**Lesson Plan**

**Name of faculty:- Sh. BIJENDER SINGH ( Theory)**

**Discipline:- Mechanical Engineering**

**Semester:- 3rd**

**Subject:- WORKSHOP TECHNOLOGY-II**

**Lesson Plan Duration:- 15 weeks (from Sept.2024 to Dec.2024)**

**Work Load:- Lectures-3**

| **WEEK** | **THEORY** |
| --- | --- |
| **LECTURE DAY** | **TOPIC** |
| 1st | 1st | **Unit-I: Welding** **Resistance welding:** Principle, advantages, limitations, working and applications of spot welding and seam welding |
| 2nd | **Other Welding Processes**: Principle, advantages, limitations, working and applications of Shielded metal arc welding, submerged arc welding. Welding defects, methods of controlling welding defects and inspection of welded joints. |
| 3rd | **Modern Welding Methods**: Methods, Principle of operation, advantages, disadvantages and applications of, Tungsten inert gas (TIG) welding, Metal inert gas (MIG) welding |
| 2nd  | 1st | Thermit welding, Electro slag welding, Electron beam welding, Ultrasonic welding, Laser beam welding, Robotic welding |
| 2nd | **Unit-II: Foundry Techniques** **Pattern Making** Types of pattern, Pattern material, Pattern allowances, Pattern codes as per B.I.S., Introduction to cores, core boxes and core materials, Core making procedure, Core prints, positioning of cores |
| 3rd | **Moulding and Casting** **Moulding Sand:** Properties of moulding sand, their impact and control of properties viz. permeability, refractoriness, adhesiveness, cohesiveness, strength, flowability, collapsibility, Various types of moulding sand, Testing of moulding sand. |
| 3rd | 1st | **Mould Making:** Types of moulds, Step involved in making a mould, Molding boxes, hand tools used for mould making |
| 2nd | **Molding processes:** Bench molding, floor molding, pit molding and machine molding. |
| 3rd | **Casting Processes**: Charging a furnace, melting and pouring both ferrous and non ferrous metals, cleaning of castings,  |
| 4th | 1st | Principle, working and applications of Die casting: hot chamber and cold chamber, Centrifugal casting |
| 2nd | **Gating and Risering System**: Elements of gating system, Pouring basin, sprue, runner, gates, Types of risers, location of risers, Directional solidification. |
| 3rd | **Melting Furnaces:** Pit furnace, Cupola furnace |
| 5th | 1st | Crucible furnace – tilting type, Electric furnace |
| 2nd | **Casting Defects:** Different types of casting defects, Non destructive testing (NDT) of castings: die penetration test, radiography, magnetic particle inspection and ultrasonic inspection. |
| 3rd | Revision |
| 6th  | 1st  | Sessional- 1st |
| 2nd  |
| 3rd  |
| 7th | 1st | **Unit-III: Shaping, Slotting and Planing** Working principle and construction of shaper, slotter and planer  |
| 2nd | Type of shapers, slotters, planers  |
| 3rd | Quick return mechanism applied to shaper and planer machine  |
| 8th | 1st | Work holding devices used on shaper and planer. Types of tools used and their geometry. |
| 2nd | Specification of shaper and planer. Speeds and feeds in above processes. |
| 3rd | **Unit-IV: Broaching** Introduction to broaching Nomenclature of broach tools, types and material |
| 9th | 1st | Types of broaching machines – single ram and duplex ram horizontal type |
| 2nd | Types of broaching machines - vertical type pull up, pull down and push down. |
| 3rd | Revision |
| 10th  | 1st  | Sessional- 2nd |
| 2nd  |
| 3rd  |
| 11th | 1st | **UNIT IV** : **Milling** Milling methods - up milling and down milling Specification and working principle of milling machine |
| 2nd | Classification, brief description and applications of milling machines Details of column and knee type milling machine |
| 3rd | Milling machine accessories and attachment – Arbors, adaptors, collets, vices, circular table, indexing head and tail stock, vertical milling attachment, rotary table. |
| 12th | 1st | Identification of different milling cutters and work mandrels Work holding devices |
| 2nd | Milling operations – face milling, angular milling, form milling, straddle milling and gang milling. |
| 3rd | Cutting parameters |
| 13th | 1st | **UNIT V** : **Jigs and Fixtures** Importance and use of jigs and fixtures, difference between jig and fixture. |
| 2nd | Principal of location, Locating and clamping devices |
| 3rd | Types of jigs – drilling jig, template jig and plate jig |
| 14th | 1st | Types of fixtures – Milling and welding fixture |
| 2nd | Revision |
| 3rd | Revision |
| 15th  | 1st | Sessional- 3rd |
| 2nd |
| 3rd |