

# Maharashtra State Board of Vocational Examination, Mumbai 400 051

1	<b>Name of Course</b>	<b>Diploma Course in Landscape Architecture</b>									
2	<b>Course Code</b>	<b>304414</b>									
3	<b>Max no. of Students</b>	25									
4	<b>Duration</b>	2 year									
5	<b>Course Type</b>	Full Time									
6	<b>No. of Days per week</b>	6 days									
7	<b>No. of hours per day</b>	7 Hrs									
8	<b>Space require</b>	Theory Class Room – 200 sqft Three Practical Lab – 500 sqft each									
9	<b>Entry qualification</b>	S.S.C. Pass									
10	<b>Objective of syllabus</b>	To get Knowledge of Building Construction, To Understanding Building Drawing, To Prepare Estimate, To do construction related Landscape Work, To do work for various Landscape Architecture									
11	<b>Employment opportunities</b>	Office of Architect, Office of Landscape Consultant, Office of Builder, any Garden Development Firm, his own practice as Landscape Architecture Consultant									
12	<b>Teachers Qualification</b>	1) For Vocational subject - B.E.Civil or Arch. 2) For Non Vocational Subject - Master Degree in Concern subject									
13	<b>Teaching Scheme –</b>										
	Sr.	Subject	Subject Code	Clock Hours / Week				Total			
				Theory	Practical						
	1	<b>English (Communication Skill)</b>	90000001	2 Hrs	1 Hrs			3 Hrs			
	2	<b>Elective – I</b>		2 Hrs	1 Hrs			3 Hrs			
	3	<b>Elective – II</b>		2 Hrs	1 Hrs			3 Hrs			
	4	<b>Building Material and Construction</b>	30440001	3 Hrs	8 Hrs			11 Hrs			
	5	<b>Building Drawing and Estimating Costing</b>	30440003	3 Hrs	8 Hrs			11 Hrs			
	6	<b>Landscape Architecture</b>	30440017	3 Hrs	8 Hrs			11 Hrs			
	<b>Total</b>								<b>42 Hrs</b>		
14	<b>Internship</b>	Two Months Summer Internship from 1 <sup>st</sup> May to 30 <sup>th</sup> June is Compulsory.									
15	<b>Examination Scheme – Final Examination will be based on syllabus of both years.</b>										
	Paper	Subject	Subject Code	Theory			Practical		Total		
				Duration	Max	Min	Duration	Max	Min	Max	Min
	1	<b>English (Communication Skill)</b>	90000001	3 Hrs	70	25	3 Hrs	30	15	100	40
	2	<b>Elective – I</b>		3 Hrs	70	25	3 Hrs	30	15	100	40
	3	<b>Elective – II</b>		3 Hrs	70	25	3 Hrs	30	15	100	40
	4	<b>Building Material and Construction</b>	30440001	3 Hrs	100	35	3 Hrs	100	50	200	85
	5	<b>Building Drawing and Estimating Costing</b>	30440003	3 Hrs	100	35	3 Hrs	100	50	200	85
	6	<b>Landscape Architecture</b>	30440017	3 Hrs	100	35	3 Hrs	100	50	200	85
										900	375
16	<b>Teachers –</b> Three Teachers per batch for vocational component. For English, Elective-I & II guest faculty on clock hour basis.										
17	<b>a) For Elective I – Student can choose any one subject</b>					<b>b) For Elective II – Student can choose any one subject</b>					
	<b>Code</b>	<b>Subject Name</b>				<b>Code</b>	<b>Subject Name</b>				
	90000011	Applied Mathematics				90000021	Applied Sciences (Physics & Chemistry)				
	90000012	Business Economics				90000022	Computer Application				
	90000013	Physical Biology (Botany & Zoology)				90000023	Business Mathematics				
	90000014	Entrepreneurship									
	90000015	Psychology									

# Subject - Building Material and Construction

Code No – 30440001

Theory	Practical
<p><b>Chapter 1: Stone and Coarse Aggregate</b></p> <p>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</p>	<p><b>Practical</b></p> <p>1) Visit to Quarry to observe quarrying operations            2) Conduct Compressive strength Test on stone            3) Conduct Abrasion Test of Metal</p>
<p><b>Chapter 2: Bricks</b></p> <p>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</p>	<p><b>Practical</b></p> <p>1. Field Tests of Brick            2. Conduct Compressive Test on Brick            3. Conduct Water absorption on Brick</p>
<p><b>Chapter 3: Cement</b></p> <p>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</p>	<p><b>Practical</b></p> <p>1. Field Tests of Cement            2. Determining initial &amp; final setting time of Cement            3. Determining fineness Modulus of Cement            4. Determination of Compressive strength of cement</p>
<p><b>Chapter 4: Fine Aggregates</b></p> <p>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 &amp; Washing of fine Aggregates</p>	<p><b>Practical</b></p> <p>1. Sieve Analysis of Sand for finding fineness modulus            2. Finding Silt content in Sand</p>
<p><b>Chapter 5: Cement Mortar</b></p> <p>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</p>	<p><b>Practical</b></p> <p>1. Preparation of Cement Mortar 1:6</p>
<p><b>Chapter 6: Concrete</b></p> <p>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 &amp; 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</p>	<p><b>Practical</b></p> <p>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</p>

6.10) Hydration of Cement 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	
<b>Theory</b>	<b>Practical</b>
<b>Chapter 7: Steel</b> 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	<b>Practical</b> 1) Conduct Tensile Test on mild steel bar / HYSD Bars
<b>Chapter 8: Flooring Tiles</b> 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 <b>Briquettes</b> , Process of manufactures and its uses	<b>Practical</b> 1) Conduct Bending Test of tiles 2) Conduct Abbreviation test of tile
<b>Chapter 9: Timber</b> 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	<b>Practical</b> Report on Visit to a Timber Factory
<b>Advance Building Materials</b> 10.1) Study of latest materials used in Flooring, Thermal Insulation, Sound proofing, Wall finishing, structural glazing, Metal Cladding & rendering, Partitioning, and Painting	

<p><b>Chapter 8: Reinforced Cement Concrete</b></p> <p>8.1) Different types of RCC members Definitions, its properties and its locations</p> <p>8.2) Ingredients of for R. C. C. Concrete</p> <p>8.3) Batching of concrete ingredients- Definition and methods, volumetric method and weight batching method of concrete mixing</p> <p>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.</p> <p>8.5) Standard Hook length for plan M. S. bar, Standard length of “EL” for Torque steel bar</p> <p>8.6) Joints in RCC work, Necessity, Types of joints in RCC work, Construction Joint, Expansion Joint, location of joints, Material used, &amp; Procedure of construction of Providing Joints.</p>	<p><b>Practical</b></p> <p>i) Visit to site for observing Bar bending, laying of Reinforcement bars</p> <p>ii) Observe method of providing cover, placing concrete in RCC Members</p> <p>iii) Draw Figures – RCC Bars reinforcement in column Footing, column, beam, slab, lintel, Chajja, Loft</p> <p>iv) Exercise on preparing standard Bar bending Schedule</p> <p>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</p>
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Subject - Building Material and Construction - 2<sup>nd</sup> Year  
Code No – 30440001

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

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

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

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

## 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, 18<sup>th</sup> 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

<b>Sr</b>	<b>Name of Item</b>	<b>No.</b>
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 Material and Construction  
Code No – 30440001

Theory	Practical
<p><b>Chapter 1: Stone and Coarse Aggregate</b></p> <p>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</p>	<p><b>Practical</b></p> <p>2) Visit to Quarry to observe quarrying operations 2) Conduct Compressive strength Test on stone 3) Conduct Abrasion Test of Metal</p>
<p><b>Chapter 2: Bricks</b></p> <p>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</p>	<p><b>Practical</b></p> <p>1. Field Tests of Brick 2. Conduct Compressive Test on Brick 3. Conduct Water absorption on Brick</p>
<p><b>Chapter 3: Cement</b></p> <p>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</p>	<p><b>Practical</b></p> <p>1. Field Tests of Cement 2. Determining initial &amp; final setting time of Cement 3. Determining fineness Modulus of Cement 4. Determination of Compressive strength of cement</p>
<p><b>Chapter 4: Fine Aggregates</b></p> <p>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 &amp; Washing of fine Aggregates</p>	<p><b>Practical</b></p> <p>1. Sieve Analysis of Sand for finding fineness modulus 2. Finding Silt content in Sand</p>
<p><b>Chapter 5: Cement Mortar</b></p> <p>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</p>	<p><b>Practical</b></p> <p>1. Preparation of Cement Mortar 1:6</p>
<p><b>Chapter 6: Concrete</b></p> <p>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 &amp; 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 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</p>	<p><b>Practical</b></p> <p>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</p>

Theory	Practical
<p><b>Chapter 7: Steel</b></p> <p>7.1) Types of steel used in RCC as per ISI</p> <p>7.2) High Tensile Steel its properties, study of IS 1786</p> <p>7.3) Cover for steel as per IS 456 - 2000</p> <p>7.4) Types of sections used in Steel Structure and its properties</p> <p>7.5) Rolled steel Joist of different sections and its uses</p>	<p><b>Practical</b></p> <p>1) Conduct Tensile Test on mild steel bar / HYSD Bars</p>
<p><b>Chapter 8: Flooring Tiles</b></p> <p>8.1) Shahabad Tiles, Kotah Tiles, Cuddappa Tiles, Marble Tiles, Granite, its occurrence, Sources of availability and its uses</p> <p>8.2) Cutting of tiles</p> <p>8.3) Cement tiles, marble mosaic tiles, chequered tiles- process of manufacture, and its uses</p> <p>8.4) Ceramic Tiles, process of manufacture, Normal sizes &amp; its uses</p> <p>8.5) Cement mortar <b>Briquettes</b>, Process of manufactures and its uses</p>	<p><b>Practical</b></p> <p>1) Conduct Bending Test of tiles</p> <p>2) Conduct Abbreviation test of tile</p>
<p><b>Chapter 9: Timber</b></p> <p>9.1) Types of Timber.</p> <p>9.2) Sections of Timber.</p> <p>9.3) Characteristics of Good Timber.</p> <p>9.4) Defects in Timber.</p> <p>9.5) Decay of Timber and remedies.</p> <p>9.6) Seasoning of Timber, necessity and methods.</p> <p>9.7) Preservation of Timber.</p> <p>9.8) Timber based Product Plywood; Block Board, Veneers, Particle wood</p> <p>9.9) Finishing to Timber</p> <p>a) Painting b) Polishing c) Sun mica</p>	<p><b>Practical</b></p> <p>Report on Visit to a Timber Factory</p>
<p><b>Advance Building Materials</b></p> <p>10.1) Study of latest materials used in Flooring, Thermal Insulation, Sound proofing, Wall finishing, structural glazing, Metal Cladding &amp; rendering, Partitioning, and Painting</p>	
<p><b>Chapter 8: Reinforced Cement Concrete</b></p> <p>8.1) Different types of RCC members Definitions, its properties and its locations</p> <p>8.2) Ingredients of for R. C. C. Concrete</p> <p>8.3) Batching of concrete ingredients- Definition and methods, volumetric method and weight batching method of concrete mixing</p> <p>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.</p> <p>8.5) Standard Hook length for plan M. S. bar, Standard length of "EL" for Torque steel bar</p> <p>8.6) Joints in RCC work, Necessity, Types of joints in RCC work, Construction Joint, Expansion Joint, location of joints, Material used, &amp; Procedure of construction of Providing Joints.</p>	<p><b>Practical</b></p> <p>i) Visit to site for observing Bar bending, laying of Reinforcement bars</p> <p>ii) Observe method of providing cover, placing concrete in RCC Members</p> <p>iii) Draw Figures – RCC Bars reinforcement in column Footing, column, beam, slab, lintel, Chajja, Loft</p> <p>iv) Exercise on preparing standard Bar bending Schedule</p> <p>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</p>

Subject - Building Material and Construction - 2<sup>nd</sup> Year

Code No – 30440001

Theory	Practical
<p><b>Chapter 1: Foundation</b></p> <p>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</p>	<p><b>Practical</b></p> <p>2) Line out for 3 to 4 Room Load Bearing Building            2) Line out for Framed structure</p>
<p><b>Chapter 2: Excavation</b></p> <p>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</p>	<p><b>Practical</b></p> <p>Visit to Site to study different methods of Excavation</p>
<p><b>Chapter 3: Plain cement concrete</b></p> <p>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</p>	<p><b>Practical</b></p> <p>1) Visit to site showing ingredients and process of mixing, transportation, laying, compacting and curing of concrete</p>
<p><b>Chapter 4: Stone Masonry</b></p> <p>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</p>	<p><b>Practical</b></p> <p>1) Construction of UCR stone masonry in foundation work, UCR stone masonry for compound wall (ht 1.2 m to 1.5 m)</p>
<p><b>Chapter 5: Brick Masonry</b></p> <p>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</p>	<p><b>Practical</b></p> <p>1) Construction of Burnt Brick Masonry in superstructures in English Bond / Flemish Bond            2) Construction of concrete block masonry in superstructure</p>
<p><b>Chapter 6: Scaffolding</b></p> <p>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</p>	<p><b>Practical</b></p> <p>1) Erecting Single Scaffolding up to G + 1 floor            2) Erecting Double Scaffolding up to G + 1 floor</p>
<p><b>Chapter 7: Lintels and Sills</b></p> <p>7.1) Necessity of lintels            7.2) R.C.C. Lintels            7.3) Jams, Sills, Head cladding, its purpose, materials used and construction procedures.</p>	<p>1) Study of Laying Lintels and Sills on Construction Site</p>

Theory	Practical
<p><b>Chapter 8: Reinforced Cement Concrete</b></p> <p>8.1) Different types of RCC members Definitions, its properties and its locations</p> <p>8.2) Ingredients of for R. C. C. Concrete</p> <p>8.3) Batching of concrete ingredients- Definition and methods, volumetric method and weight batching method of concrete mixing</p> <p>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.</p> <p>8.5) Standard Hook length for plain M. S. bar, Standard length of "EL" for Torque steel bar</p> <p>8.6) Joints in RCC work, Necessity, Types of joints in RCC work, Construction Joint, Expansion Joint, location of joints, Material used, &amp; Procedure of construction of Providing Joints.</p>	<p><b>Practical</b></p> <p>i) Visit to site for observing Bar bending, laying of Reinforcement bars</p> <p>ii) Observe method of providing cover, placing concrete in RCC Members</p> <p>iii) Draw Figures – RCC Bars reinforcement in column Footing, column, beam, slab, lintel, Chajja, Loft</p> <p>iv) Exercise on preparing standard Bar bending Schedule</p> <p>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</p>
<p><b>Chapter 9: Centering and Form work</b></p> <p>9.1) Definitions, Different members used in Form work and centering</p> <p>9.2) Materials used in preparing centering and form work</p> <p>9.3) Procedure of Erecting Centering and form work</p> <p>9.4) Precautions while erecting centering and form for RCC work.</p>	<p><b>Practical</b></p> <p>1) Draw Sketches of form work for column, Beams, Slab, Lintel and Chajja</p> <p>2) Visit to site to study Centering and form work for abovementioned members and table formwork, Mivon formwork etc.</p>
<p><b>Chapter 10: Pointing and Plastering</b></p> <p><b>10.1 Necessity of Pointing</b></p> <p>10.1.1) Materials used for Pointing</p> <p>10.1.2) Procedure of applying Pointing, preparation of surface to receive pointing, Procedure of applying pointing &amp; post applying precautions</p> <p>10.1.3) Type of Pointing</p> <p>10.2 Necessity of Plastering</p> <p>10.2.1 Materials used for plastering</p> <p>10.2.2 Types of plaster internal wall plaster, External wall plaster, Ceiling plaster, different types of furnishings, Stucco plaster.</p> <p>10.2.3 Procedure of plastering for each of above type, Use of machines for plastering</p> <p>10.2.4 P.O.P. finish to wall</p>	<p><b>Practical</b></p> <p>1) Visit to site for observing procedure for different type of plaster work</p> <p>2) Hands on experience of applying plaster of size 3m x 3 m on internal &amp; external wall surface</p>
<p><b>Chapter 11: Painting</b></p> <p>11.1. Necessity of painting, Types of paints, thinner, varnishes. Surface preparation, Use of Primers</p> <p>11.2. Anti corrosive paints, its primers, its necessity</p> <p>11.3. White Washing to walls and ceiling, Materials used, procedure for new and old surface</p> <p>11.4. Applying Dry Distemper to walls, Material, Procedure for new and old surface</p> <p>11.5. Applying Oil Bound Distemper and Emulsion, Materials used, Procedure for new and old surface</p> <p>11.6. Applying Cement Paint to External walls, Materials used, Procedure for New and old surface</p> <p>11.7. Applying Oil Paint Primer coat, procedure of applying oil paint to woodwork, steel work and walls.</p> <p>11.8. Melamine / French polish, its application on old and new wooden surfaces</p>	<p><b>Practical</b></p> <p>Hands on experience of Painting of surface with</p> <p>a) White wash 3m x 3m surface area</p> <p>b) Dry Distemper 3m x 3m surface area</p> <p>c) Oil Bound Distemper 3m x 3m surface area</p> <p>d) Cement Paint 3m x 3m surface area</p> <p>e) Oil Paint on new Steel work and old wood work</p>
Theory	Practical
<p><b>Stairs</b></p> <p>1.1) Definitions of Terms used in Stair.</p> <p>1.2) Classification of stairs based on shape and materials used for construction.</p> <p>1.3) Requirements of good stairs</p> <p>1.4) Design of stair Thumb Rules for Design of Dog legged stair</p> <p>1.5) Hand Rails Types and Fixing Procedure</p>	<p><b>Practical</b></p> <p>1) Draw neat Sketches of any 4 types of stairs</p> <p>2) Prepare design for RCC Dog-legged stair</p> <p>3) Draw its plan and sectional elevation</p> <p>4) Visit site to site for observing various type of stair</p>

<p><b>Roofs</b></p> <p>2.1 Definition &amp; 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 &amp; 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</p>	<p><b>Practical</b></p> <p>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</p>
<p><b>Flooring</b></p> <p>3.1 Definition and terms used in flooring  3.2 Flooring at Plinth level, Plinth filling &amp; 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.</p>	<p><b>Practical</b></p> <p>1. Fixing of Tiles for Pavement  2. Fixing of Tiles in area 3mX4m  3. Fixing Tiles for Dado</p>
<p><b>Door And Window</b></p> <p>4.1 Functions of Door, Functions of window  4.2 Rules for providing Doors &amp; windows  4.3 Parts of a Door and Window  4.4 Materials used in making of Door &amp; 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 &amp; 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</p>	<p><b>Practical</b></p> <p>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 &amp; windows</p>

## 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, 18<sup>th</sup> 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 Impact Drill	1
13	Marble Angle Grinder	1
14	Bench Grinder Double Ended Wheel Size 15 Cm	1
15	Vibratory Sand Screen	1

<b>Sr</b>	<b>Name of Item</b>	<b>No.</b>
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

**Building Drawing and Estimating Costing- 1<sup>st</sup> Year**  
Code No – 30440003

Theory	Practical
<b>A] Building Drawing</b>	<b>1 Year</b>
<b>Chapter 1: Introduction to Drawing</b> 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	<b>Practical</b> 1) Prepare Sheet on lettering 2) Prepare Sheet on lines 3) Prepare Sheets on Geometrical Construction 4) Prepare Sheets on Conventional Sign and Symbols
<b>Chapter 2: Orthographic Projection</b> 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	<b>Practical</b> 1) 1 <sup>st</sup> Angle Projections ----- 2 Solids 2) 3 <sup>rd</sup> Angle Projections ----- 2 Solids
<b>Chapter 3: Isometric View</b> 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	<b>Practical</b> 1) Isometric View of Rectangular Objects 2) Isometric Vies of Circular Objects 3) Isometric View of Building
<b>Chapter 4: Building Drawing</b> 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.	<b>Practical</b> 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.
<b>Chapter 5: Building By Laws and Standard Norms</b> 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	<b>Practical</b> 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
<b>Chapter 6: Development of Line Plan of a Building</b> 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

## Building Drawing and Estimating Costing- 2<sup>nd</sup> Year

Theory	Practical
<b>Introduction</b> Meaning of Term Estimating, costing Types of Estimate 1.2.1. Approximate Estimate 1.2.2 Details Estimate	<b>Practical</b> 1. Reading of Building Drawing for measurement 2. Filling of Measurement Sheet
<b>Approximate Estimate</b> 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	<b>Practical</b> 1. Preparing approximate estimate of a building using approximate method.
<b>Detail Estimate</b> 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	<b>Practical</b> 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
<b>Chapter No. 4: Working out of quantities of Steel for R.C.C work</b> 12.1 Division of R.C.C work into concrete Steel and Form work 12.2 Study of Reinforced steel for Bar diameter, its weight, 12.3 Calculating Length and weight of steel for 12.3.1 Straight bar with hook or EL at ends 12.3.2 Bent up bar with hook or EL at ends 12.3.3 Stirups 12.4 preparing Bar bending schedule and calculating Steel for: Footing, Column, Lintel, Beam, Slab, Chajja, Staircase etc	<b>Practicals</b> 1) Calculating Quantity of concrete & Steel for 2 to 3 room RCC Building or Hall.
<b>Chapter No. 5: Modes of Measurements</b> 4.1 Points Considered while fixing unit of measurement 4.2 Modes of measurements of item of work as per IS 1200 4.3 Desired Accuracy of measurement	

## Building Drawing and Estimating Costing- 2<sup>nd</sup> Year

Theory	Practical
<p><b>Chapter No. 6: Rate Analysis</b></p> <p>5.1 Meaning of Term Rate Analysis</p> <p>5.2 Necessity of Rate Analysis</p> <p>5.3 Factors affecting Rate analysis</p> <p>5.4 Rates of Material and Labor as per DSR.</p> <p>5.5 Definition of Task work and factors affecting it. Task work for Excavation, Brick Masonry, Plastering, Wood work, centering &amp; formwork, Steel work for RCC, Plain Concrete and RCC</p> <p>5.6 Methods of payment to labor.</p> <p>5.7 Transportation of material and its effect on rate analysis, Lead &amp; lift</p> <p>5.8 Preparing Rate Analysis of minimum 10 items, such As Excavation, Brick Masonry, Plastering, Wood work, Centering &amp; formwork, Steel work for RCC, Plain Concrete and RCC</p> <p>5.9 Standard schedule of Rate.</p>	<p><b>Practicals :</b></p> <ol style="list-style-type: none"> <li>1. Collecting Market Rates and DSR rates for minimum 20 building materials and 10 categories of labors</li> <li>2. Preparation of Rate analysis for at least 5 items of Building work.</li> </ol>
<p><b>Chapter 7: Specifications</b></p> <p>6.1 Necessity of Specification</p> <p>6.2 Points to be observed while framing specifications</p> <p>6.3 Types of Specifications General, Details, Standard and manufactures Specifications</p> <p>6.4 Writing detailed Specifications of minimum 5 important items of building work</p> <p>6.5 Study of Standard specification Book from organizations such as PWD, MHADA, CIDCO etc.</p>	<p><b>Practicals :</b></p> <p>Preparation of Specification for 5 items.</p>
<p><b>Chapter 8 : Tender Document &amp; Tender Notice</b></p> <p>8.1 List of Tenders document</p> <p>8.2 Necessity of Tender</p> <p>8.3 Points to be observed while framing Tender Notice</p> <p>8.4 Drafting of Tenders Notice</p> <p>8.5 Explanation of Terms: Earned Money, Security Deposit, Validity Period, Right for Rejection of one or all tenders</p> <p>8.6 Corrigendum to Tenders Notice</p> <p>8.7 Procedure of Submitting filled Tender</p> <p>8.8 Opening of Tender, Scrutiny of Tender</p> <p>8.9 Comparative Statement, Finalizing Tender</p> <p>8.10 Work order</p> <p>8.11 Rejection of all tenders</p> <p>8.12 Rejection of Lowest Tenders</p> <p>8.13 Unbalanced Tender, Ring formation, Negotiations</p> <p>8.14 Point to be observed by contractor while filling a tender.</p>	<p><b>Practical:</b></p> <p>Prepare set of full tender documents for Estimate prepared in second semester</p> <ol style="list-style-type: none"> <li>1. Tender Notice</li> <li>2. Tender Form</li> <li>3. General Directions to Contractor</li> <li>4. Schedule A</li> <li>5. Schedule B</li> <li>6. Schedule C</li> <li>7. General terms and conditions of contract</li> <li>8. Special conditions of contract</li> <li>9. Specifications</li> </ol>
<p><b>Chapter 9 : Conditions of Contract</b></p> <p>9.1 Contract - Definition, its necessity and types</p> <p>9.2 General Conditions of contract</p> <p>9.2.1 Special conditions of contract</p> <p>9.2.2 Contract Drawing</p> <p>9.2.3 Bill of Quantity</p> <p>9.2.4 site possession for execution</p> <p>9.2.5 Inspection of Materials</p> <p>9.2.6 Inspection of completed item of works</p> <p>9.2.7 Water charges and Light Charges</p> <p>9.2.8 Working on Holiday</p>	<p><b>Practical:</b></p> <ol style="list-style-type: none"> <li>1. Study of contract conditions</li> </ol>

Theory	Practical
9.2.9 Extension of Time Limit 9.2.10 Termination of Contract 9.2.11 Subletting of work 9.2.12 Suspension of work 9.2.13 Extra Item 9.2.14 Payment to contractor 9.2.15 Clearance of file & Completion Certificate 9.2.16 Defects Liability Period 9.2.17 Price Escalation Clause 9.2.18 Adherence to labor laws 9.2.19 Arbitration 9.3 Reward / Penalty clause	
<b>Chapter 10: Payment to Contractors</b> 10.1 Modes of Payment to contractor 10.1.1 Interim payments and its necessity 10.2 Types of interim payment 10.2.1 Advance payment 10.2.2 Secured Advance Payment 10.2.3 On Account Payment 10.3 Final Payment 10.4 First & final Payment 10.5 Retention Money and its Necessity 10.6 Reduced Rate Payment 10.7 Petty advance 10.8 Mobilization Advance 10.9 Measurement Book 10.10 Indent Invoice 10.11 Recoveries	
<b>Chapter 11:</b> <b>Procedure of Execution of work in P.W.D.</b> 11.1 Organization set up of PWD 11.2 PWD procedure of initiating work, Administrative Approval, Technical Sanction, Expenditure section, Budget Provision 11.3 Methods of Executing work 11.3.1 Contract Method 11.3.2 Departmental Method, Nominal Muster Roll 11.3.3 Rate List Method 11.3.4 Piece Work Method 11.3.5 Day Work Method	

### **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 Beuro of standards India (ISI)

#### **Estimating and Costing**

- 1] B. S. Patil Estimating and Costing
- 2] Estimation and costing for civil engg. Dutta 2004 UBSPD Delhi
- 3] Estimation and costingspecialisation & valuation Chakraborti,M 2004 Author -
- 4] A textbook on Estimation and costing and accounting Kohli,D.D. 2005 S.Chand Mumbai

**List of Tools and Equipment****A] General Class room**

<b>Sr</b>	<b>Name of Item</b>	<b>No.</b>
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**

<b>Sr</b>	<b>Name of Item</b>	<b>No.</b>
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**

<b>Sr</b>	<b>Name of Item</b>	<b>No.</b>
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

## **Landscape Architecture – (Theory & Practical) – 1<sup>st</sup> Year**

Code No – 30440017

### **Ecological Basis of Environmental Issues.**

Ecological concepts that form the basis for understanding environmental issues confronting Indian population growth, loss of diversity, resource limitation, pollution, and global climate change.

### **Design and the Environment.**

The built environment and its effects on natural systems. Focus is on the design of the built environment as an ongoing activity integrating ecological, social, and cultural values. Topics include land use patterns and policies, development and resource management, community design issues, and strategies for improving environmental integrity and quality of life.

### **Reading the Landscape.**

Approaches to perceiving and interpreting the landscape. Topics include the landscape in art and literature, visual assessment techniques, use of maps, field sketching, and photography.

Practical – Visit Report, Photograph report, Field Sketching Plates

### **Design Communication (Practical)**

Manual drafting and design drawing skills with an emphasis on the development of basic drafting convention and graphic presentation literacy.

### **Landscape Construction Processes and Materials.**

The range of natural processes and materials relevant to landscape architecture (e.g., climate, geomorphology, geology, hydrology, soils, and vegetation communities.) The relationship between these materials and natural processes. Exercises will include some conceptual manipulation of these materials. The range of materials used in the built environment by landscape architects: metals, concrete masonry, glass, plastics, wood. Emphasis on understanding the properties of these materials and the implications for design.

### **History of the Built Environment**

Architecture, landscape architecture, and urban design from 1600 to the present. Emphasis is on the relationship between design on the built environment and socio-cultural, technological, aesthetic, and environmental factors.

### **Landscape Engineering Processes and Materials**

The forming and building of landscapes with emphasis on the values of "sustainability." Includes introduction to landscape engineering: grading, drainage, and roadway alignment.

### **Applied Landscape Engineering.**

Applied grading, drainage, and road alignment.

### **Plants of Asia.**

A continuation of Plants of the Asia. Native and introduced species; including trees, shrubs, grasses, herbaceous annual and perennial plants, and commonly used indoor plants.

### **Planting Design .**

Analysis of plant elements and form. Emphasis on plant function in the landscape composition. Basic problems in planting design of small scale areas with emphasis on orientation, arrangement, and human needs.

**Residential Design.** Use and selection of plants for environmental design.

**Planning and Design.**

Approaches to planning and design in landscape architecture. The relationship between applied theories and methods and the environmental, social, and cultural context of projects.

**Dwelling and Community**

Concepts and theories of residential and neighborhood form.

**Urban Entomology.**

Urban entomology, including identification, biology, and control of insects and selected arthropod pests with emphasis on the efficacy and environmental impact of pest control tactics in the urban habitat.

**Garden Design in India.**

Design traditions which have shaped Indian gardens over the past 200 years with emphasis on the twentieth century, and plants, uses, design forms, and environmental conditions through which these traditions have been expressed. Designing gardens informed by traditional models.

**Healthcare and Therapeutic Garden Design.**

Physical, psychological, perceptual influences of garden design on health, healing, and wellness with emphasis on design in hospital, health care institutions, treatment centers, and childcare facilities.

**Architectural Design.**

Major design determinants in architecture. Inquiry into structural, functional/programmatic, theoretical, and environmental issues will be focused on developing an understanding of the relationship between architecture and landscape.

**Directed Study in GIS.** An independent study on a single or multiple topics in GIS. Students will select a distance learning package provided by the ESRI corporation and complete an online course.

**Design Communication (Practical)**

Advanced multimedia and desktop publishing techniques and their application to environmental design projects.

**Computer-Aided Design. (Practical)**

use of computer-aided design software for the development of environmental design and land planning projects.

**Landscape Architecture – (Theory & Practical) – 2<sup>nd</sup> Year****Applied Landscape Ecology.**

The concept and functioning of ecosystems and how this understanding can be applied in environmental design. Review of adverse impacts that can result from failure to apply sound ecological principles. Exercises will include some conceptual manipulation of ecological processes and materials.

**Applied Landscape Construction**

Detailing of architectural and planting elements in the landscape with an emphasis on appropriate detailing for sustainability and longevity in urban contexts.

**Landscape Architecture Implementation Documents.**

Construction, engineering, and planting documents for implementing landscape architecture projects.

**Landscape Architecture Post-Construction Documents and Processes.**

Post-construction processes and documents relevant to the implementation and management of designed and natural landscapes. Includes development of landscape management plans, and post-construction evaluation.

**Plant Communities of the India.** The plant communities of the southeastern United States, with emphasis on botanical and aesthetic characteristics, factors affecting community composition, and community dynamics.

**Soils in Natural and Managed Ecosystems.**

Nature and properties of soils and their influence on and response to ecosystem properties and function. Topics include soil morphological, physical, chemical, and biological properties; soil genesis; and soil fertility and plant nutrition. Anthropogenic influences on soil properties, function, and management in urban environments will be discussed.

**Region, Site and Place.**

Physical and cultural determinants of landscape character from regional to site-specific scales.

**Urban Design and Architecture**

Urban design and architecture including analysis of various theories used as a framework for the development of architectural and urban form.

**Contemporary Landscape Architecture**

Contemporary issues and theories in landscape architecture. Emphasis is on the relationship between theoretical approaches and built form.

**Landscapes in Painting, Poetry, Literature, and Design**

The appreciation and understanding of nature, landscape, and garden in painting, poetry, and literature. Study of how changing attitudes to the environment affect aesthetic appreciation of landscape and are reflected in the design of gardens and the description of landscapes in art and literature.

**Sustainable Building Design.**

Design features and technologies contained in sustainable (green) building design and the process to create a green building to include commercial and residential construction. Topics include energy and water, construction materials, site work, indoor environmental quality, and how design practices fit into the overall picture of developing a more sustainable society.

**Landscape Architecture Internship.**

Professional office experience under the supervision of licensed landscape architect or related practitioner.

**Field Study in Contemporary Landscape Architecture. (Practical)**

Current and historic works and individuals in the fields of landscape architecture, architecture, historic preservation, and urban design in the India

The class will visit significant projects, offices, national parks, and landmarks during a ten to fourteen-day trip to another region of the country.

**Field Study in Indian Garden Design. (Practical)**

Recognized professional firms, garden designers, and gardens central to the evolution and current culture of garden design in India

**Landscapes**

Design, an appreciation of materials and an understanding of processes. Studio projects selected to expose students to the wide range of approaches to design and landscapes.

## **Gardens**

The garden as the central image and metaphor in landscape architecture. Studio projects selected to explore the image and the metaphor in a variety of social and environmental contexts.

## **Nature and Sustainability.**

Concepts of nature and their implications for landscape architecture, with particular attention to the issue of sustainability. Projects selected to investigate alternative design strategies in a variety of environments from wilderness to city center.

## **Community and Place**

Concepts of community and place in architecture and urban design and their implications for landscape architecture. Projects selected to investigate alternative design strategies at a variety of scales and densities of habitation, from a single dwelling unit to a city.

## **Landscape Material and Process**

Landforms, geology, hydrology, soils, and biotic communities, with an examination of ecological concepts and their application at the landscape scale.

The history and ecology of plants and related materials associated with the design of gardens.

## **Landscape Construction.**

Landscape construction and engineering through inquiry into their ability to implement values of sustainability. Applications of landscape construction and engineering through inquiry into their ability to implement values of community and place.

## **Books:**

- 1) "Landscape Architecture" by Simonds 'Macgrow Hill"
- 2) "An Introduction to Landscape architecture" by Laurie Michael.
- 3) "Anatomy of a park" by Rultedge.
- 4) "Urban Landscape Design" by Cliff Tandy.

## **Books on Following Topics**

- 01] The Landscape of Man-shaping the environment from prehistory to present day.
- 02] The Western Tradition from Renaissance to Present day.
- 03] The Formal Garden
- 04] Garden Architecture in Europe
- 05] Complete Gardening in India
- 06] Tropical Garden Plants in colour
- 07] Beautiful shrubs
- 08] Some beautiful shrubs & climbers
- 09] Book on Plant Physiology
- 10] Landscape Handbook for the tropics.
- 11] Book on Geology and Soils
- 12] Time savers standard for Landscape Architecture
- 13] Book on Landscape Engineering
- 14] Landscape Handbook for the tropics.
- 15] Book on Climatology.
- 16] Book on Hydrology.
- 17] Landscape Handbook for the tropics.
- 18] Book on Geology and Soils.

## 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

### General Items

Sr	Name of Item	No.
1	Sieve for soil (Two Type)	1 each
2	Pitching Tool (Mason)	1
3	Chisel Mason Hammer Headed Flat 200 Mm	5
4	Hammer Mason	5
5	Level Masons 36" (1 Metre)	5
6	Plumb Bob.	5
7	Square ( Steel) 2' X 1'	5
8	Trowel Plastering Double Hand	5
9	Trowel Brick 10"	5
10	Tasla (Tin) Pans	5
11	Spade	5
12	Measuring Steel Tape 15 Mtr.	5
13	Measuring Steel Tape 30 Mtr.	5
14	Wooden Straight Edges For Ft.	5
15	Buckets 14 Lits.	5
16	Pocket Steel Tape 2 Mtr.	25
17	Pick Axes	5
18	Wheel Barrow	3
19	Mallet	5
20	Pane ( Iron)	5
21	Handsaw 1'6"	5
22	Drilling Machines	1
23	Hacksaw frame	1
24	Pipe Tube Level	2

### A) Tools & Implements

1.	Kassi / Spade	20 nos.
2.	Khurpi	20 nos.
3.	Hand hoe	20 nos.
4.	Saw	20 nos.
5.	Watering Can	05 nos.
6.	Rose Can	05 nos.
7.	Grass Cutter	20 nos.
8.	Budding & Grafting Knives	10 nos.
9.	Secateur	10 nos.
10.	Forceps	05 nos.
11.	Buckets	10 nos.
12.	Edge Cutter	02 nos.
13.	<b>Tree Pruner</b>	<b>02 nos.</b>

### B) Farm Structures

14.	Green House	01 no.
15.	Poly House	01 no.
16.	Misting Unit	01 no.

**C) Farm Equipment**

17.	Power Triller with Bowing Attachment	01 no.
18.	Wheel Barrow	01 no.
19.	Hand Sprayer (Small)	05 nos.
20.	Foot Sprayer	02 nos.
21.	Hand Gloves	20 nos.
22.	Balance	01 no.
23.	Sieve / Stainer	02 nos.

**D) Miscellaneous Farm Supplies**

24.	Earthen Pots	100 nos.
25.	Plastic Pots	100 nos.
26.	Polythene Bags	500 nos.
27.	Seed Packets	1000 nos.
28.	Brown paper bags	1000 nos.
29.	Gunny bags	10 nos.
30.	Tags-labels	100 nos.
31.	Thread balls	12 nos.
32.	Budding-tape	10 nos.
33.	Sirki	10 nos.
34.	Bamboos	20 nos.
35.	Boxes (Packing)	10 nos.
36.	Sutli	05 kgs.
37.	Moss-grass	05 kgs.
38.	Polythene roll	01 no.
39.	Tags-label (Metallic)	100 nos.
40.	Tray	10 nos.
41.	Grass Mower	01 no.

**E) Identification Materials**

46.	Flower Germ Plasm	
47.	Seed material	
48.	Packing materials	
	I) Accessories for flower arrangement	
49.	Different types of flower containers	
50.	Flower vases	
51.	Pin holder	

**F) Laboratory Misc. Supplies**

52.	Duster	20 nos.
53.	Soap	20 nos.
54.	Cotton balls	10 nos.
55.	Filter paper (Packs)	10 nos.
56.	Filter cloth	10 mtrs.

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