Maharashtra State Board of Vocational Examination, Mumbai 400 051

1	**Name of Course**	**Diploma Course in Construction Surveying**
2	**Course Code**	**304404**
3	**Max no. of Students**	25
4	**Duration**	2 year
5	**Course Type**	Full Time
6	**No. of Days per week**	6 days
7	**No. of hours per day**	7 Hrs
8	**Space require**	Theory Class Room – 200 sqft, Lab Sub.– 1500 sqft, Lab Elective - 400 sqft **Total = 2100 Sq.Ft.**
9	**Entry qualification**	S.S.C. Pass
10	**Objective of syllabus**	To get Knowledge of Building Construction, To Understanding Building Drawing, To Prepare Estimate, To Prepare Building Drawing on CAD, To carry our Civil Surveying Work
11	**Employment opportunities**	Office of Architect, Office of Consultant Civil Engineer, Office of Builder, any Civil Engineering Ferm, his own practice as Surveyor
12	**Teachers Qualification**	1) For Vocational subject - B.E.Civil 2) For Non Vocational Subject - Master Degree in Concern subject

13 **Teaching Scheme –**

Sr.	Subject	Subject Code	Clock Hours / Week		Total
			Theory	Practical	
1	**English (Communication Skill)**	90000001	2 Hrs	1 Hrs	3 Hrs
2	**Elective – I**		2 Hrs	1 Hrs	3 Hrs
3	**Elective – II**		2 Hrs	1 Hrs	3 Hrs
4	**Building Material and Construction**	30440001	3 Hrs	8 Hrs	11 Hrs
5	**Building Drawing and CAD**	30440002	3 Hrs	8 Hrs	11 Hrs
6	**Construction Surveying and Estimating**	30440007	3 Hrs	8 Hrs	11 Hrs
Total					**42 Hrs**

14 **Internship** Two Months Summer Internship from 1st May to 30th June is Compulsory.

15 **Examination Scheme – Final Examination will be based on syllabus of both years.**

Paper	Subject	Subject Code	Theory				Practical		Total	
			Duration	Max	Min	Duration	Max	Min	Max	Min
1	**English (Communication Skill)**	90000001	3 Hrs	**70**	**25**	3 Hrs	**30**	**15**	**100**	**40**
2	**Elective – I**		3 Hrs	**70**	**25**	3 Hrs	**30**	**15**	**100**	**40**
3	**Elective – II**		3 Hrs	**70**	**25**	3 Hrs	**30**	**15**	**100**	**40**
4	**Building Material and Construction**	30440001	3 Hrs	**100**	**35**	3 Hrs	**100**	**50**	**200**	**85**
5	**Building Drawing and CAD**	30440002	3 Hrs	**100**	**35**	3 Hrs	**100**	**50**	**200**	**85**
6	**Construction Surveying and Estimating**	30440007	3 Hrs	**100**	**35**	3 Hrs	**100**	**50**	**200**	**85**
									900	**375**

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16 **Teachers** – Three Teachers per batch for vocational component. For English, Elective-I & II guest faculty on clock hour basis.

17

a) For Elective I – Student can choose any one subject

Code	Subject Name
90000011	Applied Mathematics
90000012	Business Economics
90000013	Physical Biology (Botany & Zoology)
90000014	Entrepreneurship
90000015	Psychology

b) For Elective II – Student can choose any one subject

Code	Subject Name
90000021	Applied Sciences (Physics & Chemistry)
90000022	Computer Application
90000023	Business Mathematics

Subject - Building Material and Construction

Code No – 30440001

Theory	Practical
Chapter 1: Stone and Coarse Aggregate 1.1. Classifications of Rocks 1.2. Quarrying for stone 1.3. Commonly used stones in building 1.4. Requirements of good building stone 1.5. Study of crushers for obtaining coarse Aggregate 1.6. Common sizes of coarse Aggregate used in concrete 1.7. Properties of coarse Aggregate	**Practical** 1) Visit to Quarry to observe quarrying operations 2) Conduct Compressive strength Test on stone 3) Conduct Abrasion Test of Metal
Chapter 2: Bricks 2.1. Study of earth (Soils) used in manufacturing of Brick 2.2. Procedure of manufacture of Bricks 2.3. Classification of Bricks 2.4. Properties of a good Brick 2.5. Other types of Brick	**Practical** 1. Field Tests of Brick 2. Conduct Compressive Test on Brick 3. Conduct Water absorption on Brick
Chapter 3: Cement 3.1 Grades of cement as per IS 12269 – 1987, IS 8182 - 1989 and IS 289 - 1989 3.2 Ingredients of Cement, Manufacture of Cement (only introduction) 3.3 Various Types of Cements and its uses 3.4 Effect of Cement on properties of concrete 3.5 Storing of Cement	**Practical** 1. Field Tests of Cement 2. Determining initial & final setting time of Cement 3. Determining fineness Modulus of Cement 4. Determination of Compressive strength of cement
Chapter 4: Fine Aggregates 4.1. Types of fine aggregates used in preparation of cement mortar and concrete 4.2. Sources of fine aggregate 4.3. Properties of River Sand 4.4. Silt content and necessity of Screening & Washing of fine Aggregates	**Practical** 1. Sieve Analysis of Sand for finding fineness modulus 2. Finding Silt content in Sand
Chapter 5: Cement Mortar 5.1. Ingredients of Cement Mortar 5.2. Preparation of Cement Mortar – Hand Mixing, Machine Mixing – Advantages and Disadvantages 5.3. Various Proportions of Cement Mortar 5.4. Lime Mortar, its properties and use	**Practical** 1. Preparation of Cement Mortar 1:6
Chapter 6: Concrete 6.1) Ingredients of Concrete 6.2) Types of Concrete Plain Cement Concrete, (PCC) and Reinforced cement concrete (RCC) 6.3) Various proportion of Concrete and its uses, Batching of concrete- Volume batching and weigh batching 6.4) Procedure for preparing concrete – Hand Mixing, Machine Mixing 6.5) Transportation of concrete, precautions to taken . 6.6) Laying of concrete & precautions to taken 6.7) Necessity of compacting of concrete, equipments used for compacting concrete 6.8) Necessity of curing, Methods of curing 6.9) Workability - water cement ratio and its importance 6.10) Hydration of Cement	**Practical** 1) Conduct Compressive Test on Concrete (cube Test) 2) Conduct Test for Workability (slump test) 3) Conduct Compaction factor Test 4) Introduction to Non Destructive Tests on Concrete

6.11) Quality of water 6.12) Finishing of concrete surface 6.13) Admixtures used in concrete and properties of such concrete 6.14) Ready mix concrete, Properties, Manufacturing and its uses 6.15) Advances in concreting such as self compacted concrete, Trimix Concrete, etc	
Chapter 7: Steel 7.1) Types of steel used in RCC as per ISI 7.2) High Tensile Steel its properties, study of IS 1786 7.3) Cover for steel as per IS 456 - 2000 7.4) Types of sections used in Steel Structure and its properties 7.5) Rolled steel Joist of different sections and its uses	**Practical** 1) Conduct Tensile Test on mild steel bar / HYSD Bars
Chapter 8: Flooring Tiles 8.1) Shahabad Tiles, Kotah Tiles, Cuddappa Tiles, Marble Tiles, Granite, its occurrence, Sources of availability and its uses 8.2) Cutting of tiles 8.3) Cement tiles, marble mosaic tiles, chequered tiles- process of manufacture, and its uses 8.4) Ceramic Tiles, process of manufacture, Normal sizes & its uses 8.5) Cement mortar **Briquettes**, Process of manufactures and its uses	**Practical** 1) Conduct Bending Test of tiles 2) Conduct Abbreviation test of tile
Chapter 9: Timber 9.1) Types of Timber. 9.2) Sections of Timber. 9.3) Characteristics of Good Timber. 9.4) Defects in Timber. 9.5) Decay of Timber and remedies. 9.6) Seasoning of Timber, necessity and methods. 9.7) Preservation of Timber. 9.8) Timber based Product Plywood; Block Board, Veneers, Particle wood 9.9) Finishing to Timber a) Painting b) Polishing c) Sun mica	**Practical** Report on Visit to a Timber Factory
Advance Building Materials 10.1) Study of latest materials used in Flooring, Thermal Insulation, Sound proofing, Wall finishing, structural glazing, Metal Cladding & rendering, Partitioning, and Painting	

Chapter 8: Reinforced Cement Concrete 8.1) Different types of RCC members Definitions, its properties and its locations 8.2) Ingredients of for R. C. C. Concrete 8.3) Batching of concrete ingredients- Definition and methods, volumetric method and weight batching method of concrete mixing 8.4) Shape and types of Reinforcing steel bars used in RCC members. Explain Terms used - Cutting of bar; Straightening of bar; Bending of bar; Hooking of bar; lapping of bar, Binding of bars, use of G.I. wire, cover for bars. 8.5) Standard Hook length for plan M. S. bar, Standard length of "EL" for Torque steel bar 8.6) Joints in RCC work, Necessity, Types of joints in RCC work, Construction Joint, Expansion Joint, location of joints, Material used, & Procedure of construction of Providing Joints.	**Practical** i) Visit to site for observing Bar bending, laying of Reinforcement bars ii) Observe method of providing cover, placing concrete in RCC Members iii) Draw Figures – RCC Bars reinforcement in column Footing, column, beam, slab, lintel, Chajja, Loft iv) Exercise on preparing standard Bar bending Schedule v) Perform bar bending and binding by using G.I. wire for forming Hook, EL, Bend, Lap, stirrups of 6 mm bar for column and beam

Subject - Building Material and Construction - 2nd Year
Code No – 30440001

Theory	Practical
Chapter 1: Foundation 1.1) Necessity and Purpose of Foundation 1.2) Shallow Foundation 1.2.1) Spread Foundation 1.2.1.1) Footing for load Bearing Structure 1.2.1.2) Column Footing and combined Footing 1.3) Raft Foundation 1.4) Grillage Foundation 1.5) Deep Foundation and its types 1.5.1) Cast in-situ R.C.C. concrete pile 1.5.2) Pre cast concrete piles 1.6) Foundation in Black cotton soil, Under reamed pile	**Practical** 1) Line out for 3 to 4 Room Load Bearing Building 2) Line out for Framed structure
Chapter 2: Excavation 2.1) Manual method of Excavation 2.2) Mechanical Method of Excavation 2.3) Machines used for excavation 2.4) Disposal of Excavated Material 2.5) Dewatering of trenches different methods used 2.6) Shoring and strutting of Trenches 3.0) Precaution while excavation, Fencing, caution signs, removing excavated material	**Practical** Visit to Site to study different methods of Excavation
Chapter 3: Plain cement concrete 3.1) Mix design of concrete and uses of different mix of concrete 3.2) Procedure of preparing concrete. Manual and machine mixing, Transporting Laying, compacting and curing of concrete 3.3) Admixtures used in concrete 3.4) Ready mix concrete	**Practical** 1) Visit to site showing ingredients and process of mixing, transportation, laying, compacting and curing of concrete

Chapter 4: Stone Masonry 4.1) Terms used in stone masonry 4.2) Procedure of constructing un coursed Rubble and Coursed masonry, purpose of through stone in stone masonry 4.3) Points to be observed while constructing stone Masonry	**Practical** 1) Construction of UCR stone masonry in foundation work, UCR stone masonry for compound wall (ht 1.2 m to 1.5 m)
Chapter 5: Brick Masonry 5.1) Terms used in Brick Masonry. 5.2) Construction of Brick Masonry in English bond and Flemish Bond in cement mortar, pre-construction preparation, procedure of construction, post construction precaution 5.3) Brick Masonry stretcher bond and half brick thick masonry. 5.4) Hollow and solid concrete block masonry 5.5) Fixing of Door and window Frame in masonry 5.6) Brief information of Siporex block masonry 5.7) Brief information of Concrete Block masonry	**Practical** 1) Construction of Burnt Brick Masonry in superstructures in English Bond / Flemish Bond 2) Construction of concrete block masonry in superstructure
Chapter 6: Scaffolding 6.1) Purpose and Necessity of Scaffolding 6.2) Single and Double Scaffolding, name of parts erecting Scaffolding. 6.3) Materials used for Scaffolding, Tubular steel Scaffolding	**Practical** 1) Erecting Single Scaffolding up to G + 1 floor 2) Erecting Double Scaffolding up to G + 1 floor
Chapter 7: Lintels and Sills 7.1) Necessity of lintels 7.2) R.C.C. Lintels 7.3) Jambs, Sills, Head cladding, its purpose, materials used and construction procedures.	1) Study of Laying Lintels and Sills on Construction Site
Chapter 8: Reinforced Cement Concrete 8.1) Different types of RCC members Definitions, its properties and its locations 8.2) Ingredients of for R. C. C. Concrete 8.3) Batching of concrete ingredients- Definition and methods, volumetric method and weight batching method of concrete mixing 8.4) Shape and types of Reinforcing steel bars used in RCC members. Explain Terms used - Cutting of bar; Straightening of bar; Bending of bar; Hooking of bar; lapping of bar, Binding of bars, use of G.I. wire, cover for bars. 8.5) Standard Hook length for plan M. S. bar, Standard length of "EL" for Torque steel bar 8.6) Joints in RCC work, Necessity, Types of joints in RCC work, Construction Joint, Expansion Joint, location of joints, Material used, & Procedure of construction of Providing Joints.	**Practical** i) Visit to site for observing Bar bending, laying of Reinforcement bars ii) Observe method of providing cover, placing concrete in RCC Members iii) Draw Figures – RCC Bars reinforcement in column Footing, column, beam, slab, lintel, Chajja, Loft iv) Exercise on preparing standard Bar bending Schedule v) Perform bar bending and binding by using G.I. wire for forming Hook, EL, Bend, Lap, stirrups of 6 mm bar for column and beam
Chapter 9: Centering and Form work 9.1) Definitions, Different members used in Form work and centering 9.2) Materials used in preparing centering and form work 9.3) Procedure of Erecting Centering and form work 9.4) Precautions while erecting centering and form for RCC work.	**Practical** 1) Draw Sketches of form work for column, Beams, Slab, Lintel and Chajja 2) Visit to site to study Centering and form work for abovementioned members and table formwork, Mivon formwork etc.

Chapter 10: Pointing and Plastering **10.1 Necessity of Pointing** 10.1.1) Materials used for Pointing 10.1.2) Procedure of applying Pointing, preparation of surface to receive pointing, Procedure of applying pointing & post applying precautions 10.1.3) Type of Pointing 10.2 Necessity of Plastering 10.2.1 Materials used for plastering 10.2.2 Types of plaster internal wall plaster, External wall plaster, Ceiling plaster, different types of furnishings, Stucco plaster. 10.2.3 Procedure of plastering for each of above type, Use of machines for plastering 10.2.4 P.O.P. finish to wall	**Practical** 1) Visit to site for observing procedure for different type of plaster work 2) Hands on experience of applying plaster of size 3m x 3 m on internal & external wall surface
Chapter 11: Painting 11.1. Necessity of painting, Types of paints, thinner, varnishes. Surface preparation, Use of Primers 11.2. Anti corrosive paints, its primers, its necessity 11.3. White Washing to walls and ceiling, Materials used, procedure for new and old surface 11.4. Applying Dry Distemper to walls, Material, Procedure for new and old surface 11.5. Applying Oil Bound Distemper and Emulsion, Materials used, Procedure for new and old surface 11.6. Applying Cement Paint to External walls, Materials used, Procedure for New and old surface 11.7. Applying Oil Paint Primer coat, procedure of applying oil paint to woodwork, steel work and walls. 11.8. Melamine / French polish, its application on old and new wooden surfaces	**Practical** Hands on experience of Painting of surface with a) White wash 3m x 3m surface area b) Dry Distemper 3m x 3m surface area c) Oil Bound Distemper 3m x 3m surface area d) Cement Paint 3m x 3m surface area e) Oil Paint on new Steel work and old wood work
Stairs 1.1) Definitions of Terms used in Stair. 1.2) Classification of stairs based on shape and materials used for construction. 1.3) Requirements of good stairs 1.4) Design of stair Thumb Rules for Design of Dog legged stair 1.5) Hand Rails Types and Fixing Procedure	**Practical** 1) Draw neat Sketches of any 4 types of stairs 2) Prepare design for RCC Dog-legged stair 3) Draw its plan and sectional elevation 4) Visit site to site for observing various type of stair
Roofs 2.1 Definition & Purpose of Roof 2.2 Technical Terms used in Roof 2.3 Types of Roofs 2.3.1 Pitched Roof 2.3.2 Lean to Roof 2.3.3 Couple Roof 2.3.4.King Post Truss and Queen Post Truss 2.3.5 Steel Trusses 2.3.6 Roof Coverings necessity & Purpose 2.4 Types of Roof Covering and Procedure of fixing **a)** Country Tile **b)** Mangalore Tile **c)** CGI sheet Roof – Size and procedure of fixing **d)** Acc sheet Roof – Type, Sizes and Procedure of fixing 2.5 Flat Roof only R.C.C. Slab	**Practical** 1. Draw sketch of couple Roof 2. Draw sketch of King post and Queen post Truss. 3. Draw Line Diagrams of steel Truss 4. Draw sketch showing details of Joint King Post for steel Truss

Flooring 3.1 Definition and terms used in flooring 3.2 Flooring at Plinth level, Plinth filling & Plinth PCC 3.2 Types of Floor finishes and its suitability 3.3 Procedure of Laying Tiles such as Rough Shahabad for Pavement. Cement Briquette for pavement 3.4 Procedure of Laying polished Shahabad Tile floor. 3.5 Procedure for Laying cement Tiles, Marble Mosaic Tile, ceramic Tiles and Marble Tiles on floors. 3.6 Procedure for fixing PVC tiles on floors 3.7 Skirting – Function, materials used and procedure for fixing tiles. 3.8 Dado - Function, materials used and procedure for fixing.	**Practical** 1. Fixing of Tiles for Pavement 2. Fixing of Tiles in area 3mX4m 3. Fixing Tiles for Dado
Door And Window 4.1 Functions of Door, Functions of window 4.2 Rules for providing Doors & windows 4.3 Parts of a Door and Window 4.4 Materials used in making of Door & window 4.5 Wooden and Steel Door and Window frame 4.6 Types of Door Shutters a) Fully paneled Shutter b) Fully glazed shutter c) Flush Door 4.7 Fixtures & fastenings for Doors 4.8 Rolling shutter, collapsible shutters, sliding doors 4.9 Types of Windows Shutter a) Fully Paneled shutter b) Fully glazed c) Sliding shutters. d) Lowered window e) Steel Window f) Aluminum sliding windows 4.10 Fixtures and Fastening for windows 4.11 Grills for window	**Practical** 1. Draw to a scale, drawing of fully paneled 2. Draw to a scale, drawing of fully glazed window 3. Visit to observe different types of doors and Windows 4. Draw Sketches of commonly used fixtures for Door & windows

List of Books

Building Material

1] TTTI Chandigarh Civil Engg. Materials N. Delhi, McGraw Hill, 1992
2] Rangwala S. C. Engg. Materials Chariot or Book Publications,
3] Anand Gujrath Kulkarni G. J. A Textbook of engg. Materials

Building Construction

1] Mackay Building Construction Vol. 1 to 4 VaynStrand
2] Mitchell Elementary Building Construction B. T. Batsford, London
3] Molnar Building Construction Drafting and Design CBS Publications. Delhi
4] Sushil Kumar Building Construction Delhi : Standard Publishers, 1999, 18th Ed.
5] Arora S. P. & Bindra S. P. Building Construction Jaipur : Dhanapat rai & Sons
6] Rangwala S. C. Building Construction Anand : Charotar & Publishing House

Raw Material:

Sufficient Raw Material for the Syllabus Practical should be compulsorily made available to perform the practical. (e.g. Bricks, Sand, Cement, Aggregate, Lime powder, white cement, Tiles, Reinforcement Bars, Binding wire, Color, Paint, Turpentine, Brush and other such consumable raw material)

List of Tools and Equipment

A] General Class room

Sr	Name of Item	No.
1	Steel lockers 8 compartments with individual lockers (1980 x 910 x 480 mm)	4
2	Chair with writing pad	25
3	Steel almari with self 6.5' x 3' (18 gauge)	2
4	Steel table 4' x 3'	2
5	Teacher chair	2

B] For Building Material and Construction Practical

Sr	Name of Item	No.
1	Compression Testing Machine 100 Ton Capacity (Hand Operated.)	1
2	Universal Testing Machine 40 T	1
3	Table Vibrator	1
4	Cube Mould (Small And Big)	4
5	Compaction Factor Test Apparatus	1
6	Aggregate Impact Test Apparatus	1
7	Shieve Shaker	1
8	Weighing Machine 100 Kg.	1
9	Small Sieve (All Type)	1
10	Mortar And Half Bag Concrete Mixer	1
11	Marble Cutter	1
12	High Speed Imact Drill	1
13	Marble Angle Grinder	1
14	Bench Grinder Double Ended Wheel Size 15 Cm	1
15	Vibratory Sand Screen	1

Sr	Name of Item	No.
16	Bolster 4” (100mm)	1
17	Pitching Tool (Mason)	1
18	Chisel Mason Hammer Headed Flat 200 Mm	10
19	Hammer Mason (Cube) 1.5 Lbs.	10
20	Hammer Mason	10
21	Level Masons 36” (1 Metre)	10
22	Plumb Bob.	10
23	Square (Steel) 2’ X 1’	10
24	Trowel Plastering Double Hand	10
25	Trowel Brick 10”	10
26	Tasla (Tin) Pans	10
27	Spade	10
28	Measuring Steel Tape 15 Mtr.	5
29	Measuring Steel Tape 30 Mtr.	5
30	Wooden Straight Edges For Ft.	10
31	Ladders 2 To 4 Mtr.	2
32	Sledge Hammer 10 Lbs.	2
33	Buckets 14 Lits.	10
34	Bar Bending Tools And Cutting Tools 6mm To 12 Mm	2 set
35	Screw Driver 12 Inch	5
36	Pocket Steel Tape 2 Mtr.	25
37	Pick Axes	5
38	Wheel Barrow	3
39	Tubular Scaffolding 25 Mm Die With Coupling And Compete Fitting.	400 RFT
40	Steel Measuring Boxes 3 Nos. (6cft C Fts), 3 Nos. (12cfts)	6
41	Adjustable Props Steel	20
42	Platform 4 Ft X 4 Ft X 6 Ft.	2
43	Boaning Rods	2
44	Spanner Sets	1
45	Carpenter Claw Hammer	10
46	Mortise Chisel 6 Mm.	10
47	Firmer Chisel	10
48	Mallet	10
49	Pane (Iron)	10
50	Handsaw 1’6”	10
51	Drilling Machines	1
52	Sieve IS No. 9	1
53	Vicat’apparatus	1
54	Needle measuring flask	1
55	A set of 10 IS sieves 80mm, 40mm, 20mm, 10mm, 4.75mm, 1.18mm, 600u, 150u.	1 each
56	Top cover & bottom pan for sieves	1
57	Hacksaw frame	1
58	BSP Tap & Die set 18,20,25 mm	1 set
59	Pipe vice ½ “ to 18” 2 each	2
60	Alluminum Level	2
61	Pipe Tube Level	2

Subject - **Building Drawing and CAD - 1st Year**

Code No – 30440002

Theory	Practical
A] Building Drawing	**1 Year**
Chapter 1: Introduction to Drawing 1.1) Different Drawing Instrument and their use 1.2) Letters its types, Sizes and its use in Drawing 1.3) Convention of different lines 1.4) Giving dimensions 1.5) Scales and its uses 1.6) Study of IS 962	**Practical** 1) Prepare Sheet on lettering 2) Prepare Sheet on lines 3) Prepare Sheets on Geometrical Construction 4) Prepare Sheets on Conventional Sign and Symbols
Chapter 2: Orthographic Projection 2.1) Introduction to orthographic projections 2.2) First Angle Projections Method 2.3) Third Angle Projections Method 2.4) Drawing orthographic Projections of simple pictorial view	**Practical** 1) 1st Angle Projections ---------- 2 Solids 2) 3rd Angle Projections ---------- 2 Solids
Chapter 3: Isometric View 3.1) Method of Preparing Isometric Views 3.2) Isometric View of Rectangular Objects 3.3) Isometric View of Circular Objects 3.4) Isometric View of Building	**Practical** 1) Isometric View of Rectangular Objects 2) Isometric Vies of Circular Objects 3) Isometric View of Building
Chapter 4: Building Drawing Dimensions and Details of Foundation C/S. DPC, Different Types of Door and Windows, Roof Trusses, Flooring C/S, Staircase, Brick Masonry, Lintel, Arches, Chajja, C/S details of RCC Chajja, Lintel, Beam, Footing, Column, Slab, Pardi, Staircase etc.	**Practical** Detailed Drawing of Foundation C/S. DPC, Different Types of Door and Windows, Roof Trusses, Flooring C/S, Staircase, Brick Masonry, Lintel, Arches, Chajja, C/S details of RCC Chajja, Lintel, Beam, Footing, Column, Slab, Pardi, Staircase etc.
Chapter 5: Building By Laws and Standard Norms 3.1) Definitions of Plot Area, Plinth Area, Built up Area, Carpet Area, Floor Space Index (FSI) 3.3) Permissible Built up Area for Residential Bldg., Public Building 3.4) Definition of Marginal Distance and their necessity, Normal Marginal Distances provided for Residential Buildings 3.5) Definition and Necessity of Building Line, Development Line 3.6) Min Dimensions for following 3.6.1) Plinth height, Sill height, Head Room in Residential Bldg, Public Buildings, Mezzanine floor, Basements and stilts for car parking 3.7) Minimum Dimensions of: Living Room, Bed Room, Master Bed Room, W.C. Bath, Toilet. 3.7.1) Min. Width for passage and Balcony 3.8) Rules for Window Opening 3.9) Min. width of step and Landing, Head Room, Thumb Rules for fixing Rise and Tread. 3.9.1) Permissible Height of Pardi, of Building as per FSI and Road Width	**Practical** 1) Student to Draw for A Residential. Bungalow (Load Bearing) i.e. minimum 2 Bedrooms (one Bed room with attached Toilet), 1Hall, 1Kitchen, Veranda, Staircase, Toilet block, and Car Parking. a) Plan, b) Elevation c) Two sections d) Schedule of door and window e) Site plan, f) Area statement, g) Construction notes. h) Schedule of finishes

Chapter 6: Development of Line Plan of a Building 4.1) Symbols and notations as per BIS 696 in Civil Engg. Drawing. 4.2) Preparing Line Plan of Building, necessity of preparing line plan. 4.3) Development of Plan of Residential Building having living Room, Kitchen Room, Bed Room, Bath room and w.c. with slab. Draw to scale – Plan, Elevation Sections in 3 directions 4.4) Working drawings and its necessity.	2) Draw tracing of above drawing 3) Prepare ammonia sheet 4) Prepare a working drawing for Staircase, Toilet block and kitchen

Subject - **Building Drawing and CAD - 2nd Year**

Code No – 30440002

Theory	Practical
B] Computer Fundamental	**6 Month**
1] Fundamentals Of Computer Introduction Components of PC The system Unit Front part of system Unit Back part of system Unit CPU Memory of computer Monitor Mouse, Keyboard Disk, Printer, Scanner, Modem, Video, Sound cards, Speakers	**List of Practical** 1. Working with Windows 2000 desktop ,start icon, taskbar, Recycle Bin, My Computer icon ,The Recycle Bin and deleted files Creating shortcuts on the desktop 2. The Windows 2000 accessories, WordPad – editing an existing document, Use of Paint – drawing tools The Calculator, Clock 3. The Windows Explorer window, concept of drives, folders and files? Folder selection techniques, Switching drives, Folder creation, Moving or copying files, Renaming, Deleting files and folders 4. Printing, Installing a printer driver, Setting up a printer, Default and installed printers, Controlling print queues, Viewing installed fonts, The clipboard and 'drag and drop', Basic clipboard concepts Linking vs. embedding,
2] Introduction To Windows 2000/Xp Working with window Desktop Components of window Menu bar option Starting window Getting familiar with desktop Moving from one window to another Reverting windows to its previous size Opening task bar buttons into a windows Creating shortcut of program Quitting windows	5. Moving through a Word document menu bar and drop down menus toolbars 6. Entering text into a Word 2000 document, selection techniques Deleting text 7. Font formatting keyboard shortcuts 8. Paragraph formatting Bullets and numbering 9. Page formatting What is page formatting? Page margins Page size and orientation Page breaks, Headers and footers 10. Introducing tables and columns

3] GUI Based Editing, Spreadsheets, Tables & Presentation Application Using MS Office 2000 & Open Office.Org Menus Opening, menus, Toolbars, standard toolbars, formatting toolbars & closing Quitting Document , Editing & designing your document Spreadsheets Working & Manipulating data with Excel Changing the layout Working with simple graphs Presentation Working With PowerPoint and Presentation	11. Printing within Word 2000 Print setup Printing options Print preview 12. Development of application using mail merge Mail merging addresses for envelopes Printing an addressed envelope and letter 13. Creating and using macros in a document 14. Creating and opening workbooks Entering data 15. Navigating in the worksheet Selecting items within Excel 2000 Inserting and deleting cells, rows and column Moving between worksheets, saving worksheet, workbook
4] Introduction To Internet What is Internet Equipment Required for Internet connection Sending &receiving Emails Browsing the WWW Creating own Email Account Internet chatting	16. Formatting and customizing data 17. Formulas, functions and named ranges 18. Creating, manipulating & changing the chart type 19. Printing, Page setup, Margins Sheet printing options, Printing a worksheet 20. ***** Preparing presentations with Microsoft Power Point. Slides and presentations, Opening an existing presentation , Saving a presentation
5] Usage of Computer System in various Domains Computer application in Offices, books publication data analysis ,accounting , investment, inventory control, graphics, database management, Instrumentation, Airline and railway ticket reservation, robotics, artificial intelligence, military, banks, design and research work, real-time, point of sale terminals, financial transaction terminals.	21. Using the AutoContent wizard ,Starting the AutoContent wizard, Selecting a presentation type within the AutoContent wizard Presentation type Presentation titles, footers and slide number 22. Creating a simple text slide, Selecting a slide Layout Manipulating slide information within normal and outline view, Formatting and proofing text, Pictures and backgrounds, drawing toolbar, AutoShapes, Using clipart, Selecting objects, Grouping and un-grouping objects, The format painter
	23. Creating and running a slide show, Navigating through a slide show, Slide show transitions, Slide show timings. Animation effects 24. Microsoft Internet Explorer 5 & the Internet Connecting to the Internet The Internet Explorer program window, The on-line web tutorial Using hyper links, Responding to an email link on a web page 25.Searching the Internet, Searching the web via Microsoft Internet Explorer, Searching the Internet using Web Crawler, Searching the Internet using Yahoo, Commonly used search engines

6] Information technology for benefits of community Impact of computer on society Social responsibilities Applications of IT Impact of IT Ethics and information technology Future with information technology	26. Favorites, security & customizing Explorer Organizing Favorite web sites Customizing options – general, security, contents, connection, programs, advanced 27. ***** Using the Address Book Adding a new contact Creating a mailing group, Addressing a message, Finding an e-mail address 28. Using electronic mail, Starting Outlook Express Using the Outlook Express window, Changing the window layout, Reading file attachment, Taking action on message-deleting, forwarding, replying 29. Email & newsgroups, Creating and sending Emails Attached files, Receiving emails, Locating and subscribing to newsgroups, Posting a message to a newsgroup 30. Chatting on internet, Understating Microsoft chat environment, Chat toolbar
C] Computer Aided Designing and Drafting	**6 Month**
1.0 **CAD Software** Meaning, various CAD software available in the market AutoCAD, 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.	Practical related Creating New file, Closing Drawing, Saving Drawing, Startup Methods, Modes in AutoCAD, Use of Function Keys, Use of Keyboard and Mouse in AutoCAD Practice.
2.0 **CAD Commands** WCS icon, UCS icon, co-ordinates, drawing limits, grid, snap, ortho features. All Drawing commands, line, circle, polyline, multiline, ellipse, polygon etc. All Editing commands – Copy, move, offset, fillet, chamfer, trim, lengthen, mirror, rotate, array etc. Working with Layers, Block, hatches, fills, dimensioning, text etc.	Practice on Small Drawing Objects using Commands in Draw Menu Practice of Editing command on above drawing objects, Dimensioning Drawing, Creating Title block, Area Statement and Schedule of Opening using Text in AutoCAD,
3.0 **Use of Cad software for practice of:** Generation of line plan, Detailed Plan, elevation, section, site plan, Area statement and print commands Generation of 3D view using 3D Modeling commands and 3d Operation commands, Creating 3D of Building Introduction to Auto desk Architect , 3D Max	Drawing Plan, Elevation, Section, Site Plan in AutoCAD Creating 3D Model of Building and Generating required 3D view from all sides. Other CAD Practical based on the Theory.

List of Books

Building Drawing

1] Malik, R.S. & Meo G.S. Civil Engg Drawing Delhi: New Asian Publishing

2] Shah P. J. Engg. Drawing – 1 Ahmedabad : D. J. Shah Publishing

3] Bhat N. D. Engg. Drawing Anand : Charotor

4] Gurucharan Singh Civil Engg. Drawing Delhi : Standard Publishers

5] Sane Y.S Building planning

6] Shaha Kale & Patki Building Drawing

7] Mackay W. B. IS962 Beauro of standards India (ISI)

Computer Fundamental

1] Vikas Gupta Comdex Computer Course Kit First Dreamtech

2] Henry Lucas Information Technology for management 7Th Tata Mc-Graw Hills

3] B.Ram Computer Fundamentals Architecture and Organisation Revised 3rd New Age International Publisher

CAD Books

1] Reference Manual of AutoCAD AutoDesk

2] Reference Manual of Felix cad Felix CAD

3] Reference Manual of Intel CAD

4] Reference Manual of Auto Civil

5] Reference Manual of 3D-Max

List of Tools and Equipment

A] General Class room

Sr	Name of Item	No.
1	Steel lockers 8 compartments with individual lockers (1980 x 910 x 480 mm)	4
2	Chair with writing pad	25
3	Steel almari with self 6.5’ x 3’ (18 gauge)	2
4	Steel table 4’ x 3’	2
5	Teacher chair	2

B] For Building Drawing Practical

Sr	Name of Item	No.
1	Drawing Board	25
2	Drawing Table	25
3	Mini Drafter	25
4	Triangular Scale	10
5	Glass board 8’ x 4’	2

C] For Computer Fundamental and CAD Practical

Sr	Name of Item	No.
1	Computer System P4 with accessories Complete with license OS. compatible for- to run AutoCAD 2010 and Windows 7 OS.	5+1
2	Plotter- HP Design Jet 500 latest model	1
3	Scanner	1
4	Computer table	5+2
5	Chair for computer	10+2
6	Laser Printer	1
7	AutoCAD 2010 or above Software	1
8	M. S. Office Software	1

Construction Surveying & Estimating Costing– 1st year

Code No – 30440007

Theory	Practical
Chapter : 1 Introduction 1.1) Definition of Surveying 1.2) Objects of Surveying 1.3) Uses of Surveying 1.4) Principles of Surveying 1.5) Types of Survey: Plain Survey & Geodetic Surveying. 1.6) Scales - its types and uses	**Practical** Construct different types of Scales, Use of Paper Scales,
Chapter 2: Linear Measurement 2.1) Study of 20m and 30m chains and its parts. 2.2) Study of metallic woven tape 2.3) Study of steel Tape. 2.4) Instruments – peg; arrows; ranging rod. 2.5) Fixing of stations; points to be observed in selection of station. 2.6) Ranging – Direct, Indirect and reciprocal ranging, to set up intermediate points between stations. use of ranging rod in ranging, use of Line Ranger in ranging. 2.7) Procedure of chaining between two stations. Entering in Field Book. 2.8) Testing o chain and tape before and after chaining of line. 2.9) Error in chain – Meaning of terms - chain is too long and chain to too short. 2.10) Correcting of chain. 2.11) Correction of length of line of if chain is too long and too short. 2.12) Correction of Area, if chain is too long or too short. 2.13) Chaining on sloping ground, Method of Stepping only. 2.14) Degree of accuracy desired.	**Practical** 1) Study of chain and its parts for 20m and 30m chain, arrows, pegs, Ranging Rod. 2) Fixing of station and measuring length of line joining them and entering in field book. Ranging a line using Ranging Rod. 3) Use of Line Ranger. 4) Chaining on sloping ground by Method of stepping.
Chapter 3: Chain and Cross Staff Surveying 3.1) Study of Cross Staff and Optical Square and their use. 3.2) Chain Triangulation 3.2.1) Selection of Stations 3.2.2) Setting up various lines such as Base Line, Check Line, and Tie Line. 3.2.3) Definition of offsets. Its use. Types of offsets : Long offset ; Short offset and oblique offset 3.2.4) How offset is set out and measured from an object. Recording of offset in field book. 3.3) Conventional signs used in Survey map: Earth work in Cutting and Embankment Road, Railway, Stream, River, Culverts, Bridge, Tunnel, Orchard, Cultivated Land, Temple, Mosque, Church, Electric Lines, Fencing etc. 3.4) Chaining across an obstacles: Building ; Pond ; River 3.5) Chain and Cross Staff Survey for Calculating area of Field or plot.	**Practical** 1) Study of Cross-Staff and Optical Square. 2) Setting of a line; Taking offsets from objects, Recording in field book 3) Location sketch of a station 4) Measurement of area of a field or plot using Chain and Cross Staff

Chapter 4 : Chain and compass Survey 4.1) Study of Prismatic Compass. It's Component parts and function 4.2) Definition of Bearing; Fore Bearing and back bearing 4.3) Setting up of Prismatic compass and observing bearings of a line, Finding included angle using fore and back bearings of a Line, Difference in Fore and Back bearing of a line. 4.4) Definition of Open Traverse and Closed Traverse 4.5) Definition of local Attraction 4.5.1) Causes of local attraction	**Practical** 1) Study and use of Prismatic Compass 2) Setting up of compass on a station and observing bearings and finding included angles between lines 3) Measuring of Fore Bearing and Back Bearings of polygon 4 to 5 sides. Identifying stations affected by Local Attraction Calculating Included Angle, Correcting Included Angles, Correcting Bearings

Construction Surveying & Estimating Costing– 1st year

Theory	Practical
4.5.2) Errors due to local attractions 4.5.3) Precautions to be taken to avoid local attraction 4.5.4) Correction of bearing of line affected by local attraction 4.6) Running a closed Traverse by included angle method 4.6.1) Entering bearings of line in Field Book 4.6.2) Calculations of Included angle 4.6.3) Correction of Included angle 4.6.4) Correcting bearings of lines 4.6.5) Methods of Plotting Traverse 4.6.6) Graphical Adjustments for closing error by Bowdich's rule	4) Carry out a closed Traverse Survey of 4 to 5 sides enclosing a building. Making Entry of collected Data in Field Book. Calculating Included Angles Correcting for local attraction. Plotting the surveyed area eliminating closing errors. Plotting internal details of plot from survey data
Chapter 5: Leveling 5.1) Definition of Terms Level Surface; Level Line; Horizontal Line; Datum Surface 5.2) Definition of Bench Mark, Types of Bench Marks 5.3) Study of Dumpy Level – Its parts; Various Axis of a Dumpy level -- Line of Sight, Line of Collimation; Axis of Bubble Tube, Vertical Axis. Setting up of Dumpy level , Temporary and Permanent Adjustments. 5.4) Study of Tilting level. 5.5) Study of Leveling staves 5.6) Terms used in Leveling, fore sight, Intermediate Sight, Back Sight, Change Point Height of Collimation 5.7) Taking Reading by levels and entering in field book. Calculation of Reduced Levels of Points by Height of Collimation Method and Rise And Fall Method and applying arithmetic checks. 5.8) Classification of Leveling: Simple Leveling, Differential Leveling, Fly Leveling, Profile Leveling and Cross Sectioning. 5.9) Errors in Leveling and to eliminate them. 6) Study of Auto Level – Setting up and observing Readings on staff	**Practical** 1) Study of Dumpy level. Parts of Dumpy level, Temporary Adjustment of level, Axis of Dumpy level. 2) Study of Leveling staves 3) Taking reading with Dumpy level on Leveling Staff 4) Simple Leveling Taking Reading, recording in Field Book Calculating of Reduced Level. 5) Differential Leveling Taking Reading recording in Field Book Calculating of Reduced Level. 6) Fly Leveling single check and Double check, Taking Reading, recording in Field Book, Calculating of Reduced Level. 7) Study of Tilting Level observing Readings on staff 8) Study of auto Level, observing Readings on staff

Chapter 6: Contouring 6.1) Definition of Contour 6.2) Characteristics of Contour 6.3) Uses of Contour Map 6.4) Definitions of Contour Interval 6.5) Establishing grade Contour 6.6) Methods of Plotting Contour	**Practical** 1) Block Contouring for a block 200m X 200m on undulated ground by observing spot Levels at 10m X 10m. Draw a sheet showing contours at Contour interval 1.0m or 0.5m.
Chapter 7: Planimeter Note: Theory to be covered in Practicals. Coustruction of Planimeter, Use of Planimeter	**Practical** 7.1) Study of Polar Planimeter 7.2) Use of Planimeter to find area from drawings, Study of formula Anchor positions and relationship between constants 7.3) Study of Digital Planimeter, finding Area from given drawing using Digital Planimeter

Construction Surveying & Estimating Costing – 2nd year

Theory	Practical
Chapter 8: Plane Table Survey 1) 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.	**Practical** 1) Using Accessories carrying out temporary adjustments of Plane table 2) Locating details with plane table by method of intersection and orientation by Back sighting 3) Using plane table with telescopic Alidade for survey of small area.
Chapter 9: Theodolite Survey 1) Components of Transit Theodolite and their functions. 2) Technical terms used. Temporary adjustments of Transit Theodolite. 3) 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 a line by Theodolite. Prolonging a Straight line. Sources of errors in Theodolite Surveying. 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 Coordinates error of Closure, Distribution of a angular error, balancing the traverse by Bowdich's rule and Transit Rule, Gale's traverse table. Simple problems on above topic.	**Practical** 1) Understanding the components of Theodolite and their functions, reading the vernier and temporary adjustments of Theodolite. 2) Measurement of Horizontal angle by using transit Theodolite. By method of Repetition with face left and face right Measurement of vertical angles by Theodolite. Measurement of Magnetic bearing of a line using Theodolite. Measurement of deflection angle by taking open traverse of 4 –5 sides. Extending a straight Line using Theodolite in Horizontal and Vertical plane
Chapter 10: Tacheometric Survey 1) Principles of Tacheometry. Essential requirements of Tacheometer. 2) Use of Transit Theodolite as a Tacheometer with staff held in vertical position and fixed hair method (No derivation). 3) Determination of Tacheometric constants, simple numerical problems on above topics	**Practical** 1) To find Reduced levels and horizontal distances using Theodolite as a Tacheometer. 2) To find constants of a given Tacheometer.

Chapter 11: Advanced Survey Equipments 1) Construction and use of one second Micro Optic Theodolite 2) Electronic Digital Theodolite. Features of Electronic Theodolite 3) Principle of E.D.M, Components of E.D.M and their functions, 4) Use of EDM for finding horizontal and vertical distances and reduced levels. 5) Determine the geographical parameters by total station.	**Practical** 1) Operating Digital Theodolite 2) Operating Total Station
Estimating and Costing - Introduction Meaning of Term Estimating, costing Types of Estimate 1.2.1. Approximate Estimate 1.2.2 Details Estimate	Practical 1. Reading of Building Drawing for measurement 2. Filling of Measurement Sheet
Approximate Estimate 2.1 Definition of approximate estimate 2.2 Uses of Approximate Estimate 2.3 Preparing Approximate Estimate for Building Methods of preparing Approximate Estimate for Buildings 2.3.1 Plinth Area Method 2.3.2 Cubical Unit 2.3.3 Service Unit 2.3.4 Bay Unit	**Practical** 1. Preparing approximate estimate of a building using approximate method.

Construction Surveying & Estimating Costing – 2nd year

Theory	Practical
Detail Estimate 3.1 Definition of Detail Estimate 3.2 Uses of Detail Estimate 3.3 Data required to prepare detailed estimate 3.4 Procedure of preparing detailed estimate of any work 3.4.1 Taking out quantities and entering the data in measurement sheet and completing abstract sheet. 3.4.2 Abstracting using Abstract sheet 3.5 List of items with their unit of measurement. 3.6 Definition of contingencies, work charge establishment 3.7 Provisions in details estimate for sanitary, water supply, Electrification. 3.8 Types of Estimates, Detail Estimate, Revised Estimate, Supplementary Estimate, Annual report and Maintenance Estimate, Special Report Estimate, Additions and Alteration Estimate. 3.10 Procedure of calculating Quantities for excavation, Foundation concrete, Foundation & plinth Masonry, Super Structure Masonry using i) Long wall – Short Wall method ii) Center Line Method 3.11 Rules for Deduction in concrete, Masonry, Pointing & Plastering, Painting, 3.12 Multiplying factor related to oil painting	**Practical** 1. Preparation of Detail Estimate of a Residential Building (Load Bearing Structure) 2. Details estimate of septic Tank 3. Details estimate of sump well Note: No. 1 is Compulsory and any one out of 2 and 3

List of Books

Estimating and Costing

1] Estimating and Costing by B.N. Dutta and Dutta

2] B. S. Patil Estimating and Costing

Surveying

1] Kanetkar T. P & Kulkarni S. V, Surveying & leveling Part I & II, Pune Vidyarthi Griha Prakashan

2] Purnima B. C. Surveying Vol. I & II N. Delhi : Laxmi Publications, 2003

3] Sharma J. L. A Textbook of Advance Surveying Delhi : CBS Publications

4] Ray Fundamentals of Surveying N. Delhi : Phi Publishing

5] Bhasin S. K. A Textbook of Surveying S. Chand Publications

6] Shephard F. A. Engineering Surveying : Problems and Solutions Edward Arnold

7] Husein & Nagraj Text book of Surveying S. Chand & co. New Delhi

List of Tools and Equipment

A] General Class room

Sr	Name of Item	No.
1	Steel lockers 8 compartments with individual lockers (1980 x 910 x 480 mm)	4
2	Chair with writing pad	25
3	Steel almari with self 6.5’ x 3’ (18 gauge)	2
4	Steel table 4’ x 3’	2
5	Teacher chair	2

E] For Surveying Practical

Sr	Name of Item	No.
1	Chain engg. 30 meter	2
2	Cross staff open	2
3	Measuring tape 30 m	2
4	Prismatic compass set	10
5	Ranging rods	20
6	Plane table set with alidade u frame	2
7	Dumpy level with (aluminum)	1
8	Leveling staff	1
9	Theodolite	1
10	Auto level	1
11	Measurement tape 03 mtr.	5
12	Wooden Pegs	30
13	Steel Arrow	30
14	Optical Square	2
15	Cross Staff	2
16	Through Compass	2

Additional Practical Reference Details:

Drawing of conventional signs used in Engineering survey, cadastral survey. Topography and building drawing – Practice in map reading including contours and drainage.
Practice in unfolding and folding chain alignment of lines- measurements of distance between given points and their booking.
Practice in chaining and taking off- set, use of optical square and cross staff setting out right angles- booking of measurements testing of chain, tape, optical square and cross staff.
Procedure in conducting chain survey reconnaissance preparation of rough sketch selection of base lines and station points – fixing of stations etc.
Chain survey of small plots by triangulation, booking and plotting the same.
Chain survey of built up plots, locating details, booking and plotting the same.
Taking horizontal measurements on sloping ground over coming obstacles in chaining and aligning measuring distance between two points one of which is invissible or in accessible from the other
Chain survey of an extensive area, locating details plotting and finishing the same in ink and colour
Surveying of a tank, a route or obstructed field by chain traverse, method of finding height of inaccessible objects by using chain and its accessories.
Practice in chaining and taking off- set, use of optical square and cross staff setting out right angles- booking of measurements testing of chain, tape, optical square and cross staff.
Procedure in conducting chain survey reconnaissance preparation of rough sketch selection of base lines and station points – fixing of stations etc.
Chain survey of small plots by triangulation, booking and plotting the same.
Chain survey of built up plots, locating details, booking and plotting the same.
Taking horizontal measurements on sloping ground over coming obstacles in chaining and aligning measuring distance between two points one of which is invissible or in accessible from the other
Chain survey of an extensive area, locating details plotting and finishing the same in ink and colour
Surveying of a tank, a route or obstructed field by chain traverse, method of finding height of inaccessible objects by using chain and its accessories.
Practice in setting up a compass and checking its accuracy – taking bearings and calculating angles.
Determining the bearings of a given line and establishing lines of given bearings – laying out a recti- linear and polygonal plots of ground using a compass and a tape.
Determining meridian by shadow and watch methods carrying out a closed traverse of a given field with chain & compass and plotting the same.
Conducting closed traverse of built up fields and plotting the same.
Surveying an extensive built up area with compass booking plotting finish in ink and colour.
Setting up of plane cable levelling centering and orientation.
Surveying an area with plane table by radiation and intersection methods.
Traversing with plane table of built up areas.

Running and open traverse with plane table and fixing details.
Inking , finishing, colouriong & tracing of plain table maps done in previous weeks.
Practice in finding the position of the table by three points.& two points problem & locate, Use of tangent clinometer – Dolesoles clinometer – Abney level for finding height of various surrounding points - use of telescopic alidade in fixing heights of surrounding points.
Practice in setting out a level and performing temporary adjustments practice in reading staff.
Demonstration of permanent adjustment of level (at this stage, the students need not practice but only watch)
Practice in differential levelling including reciprocal levelling and establishment bench marks reading of inverted staff practice in booking and reduction checking level reading in height of collimation and rise and fall systems.
Performing permanent adjustment to various types of levelling instruments.
Establishing of alignment and grade for roads and drains. Method of centering in the field books.
Carrying out route survey longitudinal & cross section of a road project its plotting and calculation of earth work.
Practice in use of boning rods and ghat tracer for establishing grade lines for various types of work.
Road project reconnaissance preliminary and final location survey including preparation of route map to scale, taking profile and section with level plotting marking formation levels calculation of earthwork and other materials for laying road including estimation of earth work.
Practice in setting up a theodolite and taking readings.
Measurement of horizontal angles by repitition reiteration methods method of entering the same in the field book setting out given angles.
Practice in measuring vertical angles, setting out given vertical angles and entering in the field book.
Demonstration of permanent adjustment of theodolite (at this stage the student need not practice but only watch)
Setting out a straight line over and across obstacles prolonging straight lines establishing lines at given angles with given lines setting out on around given recti linear figures.
Running a closed traverse over a given area, booking calculating the coordinates and plotting the traverse.
Running an open traverse calculate and plot the same and fix the details with plane table measuring a base line for triangulation.
Practice in performing permanent adjustment of theodolite.
Finding heights and distances of accessible and inaccessible objects with theodolite and chain and calculating the same, use of box sextant
Contouring by spot level method including interpolation
Contouring by cross section method including interpolation of contours (grid methods)
Direct contouring using levels for vertical control plane table and telescopic alidade for horizontal control.
Conducting topographic survey of undulated area by theodolite triangulation and plane table resection and intersection method using Indian Pattern Clinometer.

Carrying out topographical survey with the help of theodolite level and tape of a site of reservoir cross sectional drawing of different canals.
SURVEY CAMP : In any suitable hilly place 3 week carrying out contour survey of a small area by tachometer working out proposed alignment on contoured maps (project work) on various curves and calculation , marking of alignment of road on it.
Setting out of simple curves by chain and tape with different methods setting out of curves by deflection methods with and without obstacles.
Setting out of a compound curves, transition curves with theodolite
Setting out of vertical curves
Reducing and enlarging the plain by pantograph and area by planimeter
Measurement off-set of obstructed lines, measurement of field both in the triangle and off-set system base line system, fixing, missing, land demarcation
To find the true north by observing stars and sun (current) with the help of Nantical Almanau.
CADASTAL SURVEY Testing plotting of (1:4000) village map and locating errors in measurements
Typing field numbers, printing names and inserting topographical detail in maps –comparison of field and village boundaries and side measurement .
Tracing and inking taluk, district and state maps- tracing of maps –observation of substance bar and its calculation
Azimuth observation and computation- computation of latitudes and azimuths, solution of spherical triangles

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