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SYLLABUS FOR

Module-3 : TRADE TECHNOLOGY I(TT- I)

&

Module-4 : TRADE TECHNOLOGY II(TT- II)

UNDER MODULAR PATTERN OF CRAFT INSTRUCTOR TRAINING

FOR THE TRADE OF:

FITTER

Designed in -2009

**Government Of India
Ministry Of Labour & Employment
Advanced Training Institute
Udyog Nagar,
Kanpur-208022(U.P.)**

**LIST OF MEMBERS WHO ATTENDED THE TRADE
COMMITTEE MEETING FOR THE TRADE OF
" FITTER "**

NAME , DESIGNATION & ORGANISATION

S/Sri

CHAIRMAN

D.MALLICK

Director, Advanced Training Institute,
Udyog Nagar, KANPUR

MEMBER SECRETARY

N.S. GARBYAL

Joint Director, Advanced Training Institute,
Udyog Nagar, KANPUR.

MEMBERS

1. **M.C.SHARMA**
Joint Director,
C.S.T.R.I., Kolkatta
2. **G.B. SAXENA**
Dy..General.Manager. (Retd.),
Ordnance Factory, KANPUR.
3. **H.B. KALRA**
Faculty Member,
Department of Mechanical Engineering
University Institute of Engineering & Technology,
C.S.J.M. University, KANPUR.
4. **RAJEEV KUMAR BANDIL**
Dy. Chief Engineer,
The India Thermit Corporation Ltd.
Panki Industrial Estate, KANPUR.
5. **JAI NARAYAN**
Work Shop Superintendent,
Govt. Polytechnic, KANPUR.
6. **VINOD KUMAR RASTOGI**
Technical. Assistant,
Department of Mechanical Engineering
University Institute of Engineering & Technology
C.S.J.M. University, KANPUR
7. **GOPAL**
Foreman,
Govt. I.T.I.,KANPUR.

8. **NARESH CHANDRA**
Dy. Director of Training,
Advanced Training Institute,
Udyog Nagar, KANPUR.
9. **G.N. ESWARAPPA**
Dy. Director of Training,
Advanced Training Institute,
Udyog Nagar, KANPUR.
10. **SURESH RAM**
Training Officer,
Advanced Training Institute,
Udyog Nagar, KANPUR
11. **RAVI KUMAR PANDEY**
Vocational Instructor
Advanced Training Institute,
Udyog Nagar, KANPUR

COURSE STRUCTURE

Component	Allotted Time/Week	Allotted Time/Quarter
Trade Technology-I (TT-1)	Theory: 04 Hrs a day=20 Hours Practical : 04 Hrs a day=20 Hours	20x12=240Hrs 20x12=240Hrs
Trade Technology-II (TT-2)	Theory: 04 Hrs a day=20 Hours Practical : 04 Hrs a day=20 Hours	20x12=240Hrs 20x12=240Hrs
Total	80 Hours	80x12=960 Hours

- Note: 1- Week No. 13 will used for revision and Trade Test.**
2- Five minutes per day will be allotted to each trainee for development of communication skill.
3-During the discussion of any machine, related precautions and safety measures must also be discussed.

SYLLABUS FOR TRADE TECHNOLOGY-I (TT-1) OF FITTER TRADE

Week No.	Theory.	Practical	Remarks.
01	<p>Familiarization with the Institute (Necessary guidance to be provided to the new comers to familiarize with the institute system including store etc.) Importance of safety and general precaution to be observed in the Institute and workshop.</p> <p>Importance of the trade in the development of Industrial economy of the country.</p> <p>Knowledge of First Aid.</p> <p>Introduction of safety kits and accident prevention etc. Types of work done under the trade.</p> <p>Importance of Craft Instructorship training Scheme towards transferring the skill & Knowledge Duties & responsibilities of an instructor. Preparation of a training schedule, breakup of Syllabus contents into unit/lesson/topic wise.</p>	<p>Demonstrating the importance of safety and safe work habits.</p> <p>Basic idea to handle the safety equipments e.g. Occupational and safety health hazard in the shop floor.</p> <p>Fire Extinguishers types, method of refilling, care and maintenance etc.</p> <p>Preparation of raw materials for exercises using Power Saw machine.</p> <p>Designing the graded exercise covering the list of skills.</p> <p>Demonstration on the concept of conservation of raw material.</p>	
02	<p>Concept of preventive & General maintenance and their importance.</p> <p>Need for material planning.</p> <p>Description about the common hands tools, marking, cutting and measuring tools used in a fitter trade –Their specifications conforming to BIS. Files- elements & description, classification & specification, material & types of files, their grades, cuts etc and uses.</p> <p>Method of accurate filing, care and maintenance. Chisels & Hacksaws specification, Type & kinds, construction and functions.</p> <p>Appropriate cutting and Clearance angle for cutting different materials.</p> <p>Method of chipping and sharpening of chisels. Precaution to be observed while chipping & sharpening of chisels.</p>	<p>Exercise on scraping practice on Cast-iron Surface plate to close precision limits. Scraping of Flat bearing surface and their fitting.</p> <p>Exercises on chipping a flat surface on mild steel & cast iron blocks with flat and cross cut chisels. Grinding the chisels. Filing flat surface to right angles Evaluating the job as per the marking scheme. Writing the sequence of operations in the work book. Marking on typical jobs and on casting of intricate profiles. Making a V block from C.I. and a clamp from Mild Steel as per given drawing.</p> <p>Sawing, Filing, Vee steps and chamfering to size.</p>	
03	<p>Introduction to Lathe and Shearing Machines.</p>	<p>Practice on Lathe work and practice on shearing machine work.</p>	
04	<p>Types of Drilling Machine-their specifications, capacity, special, features and work holding and Tool</p>	<p>Uses of different marking media.</p> <p>Marking the position of drill holes.</p> <p>Checking concentricity & dimension</p>	

	<p>holding devices for different jobs. Different types of drills, drill nomenclature, size and method of holding drills both straight and taper shank and their applications. Cutting and clearance angles of drills for metals. Calculation of Cutting Speed, feed, R.P.M and Time. Care and maintenance. Calculation of Tap Drill size. Method of drill grinding, common faults and their remedies. Description of drill chuck, key, drift, socket, sleeves and their proper uses in the drilling machine. Knowledge of Bench/Pedestal grinders, Mounting, Dressing, Glazing, Truing and precautions during grinding.</p>	<p>for true drilling. Practice on drilling through and blind holes on ferrous and non ferrous metals to a positional Accuracy of ± 0.1 mm. Practice on grinding twist drill with and without attachment and checking angles with the aid of gauges. Exercise on Tapping through and blind holes to suit stud and bolt. Demonstration and exercise on Counter Bore, Counter Sink, Spot facing and Reaming holes-Three piece fitting with dowel pins. <u>REVISION & INTERNAL ASSESSMENT</u></p>	
05	<p>Taps and Tapping: Taps- description, specification, Tapping through and blind holes, lubricating for tapping. Causes of broken tap and remedies. Method of removing a broken taps from a hole. Method of calculation of tap drill sizes for tapping. Specification of dies, (ISO/BIS standard.)Difference between tap wrench and die stock. Method of using dies. Lubricants used for threading. Checking with screw pitch gauge. Reamer (Hand, Machine)-Specification, types, parts and their uses Determining hole sizes for reaming and reaming procedure, use of lubricants.</p>	<p>Demonstration on removal of broken Taps or studs from a through hole and blind hole. External Threading by using dies and lubricant. Care & maintenance. Measuring the thread Dimension by various methods. Exercise involving preparation of one of the flat surfaces as Master and two of the adjoining sides square by filing flat and square.</p>	
06	<p>Discussion on precision measuring instrument such as Vernier Caliper, height gauge, Micrometer (Various Types) Depth gauge, etc. Their working principle, construction, parts, graduation, reading, uses, care and maintenance. Discussion continued on Dial Test Indicator, Bore gauge, Bevel protractor, Combination set etc.their construction, parts, graduation, reading uses, care&mainetnce. (Both English & Metric)</p>	<p>Measuring the square and flat dimension with Vernier Caliper, Outside micrometer and within an accuracy ± 0.02mm with appropriate male & female fittings. Advanced practice on Marking, Filing, Drilling, Countersinking, Tapping etc.</p>	

07	<p>General Properties of metal, Difference between metals and non metals.</p> <p>Discussion about ferrous and non ferrous metals.</p> <p>Description of Physical, Mechanical and Chemical properties of metals.</p>	<p>Assembly of parts and checking.</p> <p>Preparing a Parallel Clamp. Practice on square fitting, step Fitting, sliding and Angle Fitting within an accuracy of $\pm 0.02\text{mm}$ and on angular surface within an accuracy of ± 5 minutes and their evaluations.</p>	
08	<p>Types of Cast Iron, their properties and uses. Carbon Steel their classification, properties and uses. Alloy steel their properties and uses. Heat treatment of carbon steel;- Annealing, hardening, tempering, Normalizing etc.</p>	<p>Making Dovetail Sliding, Fitting and assembly with dowel pins and screw within an accuracy of $\pm 0.02\text{mm}$.</p> <p>Exercise on heat treatment of hand tools, such as chisels, screwdrivers, punches, coiled springs etc.</p> <p>Hardening of scriber points, the legs of calipers and dividers.</p> <p><u>REVISION & INTERNAL ASSESSMENT</u></p>	
09	<p>Case hardening, Carburizing, Induction hardening, Nitriding, Flame hardening and Cyaniding process. Change in the properties of metals due to heat treatment.</p> <p>Introduction to forging their methods and type of tools which are used for different forging methods and forging operations.</p>	<p>Annealing of hardened steel components, case hardening of hammer heads, vice jaws and the end of spanners etc.</p> <p>Exercise on preparing sets of standard double ended spanners and screw driver blade by forging method.</p>	
10	<p>Introduction to Shaper, Slotter, and planner. Introduction of Milling Machine.</p>	<p>Machining Practice on Shaper and Slotter and Planner.</p>	
11	<p>Milling Machine accessories, attachments and cutters.</p> <p>Introduction to Jig Boring and Surface grinding machine.</p>	<p>Machining Practice on Milling Machine .Machining practice on Jig Boring and Surface Grinding machine</p>	
12	<p>REVISION</p>	<p align="center">-DO- <u>REVISION & INTERNAL ASSESSMENT</u></p>	
13	<p>FINAL TRADE TEST</p>		

SYLLABUS FOR TRADE TECHNOLOGY-II (TT-2) OF FITTER TRADE

Week No.	Theory.	Practical	Remarks
01	<p>Concept of Interchangeability. Limits, Fits, Tolerance and Allowance-their definition, and practical application in Industry. Preparation of lesson Plan, Information sheet, and Assignment Sheet etc.</p> <p>System of Tolerance and Limits i.e. as per ISI or BIS system. Selection of Limits for different types of Fits.</p> <p>1-Geometrical tolerance (Shape &Form).</p> <p>2- Position Tolerances (Location).</p>	<p>Preparing stiff joint inside and outside calipers and a pair of dividers. Preparation of Demonstration plan, job sheet, Operation Sheet.</p> <p>Making a project work.</p> <p>Shop Floor demonstration Practice.</p>	
02	<p>Gauges: Introduction, necessity, different types, description and uses of feelers, Screw Pitch, Radius, Wire, Snap, Plug, Ring, Telescopic Gauge, Limit, Counter gauges etc. Explain the difference between workshop gauge and inspection gauge master gauge. Care and Maintenance.</p>	<p>Exercise on preparing different gauges (Center Gauges, square gauge, drill and snap gauge etc) with in an accuracy of ± 0.02 mm Shop Floor demonstration Practice.</p>	
03	<p>Different Types of Fastening i.e. Permanent, Semi permanent and Temporary, discuss about various types of locking devices, different nuts (i.e. castle nut, slotted nuts etc.) different types of washers (spring washers, fiber washers, tab washers etc.)</p> <p>Advantages of each type of fastener and their uses in detail. (Soldering, brazing, welding etc.) Rivets and Riveting, the object of riveting, the relation between the sizes of rivets and the thickness of the plates, pitch of rivets.</p> <p>Types of rivets and their uses. Method of riveting, specification of riveted joint. Merits and demerits of riveting over welding with some specific examples. Failures of riveted joints and remedies.</p>	<p>Continued on preparing Gauges and their heat treatment practice and hardness testing by different methods.</p> <p>Exercise on drilling and tapping (Both through and blind holes) to very close limits, fitting studs, Counter /Sunk head screw etc.</p> <p>Drilling on cylindrical surface and angular surface.</p> <p>Exercise on marking out and location of holes for riveting, lap and but joint, use of dolly and snap forming the riveted head.</p> <p>Shop Floor demonstration.</p>	
04	<p>Different methods of drives, power transmission by belts, gears, chains, clutches and coupling etc.</p> <p>Broaching machine, different types, parts, broaching process, broaching</p>	<p>Familiarization with machine and parts. Demonstration on broaching Machine.</p> <p>Familiarization with machine and part of Slotting Machine.</p>	

	<p>methods etc. Broaching Tools and classification of broaching tools. Introduction of Slotting Machine, operation, tools etc.</p>	<p>Demonstration on Slotting Machine, Practice on soldering, brazing exercise. Making of keys and method of Fitting and removing keys from pulley & shaft .BIS specification for keys and key ways. Shop Floor demonstration. <u>REVISION & INTERNAL ASSESSMENT</u></p>	
05	<p>Definition and types of Jigs, fixtures and templates. Difference between jigs and fixture. Elements of Jigs & fixtures and their materials. Advantages of jigs Fixtures in mass production. Introduction of presses, their types, main parts of a power press. Die details and accessories.</p>	<p>Exercise on preparing a simple drilling jig for mass production work, checking assembly of parts and their accuracy. Exercise on preparation of fixture and template. Shop Floor Demonstration.</p>	
06	<p>Lapping and Honing; Explain about application of lapping and honing job. Lapping and honing tools, shapes, grades, and abrasive used for both the cases, Frosting- its aim and methods of performance. Methods of protecting finished surfaces. Discuss about surface finish necessity, degree of finish, finishing symbol and its value. Methods of measuring surface finish.</p>	<p>Exercise on male and female Fitting. Practice on simple hand Lapping, honing (Hand) operation. Preparation of different joints related to the power transmission system(Universal, slip etc) Shop Floor Demonstration.</p>	
07	<p>Construction & working principle of Sine bar & Dial Test Indicator along with the application of Slip Gauge. Comparators-measurement of quality of the cylindrical bores.</p>	<p>Demonstration on Sine bar, dial test Indicator, slip gauge and comparators and their applications. Industrial visit to different Mechanical Industries/Manufacturing Industries.</p>	
08	<p>Description about digital micrometer and digital caliper. Checking tapers using ball& Roller gauges. Care and Maintenance.</p>	<p>Demonstration on digital caliper and digital micrometer. Application of checking tapers using ball& Roller gauges. Shop Floor Demonstration. <u>REVISION & INTERNAL ASSESSMENT</u></p>	
09	<p>Bearing: Introduction, classification, type & Uses. Different materials of bearing, bearing types & Uses. Lubricants & Coolants (in brief) types & their applications.</p>	<p>Filing and scraping bearing surface and practice on removing worn out bearing from shaft & replacing with a new one. Scraping and fitting of a direct control bearing on a shaft,</p>	

		preparation of oil grooves on shaft and bearing and checking their alignment. Shop Floor Demonstration.	
10	<p>Material handling system: Types of material handling, equipment & accessories and their application & uses.</p> <p>Application of hydraulic and pneumatic systems in Modern machines.</p>	<p>Practicing and inspection of dismantling & assembly of different valves, stop cocks bearing, pullers etc. and checking for leakage.</p> <p>Practice on pipe cutting, pipe fitting, pipe bending, pipe threading, replacing and repairs of various pipe works.</p> <p>Use of tools such as thread cutting dies for pipe, pipe cutters, pipe wrench and pipe bending machine etc. Shop Floor Demonstration.</p>	
11	<p>Introduction to C.N.C Machine.</p> <p>Brief description about PLC & Electronic control system and non-conventional machines-EDM, ECM etc.*</p>	<p>Simple programming & operation on C.N.C Machines.</p> <p>Demonstration on PLC, EDM, ECM, etc.</p>	
12	REVISION	<p>Practice on dismantling and reassembling of machine components from blue print. Shop Floor Demonstration and practice.</p> <p>REVISION & INTERNAL ASSESSMENT</p>	
13	FINAL TRADE TEST		

* Note: Exposure to Industry/Institute for CNC, EDM, ECM etc.

List of hand Tools and equipment for a batch of 16 Trainees

S. No.	Name of the tools and equipment	Quantity For Training Officer	Quantity For Trainees	Total
01	Rule steel 15 cm with metric graduation	01	16	17
02	Try Square 10 cm blade	01	16	17
03	Out side caliper 15 cm spring	01	16	17
04	Inside caliper 15 cm spring	01	16	17
05	Caliper 15 cm Hermaphrodite	01	16	17
06	Divider 15 cm spring	01	16	17
07	Divider 15 cm spring	01	16	17
08	Straight scribe 15 cm	01	16	17
09	Screw Driver 15 cm	01	16	17
10	Chisel cold Flat 10 cm	01	16	17
11	Hammer ball pane 0.45 kg with handle.	01	16	17
12	Hammer bal pane 0.22 kg with handle	01	16	17
13	File Flat 25 cm IInd cut	01	16	17
14	File Flat 25 cm IInd cut smooth.	01	16	17
15	File half round 15 cm IInd cut.	01	16	17
16	Hacksaw frame fixed 30 cm.	01	16	17
17	Safety goggles.	01	16	17
18	Dot punch 10 cm	01	116	17

Tools Instrument & General Shop Out fit

S. No.	Name of the tools and equipment	Quantity For Training Officer	Quantity For Trainees	Total
19	Rule steel 30 cm to read metric	04		
20	Rule steel 60 cm	04		
21	Straight edge 45 cm steel	02		
22	Flat surface 45x45 cm CI/granite	02		
23	Marking table 91x91x122 cm	01		
24	Universal scribing block 22 cm	02		
25	V- block pair 7 cm and 15 cm with clamps	02		
26	Square adjustable 15 cm blade	02		
27	Angle plate 10x20 cm	02		
28	Level spirit 15cm metal	01		
29	Punch letter 3mm set	01		
30	Punch number set 3mm	01		
31	Punch hollow 6 mm to 19 set of 5	02		
32	Punch round 3 mm x 4 mm set of 2	02		
33	Portable hand drill (electric) 0to 6 mm	02		
34	Drill twist s/s 1.5 to 12 mm by .5 mm	01set		
35	Drill twist s/s 8 mm to 15 mm by ½ mm	01set		
36	Taps and dies complete set in box B. A	01		
37	Taps and dies complete set in box width-worth	01		
38	Taps and dies complete set in box 3-18 mm set of 10	01		

39	File wording 15 cm smooth	04		
40	File knife edge 15 cm smooth	04		
41	File cant saw 15 cm smooth	04		
42	File feather edge 15 cm smooth	04		
43	File triangular 15 cm smooth	02		
44	File round 20 cm 2 nd cut	08		
45	File square 15 cm 2 nd cut	04		
46	File square 25 cm 2 nd cut	04		
47	Feeler gauge 10 blades	01set		
48	File triangular 20 cm 2 nd cut	06		
49	File flat 30 cm 2 nd cut	06		
50	File flat 20 cm bastard	06		
51	File flat 30 cm bastard	06		
52	File Swiss type needle set of 12	02set		
53	File half round 25 cm 1 nd cut	06		
54	File half round 25 cm bastard	04		
55	File round 30 cm bastard	04		
56	File hand 15 cm 2 nd cut	06		
57	File Card	06		
58	Stone oil 15 cm x5 cm x2.5 cm	04		
59	Stone carborandum 15 cm x 5 cm x 5 cm x 4	02		
60	Can oil 0.25 liters	02		
61	Pliers combination 15 cm	02		
62	Vice grip pliers	02		
63	Iron soldering 350 gm	02		
64	lamp blow 0.55 liters	02		
65	Spanner width-worth D.E.set of 10 pcs	06 Nos.		
66	Spanner adjustable 15 cm	02Set		
67	Interchangeable ratchet socket set with a 12 mm driver, sized 10-32 mm set of 18 socket and attachments	01Set		
68	Box spanner se 6-25 mm set of 8 with Tommy bar.	01Set		
69	Glass magnifying 7 cm	02 Nos.		
70	Clamp toolmaker 5cm and 7.5 cm set of 2	02 Nos.		
71	Clamp "c" 5cm	02Nos.		
72	Clamp "c" 10 cm	02Nos.		
73	Hand reamer adjustable cover max 9,12,18mm-set of 3	01Set		
74	Hand reamer taper 4-9mm set of 6 or 4-7mm set of 4	01Set		
75	Reamer parallel 12-16mm set of 5	01No.		
76	Scraper flat 15cm	06 Nos.		
77	Scraper 3corner 15 cm	06Nos.		
78	Scraper half round 15 cm	06 Nos.		
79	Chisel cold 9mm cross cut 9 mm diamond	06 each		
80	Chisel cold 19mm flat	06 Nos.		
81	Chisel cold 9 mm round nose	06 Nos.		
82	Extractor stud EZY-out	02 Nos.		
83	Set combination 30 cm	02 Nos.		
84	Micrometer 0-25mm out side	03 Nos.		
85	Micrometer 25-50mm out side	03 Nos.		
86	Micrometer 50-75mm out side	02 Nos.		
87	Micrometer in side 25-50mm with 25 mm test pcs.	01 No.		

88	Vernier caliper 20 cm	01 No.		
89	Vernier height gauges 30 cm	01 No.		
90	Vernier bevel protractor	01 No.		
91	Screw pitch gauge	01 No.		
92	Wire gauge, metric standard	01 No.		
93	Drill twist T/S 6mm to 25 mmx1.5	01set		
94	Drill chuck 12mm	01 No.		
95	Pipe wrench 40cm	01 No.		
96	Pipe wrench 30 cm	01 No.		
97	Pipe vice 100mm	02		
98	Adjustable pipe tape set BSP with die set cover pipe size 15,20,25,32,38,50mm	01 No.		
99	Wheel dresser (1 for 4 units)	01 No.		
100	Machine vice 10cm	01 No.		
101	Machine vice 15cm	01 No.		
102	Sleeve drill morse 0-1,1-2,2-3	01 Set		
103	Vice bench 12cm jaws	12 Nos.		
104	Vice legs 10cm jaw	02 Nos.		
105	Bench working 240x120x90 cm	04 Nos.		
106	Almirah 180x90x45cm	02 Nos.		
107	Lockers with 6 drawers (standard size)	04 Nos.		
108	Metal rack 182x182x45cm	01 No.		
109	Classroom Chairs for Trainees	20 Nos.		
110	Classroom Tables for Trainees	20 Nos.		
111	Training officer's Table	02 Nos.		
112	Training officer's Chair	02 Nos.		
113	Black Board with duster & White Board	02 Nos.		
114	Fire Extinguisher	02 Nos.		
115	Fire Buckets	02 Nos.		
116	Machine Vice 100mm	02 Nos.		
117	Wing Compass 25.4cm or 30cm	02 Nos.		
118	Hand Hammer 01KG with handle	02 Nos.		
119	Gauge slip as Johnson metric set	01set		
120	Carbide wear block 01mm-02mm	02each		
121	Gauge snaps Go and Not Go 25 to 50mm by 5mm set of 06pcs.	01Set		
122	Gauge pluge single ended 05 to 55 by 5mm set of 11pcs.	01set		
123	Gauge Telescopic up to 150mm	01No.		
124	Radius Gauges (Asorted)	10Nos.		
125	Dial Test Indicator .01mm on stand	01No.		
126	Sine bar 125mm	01No.		
127	Sine bar 250mm	01No.		
128	Lath Tools HSS Tiped set	02 No.		
129	Lath Tools Bit 06mm x 75mm	16Nos.		
130	Lath Tools Bit 07mm x 75mm	16 Nos.		
131	Lath Tools Bit 09mm x 75mm	16 Nos.		
132	Counter Boring and Counter sinking Tool	02Nos.		
133	Arm strong type bit holder RH	02Nos.		
134	Arm strong type bit holder LH	02Nos.		
135	Arm strong type bit holder Straight	02Nos.		

136	Stilson wrenches 25 cm	02Nos.		
137	Water pump plier 250mm	01Nos.		
138	Pipe Cutter 06mm to 50mm wheel Type	01Nos.		
139	Pipe Bender spool Type up 25mm with stand manually operated.	01Nos.		
140	Adjustable Pipe Chain Tong to Take pips up 300mm	01Nos.		
141	Adjustable Spanner 38 cm long	01		
142	Dial Vernier Caliper 0-200mm LCO.05MM (Universeltype)	01		
143	Vernier Micrometer	01		
144	Screw THREAD Micrometer with Interchangeable 0-25mm	01		
145	Depth Micrometer 0-100mm,0.01mm	01		
146	Vernier Caliper 0-130mmLC 0.02MM	01		
147	Comparators Stand With Dial Indicator LC0.01mm	01		
148	Engineers Try Square (Knife wedge) 150mm Blade.	01Set		
149	Surface Roughness compression plates N1-N12Grade	01		
150	Digital Vernier Caliper 20cm	01		
151	Digital Outside Micrometer 0-25mm	01		
152	Digital Dial Test Indicator	01		

Tools for Forging and sheet metal works.
Where forging and sheet metal Trade does not exist

153	Hammer smith 02 kg with handle	02		
154	Tongs roving 350mm	02		
155	Tongs Flat 350mm	02		
156	Smith Square 45 cm *30cm	01		
157	Cold set rod 25*200cm	02		
158	Hot set rod 25*200cm	01		
159	Swages top and bottom 12mm/19mm	01each		
160	Swage Blocks 35*35*12 cm	01		
161	Flatters (rod 55mm square)	02		
162	Fuller Top and Bottom 6mm,9mm(Pair)	02		
163	Fullering Tool	02		
164	Anvil 50Kg	02		
165	Anvil Stand	02		
166	Shovel	01		
167	Trammel 30cm	02		
168	Rake	01		
169	Quenching Tank(1Qubic made in the Institute)	02		
170	Poker	02		
171	Hardie	02		
172	Lather Apron	02		
173	Prick Punch	02		
174	Mallet	02		
175	Snips Straight 25cm	02		
176	Setting Hammers With handle	02		
177	Planishing Hammer	02		
178	Snip bent 25cm	02		
179	Stake Hatchet	02		

180	Stake Grooving	02		
181	Gauge Imperial Sheet	02		
182	Computer With all accessories	02		
183	Computer Furniture	02		

General Machinery Installations

- 1-Drilling Machine pillar sensitive 0-20mm Cap with swivel table motorised with chuck and key. **01 No.**
- 2-Drilling Machine Bench sensitive 0-12mm Cap with motorised with chuck and key. **02 Nos.**
- 3-Forge portable hand blower 38 cm to 45 cm. **01 No.**
- 4- Grinding Machine(General purpose)D.E Pedestal with 02 cm diameter wheels rough and smooth with twist drill grinding-attachment. **01 No.**
- 5-Lath all geared head stock S.S. and S.C. Height of center over bed 15 cm-gap bed complete with accessories e.g. pump. All fitting and splash gard driving plate with drives, face plate with three jaw and four jaw chucks fixed and traveling study compound turret tool post, taper turning attachment fixed and running centers, driving dogs straight and bent tails. **02 Nos.**
- 6-Shaping Machine **01No.**
- 7- Power Saw Machine..... **01No.**
- 8-Radial Drilling Machine..... **01 No.**
- 9-Slotting Machine..... **01No.**
- 10-Milling Machine **01 No.**
- 11- Surface Grinding Machine..... **01No.**
- 12-Brinell Hardness Tester..... **01No.**

LIST OF ADDITIONAL TOOLS FOR WELDING WORK Where the welding trade does not exit.

S.No.	Name of Tool	Qty
01	Transformer welding set 300Amp-continious welding current with all accessories with electrode holder.	01set
02	Welder cable to carry 400Amp with flexible rubber cover.	50meter
03	Lunges for cable	12Nos.
04	Earth clamp	02Nos.
05	Arc welding Table(All metal top)122cm*12cm*60cm with positioner	01No.
06	Oxy-acetylene gas welding set equipment with hoses regulator and other accessories.	01 set
07	Gas welding Table with positioner	01No.
08	Welding Torch Tips of different sizes.	01set
09	Gas Lighter	06Nos
10	Trolley for gas cylinder	01No.
11	Chipping Hammer	02Nos.
12	Gloves(Leather)	02 Pairs
13	Leather Apron	02 Nos.
14	Spindle Key for cylinder valve	02Nos
15	Welding Torch 5 to 10 nozeels	01set
16	Welding Goggles	04 Pairs.
17	Welding Helmet with coloured glass.	02Nos.
18	Tip Cleaner	06 Set.