GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP
DIRECTORATE GENERAL OF TRAINING

COMPETENCY BASED CURRICULUM

WELDER (INTEGRATED STEEL PLANT)

(Duration: Six month)

CRAFTMAN TRAINING SCHEME (CTS)

(Flexi MoU)

NSQF LEVEL-4

SECTOR – CAPITAL GOODS AND MANUFACTURING

WELDER
(INTEGRATED STEEL PLANT)

(Engineering Trade)

(Designed in 2019)

Version: 1.0

CRAFTSMEN TRAINING SCHEME (CTS)

(Flexi MoU)

NSQF LEVEL - 4

Developed By
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CONTENTS

1. COURSE INFORMATION

Flexi- MoU is one of the pioneer programmes under DGT on the basis of the MoU in between DGT & NISP-NAGARNAR for propagating vocational training to allow industries to take advantage of various schemes for conducting training programme in higher employment potential courses according to needs of industries. The concept of Flexi- MoUs was introduced in June-July 2014. DGT and NISP-NAGARNAR have decided to sign this memorandum of understanding to provide an opportunity to the youth to acquire skills related to WELDER (INTEGRATED STEEL PLANT) through specially designed "Learn and Earn" approach consisting a mix of theoretical and On-the-Job Training (OJT) components and hence improve their employability potential & to contribute in the overall growth of Steel industry by creating a pool of skilled resources.

During the Six months duration, a candidate is trained on subjects Professional Skill, Professional Knowledge, Workshop Calculation & Science, Engineering Drawing and Employability Skills. The practical skills are imparted in simple to complex manner & simultaneously theory subject is taught in the same fashion to apply cognitive knowledge while executing task.

The content broadly covers skills in welding process of INTEGRATED STEEL PLANT in today's steel industry. The **Six months** course coverage is categorized as below:

The contents covered are safety aspects related to trade, familiarization with integrated steel plant working covering welding and gas cutting process such as basic welding operation (Material identification, surface preparation, weld preparation, welding, gas cutting), different types of welding machines like welding transformer, welding rectifier welding generators, different process of welding. The training also covers practical training starting with gas cutting, angular cutting, edge preparation, setting of welding machine, earthing of welding machines, weld preparation, selection of welding process, welding position,(2G,3G etc.) welding electrodes, post weld treatment etc. This is followed by on job training in practice in coke ovens and bye product plant ,sintering plant, blast furnaces, steel melting shop, thin slab caster, hot strip mill, raw material handling section power and blowing station and other sections of integrated steel plant.

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2. TRAINING SYSTEM

2.1 GENERAL

Directorate General of Training (DGT) under Ministry of Skill Development & Entrepreneurship offers range of vocational training courses catering to the need of different sectors of economy/ Labour market. DGT is futuristic in preparing the prospective Indian workforce in building skills and capabilities as per the needs of the industry. In this quest, it has changed the paradigm of growth to job oriented training by partnering with industry to be an enabler of responsible, sustainable and inclusive growth. Towards this end, DGT signed this MOU with the NMDC (NISP)

NMDC shall conduct courses at NISP Nagarnar in its training institute. On the job training will be conducted inside the plant premises. It will also ensure the eligible trainees take up Apprenticeship / higher education in suitable streams and shall also guide the students to become Entrepreneurs. NISP will strictly follow the policy guidelines for Flexi - MoU as in place from time to time. No deviation for the same would be permitted. Admission and Exam for trades run under Flexi MoU at training locations of NISP Nagarnar. Theory content to be 25% and practical content to be 75%.

Broadly candidates need to demonstrate that they are able to:

- Read & interpret technical parameters/documentation, plan and organize work processes, identify necessary materials and tools.
- Perform task with due consideration to safety rules, accident prevention regulations and environmental protection stipulations;
- Apply professional knowledge, core skills & employability skills while performing the job and maintenance work.
- Check the task/job for functioning, identify and rectify errors in task/job.
- Document the technical parameters related to the task undertaken.

2.2 CAREER PROGRESSION PATHWAYS

- Can work as technician –WELDER in any integrated steel plant
- Can join Apprenticeship programme in different types of industries leading to National Apprenticeship certificate (NAC).

2.3 COURSE STRUCTURE

Table below depicts the distribution of training hours across various course elements during a period of six months:

S No.	Course Element	Notional Training Hours
1	Professional Skill (Trade Practical)	150
2	Professional Knowledge (Trade Theory)	100
3	Workshop Calculation & Science	40
4	Engineering Drawing	40
5	Employability Skills	80
	Total	**410 hrs**

On The Job Training; (380 hrs)

Revision and Examination (90 hrs)

Total duration hrs. : 410 + 380 + 90= 880 hrs.

Total training hours:-

Duration	Basic Training	On-Job Training	Revision and Examination	Total
For 6 months course	410 hrs.	380 hrs. Including one day in a week training at Training Institute.	90hrs.	880 hrs.

2.4 ASSESSMENT & CERTIFICATION

I. Conducting training of selected candidates is the sole responsibility of Industrial Training Partner (ITP).
II. Assessment will be jointly done by ITP and DGT. Practical and formative assessment shall be conducted by ITP, and Computer Based theoretical exams shall be conducted by DGT.
III. ITP must refer to the latest examination reform guidelines issued by DGT dated 4th October 2018 any changes or revisions to the same shall be applicable to flexi-MoU scheme.
IV. Maximum attempts for clearing the exam and obtaining NTC shall be in line with CTS.
V. For practical examination and formative assessment, ITP has been given flexibility to design the questions, assess the candidates and upload their marks in the scheme portal.
VI. ITP shall develop a comprehensive Question Bank (in English and Hindi) of minimum 1000 questions, grouped by chapters and difficulty level. The same shall be vetted by NIMI experts

and then be handed over to DGT for conducting theory exams. DGT may add some questions to the same before conducting actual exams.

VII. Theoretical exams shall be conducted by DGT in Computer Based Test format. Upon completion of course and payment of requisite examination fee by ITP, admit cards shall be generated by scheme portal.

VIII. DGT shall arrange for conduct of computer based theory exam at designated examination centres & certify the successful trainees with e-NTC under flexi-MoU scheme with mention of ITP name in the Certificate.

IX. Students, who have successfully appeared in the final exam after completion of course, are eligible to register as apprentices.

The trainee will be tested for his skill, knowledge and attitude during the period of the course and at the end of the training program as notified by the Government of India (GoI) from time to time.

The **Internal Assessment** during the period of training will be done by **Formative Assessment Method** by testing for assessment criteria listed against learning outcomes. The training institute has to maintain an individual trainee portfolio as detailed in assessment guideline. The marks of internal assessment will be as per the template (Annexure –II).

The learning outcome and assessment criteria will be the basis for setting question papers for final assessment. The examiner during final examination will also check the individual trainee's profile as detailed in assessment guideline before giving marks for practical examination.

2.4.1 PASS REGULATION

The minimum pass percentage for practical is 60% & minimum pass percentage of theory subjects is 33%.

2.4.2 ASSESSMENT GUIDELINE

Appropriate arrangements should be made to ensure that there will be no artificial barriers to assessment. The nature of special needs should be taken into account while undertaking the assessment. Due consideration should be given while assessing for teamwork, avoidance/reduction of scrap/wastage and disposal of scrap/waste as per procedure, behavioral attitude, sensitivity to the environment and regularity in training. The sensitivity towards OSHE and self-learning attitude are to be considered while assessing competency.

Assessment will be evidence based comprising the following:

- Job carried out in labs/workshop
- Record book/ daily diary
- Answer sheet of assessment

- Viva-voce
- Progress chart
- Attendance and punctuality
- Assignment

Evidences of internal assessments are to be preserved until forthcoming examination for audit and verification by examining body. The following marking pattern to be adopted while assessing:

Performance Level	Evidence
(a) Weightage in the range of 60%-75% to be allotted during assessment	
For performance in this grade, the candidate should produce work which demonstrates attainment of an acceptable standard of craftsmanship with occasional guidance, and due regard for safety procedures and practices	• Demonstration of good skill in the use of hand tools, machine tools and workshop equipment. • 60-70% accuracy achieved while undertaking different work with those demanded by the component/job. • A fairly good level of neatness and consistency in the finish. • Occasional support in completing the project/job.
(b) Weightage in the range of 75%-90% to be allotted during assessment	
For this grade, a candidate should produce work which demonstrates attainment of a reasonable standard of craftsmanship, with little guidance, and regard for safety procedures and practices	• Good skill levels in the use of hand tools, machine tools and workshop equipment. • 70-80% accuracy achieved while undertaking different work with those demanded by the component/job. • A good level of neatness and consistency in the finish. • Little support in completing the project/job.
(c) Weightage in the range of more than 90% to be allotted during assessment	
For performance in this grade, the candidate, with minimal or no support in organization and execution and with due regard for safety procedures and practices, has produced work which demonstrates attainment of a high standard of craftsmanship.	• High skill levels in the use of hand tools, machine tools and workshop equipment. • Above 80% accuracy achieved while undertaking different work with those demanded by the component/job. • A high level of neatness and consistency in the finish. • Minimal or no support in completing the project.

3. JOB ROLE

- **WELDERS- PIPE LINES:-**
  Oil and gasoline companies, natural gas companies, electrical and water utilities all requires pipe line to transport their products from one place to other. The main jobs of welders in these industries are
  - Manufacturing of pipe line
  - Inspection of welds joints
  - Repair of weld joint leakages

- **WELDERS- CONSTRUCTIONS**
  Building and bridge are civil engineering constructions , projects in different manufacturing industries uses beams ,angles, channels, plates, rods for making , foundation ,columns , trusses for roof etc. welders are require to joint different sections in different welding position. The main jobs of welders in these industries are
  - Tack welding of rods in making the foundation
  - Welding of structures, column, beam, trusses etc.
  - Testing of critical weld joints.

- **WELDERS- MANUFACTURING**
  Manufacturing industries encompasses much more than the automotive and truck industries. It includes any industries that make products primarily out of metal. Manufacturing includes vide range of industries that required equipment and metal gadgets and gears including agriculture, mining, telecommunication, steel, heavy electrical industries and automotive industries. The main jobs of welders in these industries are
  -Joining the different component of the machineries through welding process
  - Testing of weld joints
  - Use of different electrodes in technology for joining the parts having different chemical compositions like mild steel, medium carbon steel, stainless steel , Cast iron, non ferrous materials.

- **WELDER- BOILERS**
  Boilers makers are experienced welders that work producing steel parts and pipes from plates and tubes. They work on bridges, blast furnaces, power generation plants, ship construction industries and engineering projects. They are employed to repair, re-pipe and re-tube commercial steam and hot water pipe boiler tanks and other like materials. The main jobs of welders in these industries are
  -Welding of pipe lines of plates to make the vessels like boilers, pressure tanks etc.
  - Radiography testing of welds joints.

- Magna flux and dye penetration test.
- Repair of unsuccessful joints.

- **WELDER- INDUSTRIAL MAINTENANCE**

  Every industry utilizes machinery equipments and facilities. Welders are required to maintain and repair the machines, equipments and facilities on regular basis so that production is not hampered. The main jobs of welders in these areas are

  -Proper shut down of equipment
  - Taking safety precautions before starting the job
  - Repair the break down jobs
  - Test the repaired joints
  - Release of shut down
  - Trial running of equipment.

- **WELDER- FABRICATION**

It is most common job for welders. Fabrication is required from building industries to bigger material handling equipments. Here welding and alignment both are required for finishing the job. The main job of welders in the fabrication industries are

- Gas cutting of angles, channels, plates, rods of required sizes.
- Tacking the parts of required dimension at required place.
- Checking dimension and angle of the structures as per drawing.
- Correction required to be rectified
- The same process is repeated till the fabrication is made of required dimensions.

Welder, Gas; fuses metal parts together using welding rod and oxygen acetylene flame. Examines parts to be welded, cleans portion to be joined, holds them together by some suitable device and if necessary makes narrow groove to direct flow of molten metal to strengthen joint. Selects correct type and size of welding rod, nozzle etc. and tests welding, torch. Wears dark glasses and other protective devices while welding. Releases and regulates valves of oxygen and acetylene cylinders to control their flow into torch. Ignites torch and regulates flame gradually. Guides flame along joint and heats it to melting point, simultaneously melting welding rod and spreading molten metal along joint shape, size etc. and rectifies defects if any. May join part at various spots to prevent distortion of shape, form dimension etc. May preheat materials like cast iron prior to welding.May also weld by other gases such as argon coal etc.

Welder, Electric; Arc Welder fuses metals using arc-welding apparatus and electrodes (welding material). Examines parts to be welded, cleans them and sets joints together with clamps or any other suitable device. Starts generator or transformer (welding apparatus and regulates current according to material and thickness of welding. Clamps one lead (insulated wire carrying current from generator) to part to be welded, selects required type of electrode and clamps it to holder connected with other lead).

Generates sparks between electrode and joint, simultaneously guiding and depositing melting electrode uniformly for welding. Takes precautionary measures such as wearing rubber gloves, holding welding screen of dark glass etc. May join parts first at various points for holding at specified angles, shape, form and dimension.

Welder, Machine; operates gas or electric welding machine to joint metal parts by fusion. Sets machine for operation by igniting burners and adjusting flames or by switching on current. Regulates flow of gas or current and adjusts machine according to material to be welded. Checks cooling system and adjusts movement of conveyor, if any. Feeds material to be welded with either one by one or in batch according to type of machine and welds them by pressing paddle, or by automatic arrangements. May use fixtures or other suitable devices for mass production work. Is designated as SPOT WELDER, FLASH WELDER, etc. according to machine and type of work done.

Gas Cutter; Flame Cutter cuts metal to required shape and size by gas flame either manually or by machine. Examines material to be cut and marks it according to instruction of specification. Mounts template and sets machine to cut to specifications. Makes necessary connections and fits required size of nozzle or burner in welding torch. Releases and regulates flow of gas in nozzle or burner, ignites and adjusts flame. Guides flame by hand or machine along cutting line at required speed and cuts metal to required size. May use oxyacetylene or any other appropriate gas flame.

Brazer; fuses metal parts by heating using flux and fillings. Cleans and fastens parts to be joined face to face by wire, by seaming or by any other suitable means and prepares paste of flux and fillings. Applies it to joint and hearts in furnace or by torch to melt filling into joint.Allows it to cool down. Examines joint and cleans them by filing, buffing etc.

Reference NCO:

(i) 7212.0100 – Welder, Gas
(ii) 7212.0200 – Welder, Electric
(iii) 7212.0300 – Welder, Machine
(iv) 7212.0400 – Gas Cutter
(v) 7212.0500 – Brazer

4. GENERAL INFORMATION

Name of the Trade	**WELDER-INTEGRATED STEEL PLANT (Flexi MoU)**
NCO – 2015	7212.0100 – Welder, Gas 7212.0200 – Welder, Electric 7212.0300 – Welder, Machine 7212.0400 – Gas Cutter 7212.0500 – Brazer
NSQF Level	Level-4
Duration of Craftsmen Training	Six months
Entry Qualification	Passed 8th Class examination or its equivalent
Minimum Age	18 years as on first day of academic session.
Unit Strength (No. Of Student)	20
Space Norms	192 Sq. m.
Power Norms	17 KW
Instructors Qualification for	
1. Welder trade	B.Voc/Degree in Mechanical Engineering from recognized Engineering College /university with one year experience in the relevant field. **OR** 3 years Diploma in Mechanical Engineering from recognized board of technical education with two years experience in the relevant field. **OR** NTC/NAC in the Trade of "WELDER" with 3 years post-qualification experience in the relevant field. **Essential Qualification:** NCIC (National Craft Instructor Certificate) in WELDER trade. ***NOTE: - Out of two Instructors required for the unit of 2(1+1), one must have Degree/Diploma and other must have NTC/NAC qualifications. However, both of them must possess NCIC in any of its variants.***
2. Workshop Calculation & Science	B.Voc/Degree in Engineering from AICTE/ UGC recognized Engineering College/ University with one year Experience in the relevant field. OR

	03 years Diploma in Engineering from AICTE/ recognized Board of Technical Education or relevant Advanced Diploma (Vocational) from DGT with two years experience in the relevant field. OR NTC/ NAC in any one of the engineering trades with three years experience in the relevant field. **Essential Qualification:** National Craft Instructor Certificate (NCIC) in relevant trade. OR NCIC in RoDA or any of its variants under DGT.
3. Engineering Drawing	B.Voc/Degree in Engineering from AICTE/ UGC recognized Engineering College/ University with one year Experience in the relevant field. OR 03 years Diploma in Engineering from AICTE/ recognized Board of Technical Education or relevant Advanced Diploma (Vocational) from DGT with two years' experience in the relevant field. OR NTC/ NAC in any one of the relevant engineering group of trades categorized under Engineering Drawing / D'man (Mech. / Civil) with three years' experience. **Essential Qualification:** National Craft Instructor Certificate (NCIC) in relevant trade OR NCIC in RoDA / D'man (Mech. / Civil) or any of its variants under DGT.
4. Employability Skill	MBA/ BBA /any Graduate / Diploma in any discipline with Two years' experience with short term ToT course in Employability Skills from DGT institutes. (Must have studied English/ Communication Skills and Basic Computer at 12th / Diploma level and above). **OR** Existing Social Studies Instructors in ITIs with short term ToT course in Employability Skills from DGT institutes.

5. Minimum Age for Instructor	21 Years				
List of Tools and Equipment	As per Annexure – I				
Distribution of training on Hourly basis: (Indicative only)					
Total Hours/ Week	**Trade Practical**	**Trade Theory**	**Workshop Cal. &Sc.**	**Engg. Drawing**	**Employability Skills**
32 Hours	18 Hours	6 Hours	3 Hours	3 Hours	2 Hours

5. NSQF LEVEL COMPLIANCE

NSQF level for **WELDER (INTEGRATED STEEL PLANT)** trade under CTS (Flexi MoU): **Level -4.**

As per notification issued by Govt. of India dated- 27.12.2013 on National Skill Qualification Framework total 10 (Ten) Levels are defined.

Each level of the NSQF is associated with a set of descriptors made up of five outcome statements, which describe in general terms, the minimum knowledge, skills and attributes that a learner needs to acquire in order to be certified for that level.

Each level of the NSQF is described by a statement of learning outcomes in five domains, known as level descriptors. These five domains are:

a. Process
b. Professional Knowledge
c. Professional Skill
d. Core Skill
e. Responsibility

The broad learning outcome of **WELDER (Integrated Steel Plant)** trade under CTS (Flexi MoU) mostly matches with the Level descriptor at Level- 4.

The NSQF Level-4 descriptor is given below:

Level	Process Required	Professional Knowledge	Professional Skill	Core Skill	Responsibility
Level 4	Job that requires to work in familiar predictable routine situation of clear choice	Factual Knowledge of field of working	Recall and demonstrate practical skill, routine and repetitive in narrow range of application using appropriate rule and tool, using quality concept.	Language to communicate written or oral with required clarity. Skill to basic arithmetic and algebraic principles, basic understanding of social political and natural environment.	Responsibility for own work and learning.

6. LEARNING OUTCOME

Learning outcomes are a reflection of total competencies of a trainee and assessment will be carried out as per the assessment criteria.

6.1 GENERIC LEARNING OUTCOME

1. Recognize & comply general safe working practices, environment regulation and housekeeping.
2. Explain & perform different mathematical calculation & science in the field of study including basics and apply in day to day work. *[Calculation of area, volume, Percentage, mathematical calculation, engineering materials, ferrous and non-ferrous]*
3. Interpret specifications, different engineering drawing and apply for different application in the field of work. *[Different engineering drawing-Geometrical construction, Dimensioning, Layout, Method of representation, Symbol, scales, Lettering and numbering, Free hand sketch and drawing]*
4. Select and ascertain measuring instrument and measure dimension of components and record data.
5. Interpret & use formal and technical communication.
6. Apply the concept in productivity & quality management in day to day work to improve productivity & quality.
7. List and interpret various acts of labour welfare legislation.
8. Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources.
9. Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.
10. Utilize basic computer applications and internet to take benefit of IT developments in the industry.

6.2 SPECIFIC LEARNING OUTCOME

11. Recognize & comply health, safety & Environment practices in a steel manufacturing plant.
12. Operate and maintain gas cutting torch and welding machines.
13. Plan and execute brazing, soldering and welding of different types of welding joints.
14. Set the gas cutting plates, using oxy- acetylene torch in various profiles like regular geometrical shape, irregular shape, radial cutting, chamfering etc.
15. Perform welding in different positions like down hand, vertical, horizontal, over head etc. on mild steel plate with different type of electrodes.
16. Perform joining of two plates by fillet lab joint, single V joint and test joints by magna flux and dye penetration test.

17. Plan and execute joining of pipes by butt and lap joints.
18. Plan and perform different processes of welding like MIG, TIG, SAW, MMAW etc.
19. Set overlaying of weld metal on mild steel, medium carbon steel and stainless steel.
20. Perform joining of different metal by using manual metal arc in different welding positions.

7. LEARNING OUTCOME WITH ASSESSMENT CRITERIA

GENERIC LEARNING OUTCOME	
LEARNING OUTCOME	**ASSESSMENT CRITERIA**
1. Recognize & comply with general safe working practices, environment regulation and housekeeping.	Follow and maintain procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements.
	Recognize and report all unsafe situations according to site policy.
	Identify and take necessary precautions on fire and safety hazards and report according to site policy and procedures.
	Identify, handle and store/ dispose of dangerous/unsalvageable goods and substances according to site policy and procedures following safety regulations and requirements.
	Identify and observe site policies and procedures in regard to illness or accident.
	Identify safety alarms accurately.
	Report supervisor/ competent authority in the event of accident or sickness of any staff and record accident details correctly according to site accident/injury procedures.
	Identify and observe site evacuation procedures according to site policy.
	Identify Personal Protective Equipment (PPE) and use the same as per related working environment.
	Identify basic first aid and use them under different circumstances.
	Identify different fire extinguisher and use the same as per requirement.
	Identify environmental pollution and contribute to avoidance of same.
	Take opportunities to use energy and materials in an environmentally friendly manner.
	Avoid waste and dispose waste as per procedure.
	Recognize different components of 5S and apply the same in the working environment.
2. Explain & perform different mathematical calculation & science in the field of study including basic and apply in	Explain concept of basic science related to the field such as Material science, Mass, weight, density, speed, velocity, heat & temperature, force, motion, pressure, heat treatment, center of gravity, friction.
	Measure dimensions as per drawing.

day-to-day work.*[Different mathematical calculation & science- Calculation of area, volume, Percentage, mathematical calculation, engineering materials, ferrous and non-ferrous]*	Use scale/ tapes to measure for fitting to specification.
	Comply with given tolerance.
	Prepare list of appropriate materials by interpreting detail drawings and determine quantities of such materials.
	Ensure dimensional accuracy of assembly by using different instruments/gauges.
3. Interpret specifications, different engineering drawing and apply for different application in the field of work. *[Different engineering drawing- Geometrical construction, Dimensioning, Layout, Method of representation, Symbol, scales, Lettering and numbering, Free hand sketch and drawing*]	Read & interpret the information on drawings and apply in executing practical work.
	Read & analyse the specification to ascertain the material requirement, tools, and machining/ assembly/ maintenance parameters.
	Encounter drawings with missing/unspecified key information and make own calculations to fill in missing dimension/parameters to carry out the work.
4. *Select and ascertain measuring instrument and measure dimension of component and record data.*	*Select appropriate measuring instruments such as micrometers, vernier callipers, dial gauge, bevel protector and height gauge, feeler gauge (as per tool list).*
	Ascertain the functionality & correctness of the instrument.
	Measure dimension of the components & record data to analyse with the given drawing/measurement.
5. Interpret & use formal and technical communication.	Identify and use appropriate words for communication.
	Choose proper tools to communicate.
	Use Positive body language while communicating.
	Maintain proper eye contact to built trust and confidence.
6. Apply the concept in productivity & quality management in day to day work to improve productivity & quality.	Identify factors affecting productivity.
	Awareness on quality concepts.
7. List and interpret various acts of labour welfare legislation.	Explain benefits guaranteed under various applicable Acts.
	Interpret applicable labour and industrial laws.

8. Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources.	Explain energy conservation, cause of global warming and pollution.
	Show protective measures to balance the resources of nature.
	Explain effects of global warming and its precautions from damage. Dispose waste following standard procedure.
9. Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.	Explain personnel finance and entrepreneurship.
	Explain role of various schemes and institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non-financing support agencies to familiarize with the Policies / Programmes, procedure and available schemes.
10. Utilize basic computer applications and internet to take benefit of IT developments in the industry.	Work with MS Office viz., word, excel, etc.
	Use internet for finding out various data pertaining to the trade.

SPECIFIC LEARNING OUTCOME	
LEARNING OUTCOME	**ASSESSMENT CRITERIA**
11. Recognize & comply health, safety & Environment practices in a steel manufacturing plant.	Demonstrate various machineries used in the trade.
	Identify different tools required for this trade and filling square, marking and punching as per required dimension.
	Comply with safety working measures pertaining to the trade and perform elementary First Aid during emergency situations.
	Identify environmental pollution and contribute to avoidance of same.
12. Operate and maintain gas cutting torch and welding machines.	Knowledge of gases used in gas cutting.
	Knowledge of regulators to regulate the oxygen and acetylene.
	Identify different types of flames like oxidising, reducing and neutral flames.
	Knowledge of earthing system of welding machine.
	Knowledge of setting of current require for smooth welding.
	Identify different control systems in welding machine.
13. Plan and execute brazing, soldering and welding of different types of welding joints.	Knowledge of brazing and soldering.
	Identify different inputs used in brazing and soldering.
	Identify brazing and soldering rods.
	Identify different type of welding joints.
	Knowledge of lap, butt, tee , corner , filet joints.
14. Set the gas cutting plates, using oxy- acetylene torch in various profiles like regular geometrical shape, irregular shape, radial cutting, chamfering etc.	Knowledge of different cantos required for gas cutting.
	Identify different tools and tackles required for profile cutting.
	Set the PUG cutting machine/Mill.
	Identify different angles in which plates are to be chamfered.
	Demonstrate marking on plates according to the profile of chamfer.
15. Perform welding in different positions like down hand, vertical, horizontal, over head etc. on mild steel plate with different types of electrodes.	Identify different positions of welding.
	Perform current setting in different positions of welding.
	Identify the weld beed in different positions of welding.
	Clean in between the beeds to minimize the welding defects.
	Knowledge of different positions and angles required for overhead welding.
	Identify the defects during different positions of welding.
	Perform salvaging the welding defect.

16. Perform joining of two plates by fillet lab joint, single V joint and test joints by magna flux and dye penetration test.	Demonstrate different types of weld joints.
	Knowledge of V preparation.
	Join the metal according to the size of the plates
	Knowledge of different types of V preparation i.e. single V, double V etc.
	Identify different types of welding defects and procedure to find out through magna flux and dye penetration test.
17. Plan and execute joining of pipes by butt and lap joints.	Identify different types of joints for pipe welding.
	Perform chamfering and alignment before joining the metal.
	Demonstrate stress balancing during welding of pipes.
	Perform different types of lap joints and its preparation for pipe welding.
18. Plan and perform different processes of welding like MIG, TIG, SAW, MMAW etc.	Identify different types of machines used for MIG, TIG, SAW, MMAW etc.
	Knowledge of different consumables used in the above process.
	Knowledge of principles of working of these welding processes.
	Identify the advantages of these welding processes.
	Identify the application of these process in particular equipments/joining of different metals.
19. Set overlaying of weld metal on mild steel, medium carbon steel and stainless steel.	Identify the use of different materials for manufacturing of spare parts.
	Knowledge of pre heat and post weld treatment.
	Identify welding rods used for improving different properties like hardness , tensile strength , abrasion strength , corrosion strength etc.
	Identify the overlaying required and method of stress balancing during welding.
	Identify of different types of stainless steel and the welding rods required for overlaying.
20. Perform joining of different metal by using manual metal arc in different welding positions.	Knowledge of different materials like cast iron, medium carbon steel, high carbon steel.
	Knowledge of weld ability of metals.
	Knowledge of stress relieving during the welding process.
	Knowledge of route run and selection of size of welding rod.
	Knowledge of different welding rods used for joining dissimilar metals.

8. SYLLABUS - (BASIC SKILLS)

Durations (Hrs.)	Reference learning outcome	Professional Skills (Trade Practical)	Professional Knowledge (Trade Theory)
Professional Skill. 10Hrs.; Professional Knowledge 5Hrs	Recognize & comply health, safety & Environment practices in a steel manufacturing plant.	- Demonstrate of Machinery used in the trade. - Identification to safety equipment and their use etc. - Hack sawing, filing square to dimensions. - Marking out on MS plate and punching.	• Importance of trade Training. • 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.
Professional Skill. 15 Hrs.; Professional Knowledge 10 Hrs	Operate and maintain gas cutting torch and welding machines.	- Setting of oxy-acetylene welding equipment, Lighting and setting of flame. - Perform fusion run without filler rod on MS sheet 2mm thick in flat position. - Setting up of Arc welding machine & accessories and Striking an arc. - Deposit straight line bead on MS plate in flat position.	• Introduction and definition of welding. • Arc and Gas Welding Equipments, tools and accessories. • Arc and Gas Welding terms and definitions.
Professional Skill 15 Hrs.; Professional Knowledge 10 Hrs.	Plan and execute brazing, soldering and welding of different types of welding joints.	- Depositing bead with filler rod on M.S. sheet 2 mm thick in flat position. - Edge joint on MS sheet 2 mm thick in flat position without filler rod. - Butt & Lap joint on	• Different process of metal joining methods: Bolting, riveting, soldering, brazing, seaming etc. • Types of welding joints and its

		M.S. sheet 2 mm thick by brazing in flat position. - Soldering Practice	applications. Edge preparation and fit up for different thickness. • Surface Cleaning.
Professional Skill 15 Hrs.; Professional Knowledge 10Hrs.	Set the gas cutting plates , using oxy-acetylene torch in various profiles like regular geometrical shape, irregular shape, radial cutting, chamfering etc.	- Setting up of oxy-acetylene and make straight cuts (freehand) - Perform marking and straight line cutting of MS plate 10 mm thick by gas. Accuracy within ±2mm. - Beveling of MS plates 10 mm thick, cutting regular geometrical shapes and irregular shapes, cutting chamfers by gas cutting. - Circular gas cutting on MS plate 10 mm thick by profile cutting machine. - Marking and perform radial cuts, cutting out holes using oxy-acetylene gas cutting. • Identify cutting defects viz., distortion, grooved, fluted or ragged cuts; poor draglines; rounded edges; tightly adhering slag.	• Common gases used for welding & cutting, flame temperatures and uses. • Chemistry of oxy-acetylene flame. • Types of oxy-acetylene flames and uses. • Oxy-Acetylene Cutting Equipment principle, parameters and application.
Professional Skill 20 Hrs.; Professional Knowledge 15-Hrs.	Perform welding in different positions like down hand, vertical, horizontal, over head etc. on mild steel plate with different types of electrodes.	• Fillet lap joint on M.S. plate 10 mm thick in flat position. • Fillet "T" joint on MS sheet 2 mm thick in flat position. • Open Corner joint on MS plate 10 mm thick in flat position.	• Welding positions as per EN & ASME: flat, horizontal, vertical and over head position. • Weld slope and rotation. • Welding symbols as per BIS & AWS.

Professional Skill 15 Hrs.; Professional Knowledge 10 Hrs.	Perform joining of two plates by fillet lab joint and single V joint. Plan and organize testing of joints by magna flux and dye penetration test.	• Fillet Lap joint on MS sheet 2 mm thick in flat position. • Single "V" Butt joint on MS plate 12 mm thick in flat position . • Testing of weld joints by visual inspection. - Inspection of welds by using weld gauges.	• 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.
Professional Skill 15 Hrs.; Professional Knowledge 10 Hrs.	Plan and execute joining of pipes by butt and lap joints.	- Structural pipe welding butt joint on MS pipe Ø 50 and 3mm WT. - Fillet Lap joint on M.S. Plate 10 mm in vertical position.	• Specification of pipes, various types of pipe joints, pipe welding all positions, and procedure. • Difference between pipe welding and plate welding.
Professional Skill 15 Hrs.; Professional Knowledge 10 Hrs.	Plan and Perform different process of welding like MIG, TIG, SAW , MMAW etc.	- Pipe Flange joint on M.S plate with MS pipe Ø 50 mm X 3mm WT. - Fillet "T" joint on M.S. plate 10 mm thick in over head position.	• Weldability of metals, importance of pre heating, post heating and maintenance of inter pass temperature.
Professional Skill 15 Hrs.; Professional Knowledge 10 Hrs.	Set overlaying of weld metal on mild steel, medium carbon steel and stainless steel.	• Pipe welding butt joint on MS pipe Ø 50 and 5 mm WT. in 1G position. • Fillet Lap joint on M.S. plate 10 mm thick in over head position.	• Classification of steel. • Welding of low, medium and high carbon steel and alloy steels. • Purpose of root gap, tacking & key hole in the job pieces during welding. • Arc Welding Machine: - AC & DC Welding Machine advantages & disadvantages of AC & DC Welding. Safety Precautions: Related to Arc welding m/c &

			accessories. • Manual Metal Arc Welding Electrodes: - Sizes & Coding Edge Preparation: - Necessity of edge preparation, Nomenclature of butt & fillet weld. • Welding Symbols. Weld defects.
Professional Skill 15Hrs.; Professional Knowledge 10 Hrs.	Perform joining of different metal by using manual metal arc in different welding positions.	- Setting up of an arc welding machine, Straight bead practice. Edge preparation for same thickness of plate for arc welding. Laying straight-line bead on 12mm M.S. Plate in flat position and Horizontal Position. Making butt, lap, tee and corner joint by arc on 12 mm M.S. Plate on Flat, Horizontal position.	• Metal joining Method & its advantages Welding (Fusion, Non-fusion & Pressure) • Common tools used in welding, Classification of welding processes. • Arc Welding accessories. • Electric Arc Welding • Manual Metal Arc Welding - effect of variations in welding procedure on weldments during manual metal Arc Welding. • Basic Welding joints & Positions.

9. CORE SKILLS

9.1 CORE SKILL- ENGINEERING DRAWING AND WORKSHOP CALCULATION & SCIENCE

Engineering Drawing	Duration in Hrs.	Workshop Science & Calculation	Duration in Hrs.
Engineering Drawing: Introduction and its importance - Viewing of engineering drawing sheets. - Method of Folding of printed Drawing Sheet as per BIS SP:46-2003 - Drawing Instruments : their Standard and uses - Drawing board, Mini Drafter or T-Square , Set Squares, Protractor, Drawing Instrument Box (Compass, Dividers, Scale, etc.), Pencils of different Grades, Drawing pins / Clips.	4	Unit: Systems of unit- FPS, CGS, MKS/SI unit, unit of length, Mass and time, Conversion of units.	6
Lines : - Classification of lines (Hidden, centre, Dimension, Section) - Drawing lines of given length - (Straight, curved) - Drawing of parallel lines, - perpendicular line - Methods of Division of line - segment	4	Fractions & Simplification: Fractions, Decimal fraction, Addition, Subtraction, Multiplication and Division of Fractions and Decimals, conversion of Fraction to Decimal and vice versa. Simple problems Simplification using BODMAS.	6
Drawing of Geometrical Figures: Definition, nomenclature and practice of - - Angle: Measurement and its types, method of bisecting. - Triangle -different types - Rectangle, Square, - Circle and its elements.	8	Area and perimeter of square, rectangle and triangle. Area and Perimeter of Circle, Semi-circle , circular ring Volume of solids- cube, cuboids, cylinder	10
Lettering and Numbering as per BIS SP46-2003: - Single Stroke, Double Stroke.	6	Profit and loss, calculation of selling price, cost price, profit and loss.	6
Free Hand sketch: Hand tools and measuring instruments used in the Trade.	8	Calculation of simple interest, simple interest, compound interest.	6

Free hand drawing : - polygons, ellipse, etc. - Geometrical figures and blocks with dimension.			
Symbolic representation – different symbols used in the trade. -Transferring measurement from the given object to the free hand sketches. - Reading of trade related drawing	10	Material Science : Properties - Physical & Mechanical, Types – Ferrous & Non-Ferrous, difference between Ferrous and Non-Ferrous metals, introduction of Iron, Cast Iron, Wrought Iron, Steel, difference between Iron and Steel, Alloy steel, carbon steel, stainless steel, Non-Ferrous metals, Non-Ferrous Alloys.	6
TOTAL	**40**	**TOTAL**	**40**

9.2 CORE SKILL- EMPLOYABILITY SKILLS

Syllabus for Employability Skills (80 Hrs.)	
Module	**Topics**
1. Behavioural Skills	**Duration: 6 Hrs. Marks: Nil**
Expectation Setting	Creating a focused and responsible learning environment
Personal Strength Analysis/Strength Blindness	Self -awareness and confidence building
Perception Management	Display Professionalism at the institute and work place
Ethics, Values& Etiquette	Increased social initiations relationships and networks Acceptance of peers from different cultures and social groups and work with them. Collaboration with team to prioritize the common goal and compromise individual priorities.
Social Etiquette	Characteristic of a responsible citizen- Display the same by respecting self, others, environment, care for duty and value for time.
2. English Literacy	**Duration: 20 Hrs. Marks: 10**
Functional English	Importance of Learning English Different Naming words, Words used for replacing names, Action words, Describing people, place and their use. Introduction to punctuation - Comma, Full stop, Question mark. Singular plural Change of tense - Simple present, past; present, past progressive Construction of simple sentences - Kinds of sentences Usage of appropriate words to express themselves Greetings & Self Introduction Asking &responding to questions Sharing information with others Speak and provide information about workplace
Reading	Reading simple sentences about: a) Self b) Work c) Environment
Written English	Simple writing skills
3. Communication Skills	**Duration: 10 Hrs. Marks: 8**
Self- Introduction	Interview Skills/Confidence Building
a. Verbal Communication	Understand the usage of appropriate words to express themselves Communicate effectively on telephone.

b. Non-Verbal Communication	Manage Personal Hygiene and Presentation
	Positive body language: adopt and use it appropriately to build a positive impression
	Maintaining appropriate eye-contact in building trust and confidence
	Impact of touch in a formal environment. Acceptable and unacceptable touch.
	Role of tone in any communication.
Campus to Work	Time Management and Planning Skills
	Interview skills- its phases & ways to crack interview.
4. I.T. Literacy	**Duration: 10 Hrs. Marks:10**
Basics of Computers	Introduction to Computers and its applications Hardware and peripherals Starting and shutting down of computer Basic of computer Networks.
Operating System	Basics of Operating System Types of Operating Systems User interface of Windows 10 OS/ latest Create, Copy, Move and delete Files and Folders Use of External memory like pen drive, etc,
MS-Word	Basic operating of Word Processing Creating, opening and closing Documents Use of shortcuts, Creating and Editing of Text, Formatting the Text Creating simple document like - resume, letter writing, job application etc., Printing document
Web browsers & Search Engines	Introduction to world wide web (WWW), Useful websites, web browser - usage, search engine etc. Using popular sites like Bharat Skills, Skill Training related Government portals, naukri.com and other job portals, CITS applications, Apprenticeship portal (NAPS), resize images, signing up, Online fund transfer using UPI gateway.
Email	Creating & using an email account –like Gmail or any other. Usage of CC & BCC. Attaching documents Checking email and composing Email.
Mobile application	Scanning QR/AR code, Sharing best practices and downloading trade related videos using Wi-Fi, Fund transfer through App like BHIM.
5. Entrepreneurship Skills	**Duration: 10 Hrs. Marks: 06**
Entrepreneur	Need of becoming entrepreneur
	Ways to become a good entrepreneur
	Enabling environment available to become an entrepreneur. Different Govt. institutions/schemes promoting Entrepreneur viz., Gramin banks, PMMY-MUDRA loans, DIC, SIDA, SISI, NSIC, SIDO.

	Different Government schemes supporting entrepreneurship.
6. Maintaining Efficiency at Workplace Duration: 6 Hrs. Marks: 04	
Maintaining Efficiency at Workplace	Factors affecting productivity
	Improving Productivity
	Personal finance literacy Planning, Saving, Tax, Govt. schemes for financial safety e.g. Pradhan Mantri Jeevan Jyoti Bima Yojana (**PMJJBY**), etc.
7. Occupational Safety, Health and Environment Education Duration: 6 Hrs. Marks: 04	
Safety and Health	Introduction to Occupational Safety & health at work place, Occupational Hygiene
Occupational Hazards	Basic Hazards. Chemical, Physical (Electrical, Temperature, Illumination) Ergonomic, Biological, Vibro acoustic, Mechanical, Psychosocial Hazards, Prevention of hazards
Accident and Safety	Different types of Personal Protective Equipment (PPE) Accident Prevention techniques
First-aid	Care of injured & Sick at the workplace First-Aid & Transportation of sick person
Basic provisions on safety and Health	Basic provisions of safety & health
Environmental Issues	Introduction to Environment, ecosystem and factors causing imbalance Pollution and pollutants including liquid, gaseous, solid and hazardous waste Protecting the environment - Energy Conservation, global warming Segregation and disposal of waste

8. Labour Welfare Legislation Duration: 04 Hrs. Marks: 02	
Labour Welfare Legislation	Benefits guaranteed under various acts- Factories Act, Apprenticeship Act, Employees State Insurance Act (ESI), Payment Wages Act, Employees Provident Fund Act, The Workmen's compensation Act, POSH. Interpret applicable labour and industrial laws.
9. Quality Management Duration: 02Hrs. Marks: 02	
Quality Concept and Consciousness	Create awareness on introduction of quality Concepts.
10. Preparation to the world of work Duration: 6 Hrs. Marks: 04	
Career Plan	Identify the difference between job and career
Basic Professional Skills	Job roles available in respective trades
Career Pathways	Awareness of industries, and the respective professional pathways

Search and apply for a job	Awareness of higher education / up skilling (short-term) options Steps involved in online application for Instructor course, Apprenticeship and different jobs in popular site like theindiajobs.com, naukri.com, monsterindia.com, Govt. website.

10. DETAILS OF COMPETENCIES (ON-JOB TRAINING)

Learning to be covered in Industry for WELDER (Integrated steel plant) Trade.

1. Safety and best practices/ Basic culture (5s/Kaizen)
2. Log book writing and maintaining records.
3. Storing of different tools and consumables.

ON THE JOB TRAINING:-

1. COKE OVEN **Duration:- 35 hrs.**

- **Coal and Coke area:-**
  - i. Small coupling guards (for motor to gearbox) of various sizes.
  - ii. Bigger coupling guards (for gearbox to Drum etc) of various sizes.
  - iii. Small temporary platforms, walkways, cross over bridges etc.
  - iv. Tail end guards skirt boards etc.
  - v. Delivery chutes, receiving chutes etc. Liner plates for chutes fabrication etc.
- **Battery area:-**
  - i. For gate opening, V cleaning for charging car.
  - ii. Door latch / unlatching bracket etc.
  - iii. Door cleaning scrapers, scraper blades/ frame cleaning scrapers etc, brush holders.
  - iv. Leveller nose, leveller bar
  - v. Liner plates of various shops/sizes for bucket car, liner
- **CDCP area:-**
  - **i.** Charging rid, heat shield plates fabrication, liner plates.
- **General Item:-**
  - i. Almirah , bench, table, cupboard, chair, enclosure for welding machine, tool room, stove room, rest room

2. BLAST FURNACE **Duration:-55 hrs.**

- **Cast House:-**
  - i. Mud gun nozzles welding job, drill machine poking rods and drill rod welding, runner welding, heat shield welding jammed hook joint.
  - ii. Tap hole welding, dedusting ducts welding, temporary platforms, monkey ladders etc.
  - iii. Metal sample spoon, oxygen lance welding, hydraulic lines welding, skimmer box fabrication.

- **Furnace Proper**
  ii. Welding of structures, shell plate welding (Boiler quality plates), cooling plates welding with shell, water pipeline welding
  iii. Welding jobs in maintenance of BLT equipments, utility pipelines in furnace top, welding jobs of furnace nozzles
  iv. Structure strengthening, welding for pressure vessel plates.
- **Slag Granulation plant (SGP)**
  i. Welding of blowing box nozzle plate, slag pipelines, water pipelines, emergency tank, dewatering wheel,
  ii. Structure welding work , slag conveyor maintenance job welding like deck plat drive safety guards, stringers ,pulley mounting frames, drive frames, motor canopy etc
  iii. Chute welding jobs, liners welding, gates welding, hood welding, stone box welding ,modification of chutes .chute hard facing etc.

- **Gas cleaning plant (GCP)**
  i. BF gas ,coke oven gas pipelines welding job, various utility pipelines welding, water pipeline welding, launder welding job
  ii. Welding job of structures, water nozzles, ducts, SS pipe lines welding jobs, duct saddles with bearing plate erection
  iii. Pump & motor frames welding and welding involve in general mechanical maintenances such as scaffolding, platforms etc

- **Pulverised Coal Injection (PCI)**
  i. Welding involve in maintenance of mill rooler liners, roller table, drag chain conveyors, screw conveyors, ducts, coal transport pipelines
  ii. Welding for chute modification in raw material feeding to fine coal bin, bag house structures, manholes, bag mounting platforms, temporary ladders & platforms
  iii. Fabrication for HGG,BF gas ,COG lines, waste gas pipelines, and other general maintenance work

- **Stock House**
  i. Structure welding work , slag conveyor maintenance job welding like deck plates, drive safety guards, stringers ,pulley mounting frames, drive frames, motor canopy etc
  ii. Chute welding jobs, liners welding, gates welding, hood welding, stone box welding, modification of chutes. Chute hard facing etc

iii. Welding in Bunker, vibro feeder, belts ,screens, belt weigher, weigh hopper, structure maintenance job, suction hood and suction pipe, shuttle conveyor travel rail and buffer stopper and other maintenance job in stock house.

3. <u>SINTERING PLANT</u> Duration:-35 hrs.

- **Waste Gas Blower house and cooler blower**

ii. Blower top and Bottom casing repairing like hole blanking , angle strengthening, cone repairing work.
iii. Hydraulic pipe line and water pipe line welding work.
iv. Top and Bottom casing cross bracing pipe welding work.
v. Platform and stair case modification and welding work.
vi. Blower receiving and discharge duct repairing and welding work.

- **Waste Gas ESP and product ESP**

i. Rapping Hammer (Both anode and cathode) welding work.
ii. Gas distribution plate welding work.
iii. Hopper liner fixing, Discharge chute repairing and welding work.
iv. Inside beam and bracing welding work.

- **Sinter Machine Building**

i. Wind Box and Spillage hopper Hole blanking, Liners plate fixing and welding work.
ii. Sinter machine Discharge chute welding and repairing work.
iii. De-dusting pipe line welding / repairing work, structure welding work.
iv. Sinter machine hearth layer and surge bin adjustable gate liners welding and maintenance work .
v. Star crusher hammer and grizzly bar hard facing work.
vi. Mixed gas line, Nitrogen line, CO line Combustion air pipe line welding work.

- **Sinter cooler and discharge vibro-feeder**

i. Sinter cooler through grating system welding work.
ii. Sinter cooler discharge chute welding and repairing work.
iii. Welding job of structure, platform, and stair case and hand railing.
iv. Vibro-feeder liners fixing, body reaping and welding work.
v. Vibro-feeder discharge chute repairing and welding work.

- **Double roll-crusher and cascade chute**
  i. Cascade chute hard facing, welding and body repairing work.
  ii. Double roll-crusher rolls hard facing.
  iii. Receiving and discharge chute welding work.
  iv. Steel structure welding work.
  v. Platform and stair case modification and welding work.

- **Sinter screen and related chute**
  i. Sinter screen body, inside tie beam, side liners welding and repairing job.
  ii. Sinter screen receiving and discharge chute welding , liners fixing and body repairing work and stone box fabrication and erection work.
  iii. Discharge movable hopper repairing, liner fixing work and stone box welding work.
  iv. Hearth layer vibro-feeder liners fixing, body reaping and welding work.
  v. Hearth layer vibro-feeder discharge chute repairing and welding work.
  vi. Different type inspection door welding and repairing work.

- **Belt Conveyor system**
  i. Gallery steel structure and walkway modification welding work.
  ii. Idler frame modification and welding work.
  iii. Conveyor receiving and discharge chute liner fixing and chute body repairing.
  iv. Conveyor stair case and hand railing welding.
  v. Modification and fabrication welding
  vi. Input and output coupling guard welding work.
  vii. Deflector plate welding if any damaged.

- **Pump House and cooling tower**
  i. Water pipe line welding job, other utility pipe lines maintenance work.
  ii. General maintenance job like platform welding, scaffolding , hoist maintenance platform modification and welding work.

- **PBB Building**

i. Chute welding job, liners welding , hood welding , stone box fabrication, stone box welding jobs.
ii. Weigh feeder receiving chute, discharge chute, weigh feeder hood, weigh feeder top cover repairing and welding job.
iii. Shuttle belt conveyor receiving and discharge chute liner welding, chute repairing and top cover of trolley welding work.
iv. Welding work on bunker if any damaged, de-dusting pipe line welding work.
v. Structure welding, platform modification and welding, stair case and hand railing modification and welding.

4. <u>STEEL MELTING SHOP</u> Duration:-60 hrs.

- Lance setting and maintenance; Function; Lance is used for oxygen blowing inside the convertor. WELDER job-Repair and welding of lance tip.
- Chute maintenance, Function-It is used to supply required material inside the convertor. WELDER job- Repair and welding of chute liner, chute cover etc.
- Gas cleaning system –Function; It is used to clean the convertor gas. WELDER job-Repair of welding of pipelines connected to gas cleaning system.
- Crane maintenance; Function- It is used to transfer material from one place to other place. WELDER Job- Repair and welding of bridge and trolley structures.
- Track alignment; Track is used as path way for cranes. WELDER job-Repair and welding of clit plates and washers.
- Slag Car and metal car-It is used for transfer of metal / slag from convertor area to LH/ SLAG yard. WELDER Job- Repair and welding of trolley plates , connecting pipes etc.
- Electrode changing in Ladle furnace ; WELDER Job; Repair and welding of electrode holders device.

5. <u>THIN SLAB CASTER</u> Duration:-50 hrs.

- Operation and maintenance of Turret Car:- Welding of pipelines connected to turret car .
- Caster Cranes and their units:- Welding of structures bridge and trolley, repair and welding of rope cover.
- Tundish Car and its maintenance :- Repair and welding of pipelines and pusher used for dismantling of tundish.
- Dummy Bar :- Repair and welding of chain and broken part of the dummy bar.
- Slab cutting machine :- Repair and welding of pipeline and accessories connected to slab cutting machine.

- Assembly and dismantling of segments. :- Gas cutting of links for dismantling of segments.

6. HOT STRIP MILL **Duration:-40 hrs.**

- Tunnel furnace: - Repair and welding of pipes, valves connected with tunnel furnace. Repair and welding of rollers of the tunnel furnace.
- Rolling stands :- Repair and welding of pipes , hydraulic systems, pneumatic systems etc.
- Rollers and guides :- Repair and welding of rollers and guides.
- Coiler :- Repair and welding of coiler plates and assembly.
- Hydraulic and pneumatic system :- Repair and welding of hydraulic and pneumatic pipelines and valves ,connecting plates etc.

7. RMHS **Duration:-30 hrs.**

- Repair and welding of roller pipes.
- Repair and welding of structures
- Repair and welding of hamper crusher

8. **POWER AND BLOWING STATION** **Duration:-35 hrs.**

- Repair and welding of boiler shell.
- Repair and welding of pipes of water treatment plant.
- Repair and welding of high pressure tubes of boilers.
- Repair and welding of high pressure pipe line .

9. GENERAL TRAINING **Duration:-40 hrs.**

i. Storing of tools, tackles, welding machines, safety items, welding electrode etc.
ii. Repair of structures through gas cutting and welding
iii. Repair of spare parts through gouging and welding
iv. Lancing of metals coming out of the furnaces through breakdown.
v. Repair and welding of equipment in case of breakdown.
vi. Repair and welding of stair cases/ pathway provided for the cranes.
vii. Welding of fabrication and assemblies as per requirement
viii. Use of TIG, MIG, SAW , MAMC as per requirement of the job.
ix. Reclamation of spare parts
x. Hard facing of wearing elements.

ANNEXURE-I

List of Tools & Equipment			
WELDER (INTEGRATED STEEL PLANT) (For batch of 20 candidates)			
Sl.No.	**Name of the Tool & Equipments**	**Specification**	**Qty**
A. TRAINEES TOOL KIT			
1.	Welding Helmet fibre		20
2.	Welding hand Shield fibre		20
3.	Chipping Hammer with metal handle	250 Grams	20
4.	Chisel cold flat	19mm x 150mm	20
5.	Centre punch	9mm x 127mm	20
6.	Dividers	200cm.	20
7.	Stainless steel rule	300mm	20
8.	Scriber double point.	150mm	20
9.	Flat Tongs	350mm long	20
10.	Hacksaw frame Fixed	300mm.	20
11.	File half round bastard	300mm	20
12.	File flat bastard	350mm	20
13.	Hammer ball pane.	1 kg with handle	20
14.	Tip Cleaner		20
15.	Try square	6"	20
16.	Leather Hand Gloves	14"	20
17.	Cotton Hand Gloves	8"	20
18.	Leather Apron		20
19.	S.S Wire brush	5 rows and 3 rows 75/45	20
20.	Leather Hand Sleeves	16"	20
21.	Safety boots for welders		20
22.	Leg Guards Leathers		20
23.	Rubber hose Clips	1/2 "	20
B. GENERAL SHOP OUT-FIT			
24.	Rubber hose, oxygen	8mm dia x 10mts. Long as per BIS	4
25.	Rubber hose Acetylene	8mm.dia x 10mts. Long as per BIS	4
26.	Arc welding cable multi cored copper 400/600amp as per BIS		90m
1.	Arc welding single coloured glasses	108mm x 82mm x 3mm DIN 11A & 12A	68
2.	Arc welding glass plain	108mm x 82mm x 3mm	100

3.	Gas welding goggles with colour glass	3 or 4A DIN	40
4.	Safety goggles plain		20
5.	Spark Lighter		12
6.	Grinder wheels	AG 7	20
7.	Spindle key		4
8.	Screw Driver	300mm blade and 250mm blade. 80+70	1
9.	Magnifying glass	100 mm dia	2
10.	Universal Weld measuring gauge		2
11.	Earth Clamps	600A	6
12.	Spanner D.E.	6mm to 32mm	2
13.	Clamps - 1each	10cm and 15cm	2 sets
14.	Hammer sledge double faced.	4 kg	1
15.	S.S tape flexible in case.	5meters	1
16.	Electrode holder	600amps	6
17.	H.P Welding torch	5 nozzle nos.1,2,3,5 & 7	2
18.	Oxygen Gas Pressure regulator double stage		2
19.	Acetylene Gas Pressure regulator double stage		2
20.	CO2 gas pressure regurator with flow meter		2
21.	Argon Gas pressure regulator with flow meter		2
22.	Metal rack	182cm x 152cm x 45cm	1
23.	First Aid box		1
24.	Steel lockers with 8 Pigeon holes		2
25.	Steel almirah / cupboard		2
26.	Black board and easel with stand		1
27.	Flash back arrester (torch mounted)		4
28.	Flash back arrester (Cylinder mounted)		4
C. GENERAL INSTALLATION			
1.	Welding Transformer with all accessories	400A, OCV 60-100 V ,60% duty cycles	1
2.	Welding Transformer with all accessories	300A, OCV 60-100 V ,60% duty cycles	1
3.	D.C Arc welding rectifiers set with all accessories	400A. OCV 60-100V, 60% duty cycle	1
4.	GMAW (Co2 Arc) Welding Machine capacity with air cooled torch, Regulator, Gas hose, Water circulating system and standard accessories.	400A	1
5.	AC/DC GTAW (TIG)Welding Machine with water cooled torch, Argon regulator, Gas hose, Water circulating system and	300A	1

	standard accessories		
6.	Auto Darkening Welding Helmet		2
7.	Portable gas cutting machine capable of cutting Straight & Circular with all accessories		1
8.	Pedestal grinder fitted with coarse and medium grain size grinding wheels	dia 300mm	1
9.	Bench Grinder Fitted with fine grain size silicon carbide green grinding wheel	dia 150mm	1
10.	AG 7 Grinder		2
11.	Suitable gas welding table with fire bricks		2
12.	Suitable Arc welding table with positioner		6
13.	Trolley for cylinder (H.P. unit).		2
14.	Hand shearing machine capacity to cut sheets and flats	6mm	1
15.	Power hacksaw machine		1
16.	Portable drilling machine	cap.6mm.	1
17.	Oven, electrode drying	0 to 350 C, 10kg capacity	1
18.	Work bench	340x120x75cm with 4bench vices of 150mm jaw opening	4
19.	Oxy Acetylene Gas cutting blow pipe High pressure with cutting nozzles	0.8 mm 1.2 , and 1.6 mm	4
20.	Oxygn, Acetylene Cyclinders (1each)		2
21.	Fire extinguishers (Co2 type).		2
22.	Anvil	12sq. Inches working area with stand 50kg	1
23.	Swage block		1
24.	Die penetgrant testing kit		1
25.	Fire extinguishers. (1Each)	foam type and Co2 type	2
26.	Fire buckets with stand		4

TOOLS & EQUIPMENT FOR EMPLOYABILITY SKILLS		
S No.	**Name of the Equipment**	**Quantity**
1.	Computer (PC) with latest configurations and Internet connection with standard operating system and standard word processor and worksheet software	20 nos.
2.	UPS	As required
3.	Scanner cum Printer	1 no.
4.	Computer Tables	20 nos.
5.	Computer Chairs	20 nos.
6.	LCD Projector	One in each class room
7.	White Board 1200mm x 900mm	One in each class room

NISP Training Center ANNEXURE-II

Trainee Internal Assessment Report

Name :		**Batch No:**	
Card ID No :		**Dept:**	
Attendance % :			

Quarters	Month	Attend %	Month	Attend %	Month	Attend %	Quarterly Average Attend. %
Qtr-1							
Qtr-2							
Qtr-3							
Qtr-4							

General Assessment **Assessment Period :**

S.No	ATTRIBUTES		Score Qtr-1	Score Qtr-2	Score Qtr-3	Score Qtr-4	Score Sum of 4-Qtrs
1	**Safety**	Knowledge, follow safety precautions and rules					
2	**Sense of Responsibility**	Does he obey Sup/Line i/c instructions					
		Does he attend shift start meetings regularly					
		Does he take supervisors feedback properly					
		Whether he takes planned leaves					
		Does he participates in new drives					
		Does he take care in handling tools					
		Is Punctual					
		Positive, Behaviour, response, learning					
		Maintain 5S at his work station					
		Co-operation - Consider team work, willingness to work with and for others					
		Able to identify and report irregularities at his work place					
3	**Method**	Follow WIS/MOS					
		Able to check faults of previous station					
		Understands tools/equipment functions and its different parts					
		Able to perform the job independently					
4	**Speed**	Able to match line "TACT" time					
		Willingness to learn/flexibility for alternate job					
		Work completion/target achievement					
5	**Quality**	Able to contain defects					
		Awareness about GCA/PDI					
		Skill acquired during "On job training"					
		Total Score					
		Max. Marks					

Fill score in relevant box	**Exellent:4**	**Very Good:3**	**Good:2**	**Fair:1**	**Need Improvement:0**
Remark of Supervisor: Mention Achievement					
Remark of Shift In charge/Dept, Mgr.					
Remark of NISP Training In charge					
Any Remark					

12. COMMITTEE OF TRADE EXPERT

S.N.	Name(S/Shri.)	Qualification	Experience	Status
1.	Dr. S.N.Singh Ex. ED, SAIL Bokaro Steel Plant	BE , Phd.	40 years experience of steel industry	Chairman
2.	S.K.Saha Ex. ED, MEL(SAIL)	BE (Mech.)	25 years experience of mechanical maintenance of steel industry	Member
3.	T.K.Soni, Expert Sintering Plant	BE(Mech.) ,	15 years experience of mechanical maintenance	Member
4.	R.R.Bitra Ex. DGM(Maint.) Roukela Steel Plant	BE (Mech.)	35 years experience of mechanical maintenance of steel industry	Member
5.	P. Agarkar DGM(Mech.) NISP. Nagarnar	BE (Mech.)	20 years experience of mechanical maintenance of steel industry	Member