



SARDAR PATEL UNIVERSITY, BALAGHAT (MP)

School of Engineering and Technology

Syllabus

Course: B. Tech.

Branch: Civil Engineering

Semester: IVth

Academic Session: 2024-25

w.e.f - Date-02-09-2024

DCE041 ADVANCE SURVEYING

Course Contents

Course Objectives:

1. To provide basic knowledge about principles of surveying for location, design and construction of engineering projects.
2. Students develop skills using surveying instruments including measuring tapes, automatic levels, theodolites, and electronic distance measurement equipment.
3. The ability to identify error sources and the procedures to minimize errors.
4. Use standard survey tools.

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. Swinging the telescope, Transiting, Changing the face Measurement of Horizontal angle, method of Repetition, errors eliminated by method of repetition. Measurement of Deflection angle Measurement of Vertical angle. Measurement of magnetic bearing of line by Theodolite. Permanent adjustment of transit Theodolite (only relationship of different axes of Theodolite.) Traversing with Theodolite Method of included angles, locating details, checks in closed traverse, Calculation of bearings from angles. Traverse Computation - Latitude, Departure Consecutive Co-ordinates error of Closure, Distribution of a angular error, balancing the traverse by Bowditch rule and Transit Rule, Gale's traverse table. simple problems on above topic.

UNIT-III

Tacheometric Survey: Principle of Tacheometry. Essential requirements of Tacheometer. 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 And Remote Sensing: Aerial Survey Introductions, definition, Aerial photograph. Remote Sensing – Introduction, Electro-Magnetic Energy, Remote sensing system- Passive system, Active system. Applications – mineral, land use / Land cover, Natural Hazards and Environmental engineering system.

Course Outcomes:

CO1. Deal with the various aspects of Trilateration and Triangulation

CO2. Do the relevant computations, errors and observations.

CO3. Gain and apply the knowledge of Tacheometry, various systems, instruments etc.

CO4. Apply the concepts of Photographic and aerial surveying.

Reference Books:-

S. No.	Title	Author	Publisher
1	Surveying and Levelling ,	N N Basak,	Tata McGraw-Hill
2.	Surveying and Levelling Part I and II,	T.P. Kanetkar& S.V Kulkarni,	Pune Vidhyarthi Griha Prakashan.
3	Surveying and Levelling Vol. I and II	Dr. B. C. Punamiya	Laxmi Publication
4	Textbook of Surveying,	S.K. Husain, M.S. Nagaraj	S. Chand and company
5	Surveying and Levelling Vol. I and II,	S.K. Duggal,	Tata McGraw-Hill
6	Plane Surveying,	A.M. Chandra,	New Age International Publishers
7	Higher Surveying,	A.M. Chandra	New Age International Publishers



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DCE042 SOIL MECHANICS

Course Contents

Course Objectives:

1. To provide basic knowledge about Geotechnical Engineering, soil formation, index properties of soil, physical and engineering properties of soil.
2. To know about the types of soil according their classification, classification system, field identification, study of effective stress, capillary seepage force, etc.
3. How to measure the compaction and permeability of soil by lab experiments theoretically uses of Darcy law. Two dimensions flow and develop flow net and characteristics.

UNIT I

Physical Properties Of Soil: Soil as a three phase system. Water content, Determination of water content by oven drying method as per IS code. 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 as per IS code. 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 viz. Liquid limit, plastic limit and shrinkage limit, plasticity index. Determination of liquid limit, plastic limit and shrinkage limit as per IS code. Classification of fine grained soil by using plasticity chart. Sieve analysis of soil and sedimentation of soil, log, scale of particle size. Stokes law, Consistency limit diagram. Particle size distribution, mechanical sieve analysis as per. IS code particle size distribution curve, effective diameter of soil, Uniformity coefficient and coefficient of curvature, Well graded and uniformly graded soils. Particle size classification of soils & IS classification of soil.

UNIT III

Permeability Of Soil & Seepage Analysis: Definition of 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 by constant head and falling head permeability tests, simple problems to determine coefficient of permeability. Seepage through earthen structures, seepage velocity, seepage pressure, phreatic line, flow lines and equi-potential lines. Flow net, characteristics of flow net, application of flow net (no numerical problems)

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 – cohesion, internal friction. Mohr-coulomb failure theory(Coulomb's Law), Strength envelope ,strength Equation. Purely cohesive and cohesion less soils. Laboratory determination of shear

strength of soil – Direct shear test, Box shear test and tri-axial test Unconfined compression test & vane shear test, plotting strength envelope, determining shear strength parameters of soil.

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 – cohesion, internal friction. Mohr-coulomb failure theory (Coulomb’s Law), Strength envelope, strength Equation. Purely cohesive and cohesion less soils. Laboratory determination of shear strength of soil – Direct shear test, Box shear test and tri-axial test Unconfined compression test & vane shear test, plotting strength envelope, determining shear strength parameters of soil.

UNIT V

Compaction Of Soil & Stabilization: Concept of compaction, purpose of compaction field situations where compaction is required. Standard proctor test – test procedure as per IS code, Compaction curve, optimum moisture content, maximum dry density, Zero air voids line. Modified proctor test. Factors affecting compaction. Field methods of compaction – rolling, ramming & vibration and Suitability of various compaction equipments. California bearing ratio, CBR test, significance of CBR value. Difference between compaction and consolidation. Concept of soil stabilization, necessity of soil stabilization. Different methods of soil stabilization – Mechanical soil stabilization, lime stabilization, cement stabilization, bitumen stabilization, fly-ash stabilization.

Site Investigation And Sub Soil Exploration:

Necessity of site investigation & sub-soil exploration. Types of exploration – general, detailed. Method of site exploration open excavation & boring. Criteria for deciding the location and number of test pits and bores. Trial pits types of Augers. Auger boring ,wash boring and percussion drilling. Disturbed & undisturbed soil samples for lab testing. Field identification of soil – dry strength test, dilitancy test & toughness test. Empirical correlation between soil properties and SPT values. Record of boring Bore hole log.

Course Outcomes:

- CO1. Know about soil and development of soil mechanics and soil formation and characteristic of soil. CO1 Field identification, soil classification system.
- CO2. Study the lab experiments and simulations of experiment result with the theoretical characteristic of soil.
- CO3. Study of different theory New mart Charts, Westergaard and Boussinesq equation.
- CO4. Able to find at experiment, shear strength of soil and different method of soil exploration

Reference Books:-

S. No.	Title	Author	Publisher
1	Soil Mechanics & Foundation Engineering,	Dr. B C Punmia	Standard Books house, New Dehli
2.	Soil Mechanics & Foundation Engineering,	V.N.S. Murthi	Tata Megraw hill New Dehli



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DCE403 MECHANICS OF STRUCTURE

Course Contents

Course Objectives:

1. To understand the basic concepts of the stresses and strains for different materials and strength of structural elements.
2. To know the development of internal forces and resistance mechanism for one dimensional and two dimensional structural elements.
3. To analyse and understand different internal forces and stresses induced due to representative loads on structural elements.
4. To analyse and understand principal stresses due to the combination of two dimensional stresses on an element and failure mechanisms in materials.
5. To evaluate the behavior of torsional members, columns and struts.

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. Classification of stress, strain, Sign convention. Stress, strain curve for mild steel and HYSD bar, yield stress/ proof stress, Ultimate stress, breaking stress and percentage elongation. Deformation of body due to axial load. Deformation of a Body subjected to axial forces. Deformation of body of 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, complementary shear stress, state of simple shear, punching shear

UNIT II

Elastic Constants & Principal Stresses: Definition of lateral strain, Poisson's ratio, 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. Definition of bulk modulus, volumetric strain. Relation between modulus of elasticity, modulus of rigidity and bulk modulus. Definition of principal planes & principal stresses. Principal planes & stress due to bi-axial stress system & due to state of simple shear (Analytical method only). Strain Energy : Types of loading – gradual, suddenly applied load & Impact load. Definition of strain energy, modulus of resilience and proof resilience. Comparison of stresses due to gradual load, sudden load and impact load.

UNIT III

Shear Force And Bending Moment: Types of beams- cantilever, simply supported, fixed and continuous beams, types of loading- point load, uniformly distributed load, support reactions for determinate structures. Concept of shear force and bending moment, sign convention. Relation between bending moment, shear force and rate of loading. Shear force and bending moment diagrams for simply supported beams, overhanging beams and

cantilever subjected to point loads, UDL and couples, point of contra flexure.

Moment Of Inertia: Concept of moment of inertia, M.I of plane areas such as rectangle, triangle, circle, semicircle and quarter circle. 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 to symmetrical and unsymmetrical sections. Shear stresses in beams, Shear stress equation, meaning of terms in equation, shear stress distribution for rectangular, hollow rectangular, circular sections and hollow circular sections, I sections and T sections. 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, method of section and graphical method to find nature of forces.

Columns: End conditions, and equivalent length. Radius of gyration and 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.

Course Outcome:

CO1. The basic concepts of Mechanics of Solids are clear to students.

CO2. By knowing the stresses and strains developed in a structure, the student is able to find out at which point structure is strong and at which point it requires strengthening.

CO3. The bending moments and shear force at any cross section of the beam can be easily found out with the help of BMD and SFD, which enables the student now to study and design the beam.

CO4. Knowing the analysis of dams and retaining walls, the stresses at different points of dam and retaining can be known and these structures can be designed.

CO5. The student is now ready to learn designing of different structures. The base of study of structural analysis and designing is formed, which are the subjects of higher semesters.

Reference Books:-

S. No.	Title	Author	Publisher
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. Junnarkar- volume-I&II,	Charotar Publishing House, Anand.



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DCE044 HIGHWAY ENGINEERING Course Contents

Course Objectives:

1. Be familiar with principles of Highway planning & Geometric design.
2. Fundamental Concepts of Traffic Engineering.
3. Learning different highway materials & their testing.
4. Learning pavement design & its Construction.

UNIT - I

Road Engineering: Importance of road in India. Classification of roads according to Nagpur plan (Location and function), and third road development plan. Traffic and tonnage, Classification of urban roads. different road yojana, like pradhan mantri gram sadak yojana Mukhya mantri sadak yojna.

Investigation For Road Project: Reconnaissance survey, Preliminary survey and Location survey for a road project. Detailed survey for cross drainage- L-section and C/S sections. Fixing the alignment of road, factors affecting alignment of road. Drawings required for road project- Key map, Index map, Preliminary survey plan and detailed location survey plan, L section and C/S sections cross drainage work, land acquisition plan. Survey for availability of construction material, location plan of quarries.

UNIT - II

Geometric Design Of Highways: Camber- definition, purpose, types, IRC – specifications. Kerbs, road margin, road formation, right of way. Design speed- IRC – specifications. Gradient – definition, types, IRC specification. Sight distances– definition, types, IRC specification. Curves–Necessity, types–horizontal, vertical and transition curves. Widening of roads on curves. Super Elevation – definition, formula for calculating super elevation, minimum and maximum values of super elevation, and methods of providing super elevation. Sketching of standard C/S of national highway in embankment and cutting. Simple problems on geometric design of road

UNIT - III

Construction Of Roads Pavements And Materials: Types of road materials and Tests – soil, aggregates, bitumen, Cement Concrete. Test on soil sub grade- C.B.R. test, Test on Aggregate – Los Angeles abrasion, impact, and shape test. Tests on bitumen- Penetration, Ductility and Softening point test. Pavement – objective of pavement, structure of pavement, function of pavement components, types of pavement. Construction of earthen road – general terms used- borrows pits, spoil bank, lead and lift, balancing of earthwork. Construction procedure. Soil stabilized roads – necessity, methods of soil stabilization, brief details of mechanical soil stabilization. Water bound macadam roads – materials used, size and grading of aggregates and screening, construction procedure including precautions in rolling. Construction of bituminous roads. Terms used– bitumen, asphalt, emulsion, cutback, tar, common grades adopted for construction. Types of bituminous surface – prime coat, tack coat, seal coat, Surface dressing – procedure of construction bituminous penetration macadam, and Bitumen/Tar carpets – procedure of construction. Cement concrete

pavements- Construction procedure and equipments, Construction joints, joint filler, joint sealer.

UNIT – IV

Traffic Engineering: Traffic volume study, Traffic control devices- road signs, marking, Signals, Traffic Island. Road intersections- intersections at grade and grade separator intersections. Road accident. Building code IS:1904. Definition of active earth pressure and passive earth pressure, structures subjected to earth pressure in the field

Hill Roads: Parts and functions of hill road components, types of curves, Hill road formation. Land slides- causes and prevention. Structures- drainage structures

Drainage Of Roads: Surface drainage – side gutter, catch water drains, surface drainage. Sub-surface drainage – Longitudinal drains and cross drains

UNIT – V

Maintenance And Repairs Of Roads: Necessity of maintenance of roads, Classification of maintenance operation – ordinary, routine and periodic maintenance. Maintenance of W.B.M., bituminous and cement concrete roads.

Arboriculture: Road side arboriculture, necessity, planning of plantation of trees selection of types of trees and development of nursery considering the environment aspects.

Course Outcomes:

CO1. Students are expected to understand highway planning & design .

CO 2. Students are expected to understand traffic Engineering.

CO 3. Students are expected to understand & evaluate highway construction material.

CO 4. Students are expected to develop exposure in pavement design.

CO 5. Students are expected to learn airport planning

Reference Books:

S.No.	Title	Author	Publisher
01	Highway Engineering	Khanna & Justo	Khanna Pub.
02	Traffic Engineering	L.R. Kadiyali	
03	Transportation Engineering	N.L.Arora,S.P.Luthara	I.P.H. New Delhi
04	Transportation Engineering	Vazarani & Chandola	Khanna Pub.
05	Road, Railway, Bridges	Biridi & Ahuja.	S.B.H.New Delhi
06	Transportation Engineering	Kamala	T.M.H. New Delhi
07	DATA book of P.W. D.		

IS / International Codes. : IRC 36 – 1970, IRC 16 –1965, IRC 20 -1966

All experiment works calculation are calculated in MS office / Excel



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Course: Diploma

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Semester: IVth

Academic Session: 2024-2025

w.e.f: 02/09/2024

DCE045 PRINCIPLE & PRACTICES OF MANAGEMENT

Course Contents

Course Objectives:

1. Grasp the core principles of management, including planning, organizing, leading, and controlling.
2. Explore different organizational structures and their implications for management practices.
3. Learn to create and implement strategic plans that align with organizational goals and objectives.

UNIT-I

Marketing & Concept: Evolution of marketing- a historical background The stage of barter The stage of money economy The stage of industrial revolution The stage of competition The emergence of marketing Selected definitions of marketing Different concept of marketing The exchange concept The production concept The product concept The sales concept The marketing concept Difference between selling & marketing Benefits & significance of marketing Help store move causes for underdevelopment Improve productivity & efficiency Canalize country's economic resources properly Insure better deal for consumer Make economic planning meaningful & relevant etc.

UNIT-II

Marketing environment: Internal & external factors Demographic environment Economic environment Political environment Physical environment Technological environment Competitive environment

Marketing planning & Organization: Scope & importance of planning Steps in marketing planning process Purpose & principle of organization Models of marketing organization Line & staff type Product based organization Territory oriented organization Complex organization Task of chief marketing executive Decentralization.

UNIT-III

Market Segmentation: Types of market Definitions & benefits of segmentation Method s of segmentation Geographic segmentation Demographic segmentation Psychographic segmentation Buyer behavior Segmentation Volume segmentation Steps in market segmentation Market targeting.

UNIT-IV

Market mix: Definition of market mix Element so for marketing mix(4P'S)-Product, Place, Price, Promotion Environmental variable (un controllable variables) Customer variable Competition variable. Trade variable Environmental variable Product management Components of product, The core or basic constituent, The associated features, The brand names, package, label Types of product, The generic product, The branded product, The differentiated product, The customized product.

UNIT-V

Understanding Consumer: Factor influencing buyer behavior, Information from variety of sources, Socio-cultural environment of buyer, Group influence, Religion & language, Concern about status Buying

motives–Product & patronage motive, Buying habits–Convenience, shopping and spatiality goods.

Marketing Research & Sales fore Casting: Definition & Importance of marketing research Steps in marketing research

Defining problem, Problem analysis, Developing research design, Developing research procedure, Data collection–Primary & secondary, Analyzing & interpretation, Summarizing & preparing the research report Method of market research, Necessity & purpose of sales forecasting Methods of sales forecasting.

Course Outcomes:

- CO1. Explain the journey of management from ester years to the modern days that Experienced several adjustments in the course of its expedition.
- CO2. Understand how essential various functions of management are for every business manager.
- CO3. Explain the knowledge about various managerial processes and become competent when involved in team to achieve success.
- CO4. Analyze management practice, study of business leaders of India, identifying opportunities, apply suitable methods to estimate the economic benefits of leadership.
- CO5. Apply these principles to the practical situations concerning the management of people and organizations in real business life.

Reference Books:-

Sr. No.	Title	Author	Publisher
1	Entrepreneurial Development vol. I II, III	By Vasant desai	Himalaya Publication
2	CEDMAP	(Center of Entrepreneurial development Madhya Pradesh)	
3.	Udyamita Vikas		By Anand Prakashan



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DCE041P ADVANCE SURVEYING

List of Experiments

1. Using accessories carryout temporary adjustments of plane table. Locating details by method of Radiation.
2. Locating details with plane table by method of Intersection.
3. Understanding the components of Theodolite and their functions, reading the vernier and temporary adjustments of theodolite.
4. Measurement of Horizontal angle by transit theodolite.
5. Measurement of Horizontal angle by method of Repetition.
6. Measurement of vertical angles by theodolite.
7. Measurement of Magnetic bearing of a line using theodolite
8. Measurement of deflection angle by taking open traverse of 4 –5 sides.
9. To find Reduced levels and horizontal distances using theodolite as a Tacheometer
10. To find constants of a given Tacheometer.

Reference Books:

1. B.C Punmia, Surveying Vol-II & III, Laxmi Publication.
2. S.K. Duggal, Surveying Vol. II McGraw Hill Publishing Company Ltd.
3. Saikia MD, Das BM, Das MM, Surveying, McGraw hill
4. T.P. Kanetkar and S.V. Kulkarini Surveying and Leveling-Part-I & II, Pune Vidyarthi Griha Prakashan, Pune.
5. Gopi A, Satikumar R- Advance surveying, Pearson
6. Remote Sensing and image interpretation by Lillesand T.M. and Kiefer R.W.



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DCE042P SOIL MECHANICS

List of Experiments

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 coefficient of permeability by constant head test.
7. Determination of coefficient of permeability by falling head test.
8. Determination of shear strength of soil using direct shear test.
9. Determination of shear strength of soil using Laboratory Vane shear test.
10. Determination of CBR value of given soil sample.

Reference Books:

1. Soil Mech. & Found. Engg. by Dr. K.R. Arora - Std. Publishers Delhi.
2. Soil Mech. & Found. by Dr. B.C.Punmia- Laxmi Publications, Delhi.
3. Modern Geotech Engg. by Dr. I Aram Singh - IBT Publishers, Delhi.
4. Geotech Engg. by C. Venkatramaiah - New Age International Publishers, Delhi
5. Soil Mech. & Found. Engg. by S.K. Garg- Khanna Publishers, Delhi.
6. Soil Testing for Engg. by T.W. Lambe - John Wiley & Sons. Inc.
7. Relevant I.S. Codes.



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DCE044P HIGHWAY ENGINEERING

List of Experiments

Road project for a road of minimum 0.5 km. length having at least one small crossdrainage work.

- Site selection.
 - Reconnaissance survey. Fixing the alignment.
 - Detailed profile survey along the alignment and cross section of road and CD Work.
 - Prepare computer generated drawing of longitudinal section and typical cross sections of the road in cutting and filling.
 - Prepare computer generated drawing of proposed typical CD work/culvert. (Using CAD)
1. (Visit to a road under construction/constructed to study the construction of a) WBM road
(b) flexible pavement (c) Rigid pavement roads for observing the type of construction and construction equipments
 2. Preparing drawings of detailed cross sections of (a) major district road (b) state Highway
(c) National highway (d) Express Highway in cutting and banking showing details and dimensions with proper scale. (Any two)
 3. Traffic volume study and its representation of an important road intersection in your city.
 4. Visit to a W.B.M. and Bituminous road for observing the different types of defects in roads.
 5. Prepare a visit report. Which should consist of (a) List of various defects observed
b) Suggestions regarding the possible remedial measure.
 6. Types of road materials and Tests – soil, aggregates, bitumen, Cement Concrete. Test on soil sub grade- C.B.R. test, Test on Aggregate – Los Angeles abrasion, impact, and shape test. Tests on bitumen- Penetration, Ductility and Softening point test.
 7. Study of Different Highway software. Road SOR , MOST
1- Geometrics 2- Pythagoras 3- C-Lx

All experiment works calculation are calculated in MS office / Excel

Reference Books: -

1. Highway Engineering – Justo & Khanna (Khanna Publishers)
2. Highway Engineering Manual – Justo & Khanna (Khanna Publishers)



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DCE046P COMPUTER DRAWING AIDED LAB

UNIT I

Cad Software: Meaning, various CAD software available in the market AutoCAD 3D Felix Cad, Auto Civil, 3D Max ; etc.) Starting up of CAD, CAD Window, Tool bar, Drop down menu, Command window, Saving the drawing. Introduction of Graphic screen.

UNIT II

Cad Commands : WCS icon, UCS icon, co-ordinates, drawing limits, grid, snap, ortho features. Drawing commands, line, circle, polyline, multiline, ellipse, polygon etc. Editing commands – Copy, move, offset, fillet, chamfer, trim, lengthen, mirror, rotate, array etc. Working with hatches, fills, dimensioning, text etc.

UNIT III

Submission / Working Drawing: Generation of line plan, Detailed Plan, elevation, section, site plan, Area statement, Generation of 3D view and print commands, Introduction to Auto Civil.

Note: Above theoretical aspects should be covered in the practical periods.

UNIT IV

Building Drawing : Following exercises shall be completed with CAD software and Print of all the drawings should be prepared on A3 / A4 size paper :

- 1) Preparation of line plan of a residential building.
- 2) Preparation of line plan of a Public building.
- 3) Preparation of detailed plan of a small residential building
- 4) Preparation of submission drawing of residential building – showing Plan, Elevation, Section, Schedule of openings, Site Plan and Area Statement.

UNIT V

Civil Engineering Drawing: Preparation of Drawings with CAD software for the following exercises (Any Three) and Print of all the drawings should be prepared on A3 /A4 size paper.

- 1) Plan, Cross Section and Longitudinal section of a Culvert (Pipe culvert/Box Culvert).
- 2) Section of an Earthen Dam.

- 3) Plan and Section of K. T. Weir.
- 4) Cross Section of Retaining wall.
- 5) Bonds in brickwork – Plan and Elevation for English bond and Flemish bond for one brick thick wall.
- 6) Cross Section of ESR (Over Head Tank).
- 7) Cross Section of Clarri - flocculato

References Books:

1. P. Kandasamy, K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2nd Edition, Reprint 2012.
2. S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.
3. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
4. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2010.
5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
6. Veerarajan T., Engineering Mathematics, Tata McGraw-Hill, New Delhi, 2008.
7. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003 (Reprint).
8. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.
9. W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968. Statistics