, simple and moment resistant, riveted, bolted and welded connections.

**Design of Tension Members:**

Introduction, types of tension members, net sectional areas, design of tension members, lug angles and splices.

**UNIT-II**

**Design of Compression Members:**

Introduction, effective length and slenderness ratio, various types of sections used for columns, built up columns, necessity, design of built up columns, laced and battened columns including the design of lacing and battens, design of eccentrically loaded compression members.

**Column Bases and Footings:**

Introduction, types of column bases, design of slab base and gusseted base, design of gusseted base subjected to eccentrically loading, design of grillage foundations.

**UNIT-III**

**Design of Beams:**

Introduction, types of sections, general design criteria for beams, design of laterally supported and unsupported beams, design of built up beams, web buckling, web crippling and diagonal buckling.

**UNIT-IV**

**Gantry Girders:**

Introduction, various loads, specifications, design of gantry girder.

**Plate Girder:**

Introduction, elements of plate girder, design steps of a plate girder, necessity of stiffeners in plate girder, various types of stiffeners, web and flange splices (brief introduction), Curtailment of flange plates, design beam to column connections: Introduction, design of framed and seat connection.

**DRAWINGS:**

1. Structural drawings of various types of welded connections (simple and eccentric)
2. Beam to column connections (framed & seat connections)
3. Column bases- slab base, gusseted base and grillage foundation.
4. Plate girder.
5. Roof truss.

**Note for Paper-setter:** EIGHT questions are to set selecting at least TWO questions from each unit, covering entire syllabus. Students will be required to attempt FIVE questions selecting at least ONE question from each unit.

**Books:**

1. Design of steel structures, A.S.Arya & J.L.Ajmani, Nem chand & Bros., Roorkee.
2. Design of steel structures, M.Raghupati, TMH Pub., New Delhi.
3. Design of steel structures, S.M.A.Kazmi & S.K.Jindal, Prentice Hall, New Delhi.
4. Design of steel structures, S.K.Duggal, TMH Pub., New Delhi.

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**B. Tech. IV Semester (Civil)**  
**CE-206E FLUID MECHANICS-II**

L	T	P/D	Total
3	2	-	5

Max. Marks:	150
Theory:	100 marks
Sessionals:	50 marks
Duration:	3 hours

**UNIT-I**

**Laminar Flow:**

Navier Stoke's equation, Laminar flow between parallel plates, Couette flow, laminar flow through pipes-Hagen Poiseuille law, laminar flow around a sphere-Stokes'law.

**Flow through pipes:**

Types of flows-Reynold's experiment, shear stress on turbulent flow, boundary layer in pipes-Establishment of flow, velocity distribution for turbulent flow in smooth and rough pipes, resistance to flow of fluid in smooth and rough pipes, Stanton and Moody's diagram. Darcy's weisbach equation, other energy losses in pipes, loss due to sudden expansion, hydraulic gradient and total energy lines, pipes in series and in parallel, equivalent pipe, branched pipe, pipe networks, Hardy Cross method, water hammer.

**UNIT-II**

**Drag and Lift:**

Types of drag, drag on a sphere, flat plate, cylinder and airfoil, development of lift on immersed bodies like circular cylinder and airfoil.

**Open Channel Flow:**

Type of flow in open channels, geometric parameters of channel section, uniform flow, most economical section (rectangular and trapezoidal), specific energy and critical depth, momentum in open channel, specific force, critical flow in rectangular channel, applications of specific energy and discharge diagrams to channel transition, metering flumes, hydraulic jump in rectangular channel, surges in open channels, positive and negative surges, gradually varied flow equation and its integration, surface profiles.

**UNIT-III**

**Compressible flow:**

Basic relationship of thermodynamics continuity, momentum and energy equations, propagation of elastic waves due to compression of fluid, Mach number and its significance, subsonic and supersonic flows, propagation of elastic wave due to disturbance in fluid mach cone, stagnation pressure.

**UNIT-IV**

**Pumps and Turbines:**

Reciprocating pumps, their types, work done by single and double acting pumps. Centrifugal pumps, components and parts and working, types, heads of a pump-statics and manometric heads,. Force executed by fluid jet on stationary and moving flat vanes, Turbines-classifications of turbines based on head and specific speed, component and working of Pelton wheel and Francis turbines, cavitation and setting of turbines.

**Note for Paper-setter:** EIGHT questions are to set selecting at least TWO questions from each unit, covering entire syllabus. Students will be required to attempt FIVE questions selecting at least ONE question from each unit.

**Books:**

- 1     Hydraulics & Fluid Mechanics by P.N.Modi and S.M.Seth
- 2     Flow in Open Channels by S.Subraminayam
- 3     Introduction to Fluid Mechanics by Robert N.Fox & Alan T.Macnold

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**B. Tech. (Civil) IV Semester  
CE-208E SOIL MECHANICS**

L T P/D Total  
3 2 - 5

Max. Marks: 150  
Theory: 100 marks  
Sessionals: 50 marks  
Duration: 3 hours

**UNIT-I**

**Soil Formation and Composition**

Introduction, soil and rock, Soil Mechanics and Foundation Engineering, origin of soils, weathering, soil formation, major soil deposits of India, particle size, particle shape, interparticle forces, soil structure, principal clay minerals.

**Basic Soil Properties**

Introduction, three phase system, weight-volume relationships, soil grain properties, soil aggregate properties, grain size analysis, sieve analysis, sedimentation analysis, grain size distribution curves, consistency of soils, consistency limits and their determination, activity of clays, relative density of sands.

**Classification of soils**

Purpose of classification, classification on the basis of grain size, classification on the basis of plasticity, plasticity chart, Indian Standard Classification System.

**Permeability of Soils**

Introduction, Darcy's law and its validity, discharge velocity and seepage velocity, factors affecting permeability, laboratory determination of coefficient of permeability, determination of field permeability, permeability of stratified deposits.

**UNIT-II**

**Effective Stress Concept**

Principle of effective stress, effective stress under hydrostatic conditions, capillary rise in soils, effective stress in the zone of capillary rise, effective stress under steady state hydro-dynamic conditions, seepage force, quick condition, critical hydraulic gradient, two dimensional flow, Laplace's equation, properties and utilities of flownet, graphical method of construction of flownets, piping, protective filter.

**Compaction**

Introduction, role of moisture and compactive effect in compaction, laboratory determination of optimum moisture content, moisture density relationship, compaction in field, compaction of cohesionless soils, moderately cohesive soils and clays, field control of compaction.

**UNIT-III**

**Vertical Stress below Applied Loads**

Introduction, Boussinesq's equation, vertical stress distribution diagrams, vertical stress beneath loaded areas, Newmark's influence chart, approximate stress distribution methods for loaded areas, Westergaard's analysis, contact pressure.

**Compressibility and Consolidation**

Introduction, components of total settlement, consolidation process, one-dimensional consolidation test, typical void ratio-pressure relationships for sands and clays, normally consolidated and over consolidated clays, Casagrande's graphical method of estimating pre-consolidation pressure, Terzaghi's theory of one-dimensional primary consolidation, determination of coefficients of consolidation, consolidation settlement, Construction period settlement, secondary consolidation.

**UNIT-IV**

### **Shear Strength**

Introduction, Mohr stress circle, Mohr-Coulomb failure-criterion, relationship between principal stresses at failure, shear tests, direct shear test, unconfined compression test, triaxial compression tests, drainage conditions and strength parameters, Vane shear test, shear strength characteristics of sands, normally consolidated clays, over-consolidated clays and partially saturated soils, sensitivity and thixotropy.

### **Earth Pressure**

Introduction, earth pressure at rest, Rankine's active & passive states of plastic equilibrium, Rankine's earth pressure theory, Coulomb's earth pressure theory, Culmann's graphical construction, Rebhann's construction.

**Note for Paper-setter:** EIGHT questions are to set selecting at least TWO questions from each unit, covering entire syllabus. Students will be required to attempt FIVE questions selecting at least ONE question from each unit.

### **Books Recommended**

1. Basic and Applied Soil Mechanics by Gopal Ranjan, ASR Rao, New Age International(P)Ltd.Pub.N.Delhi.
2. Soil Engg. in Theory and Practice, Vol .I, Fundamentals and General Principles by Alam Singh, CBS Pub.,N.Delhi.
3. Engg.Properties of Soils by S.K.Gulati, Tata-Mcgraw Hill,N.Delhi.
4. Geotechnical Engg. by P.Purshotam Raj,Tata Mcgraw Hill.
5. Principles of Geotechnical Engineering by B.M.Das,PWS KENT, Boston.

**B. Tech IV Semester (Civil)**  
**CE-210E SURVEYING -II**

L T P/D Total  
3 1 - 4

Max.Marks: 150  
Theory: 100marks  
Sessionals: 50 marks  
Duration: 3 hrs.

**UNIT-I**

**Trigonometrical Levelling:**

Introduction, height and distances-base of the object accessible, base of object inaccessible, geodetical observation, refraction and curvature, axis signal correction, difference in elevation between two points.

**Triangulation:**

Triangulation systems, classification, strength of figure, selection of triangulation stations, grade of triangulation, field work of triangulation, triangulation computations, introduction to E.D.M. instruments.

**UNIT-II**

**Survey Adjustment and Treatment of Observations:**

Types of errors, definition of weight of an observation, most probable values, law of accidental errors, law of weights, determination of probable error (different cases with examples) principle of least squares, adjustment of triangulation figures by method of least squares.

**UNIT-III**

**Astronomy:**

Definitions of astronomical terms, star at elongation, star at prime vertical star at horizon, star at culmination, celestial coordinate systems, Napier's rule of circular parts, various time systems: sidereal, apparent, solar and mean solar time, equation of time-its cause.

**UNIT-IV**

**Elements of Photogrammetry:**

Introduction: types of photographs, types of aerial photographs, aerial camera and height displacements in vertical photographs, stereoscopic vision and stereoscopies, height determination from parallax measurement, flight planning,

**Introduction of remote sensing and its systems:**

Concept of G.I.S and G.P.S. -Basic Components, data input, storage & output.

**Note for Paper-setter:** EIGHT questions are to set selecting at least TWO questions from each unit, covering entire syllabus. Students will be required to attempt FIVE questions selecting at least ONE question from each unit.

**Books Recommended**

- 1 Surveying Vol.2 by B.C.Punmia
- 2 Surveying Vol.3 by B.C.Punmia
- 3 Surveying Vol2 by T.P.Kanitkar
- 4 Higher Surveying by A M Chandra

**B. Tech IV Semester (Civil)**  
**CE-212E FLUID MECHANICS-II (P)**

L	T	P/D	Total
-	-	2	2

Max. Marks:75  
Sessionals: 50 mark  
Viva-voce: 25 marks  
Duration: 3 hrs.

- 1 To determine the coefficient of drag by Stoke's law for spherical bodies.
- 2 To study the phenomenon of cavitation in pipe flow.
- 3 To determine the critical Reynold's number for flow through commercial pipes.
- 4 To determine the coefficient of discharge for flow over a broad crested weir.
- 5 To study the characteristics of a hydraulic jump on a horizontal floor and sloping glacis including friction blocks.
- 6 To study the scouring phenomenon around a bridge pier model.
- 7 To study the scouring phenomenon for flow past a spur.
- 8 To determine the characteristics of a centrifugal pump.
- 9 To study the momentum characteristics of a given jet.
- 10 To determine head loss due to various pipe fittings.

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**B. Tech. IV Semester (Civil)**  
**CE-214E SOIL MECHANICS (P)**

L	T	P/D	Total
-	-	2	2

Max.Marks:75  
Sessional:50 marks  
Pract./ Viva-Voce:25 marks  
Duration:3 hrs.

1. Visual Soil Classification and water content determination.
2. Determination of specific gravity of soil solids.
3. Grain size analysis-sieve analysis.
4. Liquid limit and plastic limit determination.
5. Field density by:
  - i) Sand replacement method
  - ii) Core cutter method
6. Proctor's compaction test.
7. Coefficient of permeability of soils.
8. Unconfined compressive strength test.
9. Direct shear test on granular soil sample.
10. Unconsolidated undrained (UU) triaxial shear test of fine grained soil sample.

**BOOKS**

- 1 Soil Testing for Engineers by S.Prakash, PK Jain, Nem Chand & Bros.,Roorkee.
- 2 Engineering Soil Testing by Lambi, Wiley Eastern.
- 3 Engineering Properties of Soils and their Measurement by J.P.Bowles, McGraw Hill.
- 4 Soil Engineering in Theory and Practice, Vol.II, Geotechnical Testing and Instrumentation by Alam Singh, CBS Pub.

**B. Tech. IV Semester(Civil)**  
**CE-216E SURVEYING-II(P)**

L	T	P/D	Total
-	-	2	2

Max. Marks: 75  
Sessionals: 50 marks  
Viva-voce: 25 marks  
Duration: 3 hrs.

1. **Theodilite:**  
Study of theodolite, measurement of horizontal angle, measurement of vertical angle, Permanent adjustment.
- 2 **Tacheometry:**  
Tacheometric constants, calculating horizontal distance and elevations with the help of tacheometer.
- 3 **Curves:**  
Setting of simple circular curves by off set method, off set from chord produced, off set from long chord and by deflection angle method.
- 4 **Triangulation:**  
An exercise of triangulation including base line measurement.

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