No.	Information on Fuel, Refractories and Furnaces	
1.	Unit Name:	Fuel, Refractories and Furnaces
2.	Unit Code:	Met-31025
3.	Classification:	EngineeringSubject
4.	Credit Value:	3
5.	Semester/Year Offered :	1/3
6.	Pre-requisite:	Met-11011 & Met-12011
7.	Mode ofDelivery:	Lecture, Tutorial, and Practical
8.	Assessment System and Breakdown of Marks:	
	Test	30%
	Mid-term/Final Examination	70%
9.	AcademicStaff Teaching Unit:	
10	Course outcome of unit: In this course, students will • study the different types of fuel, burners and coal analysis. • learn the classification, properties and manufacture of refractories • study the mechanism of furnace and select the furnace depending on ore type and operation • measure the operation temperature of furnace with thermocouple and optical pyrometer • calculate the calorific power of the fuel and sensible heat present in the fuel or air • study the combustion of coal and manufacture of producer gas	
11	Synopsis of unit: The course covers the selection of fuel, refractories and furnaces depending on ore types and extraction process. The course introduces students to types of fuel, refractories and mechanism of furnaces, combustion reaction with air and application in metal extraction from ores and concentrate.	
12	Topic 1. Fuel - Classification of fuel - Choice of fuel	

- Solid fuel
- Coal analysis
- Pulverized coal
- Coke
- Coke ovens
- Liquid fuel
- Gaseous fuel
- Gas burners
- Fuel gases
- Gassification of coal and coke
- Reaction zones in a producer-gas

2. Refractories
    - Properties of refractories
    - Classification of metallurgical refractories
    - Silica-alumina refractories
    - Basic refractories
    - Insulating refractories
    - Special refractories

3. Furnaces
    - Classification of furnaces
    - Class 1. Crucible furnaces
    - Class 2. Hearth furnaces
    - Class 3. Shaft furnaces
    - Class 4. Retorts
    - Class 5. Converters
    - Class 6. Sintering machines
    - Class 7. Some miscellaneous furnaces
4. Pyrometryo
    - Thermocarples& resistance pyroometers
    - Optical & radiation pyrometers

5. Quantities and Units
    - Some important units and definitions

	- Precision of metallurgical calculations - Dulong's formula - Calculation of developed heat content (Sensible heat) - Temperature attained in combustion - Problems 6. Manufacture of Producer Gas - Manufacture of coke and producer gas - Production of coke and by-products - Problems
13	Main references: Associate professor, U AungHlaTun, A Guide book on Metallurgical Engineering.
14	Additional reference: