

MAHARASHTRA STATE BOARD OF VOCATIONAL EDUCATION EXAMINATION, MUMBAI - 51

1	Name of Course	Certificate Course In Concrete Technology (304112)																																								
2	Max. Nos. of Student	25 Students																																								
3	Duration	6 Month																																								
4	Type	Full Time																																								
5	Nos. Of Days / Week	6 Days																																								
6	Nos Of Hours /Days	7 Hrs																																								
7	Space Required	Laboratory = 1000 Sq feet Class Room = 200 Sq feet TOTAL = 1200 Sq feet																																								
8	Entry Qualification	S.S.C.+ Any Course in Civil Group of MSBVEE																																								
9	Objective Of Syllabus/ introduction	Awareness of Safety precautions Knowledge of Engineering skill, use of tools in Construction. Awareness of Architecture. Awareness of Basic quantity Surveying Awareness of Basic Building Construction.																																								
10	Employment Opportunity	The trainee will either to be able to take up jobs with agencies which Maintain Develop and repair Concrete Technology or with working experience will be in a position to start his own independent Business.																																								
11	Teacher’s Qualification	Diploma or Degree in Civil Engineering																																								
12	Training System	Training System Per Week																																								
		Theory		Practical		Total																																				
		12 Hours		30 Hours		42 Hours																																				
13	Exam. System	<table><tr><th>Sr. No.</th><th>Paper Code</th><th>Name of Subject</th><th>TH/PR</th><th>Hours</th><th>Max. Marks</th><th>Min. Marks</th></tr><tr><td>1</td><td>30411211</td><td>Concrete Technology</td><td>TH-I</td><td>3 hrs</td><td>100</td><td>35</td></tr><tr><td>2</td><td>30411221</td><td>Basic Quantity Surveying & Architecture</td><td>PR-I</td><td>3 hrs</td><td>100</td><td>50</td></tr><tr><td>3</td><td>30411222</td><td>Concrete Technology</td><td>PR-II</td><td>6 hrs</td><td>200</td><td>100</td></tr><tr><td></td><td></td><td>TOTAL</td><td></td><td></td><td>400</td><td>185</td></tr></table>						Sr. No.	Paper Code	Name of Subject	TH/PR	Hours	Max. Marks	Min. Marks	1	30411211	Concrete Technology	TH-I	3 hrs	100	35	2	30411221	Basic Quantity Surveying & Architecture	PR-I	3 hrs	100	50	3	30411222	Concrete Technology	PR-II	6 hrs	200	100			TOTAL			400	185
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SYLLABUS

Concrete Technology

Practical - II	Theory - I
Visits to typical concrete construction sites • Listing of modern equipment and operations	• Introduction to concrete technology. Job opportunities available • Definitions and terms related to concrete technology • Pre cast concrete components • Applications of concrete technology and modern trends
• Prepare list of material note down dimensions • Prepare table of specification of different items of work • Calculate required information	• Notations and convention used in drawings • Understanding of specifications • Interpretations of a given drawing • Classification of concrete according to grade, weight & methods of mixing • Ready mixed concrete, self leveling concrete, nominal mixed and design mixed concrete • Specifications of concrete <ul style="list-style-type: none"> o Prescriptive specifications o Performance oriented specifications • Properties of concrete <ul style="list-style-type: none"> o Workability & consistency o Segregation o Bleeding o Strength o Durability o Impermeability o Volume stability
• Test cement for consistency, setting times & strength • Conduct field tests for adulteration • Make proper arrangement to store cement at site	Types of cement, relevant IS codes comparative study of their physical & chemical properties, significance of different properties • Hydration of cement • Selection of cement • Storage of cement • Factors affecting strength of cement • Rejection of cement
• Perform sieve analysis on aggregate • Determine grading, fineness modulus • Determine presence of silt and clay • Perform test to determine shape & size of aggregate • Perform test to determine bulking of sand	• Classification (IS : 383) • Grading • Characteristics (grading, fineness modules) • Bulking of fine aggregate • Deleterious substances • Factors affecting strength of concrete

<ul style="list-style-type: none"> • Perform test and analyse the effect of water cement ratio (w/c) on strength of cement 	<ul style="list-style-type: none"> • Quality • Water requirement for hydration & workability • Effect of impurities present in water
	<ul style="list-style-type: none"> • Meaning of terms • Functions • Classification • Water proofing and permeability reducing admixture • Interpretation of specifications manufactures
	<ul style="list-style-type: none"> • Meaning of terms • Functions • Classification (IS : 4082) • Water proofing and permeability reducing admixture • Interpretation of specifications manufactures
<ul style="list-style-type: none"> • Prepare concrete and lay at required place using power tools • Carry out all operations taking necessary precautions related to form work and reinforcement • Test strength of concrete • Remove form work properly 	<p>Methods used, merits and demerits of methods, tools and equipment used and precautions to be taken for the following processes :</p> <ul style="list-style-type: none"> • Batching • Mixing • Transportation • Placing • Compaction • Curing • Finishing • Strength & durability requirements (IS : 456 – 2000) • Stripping of form work • Application of Modern Power Tools
<ul style="list-style-type: none"> • Prepare reinforcement for foundation, beams, columns, slabs 	<ul style="list-style-type: none"> • Definition, purpose and types of reinforcement • Methods and tools used for bar bending • Precautions to be taken
	<ul style="list-style-type: none"> • Factors affecting RCC/PCC work • Methods of overcoming constraints
<ul style="list-style-type: none"> • Erect scaffolding & form work using safety measures 	<ul style="list-style-type: none"> • Definitions of common terms • Types & applications • Different materials used in form work • Safety precautions to be observed in scaffolding
	<ul style="list-style-type: none"> • Need & importance • Types of estimates • Approximate estimate

<ul style="list-style-type: none"> • Calculate the cost of a building by – <ul style="list-style-type: none"> o Service unit basis o Plinth area method o Cubic content method o Typical bay method o Approximate quantity method 	<ul style="list-style-type: none"> • Approximate estimate <ul style="list-style-type: none"> o Service unit basis o Plinth area method o Cubic content method o Typical bay method o Approximate quantity method
<ul style="list-style-type: none"> • Read and understand various forms used in estimating 	<ul style="list-style-type: none"> • Measurements or calculation of quantities
	<ul style="list-style-type: none"> • Measurement of various constructed elements : <ul style="list-style-type: none"> o Foundation o Column o Bema, and o Slabs
<ul style="list-style-type: none"> • Reading of specification published by PWD/CSR 	<ul style="list-style-type: none"> • General specifications • Detailed specifications • Calculation of quantity
<ul style="list-style-type: none"> • Workout rate analysis of PCC/RCC work 	<ul style="list-style-type: none"> • Rate analysis – <ul style="list-style-type: none"> • Material – quality & quantity • Labour – rate • Plant and machinery required • Overhead charges • Profit
<ul style="list-style-type: none"> • Operate and shutdown the computer • Make data entries, create files and folders • Draft simple letters • Use computer for email & internet search • Prepare inventory using computer 	<ul style="list-style-type: none"> • Basic operations using common office software • Use of software available for construction sector. • Introduction to internet

List of equipment, tools and instruments

Sl. No.	Item/ Specification	Quantity proposed for a batch of 25 trainees
1	Steel taps (3 meter)	10
2	Steel taps (15 meter)	8
3	Steel taps (30 meter)	4
4	Masons square 300 x 600	8
5	Marking rope & thread (15 m)	64 each
6	Bevel	8
7	Shovel	10
8	Pan (M.S. or PVC)	10
9	Mortar board (2000 x 2000)	2
10	Measuring box (35 ltr. Capacity)	4
11	Plumb rule and Bob	
12	Spirit level	
13	Straight edge	
14	Water tube (6 m)	
15	Bucket (5 ltr. & 10 lrt.)	
16	Trowel (required shape & sizes)	
17	Concrete mixer	
18	Concrete vibrator (pin type & plate type)	
19	Drop chute	
20	Compaction tools (durmut)	
21	Water drum 200 ltr.	
22	Bar bending table	

Basic Quantity Surveying & Architecture

Practical – I
Instrument used in the module, types of work to be done in the institute and in the section, types of jobs made. Getting ready to draw using drawing instruments. Introduction to B.I.S. conventional lines as per B.I.S. code folding of drawing sheet, layout of drawing sheet.
Free hand sketching of simple geometrical models. Lettering and numbering, vertical and inclined. Printing single and double stroke lettering both inclined and vertical.
Construction of plain geometrical figure, (line, angle, triangles, rhombus, quadrilaterals, polygons, ellipses, parabola, and hyperbola etc.) Constructions of ordinary scale. Plain scale, comparative scale, diagonal scale, Vernier scale, and scale of chords.
Drawing plans elevation of point, line, surface, solids. Dimensioning technique, sketching of model, drawing orthographic sketches including dimensioning, conventional signs and symbols used in engineering drawing including conventional breaks
Dimensions on isometric drawing. Different symbols used for architectural material. Symbols for different fitting. Reducing & enlarging of drawing objects by reducing & enlarging techniques. By graphical method and by instruments.
Drawing of perspective or one perspective projection. One point perspective projection of room with furniture etc.
Drawing of perspective view of a simple building by vanishing point. Distortion point of exactness, limitation. Three point perspective of rounded form, helix, vaults, cylinder and spiral forms.
Sciography of building. Drawing plan, elevation of a single room building.
Familiarization with institute and importance of the module. Instrument, equipments used in the module, type of work done by the trainees in the institute, nature of job done by the trainees of the module
Practice in map reading including contours and drainage. Practice in folding and unfolding chain, alignment of lines, measurement of distance between given points and their booking
Practice in setting out a level and performing temporary adjustments. Practice of fly leveling, differential leveling. Reduction of levels, booking of field work, height of collimation, rise and fall method. Calculation of area of cross sections.
Estimate of one room building by center line method and separate wall method. Calculation of different material from the quantities worked out in the estimate.
Preparation of estimate of a double room building. Calculation of different materials and labour required for the work. Valuation of the same.
ROAD ESTIMATE :- Practice of estimating different materials required for road work by mid sectional area method, mean sectional area method, and prismoidal formula method
Preparation of estimate of a modern road and writing specification of different item of work.
Valuation of a two room building. Site visit of trainees to a construction site to enable them to understand different items of work.

List of Tools & Equipments

Sr. No.	Description	Qty.
1.	Box drawing instrument containing 15 cm compass with pin point, pin point & lengthening bar, one pair spring bows, rotating compass with interchangeable ink and pencil points, drawing pens with plain point & cross point, screw driver and box of leads.	10
2.	Protractor celluloid 15 cm semi-circular.	10
3.	Scale card board-metric set of eight A to H in a box.	10
4.	Scale-metric and section wooden 30 cm long marked with eight scales.	10
5.	Set square transparent 2 mm thick with beveled edges 45 degree 20 cm and 60 degree 25 cm.	10
6.	Drawing Board 1250x 900 mm.	10
7.	T-Square 1250 mm	10
8.	Erasing shield small size	10
9.	Print trimmer cutter edge 100 mm.	1
10.	Chest of drawers 8 drawers (Standard)	5
11.	Proportional divider 15 cm	5
12.	Stencil complete set 6H	2
13.	Draughtsman table and stool.	10
14.	Land measuring chain 30 mm with arms.	5
15.	Steel tape 20 meter long.	2
16.	Ranging rods wooden 2m long	10
17.	Optical square PWD pattern.	5
18.	Optical square box type circular	1
19.	Off set rod.	5
20.	Steel tap 5m & 2.5 m.	1
21.	Gunter's chain	5
22.	Engineer's chain	5
23.	Dumpy level builder 25 cm focal length x 23 mm completes with box and accessories and stand.	2
24.	Leveling staff 4 meters reading to 5mm telescopic type.	2
25.	Theodelite.	2
26.	Surveyor's umbrella.	4
27.	Spirit level 30 cm.	2
28.	Spade	2
29.	Hand hammers 1 kg.	2
30.	Pickaxe.	2