

# **SYLLABUS FOR SIX MONTHS - FULL TIME CERTIFICATE COURSE IN WELDING AND FABRICATION**

**Effective From :-**



**UNDER DEVELOPMENT**

**Prepared by:**

**Curriculum development cell  
Institute of Research Development & Training,  
Kanpur**

## **MAIN FEATURES OF THE CURRICULUM**

**Title of the course:** Certificate Course in 'WELDING AND FABRICATION'

Duration: SIX MONTHS

Pattern of the course: Modular System

Intake:

Type of course: Full Time

Entry qualification: Minimum 8th Standard & 14 years of age

**Mode of admission:**

Study and Evaluation Scheme for

**SIX-MONTHS  
CERTIFICATE COURSE IN  
WELDING AND FABRICATION  
(To be Effective from.....)**

<b>Curriculum</b>					Courses/ Subject	Theory Marks	Practical Marks	
Periods per week								
Lecture		Lab.		Total				
3		15		18	1. SHOP FLOOR SKILLS PRACTICES- WELDING	10	35	
3		15		18	2. SHOP FLOOR SKILLS PRACTICES- FABRICATIONS	10	35	
					3. PROJECT		10	
					36	TOTAL	20	80
					36	GRAND TOTAL	(20+80)	100

**NOTE:**

1. Each period will be of 50 minutes duration.
2. Each session will be of 24 weeks
3. Effective teaching will be at least 20 weeks.
4. Remaining periods will be utilized for revision etc.
5. Each student shall under take a project in any of the areas depending on her interest and facilities available in the establishment. The duration of the project shall be one Week.

**Syllabus for the**  
**WELDING & FABRICATION**

Week No.	Shop Floor Practice Skill to be covered	Related Instructions(Theory)
1 & 2	Introduction to safety equipments used in structural welding Familiarization with machinery in shop, plasma cutting and gouging	Safety equipments and their application in industry. Principle of SMAW. Brief description and specification of welding procedure
3 & 4	Position welding for making a job by using SMAW 1F, 2F, 3F, 4F Setting gas cutting plant and SMAW weld equipment	Different types of welding procedure and their types
5 & 6	Structural fitting with tack weld, 3F, 4F position weld.	Various types of electrode selection as per job requirement Electrode, drying procedure Welding fixtures and clamps
7 & 8	Pressure pipe welding and joint by SMAW 5 F position and flange joints, M.S. pipe joint	Effects of heat and controlling of distortion and stress relieving
9 & 10	Root pass welding and preparation of different types of joints Cover pass welding (2G, 3G)	Qualification and necessity of qualified welder, structural fabrication importance Different types of steel section Welded joints dynamically loaded structure.
11 & 12	Setting of TIG welding machine and equipment as per job, working in down position.	TIG welding machine, polarity, types of equipments. Types of tungsten electrode, selection. Types of shielding.
13 & 14	Root pass welding by TIG and LPI test cover pass welding, inspection clearance	TIG welding under drift conditions Necessity of back purging Necessity of root passes welding
15 & 16	Root pass cover pass welding by TIG and SMAW with position 3G and 4G	Different types of tubular structure T.Y, K joints

17 & 18	Root inspection by gouging, adopting weld sequence for controlling distortion, joints with dissimilar thickness.	Welding defects causes and remedies Gouging methods Preheating and rewelding
19 & 20	Pipe joints T, Y.K. flat and horizontal positions	Structural fabrication procedure and planning, measurement of weldment size, testing and inspection
21 & 22	Setting of Co <sub>2</sub> plant and practice on Co <sub>2</sub> welding and automatic submerge arc welding	MIG/Flux cored arc welding, advantages and limitations of submerged arc welding. Different welding parameter.
23 & 24	Making of simple structure with angles, channels, I & T section, correction of distortion, preparation of WPS and PQR weld inspection and test	Weld defects, causes and remedies. Structural welding codes and standards Writing procedure for WPS and PQR Process qualification in various codes. Different testing method.
25 & 26	Project work, review and test.	

**Tools & equipments for the trade of 'WELDING & FABRICATION'**

<b>General installation</b>	
1.	Transformer welding set with all accessories 300A
2.	Arc welding set rectifier type 400 Amp with all accessories
3.	TIG welding set complete 300 amps AC/DC with water cooled torch
4.	Co <sub>2</sub> welding machine complete 400 (inverter type)
5.	Welding cables to carry 400 amps with flexible rubber
6.	Lugs for cables
7.	Gas welding table 822x92 cm+60 cm fire bricks on stand
8.	Arc welding table all metal with positioner
9.	Trolley for cylinder (HP Unit)
10.	Bench shear hand capacity up to 5 mm
11.	D.E. grinder 30 cm wheel motorized pedestal type
12.	Vice bench 10 cm
13.	Power hacksaw
14.	Electrode drying oven temp. range 0-250 degree, 10 kg. cap
15.	AG7 grinder & AF <sub>4</sub>
16.	Portable drilling machine (cap. 5mm)
17.	Welding helmets
18.	Steel lockers with 8 pigeon holes
19.	Dye penetrant testing kit
20.	Magnetic particle testing machine
21.	Ultrasonic flaw detector
22.	IIW/ASTM reference radiographic standard

23.	Submerged arc welding machine 600 amps
24.	Spot welding machine – 15 KVA
25.	Universal testing machine
26.	Personal computer with latest profile
27.	Welding CDs (processes and inspection methods)
28.	Fibre welding booth & welding screen
29.	Fume extractors
30.	Oxygen, acetylene, argon & Co <sub>2</sub> cylinders
31.	Fire fighting equipments & first aid box
32.	Pug cutting machine
33.	Centre lathe, height of centre 150 mm with standard accessories

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Kindly mail your suggestions/feedback for improvement/development of the syllabus to:-

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