# DCE-401 (ADVANCE SURVEYING)

## UNIT-I

**PLANE TABLE SURVEY:** Principles of plane table survey. Accessories required. Setting out of plane table , Leveling ,Centering and orientation. Methods of plane table surveying – Radiation, Intersection, and Traversing. Merits and Demerits of plane table Surveying. Situations where plane table survey is used. Use of Telescopic Alidade.

## UNIT-II

**THEODOLITE SURVEY:** Components of Transit Theodolite and Their functions. Technical terms used. Temporary adjustments of Transit Theodolite. errors eliminated by method of repetition. Measurement of Deflection angle, horizontal angle & Vertical angle. Measurement of magnetic bearing of a line. Prolonging a Straight line. Sources of errors in Theodolite Surveying. Permanent adjustment of transit Theodolite. Traversing with Theodolite,Calculation of bearings from angles. Traverse Computation - Latitude, Departure Consecutive.

## UNIT-III

**TACHEOMETRIC SURVEY:** Principle of Tacheometry. Essential requirements of Tacheorneter. Use of Theodolite as a Tacheometer with staff held in vertical and fixed hair method (No derivation). Determination of tacheometric constants, simple numerical problems on above topics

## UNIT-IV

**CURVES:** Types of curves used in road and railway alignments. Notations of simple circular curve. Designation of curve by radius and degree of curves. Method of Setting out curve by offset from Long chord method and Rankine's method of deflection. angles. Simple Numerical problems on above topics

## UNIT-V

**ADVANCED SURVEY EQUIPMENTS:** Construction and use of one second Micro Optic Theodolite, Electronic Digital Theodolite. Features of Electronic Theodolite Principle of E.D.M, Components of E.D.M and their functions, use of E.D.M. Total station , Aerial survey , Remote sensing and its application.

## REFERENCE BOOKS:

1. Surveying and Levelling, N N Basak, Tata Mc Graw-Hill.
2. Surveying and Levelling Part I and II, T .P. Kanetkar & S. V, Kulkarni, PuneVidhyarthi Griha Prakashan.
3. Surveying and Levelling Vol. I and II Dr. B. C. Punamiya Laxmi Publication.
4. Text book of Surveying, S.K.Husain, M.S. Nagaraj S. Chand and company.
5. Surveying and Levelling Vol. I and II, S. K. Duggal, Tata Mc Graw-Hill.
6. Plane Surveying, A.M.Chandra, New Age International Publishers.
7. Higher Surveying, A.M.Chandra New Age International Publishers.

# DCE-402 (SOIL MECHANICS)

## UNIT-I

**PHYSICAL PROPERTIES OF SOIL:** Soil as a three phase system. Water content, Determination of water content by oven drying method. Void ratio, porosity and degree of saturation, density index. Unit weight of soil mass – bulk unit weight, dry unit weight, unit weight of solids, saturated unit weight, submerged unit weight. Determination of bulk unit weight and dry unit weight by core cutter method and sand replacement method. Specific gravity, determination of specific gravity by pycnometer.

## UNIT-II

**CLASSIFICATION OF SOIL :** Field identification tests of fine grained soil, IS. classification chart. Consistency of soil, stages of consistency, Atterberg's. limits of consistency. Determination of liquid limit, plastic limit and shrinkage limit as per IS code. Classification of fine grained soil by using plasticity chart. Seive analysis of soil and sedimentation of soil, log scale of particle size. Strokes law, Consistency limit diagram. Particle size distribution, mechanical sieve analysis, effective diameter of soil, Uniformity coefficient and coefficient of curvature, well graded and uniformly graded soils.

## UNIT-III

**PERMEABILITY OF SOIL & SEEPAGE ANALYSIS :** Permeability. Laminar and turbulent flow. Importance of permeability. Darcy's law of permeability, coefficient of permeability, typical values of coefficient of permeability for different soil. Factors affecting permeability. Determination of coefficient of permeability. Seepage through earthen structures, seepage velocity, seepage pressure, phreatic line, flow lines and equipotential lines. Flow net, characteristics of flow net, application of flow net.

## UNIT-IV

**SHEAR STRENGTH OF SOIL :** Shear failure of soil, field situation of shear failure. Concept of shear strength of soil. Components of shearing resistance of soil. Purely cohesive and cohesion less soils. Laboratory determination of shear strength of soil, plotting strength envelope, determining shear strength parameters of soil.

## UNIT-V

**COMPACTION OF SOIL & STABILIZATION:** Concept of compaction, purpose of compaction. Standard proctor test , Compaction curve, optimum moisture content, maximum dry density, Zero air voids line. Modified proctor test. Factors affecting compaction. Field methods of compaction. CBR test, significance of CBR value. Difference between compaction and consolidation. Concept of soil stabilization & its necessity Different methods of soil stabilization.

**LIST OF EXPERIMENT:**

1.Determination of water content of given soil sample by oven drying method as per IS Code.

2. Determination of bulk unit weight dry unit weight of soil in field by core cutter method as per IS Code.

3. Determination of bulk unit weight dry unit weight of soil in field by sand replacement method as per IS Code.

4. Determination of Liquid limit & Plastic limit of given soil sample as per IS Code.

5.Determination of grain size distribution of given soil sample by mechanical sieve analysis as per IS Code.

6.Determination of CBR value of given soil sample.

**REFERENCE BOOKS:**

1. Soil Mechanics & Foundation Engineering, Dr. B. C. Punmia, Standard Book house, New Delhi.

2. Soil Mechanics & Foundation Engineering, V.N.S. Murthi Tata McGraw Hill , New Delhi.

3. Soil Mechanics, B. J. Kasmalkar Pune Vidhyarti Griha, Pune

4. Geo-technical Engineering, Gulhati & Dutta Tata McGraw Hill , New Delhi

# DCE-403 (MECHANICS OF STRUCTURE)

## UNIT-I

**STRESS & STRAIN :** Definition of rigid body, plastic body, mechanical properties of metal such as elasticity & elastic limit . Definition of stress, strain, modulus of elasticity, S.I. Unit. Stress-strain curve for mild steel and HYSD bar, percentage elongation. Deformation of body- due to axial load, stepped c/s due to axial load, max. stress and min. stress induced. Stresses in bars of composite section & deformation. Shear stress, shear strain & modulus of rigidity, state of simple shear, punching shear.

## UNIT-II

**ELASTIC CONSTANTS & PRINCIPAL STRESSESS :** Definition of lateral strain, Poisson's ratio, bulk modulus, Change in lateral dimensions. Volumetric strain due to uni-axial force and change in volume. Biaxial and tri-axial stresses and volumetric strain & change in volume. Relation between modulus of elasticity, modulus of rigidity and bulk modulus. Definition of principal planes & stresses. Strain Energy : Types of loading, Definition of strain energy, modulus of resilience and proof resilience.

## UNIT-III

**SHEAR FORCE AND BENDING MOMENT :** Types of beams, types of loading, support reactions for determinate structures. Concept of shear force and bending moment, sign convention. S.F. and BMD for simply supported beams, overhanging beams and cantilever subjected to point loads, UDL and couples, point of contra flexure.

**MOMENT OF INERTIA :** Concept of M.I, M.I of plane areas. Parallel axis and perpendicular axis theorem, M.I of composite sections, built up sections, symmetrical and unsymmetrical sections, radius of gyration & polar moment of inertia.

## UNIT-IV

**STRESSES IN BEAMS:** Bending Stresses in Beams: Concept of pure bending, theory of simple bending, assumptions in theory of bending, neutral axis, bending stresses and their nature, bending stress distribution diagram, moment of resistance. Application of theory of bending. Shear stresses in beams, Shear stress equation, shear stress distribution for type section. Relation between max. shear stress and average shear stress.

## UNIT-V

**ANALYSIS OF TRUSSES:** Definition frames, classification of frames, perfect, imperfect, redundant and deficient frame, relation between members and joints, assumption in analysis. Method of joint. COLUMNS : End conditions, and equivalent length. Slenderness ratio classification as per mode of failure. Euler's and Rankine's formulae. Use of Euler's and Rankine's formulae in solving various problems.

## List of experiments:

1.Torsion test on mild steel rod
2. Impact test on metal specimen
3. Hardness test on metals - Brinnell and Rockwell Hardness Number
4. Deflection test on beams
5. Compression test on helical springs
6. Strain Measurement using Rosette strain gauge

## REFERENCE BOOKS:

1 Strength of Materials F. L. Singer, Harpe Collins Publishers India , Delhi
2. Strength of Materials, R. S. Khurmi, S. Chand & Company, Delhi
3 Mechanics of Structures, S. B. Junnarkarvolume –I & II, Charotar Publishing House, Anand.
4 Strength of Materials, Sadhu Singh.

# DCE-404 (TRANSPORTATION ENGG-I)

## UNIT-I

**OVERVIEW OF TRANSPORTATION ENGINEERING :** Role of transportation in the development of nation. Modes of transportation system – roads, railway, airways, waterways, Importance of each mode, comparison and their relative merits and demerits. Necessity & importance of Cross drainage works for roads & railways.

## UNIT-II

**RAILWAY ENGINEERING :** Alignment and Gauges, Classification of Indian Railways, zones of Indian Railway. Alignment- Factors governing rail alignment. Rail Gauges – types, factors affecting selection of gauge. Rail track cross sections – standard cross section of BG & M.G Single & double line in cutting and embankment. Permanent ways.

## UNIT-III

**IDEAL REQUIREMENT, COMPONENT PARTS :** Rails – function & its types. Rail Joints – requirements, types, Creep of rail - causes & prevention of creep. Sleepers – functions & Requirement, types & their suitability, sleeper density. Ballast – function & different types with their properties, relative merits & demerits. Rail fixtures & fastenings. Gradient & its types, Super elevation, limits of Super elevation on curves, Cant deficiency, negative cant. Definition of point & crossing. Inspection of points and crossings. Station and Yards : Site selection for railway stations, Requirements of railway station, Types of stations & various types of yards.

## UNIT-IV

**BRIDGE ENGINEERING :** Site selection and investigation Factors affecting selection of site of a bridge. Bridge alignment, Classification of bridges according to function, material, span, size, position of HFL. Component parts of bridge. Plan & sectional elevation of bridge showing component parts of substructure & super structure. Different terminology used in bridges etc. Foundation-function, types, requirements. Abutment, Wing walls & Bearing – functions & types. Permanent and Temporary Bridges.

## UNIT-V

**TUNNEL ENGINEERING :** Definition, necessity, advantages, disadvantages. Classification of tunnels. Shape and Size of tunnels. Tunnel Cross sections for highway and railways. Tunnel investigations and surveying –Tunnel surveying locating center line on ground. Shaft - its purpose & construction. Methods of tunneling in Soft rock & in Hard rock. Precautions in construction of tunnels. Drilling equipments. Tunnel lining and ventilation.

**LIST OF EXPERIMENT:**

1. To Determine The Crushing Value of Coarse Aggregates.
2. To determine the penetration Value of Bitumen.
3. To Determine the Impact Value of Coarse Aggregates.
4. Determination of CBR Value of soil sample in the Lab or in Field.
5. To determine the Flash and Fire Point of Bituminous material.

**REFERENCE BOOKS:**

1.Railway Engineering, S.C. Saxena Dhanpatrai & sons
2. Railway Track K.R. Antia, The New Book Co. Pvt. Ltd Mumbai
3. Principles of Railway Engineering S.C. Rangwala, Charotar Publication.
4. Principles and Practice of Bridge Engineering, S.P. Bindra Dhanpatrai & sons.
5. A Text Book of Transportation Engineering N.L.Arora and S.P.Luthra, IPH New Delhi.
6. Elements of Bridge Engineering J.S. Alagia Charotar Public .
7. Tunnel Engineering, S.C. Saxena, Dhanpatrai & sons.

# DCE-405 (ENTREPRENEURSHIP)

## UNIT-I

**INTRODUCTION TO ENTERPRENEURSHIP** • Definition of Entrepreneur / Entrepreneur • Difference between Entrepreneurship / Entrepreneurship • Need for Entrepreneurship • qualities of successful entrepreneur • Myths about Entrepreneurship • Classification of entrepreneurs on the basis of different criteria • Reasons for the failure of entrepreneurs

## UNIT-II

**INDUSTRIES AND BUSINESS ORGANIZATIONS** • Concept of Industry or Enterprise • Classification of Industries (a) On the basis of capital investment - Tiny (Micro) Industry - Small Scale - Medium Scale - Large Scale (b) Others - Rural Industry - Cottage Industry (c) Forms of Business Organization - Proprietorship - Board & Co-operative - Partnership - Public Ltd. - Private Ltd. - IT Sector - Government Co-operative / Undertakings (d) Tiny small scale Industry - Definition - Its significance in National Development. - Govt. policies for SSI promotions.

## UNIT-III

**INSTITUTIONAL ASSISTANCE** (a) Types of Institutional assistance - Infra - structural assistance - Technical Assistance - Financial assistance - Marketing Assistance (b) Information / guidance & Training - SISI - ASK - MPCON - CSIR - CED- MA - NRDC (c) Infrastructure - D/C - AVN/AKVN (e) Finance - SIDBI - KVIB MPFC - NABARD - MPWDC NSIC M.P.A.V.V.N. (d) Marketing - MP- AGRO - NSIC - PM.LUN - EXPORT COPPORATION - KVIP - MPHSVN MPLDC (e) Quality Control - BIS - FPO - MPLUN F.D.A. - AG. MKT. Board.

## UNIT-IV

**INCENTIVES / CONCESSION / FACITLITIES AVAILABLE** • Seed money • Incentive / subsidies • Others ( Phones, Lands etc). PLANNING OF AN INDUSTRIAL UNIT (SSI) • Pre- Planning Stage - Scanning the environment - Market survey - Seeking information - product / project selection • Implementation Stage - PPR Preparation - DIC registration - Arrangement of Land - Arrangement of Power - Obtaining NOC / Licenses from various departments - DPR Preparation - Seeking financial assistance - Commercial Production • Post Implementation stage - Permanent registration from D.I.C. - Availing Subsidies - Diversification / Modification - Setting up of marketing channel / Distribution.

## UNIT-V

**ACHIVEMENT MOTIVATION** • Historical perspective • Concept of achievement motivation • Significance of achievement motivation • Development of achievement motivation FINANCIAL MANAGEMENT OF AN INDUSTRIAL UNIT (SSI) • Tools of financial analysis • Ratio analysis • Fund Flow / Cash flow analysis • Working capital and concepts • Financial accounting

**REFERENCE BOOKS:**

1 Entreprenerial Development Vol. I,II,III By Vasant desai Himalaya Publicaton

2 CEDMAP (Center of Entrepreneurial development Madhya Pradesh)

3. Udyamita Vikas By Anand Prakashan