

## **Maharashtra State Board of Vocational Education Examination Mumbai**

1.	Name of Course	<b>C.C.In Workshop Machine operator</b> <b>(for Visually Handicapped)</b> <b>(303230)</b>																																										
2.	Max. Nos. of student	25 Students.																																										
3.	Duration	1 year																																										
4.	Type	Full time																																										
5.	Nos of days/week	6 days																																										
6.	nos of hours/day	7 hours																																										
7.	Space required	Class Room - 200 sq. feet, <u>Workshop - 1500 sq. feet</u> 1700 sq. feet																																										
8.	Entry quantification	8 <sup>th</sup> std pass																																										
9.	Objective of Syllabus.	1. Develop skills in Bench fitting work. 2. Develop skills in job inspection with the help of Braille precision measuring instrument and gauges. 3. Provide a sound working operational. Knowledge of different types of machine such as lathe machine, drilling machine, milling machine, shaping machine, and press machine etc. 4. Handling and uses of different types of tools used in flat and sheet metal work (dies, jigs and fixtures)																																										
10.	Employment opportunity Salt employment	➤ To get knowledge of machine operator. ➤ To start his small/own workshop to undertake job involving repetitive.																																										
11.	Teacher qualification	Diploma or Certificate Course in Concern Subject.																																										
12.	Training System	<b>Training System Per Week</b> <table border="1"><tr><td>Theory</td><td>Practical</td><td>Total</td></tr><tr><td>12 Hours</td><td>30 Hours</td><td>42 Hours</td></tr></table>							Theory	Practical	Total	12 Hours	30 Hours	42 Hours																														
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13.	Exam. System	<table border="1"><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>30323011</td><td>Fitting Work</td><td>TH-I</td><td>3 hrs</td><td>100</td><td>35</td></tr><tr><td>2</td><td>30323012</td><td>Machining work</td><td>TH-II</td><td>3 hrs</td><td>100</td><td>35</td></tr><tr><td>3</td><td>30323021</td><td>Fitting work</td><td>PR-I</td><td>6 hrs</td><td>200</td><td>100</td></tr><tr><td>4</td><td>30323022</td><td>Machining work</td><td>PR-II</td><td>6 hrs</td><td>200</td><td>100</td></tr><tr><td></td><td></td><td><b>Total</b></td><td></td><td></td><td><b>600</b></td><td><b>270</b></td></tr></table>	Sr. No.	Paper Code	Name of Subject	TH/PR	Hours	Max. Marks	Min. Marks	1	30323011	Fitting Work	TH-I	3 hrs	100	35	2	30323012	Machining work	TH-II	3 hrs	100	35	3	30323021	Fitting work	PR-I	6 hrs	200	100	4	30323022	Machining work	PR-II	6 hrs	200	100			<b>Total</b>			<b>600</b>	<b>270</b>
Sr. No.	Paper Code	Name of Subject	TH/PR	Hours	Max. Marks	Min. Marks																																						
1	30323011	Fitting Work	TH-I	3 hrs	100	35																																						
2	30323012	Machining work	TH-II	3 hrs	100	35																																						
3	30323021	Fitting work	PR-I	6 hrs	200	100																																						
4	30323022	Machining work	PR-II	6 hrs	200	100																																						
		<b>Total</b>			<b>600</b>	<b>270</b>																																						

# **Syllabus :- C.C.In Workshop Machine operator**

## **Theory - I - Fitting Work**

- 1) Introduction of institute (NAB) importance of Trade, Discipline, rules, safety precaution ; and first aid.
- 2) Introduction of Braille steel rule and measuring standards.
- 3) Detailed description of work shop hand tools –types, methods, care and its importance
- 4) Brief description of finishing process.
- 5) Introduction and construction of Drilling machine - Type ports, Drilling operations, cutting speed of feed and care and safety.
- 6) Job holding devices- types , uses, and care .
- 7) Metal –Ferrous- non ferrous – Different types , uses and their properties.
- 8) Introduction and construction of Lath machine. Types, uses, function of part, Tools, Lathe operations, Brief description of accessories and cutting speed and feed and care and safety.
- 9) Introduction of gauges – types , uses, Advantages and material and care.

## **Practical – I - Fitting Work**

- 1) Introduction of Training, Machinery in work shop safety rule, fire fighting, First aid.
- 2) Use of Braille steel rule –Measuring and reading of embossed drawing.
- 3) Practice of marking and Punching –by marking tools.
- 4) Practice of Parallel filing –Methods, Shape.
- 5) Practice of Hack sawing.
- 6) Filing & right angle.
- 7) Fitting of open male –female part of square and Tee.
- 8) Filing angular shape.
- 9) Drilling practice -holding of Drill and setting job in vice.
- 10) Practice of Drilling, counter boring and counter sinking on plain surface.
- 11) Tapping, dieing and reaming Practice on plain surface.
- 12) Practice- setting of Tool in tool post and holding of job in chuck on lathe.
- 13) Facing , centering and plain Turning practice.
- 14) Measuring practice by Vernier caliper (Braille)
- 15) Step turning, drilling, boring and knurling on lathe.
- 16) Taper turning by compound rest on lathe.
- 17) Practice of parting off and under cutting on lathe.

## **Theory – II - Machining Work**

- 1) Fundamental concept of Heat treatment -Process, and its importance.
- 2) Introduction and description of Braille precision Instruments construction, Types, parts, uses and reading , measuring and care.
- 3) Introduction and construction of milling machine-Types, parts, uses, cutters, and General Milling operation. Accessories, attachment and cutting. Speed and feed- care and safety .
- 4) Introduction of coolants and lubricants –Types and uses.
- 5) Introduction of limits, fits and Paterance and Inter changeability.
- 6) Introduction of machine and machine tools and mass production machine and tools (Dies, Jigs and fixtures).
- 7) Fasteners – types and uses, and Introduction of Dismentle removal and reassemble of component.
- 8) Introduction and construction of shaping machine - Types part, functions, Tools, setting of stroke, common operations, care and safety.
- 9) Introduction, and brief description of Power saw machine, surface grinding machine, Shearing machine – function, uses, care and safety.
- 10) Description of Dies, jig and fixtures – Types, uses, material, Advantage and care.
- 11) Introduction and Brief Description of press – Types, parts, function, and care and safety.

## **Practical – II - Machining Work**

- 1) Turning Practice –Jobs on mandrel in between center
- 2) Practice of measuring and reading of Braille Vernier caliper, Micrometer, Depth gauge.
- 3) Practice of setting of cutter on arbor , Job in vice, vice on Table on Horizontal milling.
- 4) Plain milling practice
- 5) Sequence of milling a six /Two face of a solid block.
- 6) Step milling practice.
- 7) Milling a slot -Male and Female
- 8) Practice of holding a End mill cutter, Job in vice, vice on table on universal milling.
- 9) Dismantling –removal and reassembling of simple machine component.
- 10) Setting of tool in tool post and job in vice on shaper machine.
- 11) Plain Shaping
- 12) Shaping a right angle block.
- 13) Cutting practice on power saw Machine.
- 14) Cutting practice on shearing Machine.
- 15) Practice on drilling jig (For mass production)
- 16) Practice on shaping Fixture (For mass production)
- 17) Practice on hand press for flattening operation.
- 18) Practice on hand press for piercing operation.
- 19) Practice on power press for cut off operation.
- 20) Practice on Hand press for Bending , Notching, Embossing operation.

## List of Machineries

Sr.No.	MACHINERY	Qty .
1	Shaping Machine 450 mm Stroke (Motorized ) with all attachment	2 Nos.
2	Lathe-General purpose (all geared) height of centers 200 mm to below Between centers 200 mm, supplied with 3 jaws and 4 jaws chuck. Face plat, Taper Turning attachment, steadies etc. and set of Lathe Tools.	3 Nos.
3	Drill Machine Pillar Type (motorized) up to 35 mm capacity	2 Nos.
4	Drill Machine (Bench Type) upto 12 mm capacity.	3 Nos.
5	Grinding Machine Bench/Pedestal type DE 250 mm dia wheel with Guard for vision	1 No.
6	Power Saw machine (Hydraulic feed System) 350 mm Blade size	1 No.
7	Milling Machine Universal Horizontal (Motorized ) with attachments	1 No.
8	Surface Grinding Machine wheel dia 180 mm (or near) reciprocating Table, Longitudinal table traverse 300 mm fitted with adjustable Traverse stop (Motorized) supplied with magnetic Table 350 mm x 150 mm , Diamond Tool Holder , set and spanner, grease gun etc.	1 No.
9	Shearing Machine -Motorized (Plate Thick MS 4 mm, SS 3 mm Width -1200 mm)	1 Nos.
10	Power Press 80,60,40,20 Ton capacity	4 Nos.
11	Single Body Hand Press No. 6,5,4,4,3,3	6 Nos.
12	Button Hand Press	1 No.
13	Air Compressor (Motorized) pressure 12.5Kg/cm <sup>2</sup> (Double cylinder)	1 No.
14	Hand Shearing Machine (40 x 40 x 3 mm thick –angle cutting and plate capacity)	2 Nos.
15	Capstan Lathe 50 mm dia spindle bore with Accessories and attachment including set of collate, chuck.	1 No.
16	Traub Lathe Machine 25 mm dia spindle boe with accessories and attachments.	1 No.
17	Turret Lathe Machine 60 mm dia spindle boe with accessories and attachments.	1 No.

## LIST OF TOOLS AND EQUIPMENT'S

Sr.No.	Description	Qty .
1	Steel Rule 30 cm (Braille)	8 Nos.
2	Try Square 20 cm blade	8 Nos.
3	Outside Caliper 15 cm spring	8 Nos.
4	Inside Caliper 15 cm spring	8 Nos.
5	Hermaphrodite Caliper 15 cm	8 Nos.
6	Spring Divider 15cm	8 Nos.
7	Sciber 15 cm	8 Nos.
8	Centre Punch 10 cm	8 Nos.
9	Ball Pen Hammer 4.5 Kg.	8 Nos.
10	Flat File 25 cm second cut	8 Nos.
11	Flat File 25 cm smooth	8 Nos.
12	Half round File 15 cm Second cut	8 Nos.
13	Hacksaw frame adjustable 20-30 cm	8 Nos.
14	Safety gogal	8 Nos.
15	Dot punch	8 Nos.
16	Hand Files 25 cm second cut	8 Nos.
17	Flat File 25 cm bastard	8 Nos.
18	Surface Plate 60 cm x 60 cm	1 No.
19	Surface Plate 90 cm x 60 cm	1 No.
20	Universal Scribing Block 20 cm	1 No.
21	V Block (pair) 80 x 80 x 100 cm with clamps	1 No.
22	Adjustable Square 15 cm blade	1 No.
23	Angle plate 13 cm x 15 cm	1 No.
24	Letter Punch set (3mm)	1 No.
25	Portable Hand Drill machine (electrical) 10 mm cap	1 No.
26	Twist Drill SS 4 mm to 15 mm by 1 mm	1 No.
27	Twist Drill SS ¼ " to 1½ " by ⅛"	1 No.
28	Taps and dies complete set of box with B.S.W. 1/4 To 1"	1 No.
29	Taps and dies complete set of box(Metric) (M4 to M 24)	1 No.
30	Knife edge File 15 cm smooth	1 No.
31	Feather edge File 15 cm smooth	1 No.
32	Triangular File 15 cm smooth	2 Nos.
33	Round File 15 cm smooth	2 Nos.
34	Square File 25 cm second cut	2 Nos.
35	Square File 25 cm smooth	2 Nos.
36	Adjustable Spanner 15 cm	2 Nos.
37	Reamer adjustable maximum 9 mm -12mm ( set of 3 Pic.)	2 Nos.
38	Reamer Taper 4 mm -9mm (set of 4 Pic.)	1 Set
39	Reamer Parallel 12 mm -16 mm (set of 5 pic)	1 Set

40	Combination set	2 Nos.
41	Outside Micrometer 0-25mm (Braille)	2 Nos.
42	Vernier Height gauge 30 cm (Braille)	1 No.
43	Vernier Caliper 20 cm (Braille)	1 No.
44	Depth gauge 0-150 mm (Braille)	1 No.
45	Steel Rule 150 mm with	1 No.
46	Spanner - adjustable 200 mm	4 Nos.
47	Plier flat nose 150mm - side cutting.	2 Nos.
48	C clamp 150 mm	2 Nos.
49	Chisel 150 (Different shape each )	4 Nos.
50	Steel rule 30 cm	1 No.
51	Steel rule 15 cm	1 No.
52	Out side Micrometer 0-25 mm, 25-50 mm (1 each )	2 Nos.
53	Vernier Caliper 30 cm	1 No.
54	Parallel clam 150 mm	2 Nos.
55	Side and face cutter dia 250 mm X 10 mm x 25 bore	1 No.
56	Side and face cutter dia 200 mm X 10 mm x 25 bore	1 No.
57	Side and face cutter dia 150 mm X 10 mm x 25 bore	1 No.
58	Side and face cutter dia 200 mm X 10 mm x 25 bore	1 No.
59	Side and face cutter dia 200 mm X 10 mm x 25 bore	1 No.
60	End Mill cutter - 25 mm , 20 mm , 16 mm , 14 mm 12mm, 10mm, 8mm, 6mm (1 each)	8 Nos.
61	Shell End mill cutter dia 100 mm , dia 150 mm (1 each)	2 Nos.
62	Filler gauge 100 mm blade metric	1 No.
63	Radius gauge 1-12 mm	2 Set
64	Center gauge 60 degree and 55 degree	2 Nos.
65	Screw pitch gauge with BSW and Metric	2 Nos.
66	Morse Taper Sleeve 0-1, 1-2, 2-3, 3-4,	1 Set
67	Knurling Toll	1 No.
68	Drill chuck 6 mm capacity with key and shank	1 No.
69	Drill chuck 6-12 mm capacity with key and shank.	1 No.
70	Tool Holder R.H. , L.H. & Straight for 6mm square tool. (1 each)	3 Nos.
71	Parting Tool Holder with HSS Blade	1 No.
72	HSS Tool Bit 12 mm square x 150 mm	2 Nos.
73	Boring Tool Holder for 6mm Square Tool	2 Nos.
74	Oil Can 15 Pint pressure feed suction Pump	6 Nos.
75	Drilling vice 100 mm and 150 mm	2 Nos.
76	Steel Cupboard	2 Nos.
77	Pigeon Lockers	2 Nos.
78	Oil Stone 150 x 50x 25 mm	1 No.
79	Universal Vice 100 mm	1 No.
80	Machine Vice 200 (swivel base)	1 No.
81	Bench vice 150mm	6 Nos.

## LIST OF REFERENCE BOOKS FOR THE WORKSHOP MACHINE OPERATOR COURSE

Sr. No.	Name of the Book for reference	Name of the author
01	FITTER THEORY	By DANDAGWAHAL
02	MACHINIST THEORY	By DANDAGWAHAL
03	WORKSHOP TECHNOLOGY- I	By HAZRA- CHOWDHARI
04	WORKSHOP TECHNOLOGY -II	By HAZRA - CHOWDHARI
05	FITTER THEORY- I	By K. SUBBAIHA
06	FITTER THEORY -II	K. SUBBAIHA
07	TURNER THEORY- I	By K. SUBBAIHA
08	TURNER THEORY- II	By K. SUBBAIHA
09	MACHINE THEORY- I	By K. SUBBAIHA
10	MACHINE THEORY- II	By K. SUBBAIHA
11	MACHINE THEORY- III	By K. SUBBAIHA
12	TOOL & DIE MAKER THEORY	By BALBIRSINGH
13	TOOL & DIE MAKER THEORY –I	By CIMI (CHINNAI)
14	TOOL & DIE MAKER THEORY-II	By CIMI (CHINNAI)
15	TOOL & DIE MAKER THEORY-III	By CIMI (CHINNAI)

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