SCHEME OF TEACHING & EXAMINATION
BE CIVIL ENGINEERING
III SEMESTER

Sl. No	Subject Code	Title	Teaching Dept.	Teaching hours /week		Examination			
				Th.	Pr.	Dur-ation	I.A. Max. Marks	Theory/ Pract. Max. Marks	Total Marks Max. Marks
1	10 MAT 31	Engineering Mathematics –III	Maths	4	--	3	25	100	125
2	10 CV 32	Building Materials and Construction Technology	Civil	4	--	3	25	100	125
3	10 CV 33	Strength of Materials	Civil	4	--	3	25	100	125
4	10 CV 34	Surveying – I	Civil	4	--	3	25	100	125
5	10 CV 35	Fluid Mechanics	Civil	4	--	3	25	100	125
6	10 CV 36	Applied Engineering Geology	Civil/Geo.	4	--	3	25	100	125
7	10 CVL 37	Civil Engg. Material Testing Laboratory	Civil	---	3	3	25	50	75
8	10 CVL 38	Surveying Practice – I	Civil	---	3	3	25	50	75
			Total	22	08	24	200	700	900

SCHEME OF TEACHING & EXAMINATION
BE CIVIL ENGINEERING
IV SEMESTER

S. No	Subject Code	Title	Teaching Dept.	Teaching hours /week		Examination			
				Th.	Pr.	Dur-ation	I.A. Max. Marks	Theory/ Pract. Max. Marks	Total Marks Max. Marks
1	10 MAT 41	Engineering Mathematics –IV	Maths	4	--	3	25	100	125
2	10 CV 42	Concrete Technology	Civil	4	--	3	25	100	125
3	10 CV 43	Structural Analysis – I	Civil	4	--	3	25	100	125
4	10 CV 44	Surveying – II	Civil	4	--	3	25	100	125
5	10 CV 45	Hydraulics and Hydraulic Machines	Civil	4	--	3	25	100	125
6	10 CV 46	Building Planning & Drawing	Civil	1	6	4	25	100	125
7	10 CVL 47	Surveying Practice-II Laboratory	Civil	---	3	3	25	50	75
8	10 CVL 48	Applied Engineering Geology Laboratory	Civil/Geo.	---	3	3	25	50	75
			Total	21	12	25	200	700	900

ENGINEERING MATHEMATICS – III

CODE: 10 MAT 31
Hrs/Week: 04
Total Hrs: 52

IA Marks: 25
Exam Hrs: 03
Exam Marks:100

PART-A

Unit-I: FOURIER SERIES

Convergence and divergence of infinite series of positive terms, definition and illustrative examples*
Periodic functions, Dirichlet's conditions, Fourier series of periodic functions of period 2π and arbitrary period, half range Fourier series. Complex form of Fourier Series. Practical harmonic analysis.   **[7 hours]**

Unit-II: FOURIER TRANSFORMS

Infinite Fourier transform, Fourier Sine and Cosine transforms, properties, Inverse transforms   **[6 hours]**

Unit-III: APPLICATIONS OF PDE

Various possible solutions of one dimensional wave and heat equations, two dimensional Laplace's equation by the method of separation of variables, Solution of all these equations with specified boundary conditions. D'Alembert's solution of one dimensional wave equation.

[6 hours]

Unit-IV: CURVE FITTING AND OPTIMIZATION
Curve fitting by the method of least squares- Fitting of curves of the form $y = ax+b$, $y = ax^2 + bx+c$, $y = ae^{bx}$, $y = ax^b$

Optimization: Linear programming, mathematical formulation of linear programming problem (LPP), Graphical method and simplex method.
[7 hours]

PART-B

Unit-V: NUMERICAL METHODS - 1

Numerical Solution of algebraic and transcendental equations: Regula-falsi method, Newton - Raphson method. Iterative methods of solution of a system of equations: Gauss-seidel and Relaxation methods. Largest eigen value and the corresponding eigen vector by Rayleigh's power method.

Unit-VI: NUMERICAL METHODS – 2

Finite differences: Forward and backward differences, Newton's forward and backward interpolation formulae. Divided differences - Newton's divided difference formula, Lagrange's interpolation formula and inverse interpolation formula.

Numerical integration: Simpson's one-third, three-eighth and Weddle's rules (All formulae/rules without proof)

[7 hours]

Unit-VII: NUMERICAL METHODS – 3

Numerical solutions of PDE – finite difference approximation to derivatives, Numerical solution of two dimensional Laplace's equation, one dimensional heat and wave equations [7 hours]

Unit-VIII: DIFFERENCE EQUATIONS AND Z-TRANSFORMS

Difference equations: Basic definition; Z-transforms – definition, standard Z-transforms, damping rule, shifting rule, initial value and final value theorems. Inverse Z-transform. Application of Z-transforms to solve difference equations.
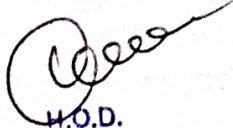
[6 hours]

Note: * In the case of illustrative examples, questions are not to be set.

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Latest edition, Khanna Publishers
2. Erwin Kreyszig, Advanced Engineering Mathematics, Latest edition, Wiley Publications.

Reference Book:

1. B.V. Ramana, Higher Engineering Mathematics, Latest edition, Tata Mc. Graw Hill Publications.
2. Peter V. O'Neil, Engineering Mathematics, CENGAGE Learning India Pvt Ltd.Publishers

H.O.D.
Dept. of Civil Engineering
Alva's Institute of Engg. & Technology
Mijar, Moodbidri - 574 225

BUILDING MATERIALS AND CONSTRUCTION TECHNOLOGY
(COMMON TO CV/TR/CTM)

Sub Code	:	**10 CV 32**	**IA Marks**	:	**25**
Hrs/ Week	:	**04**	**Exam Hours**	:	**03**
Total Hrs.	:	**52**	**Exam Marks**	:	**100**

Part-A

UNIT-1

FOUNDATION

Function and requirements of a good foundation, Types of foundations, Preliminary investigation of soil, Safe Bearing Capacity of Soil, Introduction to spread, combined, strap, mat and pile foundations, Design of strip and combined footings   6 hours

UNIT-2

MASONRY

Classification of Masonry, Definition of terms used in Masonry, Introduction to classification and qualities of bricks, Bonds in Brick work - English Bond, Flemish Bond, Reinforced, Brick Masonry, Common building stones, their properties and uses, Classification of stone masonry, Joints in stone masonry, Introduction to load bearing, cavity and partition walls.   8 hours

UNIT-3

ARCHES, LINTEL AND BALCONY

Elements of an arch, Classification of arches, Stability of arch, Definition and classification of Lintels, Definition and functions of Chejja, Canopy & Balcony.   6 hours

UNIT-4

ROOFS AND FLOORS

Types of Roofs & Roofing materials, Flat roof (RCC), Types of pitched roofs, Wooden Truss, Steel trusses, Types of flooring, Factors affecting selection of flooring materials.   7 hours

Part-B

UNIT-5

DOORS AND WINDOWS

1

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Latest edition, Khanna Publishers
2. Erwin Kreyszig, Advanced Engineering Mathematics, Latest edition, Wiley Publications.

Reference Book:

1. B.V. Ramana, Higher Engineering Mathematics, Latest edition, Tata Mc. Graw Hill Publications.
2. Peter V. O'Neil, Engineering Mathematics, CENGAGE Learning India Pvt Ltd.Publishers

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Location of doors and windows, Definition of technical terms, Types of Doors, Types of windows, Varieties of materials for doors and windows & their properties. 6 hours

UNIT-6

STAIRS

Definition of technical terms, Requirements of ground stair, Types of Stairs, Geometrical design of RCC Dog legged and open well stairs (Plain and sector elevation). 6 hours

UNIT-7

PLASTERING AND PAINTING

Purpose of plastering, Materials of plastering, Methods of plastering, Defects in plastering, Introduction to Paintings and types of Painting, Constituents of paints & types, Purpose of Painting, Defects in Painting, Application of Paints to new and old surfaces. 6 hours

UNIT-8

MISCELLANEOUS TOPICS

Properties and uses of plastics, aluminum, glasses, varnishes, Introduction to smart materials and its application, Introduction to formwork and scaffolding, Formwork details for RCC Column, Beams and Floors, Shoring and under pinning, Damp Proofing - Causes of Dampness, Effects of Dampness, Methods of Damp Proofing 7 hours

TEXT BOOKS

1. **Engineering Materials,** Rangawala P.C. Charter Publishing House, Anand, India.
2. **Engineering Materials,** Sushil Kumar, Standard Publication and Distributors, New Delhi.
3. **Concrete technology – Theory and practice,** M..S. Shetty, S. Chand and Co, New Delhi, 2002.

REFERENCE BOOKS

1. **A Text Book Building Materials,** by P.G. Varghese, Prentice-Hall of India Pvt. Ltd., Publication.
2. **Advances in Building Materials and Construction** by Mohan Rai and M.P. Jain Singh – publication by CBRI, Roorkee.
3. **Concrete Technology,** Neville A.M and Brooks J.J — ELBS Edition. London
4. **Concrete Technology** – Gambhir M.L –Dhanpat Rai and Sons, New Delhi.

STRENGTH OF MATERIALS
(COMMON TO CV/TR/EV/CTM)

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2

Sub Code	:	10 CV 33	IA Marks	:	25
Hrs/ Week	:	04	Exam Hours	:	03
Total Hrs.	:	52	Exam Marks	:	100

PART – A

UNIT 1:
Simple Stress and Strain
1.1 Introduction, 1.2 Properties of Materials, 1.3 Stress, Strain, Hook's law, Stress – Strain Diagram for structural steel and non ferrous materials, 1.4 Volumetric strain, expression for volumetric strain, 1.5 Elastic Constants: Relationship among elastic constants, 1.6 Total elongation of tapering bars of circular and rectangular cross sections. Elongation due to self weight.

7 Hours

UNIT 2:
Simple Stress and Strain continued...
2.1 Composite section, 2.3 Thermal stresses (including thermal stresses in compound bars).

6 Hours

UNIT 3:
Compound stresses
3.1 Introduction, 3.2 Stress components on inclined planes, 3.3 General two-dimensional stress system, 3.4 Principal planes and stresses, 3.5 Mohr's circle of stresses.

8 Hours

UNIT 4:
Bending moment and shear force in beams
4.1 Introduction, 4.2 Shearing force and Bending moment in beam, 4.3 Sign convention, 4.4 Relationship between loading, shear force and bending moment, 4.5 Shear force and bending moment equations, SFD and BMD with salient values for cantilever beams, simply supported beams and overhanging beams considering gravity loads(point, udl and uvl) and Couple.

7 Hours

PART – B

UNIT 5:
Bending stress, shear stress in beams
5.1 Introduction – Bending stress in beam, 5.2 Assumptions in pure bending theory, 5.3 Derivation of Pure bending equation, 5.4 Modulus of rupture, section modulus, 5.5 Flexural rigidity, 5.6 Expression for horizontal shear

3

stress in beam, 5.7 Shear stress diagram for rectangular, 'I' and 'T' section (Flitched beams not included).

6 Hours

UNIT 6:
Deflection of beams
6.1 Introduction – Definitions of slope, deflection, 6.2 Elastic curve-derivation of differential equation of flexure, 6.3 Sign convention 6.4 Slope and deflection for standard loading classes using Macaulay's method for prismatic beams and overhanging beams subjected to point loads, UDL and Couple.

6 Hours

UNIT 7:
Torsion of circular shafts
7.1 Introduction – Pure torsion-torsion equation of circular shafts, 7.2 Strength and stiffness, 7.3 Torsional rigidity and polar modulus, 7.4 Power transmitted by shaft of solid and hollow circular sections.

6 Hours

UNIT 8:
Elastic stability of columns
8.1 Introduction – Short and long columns, 8.2 Euler's theory on columns, 8.3 Effective length slenderness ratio, 8.4 Radius of gyration, buckling load, 8.5 Assumptions, derivations of Euler's Buckling load for different end conditions, 8.6 Limitations of Euler's theory, 8.7 Rankine's formula, problems.

6 Hours

TEXT BOOKS:
1. **Strength of Materials,** Subramanyam, Oxford University Press, Edition 2008
2. **Mechanics of Materials,** B.C Punmia Ashok Jain, Arun Jain, Lakshmi Publications, New Delhi.
3. **Strength of Materials**; Basavarajaiah and Mahadevappa Universities Press (2009).

REFERENCE BOOKS:
1. **Strength of Materials,** Singer Harper and Row Publications.
2. **Elements of Strength of Materials,** Timoshenko and Young Affliated East-West Press.
3. **Mechanics of Materials,** James M. Gere, Barry J.Goodno (India Edition), Cengage Learning.

4

SURVEYING – I
(COMMON TO CV/TR/EV/CTM)

Sub Code	:	**10 CV 34**	**IA Marks** :	**25**
Hrs/ Week	:	**04**	**Exam Hours** :	**03**
Total Hrs.	:	**52**	**Exam Marks** :	**100**

PART – A

UNIT 1:
Introduction
1.1 Definition of Surveying, 1.2 Classification of Surveys, 1.3 Uses of Surveying Units of Measurements, 1.4 Map & Classification, 1.5 Survey of India topographical Maps and their numbering., 1.6 Basic principles of surveying, 1.7 Errors, Classification, 1.8 Precision and accuracy.

04 Hours

UNIT 2:
Measurement of horizontal distances.
2.1 Chain and types, 2.2 Tape and types, 2.3 EDM devices, 2.3 Ranging of lines 2.4 Direct and Indirect, 2.5 Measurement of distances over sloping grounds, 2.6 Chain and Tape corrections - Numerical problems.

5 Hours

UNIT 3:
Chain Surveying
3.1 Accessories required, 3.2 Selection of stations and lines, 3.3 Offsets and types 3.4 Setting out of right angles, 3.5 Working principle and use of optical square, prism square, cross staff., 3.6 Linear methods of setting out right angles, 3.7 Booking of chain survey work, 3.8 Field book, entries, conventional symbols, 3.9 Obstacles in chain survey, Numerical problems, 3.10 Errors in chain survey and precautions to be taken.

7 Hours

UNIT 4:
Compass Surveying
4.1 Meridians and bearings, 4.2 Principle, working and use of - Prismatic compass 4.3 Surveyor's compass, 4.4 Magnetic bearing, true bearings, 4.5 WCB and Reduced bearing. 4.6 Dip and Declination
4.7 Accessories required for compass surveying, 4.8 Traverse - closed and open traverse 4.9 Computation of bearings of legs of closed traverse given the bearing of one of the legs, 4.10 Computation of included angles given the

5

bearings of legs of a closed traverse.

<div align="right">**6 Hours**</div>

PART – B

UNIT 5:
Compass Traversing continued....
5.1 Local attraction, determination and corrections, 5.2 Dependent and independent co-ordinates, 5.3 Checks for closed traverse and determination of closing error and its direction 5.4 Bowditch's graphical method of adjustment of closed traverse, 5.5 Bowditch's rule and transit rule, 5.6 Omitted measurements (Only Length and corresponding bearing of one line).

<div align="right">**8 Hours**</div>

UNIT 6:
Introduction to Levelling
6.1 Principles and basic definitions, 6.2 Fundamental axes and part of a dumpy level, 6.3 Types of adjustments and objectives, 6.4 Temporary and Permanent adjustments of a dumpy level, 6.5 Sensitiveness of bubble tube, 6.6 Curvature and refraction correction, 6.7 Type of leveling, 6.8 Simple leveling, 6.9 Reciprocal leveling, 6.10 Profile leveling, 6.11 Cross sectioning, 6.12 Fly leveling,

<div align="right">**7 Hours**</div>

UNIT 7:
Reduction of Levelling continued....
7.1 Booking of levels 7.2 Rise and fall method and Height of instrument method 7.3 comparison Arithmetic checks 7.4 Fly back leveling., 7.5 Errors and precautions.

<div align="right">**6 Hours**</div>

Contouring
7.6 Contours and their characteristics, 7.7 Methods of contouring, 7.8 direct and indirect methods, 7.9 Interpolation techniques, 7.10 Uses of contours 7.11 Numerical problems on determining intervisibility, 7.12 Grade contours and uses.

<div align="right">**4 Hours**</div>

UNIT 8:
Plane Table Surveying
8.1 Plane table and accessories, 8.2 Advantages and limitations of plane table survey, 8.3 Orientation and methods of orientation, 8.4 Methods of plotting – Radiation, Intersection, Traversing, 8.5 Resection method, 8.6 Two point and three point problems, 8.7 Solution to two point problem by graphical method,

<div align="center">6</div>

8.8 Solution to three point problem Bessel's graphical method, 8.9 Errors in plane table survey.

5 Hours

TEXT BOOKS:
1. 'Surveying' Vol–1 – B.C. Punmia , Laxmi Publications, New Delhi.
2. Surveying and Levelling – R Subramanian. Oxford University Press (2007)

Text Book of Surveying – C. Venkataramiah. Universities Press.(2009 Reprint)

REFERENCE BOOKS:
1. Fundamentals of Surveying - Milton O. Schimidt – Wong, Cengage Learning.
2. Fundamentals of Surveying - S.K. Roy – Prentice Hall of India.
3. Surveying Vol. I, S.K. Duggal, Tata McGraw Hill - Publishing Co. Ltd., New Delhi.
* Survey of India Publication on maps.

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FLUID MECHANICS
(COMMON TO CV/TR/EV)

Sub Code	:	10 CV 35	IA Marks	:	25
Hrs/ Week	:	04	Exam Hours	:	03
Total Hrs.	:	52	Exam Marks	:	100

PART-A

UNIT-1: BASIC PROPERTIES OF FLUIDS

Introduction, Definiton of Fluid, Systems of units, properties of fluid: Mass density, Specific weight, Specific gravity, Specific volume, Viscosity, Cohesion, Adhesion, Surface tension,& Capillarity. Newton's law of viscosity (theory & problems).Capillary rise in a vertical tube and between two plane surfaces (theory & problems).   **06 Hrs.**

7

UNIT-2: PRESSURE AND ITS MEASUREMENT

Definition of pressure, Pressure at a point, Pascal's law, Variation of pressure with depth. Types of pressure. Vapour pressre. Measurement of pressure using a simple, differential & inclined manometers (theory & problems). Introduction to Mechanical and electronic pressure measuring devices. **07 Hrs**.

UNIT-3: HYDROSTATIC PRESSURE ON SURFACES

Basic definitions, equations for hydrostatic force and depth of centre of pressure for Vertical and inclined submerged laminae (plane and curved)- Problems. **06 Hrs**

UNIT-4: KINEMATICS OF FLOW

Introduction, methods of describing fluid motion, definitions of types of fluid flow, streamline, pathline, streakline and streamtube. One and Three dimensional continuity equation in Cartesian Coordinates (derivation and problems). Velocity potential, Stream function, Equipotential line, Stream line-problems, Physical concepts of Streamfunction. Introduction to flow net. **07 Hrs**

PART-B

UNIT-5: DYNAMICS OF FLUID FLOW

Introduction, Energy possessed by a fluid body. Euler's equation of motion along a streamline and Bernoulli's equation. Assumptions and limitations of Bernoulli's equation. Problems on applications of Bernoulli's equation (with and without losses). Introduction to kinetic energy correction factor. Momentum equation problems on pipe bends.

07 Hrs

UNIT-6: PIPE FLOW

Introduction, losses in pipe flow,. Darcy-Weisbach equation for head loss due to friction in a pipe. Pipes in series, pipes in parallel, equivalent pipe-problems. Minor losses in pipe flow, equation for head loss due to sudden expansion- problems. Water hammer in pipes, equation for pressure rise due to gradual valve closure & sudden closure for rigid and elastic pipes-problems.

07 Hrs

UNIT-7: DEPTH AND VELOCITY MEASUREMENTS

Introduction, Measurement of depth, point & hook gauges, self recording gauges. Staff gauge, Weight gauge, float gauge. Measurement of velocity- single and double gauges, pitot tube, Current meter- Problems.

06 Hrs

UNIT-8: DISCHARGE MEASUREMENTS

Introduction, Venturimeter, Orificemeter, Rotometer, Venturiflume, Triangular notch, Rectangular notch, Cipolletti notch, Ogee weir and Broad crested weir, Small orifices-Problems.

06 Hrs

TEXT BOOKS:
1. 'A TextBook of Fluid mechanics & Hydraulic Machines'- R.K.Rajput, S.Chand & Co, New Delhi, 2006 Edition.

9

2. 'Principles of Fluid Mechanics and Fluid Machines'- N.Narayana Pillai, Universities Press(India), Hyderabad,2009 Edition.
3. ' Fluid Mechanics and Turbomachines'- Madan Mohan Das, PHI Learning Pvt. Limited, New Delhi. 2009 Edition.

REFERENCE BOOKS:

1. ' Fundamentals of Fluid Mechanics' – Bruce R. Munson, Donald F.Young, Theodore H. Okiishi, Wiley India, New Delhi, 2009 Edition.
2. 'Introduction To Fluid Mechanics' – Edward j. Shaughnessy,jr; Ira m. Katz:; James p Schaffer, Oxford University Press, New Delhi, 2005 Edition.
' Text Book Of Fluid Mechanics& Hydralic Machines'- R.K.Bansal, Laxmi Publications, New Delhi, 2008 Edition.

APPLIED ENGINEERING GEOLOGY

Sub Code	:	10 CV-36	IA Marks	:	25
Hrs/ Week	:	04	Exam Hours	:	03
Total Hrs.	:	52	Exam Marks	:	100

PART – A

Unit: 1 - INTRODUCTION:

Geology and its role in the field of civil engineering. Earth: Its internal structure and composition. – 2 hours

MINERALOGY:

Description and identification of Rock forming minerals and Ores, based on physical and special properties;
Quartz and its varieties; Feldspar group; Mica group; carbonate group;
Hornblende, Augite, Olivine, Asbestos, Kaolin, Talc, Gypsum, Garnet, Corundum.

Magnetite, Hematite, Limonite, Pyrite, Chalcopyrite, Pyrolusite, Psilomalane, Chromite, Galena, Bauxite. – 6 hours

Unit: 2- PETROLOGY:

Rocks as fundamental units and building materials of the earth crust and their engineering applications: As building stones, road metals and stones for decoration, pavement, cladding, roofing, flooring, concreting and foundation engineering.

Igneous rocks: Origin, classification (chemical and textural), mode of occurrence; Identification and description of Granite, Syenite, Diorite, Gabbro, Dunite; Pegmatite, Porphiries, Dolerite; Rhyolite, Basalt and Pumice.

Sedimentary rocks: Origin, classification, primary structures and description of Sandstones, Conglomerate, Breccia, Shale, Limestones and Laterite.

Metamorphic rocks: Kinds of metamorphism, description of Gneiss, Quartzite, Marble, Slate, Phyllite and Schists. – 6 hours

Unit: 3-GEOMORPHOLOGY:

Epigene and Hypgene geological agents; rock weathering and its types; Soil formation, types, erosion and remedial measures; Geological action of rivers with different drainage patterns; Geological action of wind. – 5 hours

Unit: 4-GEODYNAMICS:

Earthquakes- seismic waves, seismograph, causes, effects, seismic zones, shield areas and seismic resisting structures. Coastal zones, coastal landforms, continental shelf, continental rise, continental slope, abyssal plain, mid-oceanic ridges, trenches, tsunamis. Land slides; causes, effects and remedial measures – 5 hours

PART B

Unit: 5- ROCK MECHANICS:

Stress, strain and deformational effects on different rocks; Out crop, Dip, strike and escarpment, Clinometer-compass- Joints, faults, folds and unconformities their effects on civil engineering structures. – 6 hours

Unit:6- ENGINEERING GEOLOGY:

Geotechnical investigations for civil engineering projects: Study of toposheets and geological maps, importance of lithological and structural features studies for the construction of Dams, Reservoirs, Tunnels, Bridges and Highways – 6 hours

Unit: 7-HYDROGEOLOGY:

Hydrological cycle; distribution of ground water in the earth crust; properties of water bearing geological formation: Aquifers and their types; selection of sites for well locations and spacing of wells; geological, hydrological and geophysical (electrical resistivity) investigations for ground water exploration; artificial recharge of groundwater methods and rain water harvesting. Sea water intrusion and remedial measures. – 9 hours

Unit:8- GEOMATICS AND ENVIRONMENTAL GEOLOGY:

Introduction to remote sensing (RS), geographical information system (GIS) and global positioning system (GPS); land sate imageries, stereoscopes and their applications in civil engineering. Impact of quarrying, mining and dams on Environment. Quality of ground water in different geological terrain. – 7 hours

QUESTION PAPER PATTERN:

Question paper shall be consisting of eight full questions, selecting four from each part.

The student has to answer any five, selecting at least two from each part. Each question carry 20 marks.

References books:

1. Text book of Geology by P.K. Mukerjee, World Press Pvt. Ltd. Kolkatta.
   1. Foundations of Engineering Geology,by Tony Waltham (3rd Ed.) Universities Press.
   2. Structural Geology (3rd Ed.)by M. P. Billings, Published by Prentice Hall of India Pvt. Ltd. New Delhi
   3. Text of Engineering and General Geology by Parbin Singh, Published by S. K. Kataria and Sons, New Delhi.
   4. Rock Mechanics for Engineers by Dr B.P.Verma, Khanna Publishers, New Delhi.
   5. Engineering Geology for Civil Engineering by D. Venkata Reddy, Oxford and IBH Publishing Company, New Delhi.
   6. Ground water geology by Todd D.K. John Wiley and Sons, New York.
   7. Remote sensing Geology by Ravi P Gupta, Springer Verilag, New York.
   8. Physical Geology by Arthur Holmes, Thomson Nelson and Sons, London.
   9. Environmental Geology by K. S. Valdiya, Tata Mc Graw Hills.
   10. A text book of Engineering Geology by Chenna Kesavulu, Mac Millan India Ltd.
   11. Remote sensing and GIS by M.Anji Reddy.

12. Ground water assessment, development and management by
    K.R.Karanth, Tata Mc Graw Hills

Civil Engineering MATERIAL TESTING LAB
(COMMON TO CV/TR)

Sub Code	:	**10 CVL 37**	**IA Marks**	:	**25**
Hrs/ Week	:	**03**	**Exam Hours**	:	**03**
Total Hrs.	:	**42**	**Exam Marks**	:	**50**

1. Tension test on Mild steel and HYSD bars.
2. Compression test of Mild Steel, Cast iron and Wood.
3. Torsion test on Mild Steel circular sections
4. Bending Test on Wood Under two point loading
5. Shear Test on Mild steel.
6. Impact test on Mild Steel (Charpy & Izod)
7. Hardness tests on ferrous and non-ferrous metals – Brinell's, Rockwell and Vicker's
8. Test on Bricks and Tiles
9. Tests on Fine aggregates – Moisture content, Specific gravity, Bulk density, Sieve analysis and Bulking
10. Tests on Coarse aggregates – Absorption, Moisture content, specific gravity, Bulk density and Sieve analysis
11. Demonstration of Strain gauges and Strain indicators

NOTE: All tests to be carried out as per relevant BIS Codes

REFERENCE BOOKS:

1. **Testing of Engineering Materials**, Davis, Troxell and Hawk, International Student Edition – McGraw Hill Book Co. New Delhi.
2. **Mechanical Testing of Materials"**, Fenner, George Newnes Ltd. London.
3. **"Experimental Strength of Materials"**, Holes K A, English Universities Press Ltd. London.
4. **"Testing of Metallic Materials"**, Suryanarayana A K, Prentice Hall of India Pvt. Ltd. New Delhi.
5. **Relevant IS Codes**
6. **"Material Testing Laboratory Manual"**, Kukreja C B- Kishore K. Ravi Chawla Standard Publishers & Distributors 1996.
7. **Concrete Manual**, M.L.Gambhir –Dhanpat Rai & Sons- New Delhi.

Scheme of Examination:

Group Experiments: Tension, Compression Torsion and Bending Tests
Individual Experiments: Remaining tests

Two questions are to be set – one from group experiments and the other as individual experiment.

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SURVEYING PRACTICE – I
(COMMON TO CV/TR/EV/CTM)

Sub Code	:	10 CVL 38	**IA Marks**	:	25
Hrs/ Week	:	03	**Exam Hours**	:	03
Total Hrs.	:	42	**Exam Marks**	:	50

Exercise – 1
a) To measure distance between two points using direct ranging
b) To set out perpendiculars at various points on given line using cross staff, optical square and tape.

Exercise – 2
Setting out of rectangle, hexagon using tape/chain and other accessories

Exercise – 3
Measurement of bearing of the sides of a closed traverse & adjustment of closing error by Bowdich method and Transit method

Exercise – 4
To set out rectangles, pentagon, hexagon, using tape /chain and compass.

Exercise – 5
To determine the distance between two inaccessible points using chain/tape & compass.

Exercise – 6
To locate points using radiation and intersection method of plane tabling

Exercise – 7
To solve 3-point problem in plane tabling using Bessel's graphical solution

Exercise –8
To determine difference in elevation between two points using fly leveling technique & to conduct fly back leveling. Booking of levels using both HI and Rise & Fall methods.

Exercise – 9
To determine difference in elevation between two points using reciprocal leveling and to determine the collimation error

Exercise – 10

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ENGINEERING MATHEMATICS – IV

CODE: 10 MAT 41
Hrs/Week: 04
Total Hrs: 52

IA Marks: 25
Exam Hrs: 03
Exam Marks:100

PART-A

Unit-I: NUMERICAL METHODS - 1

Numerical solution of ordinary differential equations of first order and first degree; Picard's method, Taylor's series method, modified Euler's method, Runge-kutta method of fourth-order. Milne's and Adams - Bashforth predictor and corrector methods (No derivations of formulae).

[6 hours]

Unit-II: NUMERICAL METHODS – 2

Numerical solution of simultaneous first order ordinary differential equations: Picard's method, Runge-Kutta method of fourth-order. Numerical solution of second order ordinary differential equations: Picard's method, Runge-Kutta method and Milne's method.

[6 hours]

Unit-III: Complex variables – 1

Function of a complex variable, Analytic functions-Cauchy-Riemann equations in cartesian and polar forms. Properties of analytic functions. Application to flow problems- complex potential, velocity potential, equipotential lines, stream functions, stream lines.

[7 hours]

Unit-IV: Complex variables – 2

Conformal Transformations: Bilinear Transformations. Discussion of Transformations: $w = z^2$, $w = e^z$, $w = z + (a^2/z)$. Complex line integrals- Cauchy's theorem and Cauchy's integral formula.

[7 hours]

Unit-V: SPECIAL FUNCTIONS

Solution of Laplace equation in cylindrical and spherical systems leading Bessel's and Legendre's differential equations, Series solution of Bessel's differential equation leading to Bessel function of first kind. Orthogonal property of Bessel functions. Series solution of Legendre's differential equation leading to Legendre polynomials, Rodrigue's formula.

[7 hours]

Unit-VI: PROBABILITY THEORY - 1

Probability of an event, empherical and axiomatic definition, probability associated with set theory, addition law, conditional probability, multiplication law, Baye's theorem.

[6 hours]

Unit-VII: PROBABILITY THEORY- 2

Random variables (discrete and continuous), probability density function, cumulative density function. Probability distributions – Binomial and Poisson distributions; Exponential and normal distributions.

[7 hours]

Unit-VIII: SAMPLING THEORY

Sampling, Sampling distributions, standard error, test of hypothesis for means, confidence limits for means, student's t-distribution. Chi -Square distribution as a test of goodness of fit

[6 hours]

To conduct profile leveling for water supply /sewage line and to draw the longitudinal section to determine the depth of cut and depth of filling for a given formation level.

Demonstration
Minor instruments – Clinometer, Ceylon ghat tracer, Hand level, Box sextant, Planimeter and Pantagraph.

Scheme of Examination:
Any one of the above exercise is to be conducted in the examination by the student.

TEXT BOOKS:
1. 'Surveying' Vol.–1, B.C. Punmia , Laxmi Publications, New Delhi.

2. "Plane Surveying' Vol-1-A.M. Chandra , Newage International ® Ltd.

3. 'Plane Surveying' – ALAK , S. Chand and Company Ltd., New Delhi.

REFERENCE BOOKS :
1. Fundamentals of Surveying - S.K. Roy – Prentice Hall of India.

2. Fundamentals of Surveying - Milton O. Schimidt – Wong, Thomson Learning.

4. Surveying Vol. I, S.K. Duggal

ENGINEERING MATHEMATICS - IV

Sub Code	:	10MAT41	IA Marks	:	25
Hrs/ Week	:	04	Exam Hours	:	03
Total Hrs.	:	52	Exam Marks	:	100

CONCRETE TECHNOLOGY
(COMMON TO CV/TR/CTM)

Sub Code	:	10 CV 42	**IA Marks** :	25
Hrs/ Week	:	04	**Exam Hours** :	03
Total Hrs.	:	52	**Exam Marks** :	100

PART – A

Unit- 1

Cement, Chemical composition, hydration of cement, Types of cement, manufacture of OPC by wet and dry, process (flow charts only) Testing of cement - Field testing, Fineness by sieve test and Blaine's air permeability test, Normal consistency, testing time, soundness, Compression strength of cement and grades of cement, Quality of mixing water. —7 Hours

Unit-2

Fine aggregate - grading, analysis, Specify gravity, bulking, moisture content, deleterious materials. Coarse aggregate – Importance of size, shape and texture.Grading of aggregates - Sieve analysis, specific gravity, Flakiness and elongation index, crushing, impact and abrasion tests. - 6 Hours

Unit-3

Workability - factors affecting workability, Measurement of workability - slump, flow tests, Compaction factor and vee-bee consistometer tests, Segregation and bleeding, Process of manufactures of concrete : Batching, Mixing, Transporting, Placing, Compaction, Curing.   -7 Hours

Unit-4

Chemical admixtures - plasticizers, accelerators, retarders and air entraining agents, Mineral admixtures - Fly ash, Silica fumes, rice husk ash and GGBS.
 -6 Hours

Part-B

Unit-5

Factors affecting strength, w/c ratio, gel/space ratio, maturity concept, Effect of aggregate properties, relation between compressive strength, and tensile strength, bond strength, modulus of rupture, Accelerated curing, aggregate - cement bond strength, Testing of hardened concrete - compressive strength, split tensile strength, Flexural strength, factors influencing strength test results.   - 6Hours

Unit-6

Elasticity - Relation between modulus of elasticity and Strength, factors affecting modulus of elasticity, Poisson , Ratio, Shrinkage - plastic shrinkage

and drying shrinkage, Factors affecting shrinkage, Creep - Measurement of creep, factors affecting creep, effect of creep, - 7 Hours

Unit-7

Durability - definition, significance, permeability, Sulphate attack, Chloride attack, carbonation, freezing and thawing – remedial measures. - 6 Hours

Unit-8

Concept of Concrete Mix design, variables in proportioning , exposure conditions, Procedure of mix design as per IS 10262-2009, Numerical examples of Mix Design
- 7 Hours

TEXT BOOKS:

1. "Concrete Technology" - Theory and Practice, M.S.Shetty, S.Chand and Company, New Delhi, 2002.
2. "Concrete Technology" – M.L.Gambhir, TATA McGRAW HILL, New Delhi.

REFERENCES :

1. "Properties of Concrete"Neville, A.M. : , ELBS, London
2. "Concrete Technology" – A.R.Santakumar. Oxford University Press (2007)'
3. "Concrete Mix Design" - N.Krishna Raju, Sehgal - publishers.
4. "Recommended guidelines for concrete mix design" - IS:10262,BIS Publication

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STRUCTURAL ANALYSIS –I
(COMMON TO CV/TR)

Sub Code	:	10 CV 43	IA Marks	:	25
Hrs/ Week	:	04	Exam Hours	:	03
Total Hrs.	:	52	Exam Marks	:	100

PART – A

UNIT 1:

STRUCTURAL SYSTEMS AND ENERGY CONCEPT

1.1 Introduction, 1.2 Forms of structures – One, Two & Three dimensional structural systems, 1.3 Degrees of Freedom, 1.2 Conditions of equilibrium,1.3 Degree of freedom (Kinematic indeterminacy) 1.4 Determinate and indeterminate structures-Static indeterminacy, 1.5 Linear and Non linear structures, 1.6 Strain energy and complimentary strain energy, 1.8 Strain energy due to axial load, bending and shear, 1.9 Theorem of minimum potential energy, 1.10 Law of conservation of energy, 1.11 Principle of virtual work,

18

UNIT 2:
DEFLECTION OF BEAMS
2.1 Moment area method, 2.2 Conjugate beam method

UNIT 3:
DEFLECTION OF BEAMS AND TRUSSES BY STRAIN ENERGY
3.1 The first and second theorem of Castigliano's, problems on beams, bents and trusses, 3.2 Betti's law, 3.3 Clarke - Maxwell's theorem of reciprocal deflection(Static and Kinematic indeterminacy less than/equal to 2).

7 Hours

UNIT 4:
ANALYSIS OF BEAMS AND PLANE FRAMES BY STRAIN ENERGY
4.1 Analysis of beams (Propped cantilever and Fixed beams) and trusses using strain energy and unit load methods   (Static   and   Kinematic indeterminacy less than/equal to 2)

7 Hours

PART – B

UNIT 5:
ARCHES AND CABLES
5.1 Introduction, 5.2 Three hinged circular and parabolic arches with supports at same levels and different levels, 5.3 Determination of thrust, shear and bending moment, 5.4 Analysis of cables under point loads and UDL, length of cables (Supports at same levels and at different levels).

6 Hours

UNIT 6:
ANALYSIS OF BEAMS
6.1 Consistent deformation method – Propped cantilever and fixed beams

6 Hours

UNIT 7:
7.1 Clapeyron's theorem of three moments – Derivation of equation, continuous beams and fixed beams-related problems.

6 Hours

UNIT 8:

ANALYSIS OF ARCHES

8.1 Two hinged parabolic arch, 8.2 Two hinged Circular Arch.

7 Hours

TEXT BOOKS:

1. **Theory of Structures**, Pandit and Guptha, Vol. – I, Tata McGraw Hill, New Delhi.
2. **Basic Structural Analysis** Reddy C. S., Tata McGraw Hill, New Delhi.
3. **Strength of Materials and theory of structures** Vol I & II, B.C. Pumia , R.K., Jain   Laxmi Publication New Delhi

REFERENCE BOOKS:

1. **Elementary Structural Analysis**, Norris and Wilbur, International Student Edition. McGraw Hill Book Co: New York
2. **Structural Analysis**, 4th SI Edition by Amit Prasanth & Aslam Kassimali, Cengage Learning.
3. **Analysis of Structures**, Thandava Murthy, Oxford University Press, Edition 2005.

20

SURVEYING – II
(COMMON TO CV/TR/EV/CTM)

Sub Code	:	10 CV 44	**IA Marks** :	25
Hrs/ Week	:	04	**Exam Hours** :	03
Total Hrs.	:	52	**Exam Marks** :	100

PART – A

UNIT 1:
THEODOLITE SURVEY

1.1 Thedolite and types, 1.2 Fundamental axes and parts of a transit theodolite, 1.3 Uses of theodolite, 1.4 Temperary adjustments of a transit thedolite, 1.5 Measurement of horizontal angles – Method of repetitions and reiterations, 1.6 Measurements of vertical angles, 1.7 Prolonging a straight line by a theodolite in adjustment and theodolite not in adjustment

6 Hours

UNIT 2:
PERMANENT ADJUSTMENT OF DUMPY LEVEL AND TRANSIT THEODOLITE

2.1 Interrelationship between fundamental axes for instrument to be in adjustment and step by step procedure of obtaining permanent adjustments

7 Hours

UNIT 3:
TRIGONOMETRIC LEVELING

3.1 Determination of elevation of objects when the base is accessible and inaccessible by single plane and double plane method, 3.2 Distance and difference in elevation between two inaccessible objects by double plane method. Salient features of Total Station, Advantages of Total Station over conventional instruments, Application of Total Station.

8 Hours

UNIT 4:
TACHEOMETRY

4.1 Basic principle, 4.2 Types of tacheometric survey, 4.3 Tacheometric equation for horizontal line of sight and inclined line of sight in fixed hair method, 4.4 Anallactic lens in external focusing telescopes, 4.5 Reducing the

21

constants in internal focusing telescope, 4.6 Moving hair method and tangential method, 4.7 Substance bar, 4.8 Beaman stadia arc.

7 Hours

PART – B

UNIT 5:
CURVE SETTING (Simple curves)
5.1 Curves – Necessity – Types, 5.2 Simple curves, 5.3 Elements, 5.4 Designation of curves, 5.5 Setting out simple curves by linear methods, 5.6 Setting out curves by Rankine's deflection angle method.
CURVE SETTING (Compound and Reverse curves)
5.2 Compound curves 5.2 Elements 5.3 Design of compound curves 5.4 Setting out of compound curves 5.5 Reverse curve between two parallel straights (Equal radius and unequal radius).

10 Hours

UNIT 6:
6.1 Triangulation Survey: Figures and systems, system of framework, baseline measurement, base measurement by rigid bar and flexible apparatus, tape correction, Measurement of angles, satellite station and reduction to centre and field checks in triangulation and principle of least squares, triangulation adjustment- angle and station

Hours   **6**

UNIT 7:
CURVE SETTING (Transition and Vertical curves)
7.1 Transition curves 7.2 Characteristics 7.3 Length of Transition curve 7.4 Setting out cubic Parabola and Bernoulli's Lemniscates, 7.5 Vertical curves – Types – Simple numerical problems.

6 Hours

UNIT 8:
AREAS AND VOLUMES .
8.1 Calculation of area from cross staff surveying, 8.2 Calculation of area of a closed traverse by coordinates method. 8.3 Planimeter – principle of working and use of planimeter to measure areas, digital planimter, 8.4 Computations of volumes by trapezoidal and prismoidal rule, 8.5 Capacity contours

6 Hours

TEXT BOOKS:

22

1. 'Surveying' Vol 2 and Vol 3 - B. C. Punmia, Laxmi Publications
2. 'Plane Surveying' A. M. Chandra – New age international (P) Ltd
3. 'Higher Surveying' A.M. Chandra New age international (P) Ltd

REFERENCE BOOKS:
1. **Fundamentals of Surveying** - Milton O. Schimidt – Wong, Cengage Learning.
2. **Fundamentals of Surveying** - S.K. Roy – Prentice Hall of India
3. **Surveying**, Arther Bannister et al., Pearson Education, India

HYDRAULICS & HYDRAULIC MACHINES
(COMMON TO CV/TR/EV)

Sub Code	:	10 CV 45	IA Marks	:	25
Hrs/ Week	:	04	Exam Hours	:	03
Total Hrs.	:	52	Exam Marks	:	100

PART-A

UNIT-1: DIMENSIONAL ANALYSIS AND MODEL STUDIES

Introduction, Systems of units, Dimensions of quantities, Dimensional Homogeneity of an equation. Analysis- Raleigh's method, Buckingham's Π theorem- problems.
Model Studies, Similitude, Non-dimensional numbers: Froude models-Undistorted and Distorted models. Reynold's models-Problems   **07 hrs**

UNIT-2: UNIFORM FLOW IN OPEN CHANNELS

Introduction, Geometric properties of Rectangular, Triangular, Trapezoidal and Circular channels. Chezy's equation, Manning's equation-problems.

23

Most economical open channels-Rectangular, Triangular, Trapezoidal and Circular channeles- problems.

06 Hrs

UNIT-3: NON-UNIFORM FLOW IN OPEN CHANNELS

Introduction, Specific energy, Specific energy diagram, Critical depth, Conditions for Critical flow- Theory & problems.
Hydraulic jump in a Horizontal Rectangular Channel- Theory and problems.
Dynamic equation for Non-Uniform flow in an Open channel, Classification of Surface profiles- simple Problems.

07 Hrs

UNIT-4: IMPACT OF JET ON FLAT VANES

Introduction, Impulse- Momentum equation. Direct impact of a jet on a stationary flat plate, Oblique impact of a jet on a stationary flat plate, Direct impact on a moving plate, Direct impact of a jet on a series of a jet on a series of flat vanes on a wheel. Conditions for maximum hydraulic efficiency. Impact of a jet on a hinged   flat
plate- problems.

06 Hrs

PART-B

UNIT-5: IMPACT OF JET ON CURVED VANES

24

Introduction, Force exerted by a jet on a fixed curved vane, moving curved vane.
Introduction to concept of velocity triangles, Impact of jet on a series of curved vanes-problems.

06 Hrs

UNIT-6: PELTON WHEEL

Introduction to Turbines, Classification of Turbines. Pelton wheel- components, working and velocity triangles. Maximum power, efficiency, working proportions- problems.

07 Hrs

UNIT-7: KAPLAN TURBINES

Introduction, Components, Working and Velocity triangles, Properties of the Turbine, Discharge of the Turbines, Number of Blades-Problems. Draft Tube: Types, efficiency of a Draft tube. Introduction to Cavitation in Turbines.

07 Hrs

UNIT-8: CENTRIFUGAL PUMPS

Introduction, Classification, Priming, methods of priming. Heads and Efficiencies. Equation for work done, minimum starting speed, velocity triangles. Multistage Centrifugal Pumps (Pumos in Series and Pumps in parallel). Characteristic Curves for a Single stage Centrifugal Pumps- problems.

06 Hrs

TEXT BOOKS:
4. 'A TextBook of Fluid mechanics & Hydraulic Machines'- R.K.Rajput, S.Chand & Co, New Delhi, 2006 Edition.

5. ' Text Book Of Fluid Mechanics& Hydralic Machines'- R.K.Bansal, Laxmi Publications, New Delhi, 2008 Edition.
3. ' Fluid Mechanics and Turbomachines'- Madan Mohan Das, PHI Learning Pvt. Limited, New Delhi. 2009 Edition.

REFERENCE BOOKS:

3. ' Introduction to Fluid Mechanics' – Robert w. Fox: Philip j. Pritchard: Alan t. McDonald, Wiley India, New Delhi, 2009 Edition.
4. 'Introduction To Fluid Mechanics' – Edward j. Shaughnessy,jr; Ira m. Katz:; James p Schaffer, Oxford University Press, New Delhi, 2005 Edition.
5. 'Hydraulics and Fluid Mrchanics' – Dr. P.N. Modi& Dr S.M. Seth, Standard Book House- New Delhi. 2009 Edition..

BUILDING PLANNING AND DRAWING
(COMMON TO CV/TR)

Sub Code	:	10 CV 46	IA Marks	:	25
Hrs/ Week	:	06 (3 x 2 = 6) Practical	Exam Hours	:	04
		01 Theory	Exam Marks	:	100

1. To prepare geomatrical drawing of component of buildings i) Stepped wall footing and isolated RCC column footing, ii) Fully paneled and flush doors, iii) Half paneled and half-glazed window, iv) RCC dog legged and open well stairs, v) Steel truss.

15 Hours

2. Functional design of building (Residential, Public and Industrial), positioning of various components of buildings, orientation of buildings, building standards, bye laws, set back distances and calculation of carpet area, plinth area and floor area ratio.

9 Hours

3. Development of plan, elevation, section and schedule of openings from the given line diagram of residential buildings, i) Two bed

26

room building, ii) Two storeyed building.

27 Hours

4   Functional design of building using inter connectivity diagrams
       (bubble diagram), development of line diagram only for fallowing
       building i) Primary health centre, ii) Primary school building, iii)
       College canteen iv) Office building

12 Hours

5   For a given single line diagram, preparation of water supply,
       sanitary and electrical layouts

6 Hours

REFERENCE BOOKS:

1   **"Building Drawing"**, Shah M.H and Kale C.M, Tata Mc Graw Hill
    Publishing co. Ltd., New Delhi.
2   **"Building Construction"**, Gurucharan Singh, Standard Publishers
    &distributors,New Delhi.
3   **National Building Code**, BIS, New Delhi.

IA MARKS

15 Marks for term work.
10 Marks for a test conducted at the end of the
semester of 4hrs duration on the Line of VTU
examination.

TERM WORKS DETAILS:

Sheet No: **1 to 4 from chapter No1**
Sheet No: **5 to 8 from chapter No3**
Sheet No: **9 to 13from chapter No4**
Sheet No: **14 &15from chapter No5**

SCHEME OF EXAMINATION

Section-I   Compulsory question from chapter No 3 for 60 Marks
               Plan...........................25 ⎤
               Elevation.....................15 ⎬60
               Section.......................15 ⎟
               Schedule of opening........05 ⎦

Section-II   Four questions from chapters 1, 2, 4 and 5 should be set,
               out of which two have to be answered (20 x 2 = 40 Marks).

Note: No theory question shall be asked from any chapter.

SURVEYING PRACTICE – II LABORATORY
(COMMON TO CV/TR/CTM)

Sub Code	:	10 CVL 47	IA Marks	:	25
Hrs/ Week	:	03	Exam Hours	:	03
Total Hrs.	:	42	Exam Marks	:	50

Exercise – 1

Measurement of horizontal angles with method of repetition and reiteration using theodolite, Measurement of vertical angles using theodolite.

Exercise – 2

To determine the elevation of an object using single plane method when base is accessible and inaccessible.

Exercise – 3

To determine the distance and difference in elevation between two inaccessible points using double plane method.

Exercise – 4

To determine the tachemetric constants using horizontal and inclined line of sight.

Exercise – 5

To set out simple curves using linear methods – perpendicular offsets from long chord and offsets from chords produced.

Exercise – 6

To set out simple curves using Rankine's deflection angles method.

Exercise – 7

To set out compound curve with angular methods with suing theodolite only.

Exercise – 8

To set out the center line of a simple rectangular room suing offset from base line

Exercise – 9

To set out center lines of columns of a building using two base lines at right angles

Demonstration

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Exposure to use of Total Station. Traversing, Longitudinal sections, Block levelling, Usage of relevant softwares for preparation of the contour drawings.

Scheme of Examination:
Any one of the above exercise is to be conducted in the examination by the student.

APPLIED ENGINEERING GEOLOGY LABORATORY
(COMMON TO CV/TR)

Sub Code	:	10 CVL 48	IA Marks	:	25
Hrs/ Week	:	03	Exam Hours	:	03
Total Hrs.	:	42	Exam Marks	:	50

1. Describe and identify the minerals based on their physical, special properties, chemical composition and uses. Study of important rock forming minerals, ores and other important industrial minerals. (As per the III semester theory syllabus) – 2 practicals

2. Describe and identify the rocks as per the theory syllabus by giving their physical properties and engineering uses. – 2 practicals

3. Study of Geological maps and their sections: interpreting them in terms of selecting the sites for various civil engineering structures. - 3 practicals

4. Dip and strike (surface method) problems: To find out the dip and strike of the geological formation to select suitable site for civil engineering structures. – 2 practicals

5. Borehole problems (sub surface dip and strike): three point level ground methods: - 2 practicals

6. Thickness of strata (out crops) problems: To determine the true thickness, vertical thickness and the width of the out crops on different topographical terrain. – 1 practical

7. Filed visit to Civil engineering projects –Dams, Reservoirs, Harbours etc. – 3 days

Scheme of Examination

1. Identification of Minerals (5 Nos.): 5x2 : 10 marks
2. Identification of Rocks (5Nos.): 5x2 : 10 marks
3. Geological Map: 1x 15 : 15 marks
4. Borehole Problems: 1x 05 : 05 marks
5. Dip and Strike Problems: 1x04 : 04 marks
6. Thickness of strata problems: 1x03 : 03 marks
7. Viva- Voce: 03 marks

I.A. Marks should be assessed by conducting a test for 10 Marks and 15 Marks for practical record. (Total Marks: 25)

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