For Electrician, Fitter, Diesel Mech., and Welder TP-25hrs & TT-7 hrs. per WEEK **For COPA TP- 30hrs. & TT-6 hrs. per WEEK**

LESSON PLAN (FOR RELATED THEORY PART)

TRADE :	**Welder**		SEM:	I	YEAR-1
LEARNING OUTCOME	**2**	EXERCISE NO	5	LESSON NO (REF TO PRACTICAL):	

DAY (1)	Hrs (2)	Major topics/Lesson Title (Reference syllabus) (3)	Details of each day plan (Explanation) /Sub topics (Reference NIMI book) (4)	Text and media content to be displayed for viewing (5)	Media nature (ie., 2D image/ 3D image / animation video/ Simulation etc.,) (6)	Whether Direct teaching or digital video for self learning (7)	Type of assessment Assessment (like Quiz, Identify, Fill in the blank, MCQ, etc.) (8)
		Common Gases used	Introduction • Different gases used with combination in gas welding for produce hot gas flame.	Text & Images	PPT Slides	Direct teaching	Quiz and Assignment
			Fuel Gas- Acetylene,Propone, Butane,Coal,LPG,Hydrogen, Welding C.I using SMAW process	Images & videos	PPT Slides	Direct teaching	Quiz and Assignment
			Supporting Gas - Oxygen and Air	Images & videos	PPT Slides	Direct teaching	Quiz and Assignment
			Name of Gas Flame Combination - 1. Oxy – Acetylene flame 2. Oxy-hydro flame 3. Oxy Cool Flame 4. Oxy LPG Flame 5. Oxy-Propane Flame 6. Oxy- Butane Flame 7. Air Acetylene	Text & Images	PPT Slides	Direct teaching	Quiz and Assignment

1	1.5	Common Gases used for Welding & Cutting, Flames Temperature and Uses	Temperature of flame combination - 1. Oxy Acetylene – 3100 to 3300°C 2. Oxy Hydrogen 2400 to 2700°C 3. Oxy Coal 1800 to 2200°C 4. Oxy LPG 2700 to 2800 °C 5. Air Acetylene 1825 to 1875°C	Text & Images	PPT Slides	Direct teaching	Quiz and Assignment
			Uses - 1. Oxy Acetylene Flame Used in all ferrous & non ferries & alloy metal welding steel cutting & gas cutting barging bronze welding metal spraying and hard surfacing 2. Oxy Hydrogen :- Only used for brazing, silver soldering and under water steel gas cutting 3. Oxy Coal Silver soldering and under water steel gas cutting 4. Oxy LPG Steel gas cutting & heating 5. Air Acetylene Only for soldering barging application and lead combination	Text & Images	PPT Slides	Direct teaching	Quiz and Assignment
			Types and Features of Oxy Acetylene flames 1. Inner Cone 2. Acetylene feather or intermediate zone 3. Outer envelope	Text & Images	PPT Slides	Direct teaching	Quiz and Assignment
			Different types of zones & Temperature - Primary and Secondry Combustion Stage in the Oxy Acetylene Flame	Text & Images	PPT Slides	Direct teaching	Quiz and Assignment

2	2	Chemistry of OXY Acetylene flame	Combustion ration of oxygen & Acetylene in flame: One volume of acetylene is required for complete combustion and one half of oxygen Acetylene 1 Ltr Oxygen 2.5 Ltr One of the Acetylene & one volume oxygen required for neutral flame Acetylene : Oxygen 1 1 Then full combination of Acetylene required 1.5 Ltr Oxygen	Text & Images	PPT Slides	Direct teaching	Quiz and Assignment
			Chemical Reaction: A Quantity of acetylene combine with two and a half quantities of oxygen and burans two quantities of carbon dioxide water vapor and quantity of heat	Text & Images	PPT Slides	Direct teaching	Quiz and Assignment
			Advantage: **Oxy acetylene flame use in gas welding because:-** **• High temperature & good controlled flames** **• Easy use for metal fusim** **• No change in metal chemically properties**	Text & Images	PPT Slides	Direct teaching	Quiz and Assignment
			Types: **There are three types of any acetylene :-** **1 Neutral flame** **2 Oxidizing flames** **3 Carburizing flame**	Text & Images	PPT Slides	Direct teaching	Quiz and Assignment

3	2	**Types of Oxy-Acetylene flames and uses**	**Neutral flames:** **Inner cone** **Outer envelope** **The neutral flames was one to one ration of acetylene and oxygen it has obtains additional oxygen from the air and provides complete combustion It is generally preferred for welding** **The neutral flame has a clear well defined or luminous cone indicating toast combustion is complete.**	Text & Images	PPT Slides	Direct teaching	Quiz and Assignment
			Oxidizing Flames: **Oxidizing have are produced when slight more has one volume of oxygen is matched with one volume of acetylene Its inner cone is point and slightly purple Its can recognized by its district hinging sound.**	Text & Images	PPT Slides	Direct teaching	Quiz and Assignment
			Carburizing Flame: **Its has excepts acetylene he inner cone has a teathery edgy extending beyond it**	Text & Images	PPT Slides	Direct teaching	Quiz and Assignment
			Uses: **Neutral flame :- Neutral flames are commonly used to held mild steel stainless sheet cost iron copper aluminum** **Oxidizing flames – Oxidizing flames are commonly used to weld Zinc,Copper,Manganese steel,Cost iron** **Carburizing Flames:- Carburizing Flames is used for welding the metal boils and its not clear. Its used for hard facing,**	Text & Images	PPT Slides	Direct teaching	Quiz and Assignment

4	1.5	**Oxy- Acetylene cutting equipment, principle, parameters and application**	**Oxy Acetylene Cutting Equipment:** **• Oxygen regular** **• Acetylene regular** **• Oxygen &Acetylene gas hose pipe** **• Hose clips** **• Cutting troch** **• Cylinders and cart** **• Flash back arrestor** **• Flint lighter to ignite troch**	Text & Images	PPT Slides	Direct teaching	Quiz and Assignment
			Cutting troch: **The cutting torch lite the welding troch has a tube for oxygen and one for acetylene in addition there is a tube for high pressure oxygen along with a cutting tip**	Text & Images	PPT Slides	Direct teaching	Quiz and Assignment
			Difference: **Between blow pipe and cutting troch A blow pipe has a nozzle with one hole the torch body oxygen and we get flame A cutting troch has which of nozzle in a circle with an any acet mix as blow pipe and a bigger role in the middle where oxygen comes out the outer holes heat the steel the inner roles cuts** **M.S cutting Operation Parameters :-**	Text & Images	PPT Slides	Direct teaching	Quiz and Assignment
			Oxy acetylene cutting process : **1 Attach the required cutting tip to the troch and adjust the oxygen andacetylene pressure in accordance with table above** **adjust the preloading flame to neutral hold the troch so that the cutting oxy lever be operated with one hand keep flame at a 90 degree angle to work in the direction of trowel the inner cone of the preheat flame should be above 1.6 mm above the end of the properly move the troch at a speed which will allow the cut to continue penetrating the work a good cut will be clean and name**	Text & Images	PPT Slides	Direct teaching	Quiz and Assignment

			Principle of gas cutting : **The process consists of preheating the metal to be cut to its oxides temperature above 870 degree C in case of steel the preheating is done by oxy acetylene gas flame which is supplied from surrounding opening of the cutting troch the metal is rapidly oxidized and slag is formed**	Text & Images	PPT Slides	Direct teaching	Quiz and Assignment
			Application of Oxy acetylene gas cutting: **o Used for cutting of all ferrous metals and steel & its allow except high carbon sheet** **Automotive repair, removing a sized bolts** **o Robotic oxy fuel cutting** **o Straight cutting of Mis plates thickeners** **o Bevel cutting** **o Circular cutting by using guides** **o Profile cutting**	Text & Images	PPT Slides	Direct teaching	Quiz and Assignment