Lesson Plan

Subject : MANUFACTURING TECHNOLOGY (MEC-302A)

Lesson plan Duration : 15 Weeks

Work load (lecture) per week : Lectures: 3 hours/Week

Lecture No	Description
1	Introduction to subject.
2	**Unit I:** Fundamentals of castings: Introduction to casting: basic requirements of casting processes.
3	Casting terminology, solidification process.
4	Prediction of solidification time, the cast structure, molten metal problems.
5	Fluidity and pouring temperature, role of gating system, solidification shrinkage.
6	Riser and riser design, risering aids, Patterns, design considerations in castings.
7	Expandable-mold casting processes: Sand casting.
8	Cores and core making, other expendable-mold processes with multiple use patterns.
9	Expendable-mold processes with multiple use patterns, shakeout, cleaning and finishing.
10	Multiple-use-mold casting processes: Permanent mold casting, die casting.
11	Squeeze casting and semisolid metal casting, centrifugal casting.
12	Cleaning treating and heat treating of castings, automation in foundry operations.
13	**Unit-II** Metal forming processes: classifications of metal forming processes.
14	Bulk deformation processes, material behavior in metal forming, temperature in metal forming, rolling: flat rolling and its analysis.
15	Shape rolling, rolling mills, forging: open-die forging, impression-die forging, flash less forging, forging hammers.
16	Presses, and dies, extrusion: types of extrusion, analysis of extrusion, extrusion dies and presses, defects in extruded products.
17	Wire and bar drawing, analysis of drawing, drawing practice, tube drawing.
18	Sheet metal working: Cutting operations: shearing, blanking, and punching.
19	Engineering analysis of sheet-metal cutting, other sheet-metalcutting operations.

20	Bending operations: v-bending and edge bending, engineering analysis of bending, drawing.
21	Mechanics of drawing, engineering analysis of drawing, defects in drawing.
22	**Unit-III** : Joining processes: Principles of fusion welding processes, arc welding processes-consumable electrodes.
23	Shielded metal arc welding, gas metal arc welding.
24	Flux-cored arc welding, submerged arc welding, Arc welding processes-non-consumable electrodes.
25	Gas tungsten arc welding, plasma arc welding, resistance welding processes.
26	Other fusion-welding processes: electron-beam welding.
27	Laser- beam welding, electro-slag welding, thermit welding.
28	Principles of solid state welding processes: friction welding, explosive welding.
29	Ultrasonic welding processes. Brazing, soldering, and adhesive bonding.
30	Principles of adhesive, brazing and soldering processes, origins of welding defects.
31	**Unit IV:** Powder metallurgy: Characterization of engineering powders.
32	Geometric features, other features production of metallic powders.
33	Atomization: other production methods.
34	Conventional pressing and sintering: blending and mixing of the powders.
35	Compaction, sintering, heat treatment and finishing.
36	Design considerations in powder metallurgy.
37	Shaping processes for plastics: Properties of polymer melts, extrusion.
38	Production of sheet and film, fiber and filament production (spinning)
39	Coating processes, injection molding, compression and transfer molding.
40	Blow molding and rotational molding, thermoforming.