Break-up of Syllabus (One time preparation for the Trade)

Name of Institute:- **Name of Trainer:-**

Trade:- **Duration:-** **Batch:-**

Theory				Practical	
Week No.	**Module**	**Lesson No.**	**Description of Lesson**	**Operation /Aim with Exercise no.**	**Remarks**
1	**Importance of trade Training.**	1	General discipline in the Institute. Elementary First Aid. Importance of Welding in Industry. Safety precautions in Shielded Metal Arc welding, and Oxy-Acetylene Welding and Cutting.	1. Demonstration of Machinery used in the trade. (6 hrs.) 2. Identification to safety equipment and their use etc. (4 hrs.) 3. Hack sawing, filing square to dimensions. (7 hrs.) 4. Marking out on MS plate and punching. (8 hrs.)	
2	**OAW-01 & SMAW-01**	2	- Introduction and definition of welding. Arc and Gas Welding Equipments, tools and accessories. Various Welding Processes and its applications. Arc and Gas Welding terms and definitions.	5. Setting of oxy-acetylene welding equipment, Lighting and setting of flame. (2 hrs.) 6. Perform fusion run without filler rod on MS sheet 2mm thick in flat position. (2 hrs.) 7. Setting up of Arc welding machine & accessories and Striking an arc. (2 hrs.) 8. Deposit straight line bead on MS plate in flat position. (2 hrs.)	
3	**OAW-02 & OAW-03**	3	- Different process of metal joining methods: Bolting, riveting, soldering, brazing, seaming etc. Types of welding joints and its applications. Edge preparation and fit up for different thickness. - Surface Cleaning	9. Depositing bead with filler rod on M.S. sheet 2 mm thick in flat position. (10 hrs.) 10. Edge joint on MS sheet 2 mm thick in flat position without filler rod. (15 hrs.)	
4	**SMAW-02 & SMAW-03**	4	- Basic electricity applicable to arc welding and related electrical terms & definitions. Heat and temperature and its terms related to welding Principle of arc welding and characteristics of arc.	11. Straight line beads on M.S. plate 10 mm thick in flat position. (10 hrs.) 12. Weaved bead on M. S plate 10mm thick in flat position. (15 hrs.)	
5	**OAGC-01 & OAGC-02 & OAGC-03 & OAGC-04 & OAGC-05 & OAGC-06**	5	Common gases used for welding & cutting, flame temperatures and uses. Chemistry of oxy-acetylene flames. Types of oxy-acetylene flames and uses. Oxy-acetylene cutting equipments, principle, parameters and applications.	13. Setting up of oxy-acetylene and make straight cuts (freehand) (2 hrs.) 14. Perform marking and straight line cutting of MS plate 10 mm thick by gas. Accuracy within ±2mm. (4 hrs.) 15. Beveling of MS plates 10 mm thick, cutting regular geometrical shapes and irregular shapes, cutting chamfers by gas cutting. (7 hrs.) 16. Circular gas cutting on MS plate 10 mm thick by profile cutting machine. (7 hrs.) 17. Marking and perform radial cuts, cutting out holes using oxyacetylene gas cutting.(3 hrs.) 18. Identify cutting defects viz., distortion, grooved, fluted or ragged cuts; poor draglines; rounded edges; tightly adhering slag. (2 hrs.)	

Trainer **Training Officers** **Principal/Head of Office**

www.prahladsharma.in

Break-up of Syllabus (One time preparation for the Trade)

Name of Institute:- **Name of Trainer:-**

Trade:- **Duration:-** **Batch:-**

6	**OAW-04 & SMAW-04 & OAW-05**	6	- Arc welding power sources: Transformer, Motor Generator set, Rectifier and Inverter type welding machines and its care & maintenance. Advantages and disadvantages of A.C. and D.C. welding machines.	19. Square butt joint on M.S. sheet 2 mm thick in flat Position. (1G) (8 hrs.) 20. Fillet "T" joint on M.S. Plate 10 mm thick in flat position. (1F) (8 hrs.) 21. Open corner joint on MS sheet 2 mm thick in flat Position (1F) (9 hrs.)	
7	**SMAW-05 & OAW-06 & SMAW-06**	7	Welding positions as per EN &ASME: flat, horizontal, vertical and over head position. Weld slope and rotation. Welding symbols as per BIS& AWS	22. Fillet lap joint on M.S. plate 10 mm thick in flat position. (1F) (8 hrs.) 23. Fillet "T" joint on MS sheet 2 mm thick in flat position. (1F) (8 hrs.) 24. Open Corner joint on MS plate 10 mm thick in flat position. (1F) (9 hrs.)	
8	**OAW-07 & SMAW-07 & I&T-01**	8	- Arc length – types – effects of arc length. Polarity: Types and applications. Weld quality inspection, common welding mistakes and appearance of good and defective welds. Weld gauges & its uses.	25. Fillet Lap joint on MS sheet 2 mm thick in flat position. (1F) (10 hrs.) 26. Single "V" Butt joint on MS plate 12 mm thick in flat position (1G) . (13 hrs.) 27. Testing of weld joints by visual inspection. (1 hrs.) 28. Inspection of welds by using weld gauges. (1 hrs.)	
9	**OAW-08 & SMAW-08 & SMAW-09**	9	- Calcium carbide properties and uses. Acetylene gas properties and generating methods. Acetylene gas Purifier, Hydraulic back pressure valve and Flash back arrestor.	29. Square Butt joint on M.S. sheet. 2 mm thick in Horizontal position. (2G) (10 hrs.) 30. Straight line beads and multi layer practice on M.S. Plate 10 mm thick in Horizontal position. (6 hrs.) 31. Fillet " T" joint on M.S. plate 10 mm thick in Horizontal position. (2F) (9 hrs.)	
10	**OAW-09 & SMAW-10**	10	- Oxygen gas and its properties Production of oxygen by Air liquefaction. Charging process of oxygen and acetylene gases Oxygen and Dissolved Acetylene gas cylinders and Color coding for different gas cylinders. - Gas regulators, types and uses.	32. Fillet Lap joint on M.S. sheet 2 mm thick in horizontal position .(2F) (12 hrs.) 33. Fillet Lap joint on M.S. plate 10 mm thick in horizontal position . (13 hrs.) (2F)	
11	**OAW-10 & OAW-11 & SMAW-11**	11	- Oxy acetylene gas welding Systems (Low pressure and High pressure).Difference between gas welding blow pipe (LP &HP) and gas cutting blow pipe Gas welding techniques. Rightward and Leftward Techniques.	34. Fusion run with filler rod in vertical position on 2mm thick M.S sheet. (8hrs.) 35. Square Butt joint on M.S. sheet. 2 mm thick in vertical position (3G) (8 hrs.) 36. Single Vee Butt joint on M.S. plate 12 mm thick in horizontal position (2G). (9 hrs.)	

Trainer **Training Officers** **Principal/Head of Office**

www.pankajsharma.in

Break-up of Syllabus (One time preparation for the Trade)

Name of Institute:- **Name of Trainer:-**

Trade:- **Duration:-** **Batch:-**

12	**OAW-12 & SMAW-12 & SMAW-13**	12	- Arc blow – causes and methods of controlling. Distortion in arc & gas welding and methods employed to minimize distortion Arc Welding defects, causes and Remedies.	37. Weaved bead on M.S Plate 10mm in vertical position. (8 hrs.) 38. Fillet "T" joint on M.S sheet 2 mm thick in vertical position. (3F) (8 hrs.) 39. Fillet "T" joint on M.S. plate 10 mm thick in vertical position. (3F) (9 hrs.)	
13	**OAW-13 & SMAW-14**	13	Specification of pipes, various types of pipe joints, pipe welding all positions, and procedure. Difference between pipe welding and plate welding.	40. Structural pipe welding butt joint on MS pipe Ø 50 and 3mm WT in 1G position. (15 hrs.) 41. Fillet Lap joint on M.S. Plate 10 mm in vertical position. (3G) (10 hrs.)	
14	**OAW-14 & SMAW-15**	14	Pipe development for Elbow joint, "T" joint, Y joint and branch joint - Manifold system	42. Open Corner joint on MS plate 10 mm thick in vertical position. (2F) (10 hrs.) 43. Pipe welding - Elbow joint on MS pipe Ø 50 and 3mm WT. (1G) (15 hrs.)	
15	**OAW-15 & SMAW-16**	15	Gas welding filler rods, specifications and sizes. Gas welding fluxes – types and functions. Gas Brazing & Soldering : principles, types fluxes & uses Gas welding defects, causes and remedies	44. Pipe welding "T" joint on MS pipe Ø 50 and 3mm WT. (1G) (10 hrs.) 45. Single "V" Butt joint on MS plate12 mm thick in vertical position (3G). (15 hrs.)	
16	**OAW-16 & SMAW-17**	16	- Electrode : types, functions of flux, coating factor, sizes of electrode Coding of electrode as per BIS, AWS, - Effects of moisture pick up. Storage and baking of electrodes. Special purpose electrodes and their applications.	46. Pipe welding 45 ° angle joint on MS pipe Ø 50 and 3mm WT. (1G) (15 hrs.) 47. Straight line beads on M.S. plate 10mm thick in over head position. (10 hrs.)	
17	**SMAW-18 & SMAW-19**	17	Weld ability of metals, importance of pre heating, post heating and maintenance of inter pass temperature.	48. Pipe Flange joint on M.S plate with MS pipe Ø 50 mm X 3mm WT (1F) (15 hrs.) 49. Fillet "T" joint on M.S. plate 10 mm thick in over head position. (4F) (10 hrs.)	
18	**SMAW-20 & SMAW-21**	18	Classification of steel. Welding of low, medium and high carbon steel and alloy steels.	50. Pipe welding butt joint on MS pipe Ø 50 and 5 mm WT. in 1G position. (15 hrs.) 51. Fillet Lap joint on M.S. plate 10 mm thick in over head position. (4G). (10 hrs.)	
19	**SMAW-22 & SMAW-23**	19	Effects of alloying elements on steel Stainless steel types- weld decay and weld ability.	52. Single "V" Butt joint on MS plate 10mm thick in over head position(4G) (15 hrs.) 53. Pipe butt joint on M. S. pipe Ø 50mm WT 6mm (1G Rolled). (10 hrs.)	

Trainer **Training Officers** **Principal/Head of Office**

www.parmodsharma.in

Break-up of Syllabus (One time preparation for the Trade)

Name of Institute:- **Name of Trainer:-**

Trade:- **Duration:-** **Batch:-**

20	**OAW-17 SMAW -24 OAW-18**	**20**	Brass – types – properties and welding methods. - Copper – types – properties and welding methods.	54. Square Butt joint on S.S. sheet. 2 mm thick in flat position. (1G) (8 hrs.) 55. Square Butt joint on S.S. Sheet 2 mm thick in flat position. (1G) (8 hrs.) 56. Square Butt joint on Brass sheet 2 mm thick in flat position. (1G) (9 hrs.)	
21	**OAW-19& SMAW-25 & AG-01**	**21**	Aluminum and its alloys, properties and weld ability, Welding methods Arc cutting & gouging	57. Square Butt & Lap joint on M.S. sheet 2 mm thick by brazing in flat position. (11 hrs.) 58. Single "V" butt joint C.I. plate 6mm thick in flat position. (1G) (11 hrs.) 59. Arc gouging on MS plate 10 mm thick. (3 hrs.)	
22	**OAW-20& OAW-21**	**22**	Cast iron and its properties types. Welding methods of cast iron.	60. Square Butt joint on Aluminum sheet. 3 mm thick in flat position. (12 hrs.) 61. Bronze welding of cast iron (Single "V" butt joint) 6mm thick plate (1G). (13 hrs.)	
23	**IT-02 & IT-03 & IT-04 & IT-05 & IT-06**	23	Types of Inspection methods Classification of destructive and NDT methods Welding economics and Cost estimation.	62. Dye penetrant test. (5 hrs.) 63. Magnetic particle test. (5 hrs.) 64. Nick- break test. (5 hrs.) 65. Free bend test. (5 hrs.) 66. Fillet fracture test. (5 hrs.)	
24	**GMAW-01 & GMAW-02**	24	Safety precautions in Gas Metal Arc Welding and Gas Tungsten Arc welding. Introduction to GMAW - equipment – accessories. Various other names of the process. (MIG/MAG/CO2welding.)	67. Introduction to safety equipment and their use etc. (2 hrs.) 68. Setting up of GMAW welding machine & accessories and striking an arc. (4 hrs.) 69. Depositing straight line beads on M.S Plate. (10 hrs.) 70. Fillet weld – "T" joint on M.S plate 10mm thick in flat position by Dip transfer. (1F) (9 hrs.)	
25	**GMAW-03 & GMAW-04 & GMAW-05**	25	Advantages of GMAW welding over SMAW, limitations and applications. Process variables of GMAW. Modes of metal transfer – dip or short circuiting transfer spray transfer (free flight transfer) and globular transfer (intermittent transfer) and Pulsed metal transfer.	71. Fillet weld – Lap joint on M.S. sheet 3mm thick in flat position by Dip transfer. (1F) (8 hrs.) 72. Fillet weld – "T" joint on M.S. sheet 3mm thick in flat position by Dip transfer. (1F) (8 hrs.) 73. Fillet weld – corner joint on M.S. sheet 3mm thick in flat position by Dip transfer. (1F) (9 hrs.)	
26	**GMAW-06 & GMAW-07**	26	Wire feed system –types –care and maintenance. Welding wires used in GMAW, standard diameter and Codification as per AWS.	74. Butt weld – Square butt joint on M.S sheet 3mm thick in flat position (1G) (10 hrs.) 75. Butt weld – Single "V" butt joint on M.S plate 10 mm thick by Dip transfer in flat position. (1G) (15 hrs.)	
27	**GMAW-08 & GMAW-09**	27	Types of shielding gases and gas mixtures used in GMAW and its applications. Flux cored arc welding – description, advantage, welding wires, coding as per AWS.	76. Fillet weld – "T" joint on M.S plate 10mm thick in Horizontal position by Dip transfer. (2F) (10 hrs.) 77. Fillet weld – corner joint on M.S plate 10mm thick in Horizontal position by Dip transfer. (2F) (15 hrs.)	

Trainer **Training Officers** **Principal/Head of Office**

www.pahadisharma.in

Break-up of Syllabus (One time preparation for the Trade)

Name of Institute:- **Name of Trainer:-**

Trade:- **Duration:-** **Batch:-**

28	**GMAW-10 & GMAW-11**	28	Edge preparation of various thicknesses of metals for GMAW. GMAW defects, causes and remedies	78. Fillet weld – "T" joint on M.S. sheet 3mm thick in Horizontal position by Dip transfer. (2F) (10 hrs.) 79. Fillet weld – corner joint on M.S. sheet 3mm thick in Horizontal position by Dip transfer. (2F) (15 hrs.)	
29	**GMAW-12 & GMAW-13**	29	Heat input and techniques of controlling heat input during welding. Heat distribution and effect of faster cooling.	80. Fillet weld – "T" joint on M.S plate 10mm thick in vertical position by Dip transfer. (3F) (10 hrs.) 81. Fillet weld – corner joint on M.S plate 10mm thick in vertical position by dip transfer. (3F) (15 hrs.)	
30	**GMAW-14 & GMAW-15**	30	Pre heating & Post Weld Heat Treatment. Use of temperature indicating crayons.	82. Fillet weld – Lap joint on M.S. sheet 3mm thick in vertical position by Dip transfer. (3F) (10 hrs.) 83. Fillet weld – corner joint on M.S. sheet 3mm thick in vertical position by Dip transfer. (3F) (15 hrs.)	
31	**GMAW-16 & GMAW-17**	31	Submerged arc welding process – principles, equipment, advantages and limitations Electro slag and Electro gas welding processes–principles, equipments, advantages and limitations.	84. Fillet weld – Lap and "T" joint on M.S sheet 3mm thick inover head position by Dip transfer. (4F) (25 hrs.) 85. Tee Joints on MS Pipe Ø 60 mm OD x 3 mm WT 1G position – Arc constant (Rolling) (25 hrs.)	
32	**GMAW-18 & GMAW-19**	32	Thermit welding process- types, principles, equipments, Thermit mixture types and applications. process- types Use of backing strips and backing bars	86. Depositing bead on S.S sheet in flat position. (10 hrs.) 87. Butt joint on Stainless steel 2 mm thick sheet in flat position by Dip transfer. (15 hrs.)	
33	**GTAW-01 & GTAW-02**	33	GTAW process brief description. Difference between AC and DC welding, equipments, polarities and applications. Various other names of the process (TIG, Argnoarc) Power sources for GTAW – AC &DC	88. Depositing bead on Aluminum sheet 2 mm thick in flat position. (10 hrs.) 89. Square butt joint on Aluminum sheet 1.6mm thick in flat position. (15 hrs.)	
34	**GTAW-03 & GTAW-04**	34	Tungsten electrodes – types & uses, sizes and preparation GTAW Torches- types, parts and their functions GTAW filler rods and selection criteria.	90. Fillet weld – "T" joint on Aluminum sheet 1.6 mm thick in flat position. (1F) (10 hrs.) 91. Fillet weld – Outside corner joint on Aluminum sheet 2 mm thick in flat position. (1F) (15 hrs.)	

Trainer **Training Officers** **Principal/Head of Office**

www.parmodsharma.in

Break-up of Syllabus (One time preparation for the Trade)

Name of Institute:- **Name of Trainer:-**

Trade:- **Duration:-** **Batch:-**

35	**GTAW-05**	35	Edge preparation and fit up. GTAW parameters for welding of different thickness of metals - Pulsed TIG welding brief description, pulse parameters slope up and slope down.	92. Butt weld - Square butt joint on Stainless steel sheet 1.6 mm thick in flat position with purging gas (1G) (25 hrs.)	
36	**GTAW-06**	36	Argon/Helium gas properties – uses. GTAW Defects causes and remedy.	93. Fillet weld – "T" joint on Stainless steel sheet 1.6 mm thick in flat position. (1F) (25 hrs.)	
37	**GTAW-07**	37	Friction welding process- equipment and application welding(EBW) Laser beam welding (LBW)and Electron beam	94. Pipe butt joint on Aluminum pipe Ø 50 mm x 3 mm WT in Flat position. (1G) (25 hrs.)	
38	**GTAW-08 & PAC-01**	38	Plasma Arc Welding (PAW) and cutting (PAC) process– equipments and principles of operation. Types of Plasma arc , advantages and applications.	95. "T" Joints on MS Pipe Ø 50 mm OD x 3 mm WT, position – Flat (1F) (15 hrs.) 96. Straight cutting on ferrous and non ferrous (10 hrs.)	
39	**RW-01 & RW-02**	39	Resistance welding process -types, principles, power sources and welding parameters. Applications and limitation.	97. Lap joint on Stainless steel sheet by Resistance Spot welding (10 hrs.) 98. MS sheets joining by Resistance Spot welding (15 hrs.)	
40	**OAW-01 & OAW-02**	40	Metalizing –types of metalizing principles, equipments, advantages and applications Manual Oxy – acetylene powder coating process-principles of operation and its applications	99. Square butt joint on Copper sheet 2mm thick in flat position. (1G) (15 hrs.) 100. "T" joint on Copper to MS sheet 2mm thick in flat position by Brazing (1F) (10 hrs.)	
41	**OAW-03 & OAW-04**	41	Welding codes and standards Reading of assembly drawing. Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR)	101. Silver brazing on S.S Sheet with copper sheet "T" joint. (10 hrs.) 102. Silver brazing on copper tube to tube. (15 hrs.)	
42	**OAW-05 & SMAW-01 & SMAW-02**	42	Hard facing/ surfacing necessity, surface preparation, various hard facing alloys and advantages of hard facing.	103. Repair welding of broken C.I. machine parts by oxy-acetylene welding with C.I and bronze filler rod. (10 hrs.) 104. Repair welding of broken C.I machine parts by C.I. electrode. (8 hrs.) 105. Hard surfacing practice on M.S round rod Ø 25 mm by using Hard facing electrode in flat position. (7 hrs.)	

Trainer **Training Officers** **Principal/Head of Office**

www.barmansharma.in