**LESSON PLAN (4th semester)**

**FUELS AND CERAMIC KILNS**

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| SL.No | TOPIC | Reference | Assignment | Comment  /Periods |
| 1.0 | I INTRODUCTION TO FUEL AND COMBUSTION | O. P gupta |  |  |
| 1.1 | state and explain introduction to solid liquid and gaseous fuels. | O. P gupta |  | One period |
| 1.2 | Explain non conventional source of energy for burning ceramic kiln. | O. P gupta |  | One period |
| 1.3 | State and explain combustion of fuels. | O. P gupta |  | One period |
| 1.4 | Conservation of fuels. | O. P gupta |  | One period |
| 1.5 | terms and definitions related to fuel testing. | O. P gupta |  | One period |
| 2.0 | SOLID LIQUID AND GASEOUS FUELS |  |  |  |
| 2.1 | State various types of solid fuels. | O. P gupta |  | One period |
| 2.2 | Classify solid fuels. | O. P gupta |  | One period |
| 2.3 | Describe methods of formation of coal and types of coal. | O. P gupta |  | One period |
| 2.4 | State and explain the properties of coal. | O. P gupta |  | One period |
| 2.5 | Describe in detail how Coke is prepared in Coke oven. | O. P gupta |  | One period |
| 2.6 | State the properties of coke. | O. P gupta |  | One period |
| 2.7 | Describe the procedure for storage of coal. | O. P gupta |  | One period |
| 2.8 | State the reasons for washing of coal. | O. P gupta |  | One period |
| 2.9 | Describe briefly the gradation of coal. | O. P gupta |  | One period |
| 2.10 | Testing of solid fuel. | O. P gupta |  | Two periods |
| 2.11 | Classify liquid fuels. | O. P gupta |  | One period |
| 2.12 | describe the process of refining crude petroleum. | O. P gupta |  | One period |
| 2.13 | state and explain the properties of various liquid fuels and petroleum by products( introduction only). | O. P gupta |  | One period |
| 2.14 | State the advantages of liquid fuels over solid fuels. | O. P gupta |  | One period |
| 2.15 | testing of liquid fuels such as flash point ,fire point ,pour point ,smoke point, dew point etc. (General ideas only). | O. P gupta |  | One period |
| 2.16 | Describe the procedure for storage of liquid fuels. | O. P gupta |  | One period |
| 2.17 | Classify gaseous fuel | O. P gupta |  | One period |
| 2.18 | state and explain the properties of various gaseous fuels and their application in industries and blast furnace gas, Coke oven gas,BOF gas, coal gas, oil gas mixed gas. | O. P gupta |  | Two periods |
| 2.19 | Explain in details the manufacturing method of procedure gas and water gas. | O. P gupta |  | One period |
| 2.20 | List the advantages of gaseous fuel over liquid and solid fuel. | O. P gupta |  | One period |
| 2.21 | Describe the manufacturing methods of biogas. | O. P gupta |  | One period |
| 2.22 | Testing gaseous fuel (introduction only) | O. P gupta |  | One period |
| 2.23 | Rocket fuel and Nuclear fuel. | O. P gupta |  | One period |
| 3.0 | CERAMIC KILNS |  |  |  |
| 3.1 | Define kiln, furnace and oven. | O. P gupta |  | Two periods |
| 3.2 | Classify ceramic kiln in details. | O. P gupta |  | Two periods |
| 3.3 | describe the operation and uses of the following kilns in details:-  a) downdraft kiln  b) updraft kiln  c) chamber kiln  d) tunnel kiln and roller Hearth kiln  e) muffle kiln  f)shaft kiln  g) glass pot furnace  h) glass tank furnace  i) electric furnace for glass melting  j) rotary kiln  k) Coke oven | O. P gupta |  | One period  One period  One period  one period  One period  One period  One period  One period  One period  One period  One period |
| 3.4 | List the advantages of continuous kiln over period kiln. |  |  | One period |
| 3.5 | Describe various type of kiln furniture used in ceramic kilns. |  |  | One period |
| 3.6 | Describe various types of furnace and kilns accessories used in kiln operation. |  |  | One period |
| 4.0 | FURNACES (introduction only) | O. P gupta |  |  |
| 4.1 | Classification of furnaces. | O. P gupta |  | One period |
| 4.2 | Furnaces used in iron and steel plant. | O. P gupta |  | One period |
| 4.3 | Fuels used in steel plant furnaces and their characteristics. | O. P gupta |  | One period |
| 4.4 | Sketch the following furnaces showing various section and explain their uses. | O. P gupta |  | One period |
| 5.0 | PYROSCOPE AND PYROMETER |  |  |  |
| 5.1 | Define pyroscope and pyrometer. | O. P gupta |  | One period |
| 5.2 | Disuses various type of pyroscopes. | O. P gupta |  | One period |
| 5.3 | Describe various types of cones used in ceramic kiln firing. | O. P gupta |  | One period |
| 5.4 | state the requirements of Pyroscope and pyrometer in kiln firing. |  |  | One period |
| 5.5 | Describe various pyrometers used in ceramic kiln firing. |  |  | One period |