WELDING (WELD)

General Information :

1. Name of the Trade : Welding
2. Entry Qualification : Passed class VIII
3. Duration of Training : 06 Months [Under Vocational Short Term Course]

Obiective of the Course :

The objective of the course is to impart necessary competencies focusing on technical skill and knowledge so that they become employable in small scale industry as well as able to be self employed after being trained and obtaining certificate from the Vocational Council.

Welder has significant role in Urban, semi urban and rural areas with respect to Civil, Mechanical, Automobile, Electrical, Agriculture related technology, Set up and maintenance, Manufacture of grills, Gates, Shutters, Pipe joints, Cracks & Leakage repair etc. (both Industrial and Domestic).

Course Break - up :

(a) Practical instruction	: 288 Hours.
(b) Theoretical instruction	: 67 Hours.
(c) Entrepreneurial instruction	: 05 Hours.

Marks allotted :

(a) Practical	: 400
(b) Theory	: 100
Total	: 500

The course content is to be covered in less than 26 weeks since some weeks will be used for enrollment procedures, Leave of the instructors, holidays, examination and tests, industrial visits etc.

Industrial Visit :

Industrial visit to at least one / two Large & Medium established welding farm / shop is essential.

COURSE CURRICULUM
THEORY : (Arc Welding)

	TOPIC	Hours Allotted
I.	Basic Electricity - Current, Voltage, Conductor, Insulator D.C., A.C., Resistance, Ohm's Law, Voltmeter, Ammeter power & heating effect or current.	4 hrs.
2.	Use of Electricity as applied to welding - A.C. - D.C. types of Electric welding and application.	3
3.	Principles of arc welding - necessity of welding machines - types of machines - care and maintenance.	4
4.	Arc - its formation & characteristics - arc length its effect and uses, advantages & dis-advantages. Polarity - types, uses.	4
5.	Principles of arc welding - Use of welding fixture.	3
6.	Arc blow definition, distortion in arc welding, causes & effects, methods of minimizing its effects.	3
7.	Welding symbols - description and use, edge preparation - necessity - types on plate thickness.	4
8.	Electrode - types, size, holder (description with sketch) LS. - 815-1974. Selection	4
9.	Basic joint types - Butt - Flange - Butt (Pieces differing in thickness) Lap, Corner, 'Tee, Slot and Plug Lap, Edge, Strapped, Spot - (Single spot - 3 Work pieces) - Sketches of all - Techniques of welding all the above cases, filet weld.	4
I0	Advantages & disadvantages of Butt joint and Lap joint., Reading of Simple Drawings	2
11.	Tables incorporating - a) Rated current against Plate thickness. b) Size of Electrode against Plate thickness.	2
12.	Sequence of deposition - Single continuous pass - Back step sequence - Teehnique.	3

13.	Single layer, Single pass - Multi layer, Multi pass, Basic patterns of weaving motion of electrode - Illustration with sketches - Weave beads - Normal bead (Stringer) - Zig - Zag motion, Looped motion.	3 hrs.
14.	Tools and Equipments required for Arc Welding - names - types - uses care & maintenance.	2
15.	Welding machine - Generator, Transformer Set, Rectifier - Funtions, Demonstration's on welding set.	5
16.	Safely in welding work & first aid knowledge.	2
17.	Are welding defects - reasons and remedies.	4
18.	Pipe and plate welding - difference - Sample Example.	2
19.	Gas welding - types of fuel gases, Oxy - acetylene welding - types of flames and their uses.	5
20.	Weldability and materials having good welding characteristics.	4
	Total	**67 hrs.**

COURSE CURRICULUM

PRACTICAL :

	TOPIC	Hours Allotted
1.	Training introduction - Recapitulations & Interaction with theory part learned / learning, Machinery used in the trade. Introduction to safety equipment and their uses. Setting up of Arc and Gas apparatus / machineries - Striking on Arc - adjustment of flame.	25
2.	Operating generator, transformer and rectifier.	9
3.	Marking out of M. S. Plate or flat, filing square to dimensions.	9
4.	Edge chipping & cutting, Hack sawing, Drilling.	9
5.	Position F by Arc - Fusion run practice with / without filler rod. Straight line beads on M. S. plates 6/8/10 mm thick:	40
6.	Butt weld square butt joint on M. S. Plate 6 & 8 mm - Position F.Fillet weld Lap joint on M. S. Plate 3 mm position F.	21
7.	Fillet weld Lap joint on M. S. Plate, M. S. Plate 5 mm position F. Butt weld in open squarc butt joint, M. S. Plate 5 mm, Position F. Butt weld single 'Vee' butt joint, M. S. Plate 10 mm position F (E).	21
8.	Fusion run with filler rod on M. S. Plate at par with theory, Fillet weld 'Tee' joint on M. S. Plate 10 mm. position H (E). Butt weld single 'Vee' joint on M. S. Plate 10 mm. position H (E).	15
9.	Fillet weld inside corner joint. M. S. Plate 6-8 mm. position H. Fusion run with filler weld Tee - joint M. S. Plate 10 mm. position 'Vee' (E)	12
10.	Butt weld : Square butt joint. M. S. Plate 6 mm. position H.Fusion run with filler rod on M. S. Plate - 6 mm. position 'V'.	12
11.	Weaved bead on M. S. Plate - 6/8/10 mm. position F (E). Fillet weld open corner joint on M. S. Plate - 6/8/10 mm. position F (E). Fillet Tee joint on M. S. Plate 10 mm. position F (E).	16
12.	Butt weld / Single Vee butt joint - Grooved and fillet - M. S. Plate 10 mm. position upward (E). Straight line beads on M. S. Plate 10 mm. position OH (E) - Tee joint in same manner.	I5
13.	Fillet weld Lap joint. M. S. Plate 6 mm. position 'V'. Tee joint in same manner - 6 mm. plate - Fillet weld out side corner joint. M. S. Plate 6 mm. position 'V' (E).	I5

14. Fillet Lap joint. M. S. Plate 10 mm. position OH (E). Butt weld single 'V' butt joint M. S. Plate 8 mm. position OH (E). 15
15. Fillet taper tray (plate M. S.), Elbow joints, Pipe joint - Tee pipes -equal & unequal pipes. 9
16. Tube or pipe welding fixing position - Their straight & corner joints -in fixed and rotating position. 9
17. Production jobs as per drawing such as furniture items. 15
18. Preparation of utility goods for domestic use by steel wire, preparation of different models with 5 mm. M. S. Rods or wire for common structural items - Grills, Gratings, Gates etc. 21

Total 288 hrs.

[E= Electric Welding, F=Flat, H=Horizontal]

Note :- The Teacher / Instructor / Trainer may arrange the sequence of items of syllabus properly so as to convey the required knowledge to the trainees according to technically represen table and acceptability - both in Theory and Practical.

ENTREPRENEURIAL INSTRUCTION

SL No.	Course Curriculum	Hours
1.	Brief idea on nature of small business management and Industrial Technical skill.	
2.	Preparation of schemes and vetting to Financial Institutions/ Lead Bank for obtaining loans.	
3.	Rules for setting up of business / production Unit.	
4.	Maintenance of Accounts; Labour Capital etc.	
5.	Man Management, Communication, Motivation.	
6.	Operational Management.	
7.	Market Survey.	
8.	Quality Control.	
9.	Visit to Industrial units for gathering idea to start the unit.	
10.	Choice of technology as per demand of local people of the District / State.	
11.	Knowledge of Sales Tax etc.	
12.	Brief idea for Registration of SSI, Trade License, Project Report, Proposal for loans etc.	
		Total 05