Model Curriculum

QP Name: WELDER, V2

QP Code:STC CGM/2022/0701,V2

QP Version: 2.0

NSQF Level: 3

Model Curriculum Version: 2.0

West Bengal State Council of Technical & Vocational Education and Skill Development, KarigariBhavan, (5th Floor), Plot-B/7, Action Area-III, New Town, Kolkata-700160

Table of Contents

Training Parameters

Sector	Capital Goods
Sub-Sector	Welding
Occupation	Welder
Country	India
NSQF Level	3
Aligned to NCO/ISCO/ISIC Code	
Minimum Educational Qualification and Experience	1. Class 8 pass and pursuing continuous regular schooling, OR 2. Class 8 Pass with 1 year experience, OR 3. Class 8 Pass + ITI, OR 4. Class 10 Pass OR 5. Previous relevant qualification of NSQF Level 2 with 1 yr experience
Pre-Requisite License or Training	
Minimum Job Entry Age	18 Years
Last Reviewed On	
Next Review Date	
Version	2.0
NSQC Approval Date	
Model Curriculum Creation Date	
Model Curriculum Valid UptoDate	
Model Curriculum Version	2.0

Minimum Duration of the Course	390 hours
Maximum Duration of the Course	390 hours

Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

At the end of the program, the participants will be able to:

- Apply Safe Working Practices
- Recognize the application of electricity in welding
- Illustrate the formation of arc and principle of arc welding
- Demonstrate different types of electrodes, their symbols, welding symbols, edge preparation
- Demonstrate different types of weld joins with neat and appropriate sketch.
- Perform arc welding in different joint of two plates having different thicknesses
- Set up gas welding plant and Perform gas welding following safety precautions
- Recognize various defect of welding for plates and pipes. .
- OJT.

Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
CGM/0701/OC1 Apply Safe Working Practices **NOS Version No.: 2.0** **NSQF Level: 3**	**10:00 Hours**	**20:00 Hours**	**00:00Hours**	**00:00Hours**	**30:00 Hours**
Module1: Apply Safe Working Practices	10:00 Hours	20:00 Hours	00:00Hours	00:00Hours	30:00 Hours
CGM/0701/OC2 **Recognize the application of electricity in welding** **NOS Version No. :2.0** **NSQF Level:3**	**10:00 Hours**	**20:00 Hours**	**00:00Hours**	**00:00Hours**	**30:00 Hours**
Module2: Recognize the application of electricity in welding	10:00 Hours	20:00 Hours	00:00Hours	00:00Hours	30:00 Hours

CGM/0701/OC3 Illustrate the formation of arc and principle of arc welding NOS Version No.:2.0 NSQF Level: 3	**10:00 Hours**	**20:00 Hours**	**00:00Hours**	**00:00Hours**	**30:00 Hours**
Module3: Illustrate the formation of arc and principle of arc welding	10:00 Hours	20:00 Hours	00:00Hours	00:00Hours	30:00 Hours
CGM/0701/OC4 Demonstrate different types of electrodes, their symbols, welding symbols, edge preparation NOS Version No.:2.0 NSQF Level:3	**10:00 Hours**	**20:00 Hours**	**00:00Hours**	**00:00Hours**	**30:00 Hours**
Module 4: Demonstrate different types of electrodes, their symbols, welding symbols, edge preparation	10:00 Hours	20:00 Hours	00:00Hours	00:00Hours	30:00 Hours
CGM/0701/OC5 Demonstrate different types of weld joins with neat and appropriate sketch NOS Version No.:2.0 NSQF Level: 3	**10:00 Hours**	**20:00 Hours**	**00:00Hours**	**00:00Hours**	**30:00 Hours**
Module 5: Demonstrate different types of weld joins with neat and appropriate sketch	10:00 Hours	20:00 Hours	00:00Hours	00:00Hours	30:00 Hours
CGM/0701/OC6 Perform arc welding in different joint of two plates having different thicknesses NOS Version No.: 2.0 NSQF Level: 3	**10:00 Hours**	**20:00 Hours**	**00:00Hours**	**00:00Hours**	**30:00 Hours**
Module 6: Perform arc welding in different joint of two plates having different thicknesses	10:00 Hours	20:00 Hours	00:00Hours	00:00Hours	30:00 Hours

CGM/0701/OC7 Set up gas welding plant and Perform gas welding following safety precautions NOS Version No.:2.0 NSQF Level: 3	**20:00 Hours**	**40:00 Hours**	**00:00Hours**	**00:00Hours**	**60:00 Hours**
Module 7: Set up gas welding plant and Perform gas welding following safety precautions	20:00 Hours	40:00 Hours	00:00Hours	00:00Hours	60:00 Hours
CGM/0701/OC8 Recognize various defect of welding for plates and pipes. NOS Version No.: 2.0 NSQF Level: 3	**10:00 Hours**	**20:00 Hours**	**00:00Hours**	**00:00Hours**	**30:00 Hours**
Module 8:Recognize various defect of welding for plates and pipes.	10:00 Hours	20:00 Hours	00:00Hours	00:00Hours	30:00 Hours
CGM/0701/OC9 Work in real job situation with special emphasis on basic safety and hazards in this domain. NOS Version No.: 2.0 NSQF Level: 3	**00:00 Hours**	**00:00 Hours**	**60:00Hours**	**00:00Hours**	**60:00 Hours**
Module 9: OJT.	00:00 Hours	00.00 Hours	60:00Hours	00:00Hours	60:00 Hours
DGT/VSQ/N0102Employability Skills NOS Version No.: 1.0 NSQF Level: 3	**60:00 Hours**	**00:00 Hours**	**00:00Hours**	**00:00Hours**	**60:00 Hours**
Module 10: Employability Skills	60:00 Hours	00:00 Hours	00:00Hours	00:00Hours	60:00 Hours
Total Duration	**150:00 Hours**	**180:00 Hours**	**60:00Hours**	**00:00Hours**	**390:00 Hours**

Module Details

Module1: Apply Safe Working Practices

Mapped to CGM/0701/OC1

Terminal Outcomes:

- Apply and maintain Safe Working Practices
- Recognize any unsafe situations according to site policy.
- Identify fire and safety and fire hazards
- Identify different fire extinguishers and use them as per requirements.

Duration: *10:00*	**Duration**: *20:00*
Theory–Key Learning Outcomes	**Practical–Key Learning Outcomes**
• Maintain procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements according to site policy. • Recognize any unsafe situations according to site policy, and assess his report accordingly. • Identify and take necessary precautions on fire and safety hazards and report according to site policy and procedures.	• Recognize any unsafe situations according to site policy, and assess his report accordingly. • Demonstrate Personal Productive Equipment (PPE) like: safety helmet, safety glove, and safety shoe, use the same as per related working environment. • Demonstrate basic first aid & CPR and use them under different circumstances. • Identify different fire extinguishers and use the same as per requirement in a mock drill.
Classroom Aids: Computer, Projection Equipment, Power Point Presentation and software, Facilitator's Guide, Participant's Handbook.	
Tools, Equipment and Other Requirements: First Aid box, Different types of fire extinguishers, PPE kits, Safety charts.	

Module2: Recognize the application of electricity in welding

Mapped to CGM/0701/OC2

Terminal Outcomes:

- Identify different basic terms used in electricity.
- Identify and demonstrate the various use of ammeter and voltmeter.
- Demonstrate the use of electricity as applied to both AC and DC welding machine
- Demonstrate the types of electric welding.
- Identify the parts of electric welding machine and narrate its functions.

Duration: *10:00*	**Duration**: *20:00*
Theory–Key Learning Outcomes	**Practical–Key Learning Outcomes**
• Describe basic Electricity - Current, Voltage, Conductor, Insulator D.C., A.C., Resistance, Ohm's Law, Voltmeter, Ammeter power & heating effect or current. • Explain use of Electricity as applied to welding - A.C. - D.C. types of Electric welding and application.	• Demonstrate Ohm's Law, • Identify the different electrical instruments used. • Demonstrate the uses of Electricity as applied to welding - A.C. - D.C. types of Electric welding and application.
Classroom Aids:	
Computer, Projection Equipment, Power Point Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Electrode holder,H.P. Welding torch, CO2 Gas pressure regulator, Argon Gas pressure regulator, Ammeter, Welding Transformer (or) Inverter based welding machine, D.C Arc welding rectifiers set with all accessories	

Module 3: Illustrate the formation of arc and principle of arc welding

Mapped to CGM/0701/OC3

Terminal Outcomes:

- Demonstrate the principles of arc, characteristic of arc, effect of arc length.
- Illustrate the effect of polarity on arc and their use.
- Identify the defects such as arc blow, distortion in welding caused by arc along with the method of minimizing its effect.
- Demonstrate the arc formation
- Describe the application of welding fixture.

Duration:10:00	Duration:20:00
Theory–Key Learning Outcomes	**Practical–Key Learning Outcomes**
• Describe the principles of arc welding - necessity of welding machines types of machines - care and maintenance. • Identify Arc - its formation & characteristics - arc length its effect and uses, advantages & dis-advantages. Polarity-types, uses. • Explain principles of arc welding - Use of welding fixture. Arc blow definition, distortion in arc welding, causes &effects, methods of minimizing its effects.	• Set the Arc and Gas apparatus / machineries – Striking on Arc - adjustment of flame. • Operating generator, transformer and rectifier. • Marking out of M. S. Plate or flat, filing square to dimensions. • Edge chipping & cutting, Hack sawing, drilling.
Classroom Aids:	
Computer, Projection Equipment, Power Point Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Welding Transformer (or) Inverter based welding machine. D.C Arc welding rectifiers set with all accessories. GMAW welding machine, Auto Darkening Welding Helmet, Pedestal grinder fitted with coarse and medium grain size grinding wheels, Bench grinder fitted with fine grain size silicon carbide green grinding wheel, Suitable gas welding table, Suitable Arc welding table Trolley for cylinder (H.P. Unit), Hand shearing machine capacity Oven, electrode drying Work bench, Oxygen, Acetylene Cylinders, CO2 cylinder, Argon gas cylinder	

Module 4: Demonstrate different types of electrodes, their symbols, welding Symbols, edge preparation

Mapped to CGM/0701/OC4

Terminal Outcomes:

- Identify different electrodes along with their symbols
- Demonstrate the reason of edge preparation required in different welding joint
- Select amount of edge preparation in accordance with plate thickness with the help of Table.
- Select size of electrodes in accordance with plate thickness with the help of Table.
- Select rated current against different plate thickness with the help of Table.
- Identify and select electrode holder according to LS-815-1974.

Duration: *10:00*	**Duration**: *20:00*
Theory–Key Learning Outcomes	**Practical–Key Learning Outcomes**
• Demonstrate different types of Welding symbols - description and use, edge preparation-necessity - types on plate thickness. • Identify of Electrode - types, size, holder (description with sketch) LS. - 815-1974. Selection	• Identify different electrodes along with their symbols • Demonstrate the reason of edge preparation required in different welding joint • Select amount of edge reparation in accordance with plate thickness with the help of Table.
Classroom Aids:	
Computer, Projection Equipment, Power Point Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Spindle key, Screw Driver, Number punch, Letter punch, Earth clamp, Spanner D.E. C-Clamps, Hammer sledge, S.S tape, Electrode holder, H.P. Welding torch, CO2 Gas pressure regulator, Argon Gas pressure regulator, GMAW welding machine, Auto Darkening Welding Helmet, Pedestal grinder fitted with coarse and medium grain size grinding wheels, Bench grinder fitted with fine grain size silicon carbide green grinding wheel, Suitable gas welding table, Suitable Arc welding table Trolley for cylinder (H.P. Unit), Hand shearing machine capacity Oven, electrode drying Work bench, Oxygen, Acetylene Cylinders, CO2 cylinder, Argon gas cylinder	

Module 5: Demonstrate different types of weld joins with neat and appropriate sketch.

Mapped to CGM/0701/OC5

Terminal Outcomes:

- Demonstrate different types of weld joint such as lap, flange, butt, corner, Tee, plug lap, strapped joints with neat and appropriate sketches..
- Illustrate butt joint for various thickness of joining plate.
- Demonstrate the Spot welding process used for single spot on three work pieces with help of neat sketch.
- Describe fillet weld joint
- Demonstrate the technique for weaving motion of electrode.
- Describe the necessity of single pass and multi pass deposition of electrode
- Describe the use of different types of electrode motion and the corresponding weld bead with neat sketch.

Duration: *10:00*	**Duration**: *20:00*
Theory–Key Learning Outcomes	**Practical–Key Learning Outcomes**
• Describe 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. • Explain advantages & disadvantages of Butt joint and Lap joint., Reading of Simple Drawings	• Illustrate butt joint for various thickness of joining plate. • Demonstrate the Spot welding process used for single spot on three work pieces with help of neat sketch. • Describe fillet weld joint • Demonstrate the technique for weaving motion of electrode. • Describe the necessity of single pass and multi pass deposition of electrode
Classroom Aids:	
Computer, Projection Equipment, Power Point Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Spindle key, Screw Driver, Number punch, Letter punch, Earth clamp, Spanner D.E. C-Clamps, Hammer sledge, S.S tape, Electrode holder, H.P. Welding torch, CO2 Gas pressure regulator, Argon Gas pressure regulator, GMAW welding machine, Auto Darkening Welding Helmet, Pedestal grinder fitted with coarse and medium grain size grinding wheels, Bench grinder fitted with fine grain sizesilicon carbide green grinding wheel, Suitable gas welding table, Suitable Arc welding table. Trolley for cylinder (H.P. Unit), Hand shearing machine capacity Oven, electrode drying Work bench, Oxygen, Acetylene Cylinders, CO2 cylinder, Argon gas cylinder	

Module 6: Perform arc welding in different joint of two plates having different thicknesses

Mapped to CGM/0701/OC6

Terminal Outcomes:

- Demonstrate different types of equipment used for arc welding process with neat sketches.
- Identify the operations of the equipment used for arc welding.
- Describe different welding position such as horizontal (H) , flat(F) and overhead (OD).
- Set up the machine for the operation.
- Perform arc welding to prepare F position bead on 8/6 mm MS plate
- Perform arc welding to prepare different joint in the plates by preparing normal bead
- Perform Fillet joint by arc welding
- Perform weaved bead on plates having different thicknesses.

Duration: *10:00*	**Duration**: *20:00*
Theory–Key Learning Outcomes	**Practical–Key Learning Outcomes**
The student will able to describe the following:- • Electrode - types, size, holder (description with sketch) LS. - 815-1974. • Selection 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.	The students will be able to do the following activities: • Position F by Arc - Fusion run practice with / without filler rod. Straight line beads on M. S. plates 6/8/10 mm thick: 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.Fillet weld Lap joint on M. S. Plate, M. S. Plate 5 mm position F. Butt weld in open square butt joint, M. S. Plate 5 mm, Position. F. Butt weld single 'Vee' butt joint, M. S. Plate 10 mm position F (E). • 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). 'Vee' joint on M. S. Plate 10 mm. position H (E). 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)

	• 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'. 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). Butt weld / Single Vee butt joint - Grooved and fillet -M. S. Plate .mm. position upward (E). Straight line beads on M. S. Plate 10 mm.position OH (E) - Tee joint in same manner. 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). 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).
Classroom Aids:	
Computer, Projection Equipment, Power Point Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	

Spindle key, Screw Driver, Number punch, Letter punch, Earth clamp, Spanner D.E. C-Clamps, Hammer sledge, S.S tape, Electrode holder, H.P. Welding torch, CO2 Gas pressure regulator, Argon Gas pressure regulator, GMAW welding machine, Auto Darkening Welding Helmet, Pedestal grinder fitted with coarse and medium grain size grinding wheels, Bench grinder fitted with fine grain sizesilicon carbide green grinding wheel, Suitable gas welding table, Suitable Arc welding table.

Trolley for cylinder (H.P. Unit), Hand shearing machine capacity Oven, electrode drying Work bench, Oxygen, Acetylene Cylinders, CO2 cylinder, Argon gas cylinder

Module 7: Set up gas welding plant and Perform gas welding following safety precautions

Mapped to CGM/0701/OC7

Terminal Outcomes:

- Demonstrate principles of gas welding with the help of neat sketch
- Describe different components needed in gas welding along with their uses.
- Plan and select the nozzle size, flame, working pressure and filler rod.
- Demonstrate different types of flames used in gas welding, their characteristics and their use with the help of neat sketch.
- Perform normal bead on MS plate by gas welding
- Perform different joint with/without use of filler material by gas welding
- Carryout the visual inspection to ascertain the quality weld joint.

Duration: *20:00*	**Duration**: *40:00*
Theory–Key Learning Outcomes	**Practical–Key Learning Outcomes**
• Demonstrate principles of gas welding with the help of neat sketch • Describe different components needed in gas welding along with their uses. • Plan and select the nozzle size, flame, working pressure and filler rod. Gas welding - types of fuel gases, Oxy - acetylene welding - types of flames and their uses. • Weldability and materials having good welding characteristics.	• Describe different components needed in gas welding along with their uses. • Plan and select the nozzle size, flame, working pressure and filler rod. • Demonstrate different types of flames used in gas welding, their characteristics and their use with the help of neat sketch. • Perform normal bead on MS plate by gas welding • Perform different joint with/without use of filler material by gas welding • Carryout the visual inspection to ascertain the quality weld joint.
Classroom Aids:	
Computer,ProjectionEquipment,Power Point Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	

Spindle key, Screw Driver, Number punch, Letter punch, Earth clamp, Spanner D.E. C-Clamps, Hammer sledge, S.S tape, Electrode holder, H.P. Welding torch, CO2 Gas pressure regulator, Argon Gas pressure regulator, GMAW welding machine, Auto Darkening Welding Helmet, Pedestal grinder fitted with coarse and medium grain size grinding wheels, Bench grinder fitted with fine grain size silicon carbide green grinding wheel, Suitable gas welding table, Suitable Arc welding table Trolley for cylinder (H.P. Unit), Hand shearing machine capacity Oven, electrode drying Work bench, Oxygen, Acetylene Cylinders, CO2 cylinder, Argon gas cylinder

Module 8: Recognize various defect of welding for plates and pipes. .

Mapped to CGM/0701/OC8

Terminal Outcomes:

- Identify the common defects occur during welding with help of neat sketches.
- Analyze the defects and identify the cause
- Demonstrate some methods to minimize the defects caused during welding.

Duration: *10:00*	**Duration**: *20:00*
Theory–Key Learning Outcomes	**Practical–Key Learning Outcomes**
• Describe the arc welding defects - reasons and remedies. • Analyze the defects • Identify the cause of defects	• Identify the common defects occur during welding with help of neat sketches. • Analyze the defects and identify the cause • Demonstrate the methods to minimize the defects caused during welding.
Classroom Aids:	
Computer,ProjectionEquipment,Power Point Presentation and software, Facilitator's Guide, Participant's Handbook	
Tools, Equipment and Other Requirements	
Spindle key, Screw Driver, Number punch, Letter punch, Earth clamp, Spanner D.E. C-Clamps, Hammer sledge, S.S tape, Electrode holder, H.P. Welding torch, CO2 Gas pressure regulator, Argon Gas pressure regulator, GMAW welding machine, Auto Darkening Welding Helmet, Pedestal grinder fitted with coarse and medium grain size grinding wheels, Bench grinder fitted with fine grain size silicon carbide green grinding wheel, Suitable gas welding table, Suitable Arc welding table Trolley for cylinder (H.P. Unit), Hand shearing machine capacity Oven, electrode drying Work bench, Oxygen, Acetylene Cylinders, CO2 cylinder, Argon gas cylinder	

Module 9: OJT

Mapped to CGM/0701/OC9

Terminal Outcomes:

Assessor will check report prepared for this component of training of the course and assess whether competency has been developed to work in the real job situation with special emphasis on basic safety and hazards in this domain. (The trainee is expected to undertake work in actual workplace under any supervisor / contractor for 150 Hours.)

Duration:*00:00*	**Duration**: *60:00*
Theory–Key Learning Outcomes	**Practical–Key Learning Outcomes**
	• Production jobs as per drawing such as furniture items. • Preparation of utility goods for domestic use by steel wire, preparation of different models with 5mm. M.S. Rods or wire for common structural items - grills, Gratings, Gates etc. • Assessor will check report prepared for this component of training of the course and assess whether competency has been developed to work in the real job situation with special emphasis on basic safety and hazards in this domain. (The trainee is expected to undertake work in actual workplace under any supervisor / contractor for 150 Hours.)
Classroom Aids:	

Module10: Employability skills

MappedtoDGT/VSQ/N0102,v1.0

Employability skills

Terminal Outcomes:

1. Demonstrate a comprehensive knowledge of constitutional values and apply them in their actions, decisions, and interactions, thereby upholding the principles of the constitution.
2. Develop proficiency in basic English skills, including reading, writing, listening, and speaking, enabling effective communication in everyday situations.
3. Exhibit proficiency in basic communication skills, including active listening, effective verbal and nonverbal communication, and clarity in expressing ideas, fostering successful interpersonal interactions.
4. Explain financial and legal literacy, including understanding key financial concepts, making informed financial decisions, and navigating legal frameworks related to personal and business finances.
5. Interpret digital tools and technologies, navigating online platforms, and practicing safe and responsible digital behavior.

• Discuss the importance of Employability Skills in meeting the job requirements. Explain constitutional values, civic rights, duties, citizenship, responsibility towards society etc. that are required to be followed to become a responsible citizen. Discuss 21st century skills such as Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life. • Use basic English for everyday conversation in different contexts, in person and over the telephone. Read and understand routine information, notes, instructions, mails, letters etc. written in English. Write short messages, notes, letters, e-mails etc. in English. • Demonstrate how to communicate in a well -mannered way with others. Apply verbal and non-verbal communication etiquette and active listening techniques in various settings. Demonstrate working with others in a team • Show how to conduct oneself appropriately with all genders and PwD. • Select financial institutions, products and services as per requirement. Carry out offline and online financial transactions, safely and securely. identify common components of salary and compute income, expenses, taxes, investments etc. • Show how to operate digital devices and use the associated applications and features, safely and securely.	

Use e-mail and social media platforms and virtual collaboration tools to work effectively. Use the features of word processor, spreadsheets and presentations. Create a biodata. • Identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research. Identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity • Identify different types of customers. Identify and respond to customer requests and needs in a professional manner
Classroom Aids:
Computer, Projection Equipment, Power Point Presentation and software, Facilitator's Guide, Participant's Handbook

Details Syllabus Content

Theory Syllabus: 90 Hours

	Topic
1.	Basic Electricity - Current, Voltage, Conductor, Insulator D.C., A.C., Resistance, Ohm's Law, Voltmeter, Ammeter power & heating effect or current.
2.	Use of Electricity as applied to welding - A.C. - D.C. types of Electric welding and application.
3.	Principles of arc welding - necessity of welding machines types of machines - care and maintenance.
4.	Arc - its formation & characteristics - arc length its effect and uses, advantages & dis-advantages. Polarity-types, uses.
5.	Principles of arc welding - Use of welding fixture.
6.	Arc blow definition, distortion in arc welding, causes & effects, methods of minimizing its effects.
7.	Welding symbols - description and use, edge preparation-necessity - types on plate thickness.
8.	Electrode - types, size, holder (description with sketch) LS. - 815-1974. Selection
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.
10.	Advantages & disadvantages of Butt joint and Lap joint., Reading of Simple Drawings
11.	Tables incorporating - a) Rated current against Plate thickness. b) Size of Electrode against Plate thickness.
12.	Sequence of deposition - Single continuous pass - Back step sequence - Teehnique.
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.
14.	Tools and Equipments required for Arc Welding - names - types - uses care & maintenance.

15.	Welding machine - Generator, Transformer Set, Rectifier , its functions. Demonstration's on welding set.
16.	Safely in welding work & first aid knowledge.
17.	Are welding defects - reasons and remedies.
18.	Pipe and plate welding - difference - Sample Example.
19.	Gas welding - types of fuel gases, Oxy - acetylene welding - types of flames and their uses.
20.	Weldability and materials having good welding characteristics.

Practical Syllabus: 180 Hours

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.
2. Operating generator, transformer and rectifier.
3. Marking out of M. S. Plate or flat, filing square to dimensions.
4. Edge chipping & cutting, Hack sawing, Drilling.
5. Position F by Arc - Fusion run practice with / without
   filler rod. Straight line beads on M. S. plates 6/8/10 mm thick:
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.
7. Fillet weld Lap joint on M. S. Plate, M. S. Plate 5 mm position F.
   Butt weld in open square butt joint, M. S. Plate 5 mm, Position
   F. Butt weld single 'Vee' butt joint, M. S. Plate 10 mm position F (E).
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 15
   'Vee' joint on M. S. Plate 10 mm. position H (E).
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)
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'.
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). 1

12. Butt weld / Single Vee butt joint -Grooved and fillet -M. S. Plate mm. position upward (E). Straight line beads on M. S. Plate 10 mm. position OH (E) - Tee joint in same manner.
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).
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. Fillet taper tray (plate M. S.), Elbow joints, Pipe joint - Tee pipes -equal & unequal pipes.
16. Tube or pipe welding fixing position - Their straight & corner joints -in fixed and rotating position.
17. Production jobs as per drawing such as furniture items.
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.

Detail of Employability Skills Syllabus: 60 hours

Key Learning Outcomes

Introduction to Employability Skills Duration: 1.5 Hours

After completing this programme, participants will be able to:

1. Discuss the Employability Skills required for jobs in various industries
2. List different learning and employability related GOI and private portals and their usage

Constitutional values - Citizenship Duration: 1.5 Hours

3. Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting others that are required to become a responsible citizen
4. Show how to practice different environmentally sustainable practices.

Becoming a Professional in the 21st Century Duration: 2.5 Hours

5. Discuss importance of relevant 21st century skills.
6. Exhibit 21st century skills like Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life.
7. Describe the benefits of continuous learning.

Basic English Skills Duration: 10 Hours

8. Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone

9. Read and interpret text written in basic English
10. Write a short note/paragraph / letter/e -mail using basic English

Career Development & Goal Setting Duration: 2 Hours

11. Create a career development plan with well-defined short- and long-term goals

Communication Skills Duration: 5 Hours

12. Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette.
13. Explain the importance of active listening for effective communication
14. Discuss the significance of working collaboratively with others in a team

Diversity & Inclusion Duration: 2.5 Hours

15. Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD
16. Discuss the significance of escalating sexual harassment issues as per POSH act.

Financial and Legal Literacy Duration:5 Hours

17. Outline the importance of selecting the right financial institution, product, and service
18. Demonstrate how to carry out offline and online financial transactions, safely and securely
19. List the common components of salary and compute income, expenditure, taxes, investments etc.
20. Discuss the legal rights, laws, and aids

Essential Digital Skills Duration: 10 Hours

21. Describe the role of digital technology in today's life
22. Demonstrate how to operate digital devices and use the associated applications and features, safely and securely
23. Discuss the significance of displaying responsible online behavior while browsing, using various social media platforms, e-mails, etc., safely and securely
24. Create sample word documents, excel sheets and presentations using basic features
25. utilize virtual collaboration tools to work effectively

Entrepreneurship Duration: 7 Hours

26. Explain the types of entrepreneurship and enterprises
27. Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan
28. Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement
29. Create a sample business plan, for the selected business opportunity

Customer Service Duration: 5 Hours

30. Describe the significance of analyzing different types and needs of customers
31. Explain the significance of identifying customer needs and responding to them in a professional manner.
32. Discuss the significance of maintaining hygiene and dressing appropriately

Getting Ready for apprenticeship & Jobs Duration: 8 Hours

33. Create a professional Curriculum Vitae (CV)
34. Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively
35. Discuss the significance of maintaining hygiene and confidence during an interview
36. Perform a mock interview
37. List the steps for searching and registering for apprenticeship opportunities

TRADE: WELDER

LIST OF TOOLS AND EQUIPMENT (For 20 candidates)
A. TRAINEES TOOL KIT (For each additional unit trainees tool kit S no. 1-19 is required additionally)

S No.	Name of the Tools & Equipment	Specification	Quantity
1	Welding helmet fiber		(20+1) nos.
2	Welding hand shield fiber		(20+1) nos.
3	Chipping hammer	with metal handle 250 Grams	(20+1) nos.
4	Chisel cold	flat 19 mm x 150 mm	(20+1) nos.
5	Centre punch	9 mm x 127 mm	(20+1) nos.
6	Dividers	200 mm	(20+1) nos.
7	Stainless steel rule	300mm	(20+1) nos.
8	Scriber	150 mm double point	(20+1) nos.
9	Flat Tongs	350mm long	(20+1) nos.
10	Hack saw frame	fixed 300 mm	(20+1) nos.
11	File half round	bastard 300 mm	(20+1) nos.
12	File flat	350 mm bastard	(20+1) nos.
13	Hammer ball pane	1 kg with handle	(20+1) nos.
14	Tip Cleaner		(20+1) nos.
15	Try square	6”	(20+1) nos.
B. INSTRUMENTS AND GENERAL SHOP OUTFIT - For 2 (1+1) units no additional items are required			
TOOLS & EQUIPMENT			
16	Spindle key		4 Nos.
17	Screw Driver	300mm blade and 250 mm blade	1 each
18	Number punch	6 mm	2 sets
19	Letter punch	6 mm	2 sets
20.	Earth clamp	600A	6 Nos.
21.	Spanner D.E.	6 mm to 32mm	2 sets
22.	C-Clamps	10 cm and 15 cm	2 each
23.	Hammer sledge	double faced 4 kg	1 No.
24.	S.S tape	5 meters flexible in case	1 No.
25.	Electrode holder	600 amps	6 Nos.
26.	H.P. Welding torch	with 5 nozzles	2 sets
27.	CO_2 Gas pressure regulator	with flow meter	2 set
28.	Argon Gas pressure regulator	with flow meter	2 set
29.	Metal rack	182 cm x 152 cm x 45 cm	1 No.

30.	First Aid box		1 No.
31.	Steel lockers	with 8 Pigeon holes	2 Nos.
32.	Steel almirah / cupboard		2 Nos.
33.	Black board and easel with stand		1 No.
34.	Flash back arrester (torch mounted)		4 pairs
35.	Flash back arrester (cylinder mounted)		4 pairs
C. GENERAL SHOP OUTFIT			
36.	Welding Transformer (or) Inverter based welding machine		01 nos.
37.	D.C Arc welding rectifiers set with all accessories		01 nos.
38.	GMAW welding machine		01 nos.
39.	Auto Darkening Welding Helmet		01 nos.
40.	Pedestal grinder fitted with coarse and medium grain size grinding wheels	300 mm dia.	01 nos.
41.	Bench grinder fitted with fine grain size silicon carbide green grinding wheel	150 mm dia.	01 nos.
42.	Suitable gas welding table	with fire bricks	2 Nos.
43.	Suitable Arc welding table	with positioner	4 Nos.
44.	Trolley for cylinder (H.P. Unit)		2 Nos.
45.	Hand shearing machine capacity	cut 6 mm sheets and flats	01 nos.
46.	Oven, electrode drying	0 to 350°C, 10 kg capacity	01 nos.
47.	Work bench	340x120x75 cm with 4 bench vices of 150 mm jaw opening	02 nos.
48.	Oxygen, Acetylene Cylinders		2 each
49.	CO_2 cylinder		1 no.
50.	Argon gas cylinder		1 no.
51.	Fire extinguishers (foam type and CO_2 type)		1. No.
52.	Fire buckets with stand		04 nos.
53.	Oxy Acetylene Gas cutting blow pipe		2 sets
C. CONSUMABLE			
54.	Leather Hand Gloves	14”	20 pairs
55.	Cotton hand Gloves	8”	20 pairs

56.	Leather Apron leather		20 Nos.
57.	S.S Wire brush	5 rows and 3 rows	20Nos. each
58.	Leather hand sleeves	16”	20 pairs
59.	Safety boots for welders		20 pairs
60.	Leg guards leather		20 pairs
61.	Rubber hose clips	½"	20 Nos.
62.	Rubber hose oxygen	8 mm dia X 10 Mtr. Long as per BIS	2 Nos.
63.	Rubber hose acetylene	8 mm dia X 10 Mtr. Long as per BIS	08 nos.
64.	Arc welding cables multi cored copper	400/ 600 amp as per BIS	45 mts. each

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
CTS/ATS	Welder trade	5	-	-	-	-
Diploma	Mechanical Engineering/ Automobile Engineering.	3	-	-	-	-
B. Tech/BE	Mechanical Engineering/ Automobile Engineering.	2	-	-	-	-
ITI	Welder Trade/ Mechanic Motor Vehicle Trade	3	-	-	-	-

Trainer Certification	
Domain Certification	**Platform Certification**

Certified for Job Role: “Welder” mapped to QP: “STC - CGM/NSQF -2018 /801”. OR CGM/2022/0701 Minimum accepted score is 80%.	Recommended that the Trainer is certified for the Job Role: “Trainer”, mapped to the Qualification Pack:“MEP/Q2601”.Minimum accepted score as per MEPSC guidelines is 80%.

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training/Assessment Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
CTS/ATS	Welder trade	5	-	-	-	-
Diploma	Mechanical Engineering/ Automobile Engineering.	3	-	-	-	-
B. Tech/BE	Mechanical Engineering/ Automobile Engineering.	2	-	-	-	-
ITI	Welder Trade/ Mechanic Motor Vehicle Trade	5	-	-	-	-

Assessor Certification	
Domain Certification	**Platform Certification**
Certified for Job Role: "Welder" mapped to QP: "STC - CGM/NSQF -2018 /801". OR CGM/2022/0701 Minimum accepted score is 80%.	Recommended that the Assessor is certified for the Job Role: "Assessor", mapped to the Qualification Pack: "MEP/Q2701". Minimum accepted score as per MEPSC guide lines is 80%.

Assessment Strategy

Assessment will be based on the concept of Independent Assessors empaneled with West Bengal State Council of Technical & Vocational Education & Skill Development (WBSCT&VE&SD), identified, selected, trained and certified on Assessment techniques. These Assessors would be aligned to assess as per the laid down criteria.

WBSCT&VE&SD would conduct assessment only at the training centers or designated testing centers authorized by WBSCT&VE&SD.

Ideally, the assessment will be a continuous process comprising of two distinct steps:

A. Continuous assessment by Trainers
B. Term end /Final Assessment by WBSCT&VE&SD

Each National Occupational Standard (NOS) in the respective QPs will be assigned weightage. Each Performance Criteria in the NOS will be assigned marks for theory and/or practical based on relative importance and criticality of function.

This will facilitate preparation of question bank / paper sets for each of the QPs. Each of these papers sets/question banks created by subject matter experts through WBSCT&VE&SD, especially with regard to the practical test and the defined tolerances, finish, accuracy etc.

The following tools are proposed to be used for final assessment:

i. Written Test: This will comprise of (i) True/False Statements and/or (ii)Multiple Choice Questions and/or (iii) Matching Type Questions. Online system for this will be preferred.
ii. Practical Test: This will comprise a test job to be prepared as per project briefing following appropriate working steps, using necessary tools, equipment and instruments. Through observation it will be possible to ascertain candidate's aptitude, attention to details, quality consciousness etc.
iii. Structured Viva-voce: This tool will be used to assess the conceptual understanding and the behavioral aspects as regards the job role and the specific task at hand.

Marks distribution as per outcome

Course Name	Sr No	Outcome No.	Outcome Name	ThHrs	PrHrs	Total marks Th	Total marks Pr
Welder	1	CGM/0701/OC1	Apply Safe Working Practices	10	20	20	60
	2	CGM/0701/OC2	Recognize the application of electricity in welding	10	20	10	60
	3	CGM/0701/OC3	Illustrate the formation of arc and principle of arc welding	10	20	10	80
	4	CGM/0701/OC4	Demonstrate different types of electrodes, their symbols, welding symbols, edge preparation	10	20	20	80
	5	CGM/0701/OC5	Demonstrate different types of weld joins with neat and appropriate sketch.	10	20	20	80
	6	CGM/0701/OC6	Perform arc welding in different joint of two plates having different thicknesses	10	20	20	80
	7	CGM/0701/OC7	Set up gas welding plant and Perform gas welding following safety precautions	20	40	30	130
	8	CGM/0701/OC8	Recognize various defect of welding for plates and pipes.	10	20	20	80
	9	CGM/0701801/OC9	OJT.	0	60	0	150
	10	DGT/VSQ/N0102	Employability Skills- 60 hrs.	60		50	0
	TOTAL Theory 150 Hrs, Practical 180Hrs (Including Employability Skill 60 Hrs)					200	800

Glossary

Term	Description
Declarative Knowledge	Declarative knowledge refers to facts, concepts and principles that need to Be known and/or understood in order to accomplish or to solve a problem.
Key Learning Outcome	Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training Outcome is specified in terms of knowledge, understanding (theory) and skills (practical application).
OJT(M)	On-the-job training(Mandatory);trainees are mandated to complete specified hours of training on site
OJT(R)	On-the-job training(Recommended);trainees are recommended the specified hours of training on site
Procedural Knowledge	Procedural knowledge addresses how to do something, or how to perform a task. It is the ability to work, or produce a tangible work output by applying Cognitive, affective or psycho motor skills.
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do **upon the completion of the training**.
Terminal Outcome	Terminal outcome is a statement of what a learner will know, understand and be able to do **upon the completion of a module.** A set of terminal outcomes help to achieve the training outcome.

Acronyms and Abbreviations

Term	Description
QP	Qualification Pack
NSQF	National Skills Qualification Framework
NSQC	National Skills Qualification Committee
NOS	National Occupational Standards