**Lesson Plan**

**Name of faculty: Kamaljeet Motia**

**Discipline: Mechanical**

**Semester: 4th**

**Subject: Steam Generation & Power**

Lesson Plan Duration: 15 weeks (from January, 2018 to April, 2018)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Week** | **Theory** | | **Practical** | |
|  | **Lecture day** | **Topic(Including assignment/ test)** | **Practical day** | **Topic** |
| 1st |  | **Chapter 1 : Introduction;** classification of boilers |  | To study the Babcock-Wilcox boiler (Model) |
|  | Comparison of fire tube and water tube boiler; their advantages |
|  | Description of boiler; Lancashire; locomotive |
| 2nd |  | Babcock & Wilcox Boiler etc |  | To study the locomotive boiler (Model) |
|  | Boiler mountings; stop valve; safety valve; blow off valve; feed check etc |
|  | Water level indicator; fusible plug; pressure gauge |
| 3rd |  | Boiler accessories; feed pump; feed water heater |  | Checking of files and Viva Voce and remedial measures regarding the practical performed ( If any) |
|  | Preheater; super heater; economizer |
|  | Natural draught chimney design; artificial draught |
| 4th |  | Stream jet draught; mechanical draught |  | To study the Lancashire boiler (Model) |
|  | Calculation of boiler efficiency and equivalent evaporation(no numerical problem) |
|  | **Chapter 2 : Carnot cycle**; simple and modified Rankine cycle |
| 5th |  | Effect of operating parameters on Rankine cycle performance |  | To study the Nestler’s boiler(Model) |
|  | Effect of superheating; effect of maximum pressure; effect of exhaust pressure |
|  | Reheating and regenerative Rankine cycle |
| 6th |  | Types of feed water heater; reheat factor |  | Checking of files and Viva Voce and remedial measures regarding the practical performed ( If any) |
|  | Binary vapour cycle |
|  | Simple steam engine, compound engine |
| 7th |  | Function of various components |  | To study various parts of the vertical steam engine |
|  | Numericals & Problems |
|  | **Chapter 3 :**  Function of steam nozzle |
| 8th |  | Shape of nozzle for subsonic and supersonics flow of stream. |  | To study the various mountings and accessories of a boiler |
|  | Variation of velocity; area of specific volume |
|  | Steady state energy equation; continuity equation |
| 9th |  | Nozzle efficiency; critical pressure ratio for maximum discharge |  | Checking of files and Viva Voce and remedial measures regarding the practical performed ( If any) |
|  | Physical explanation of critical pressure, super saturated flow of steam |
|  | Design of steam nozzle. |
| 10th |  | Advantage of steam condensation; component of steam condensing plant |  | To find dryness fraction of steam by separating and throttling calorimeter |
|  | Types of condensers; air leakage in condensers |
|  | Dalton’s law of partial pressure; vacuum efficiency |
| 11th |  | Calculation of cooling water requirement |  | To study and find volumetric efficiency of a reciprocating air compressor |
|  | Air expansion pump |
|  | **Chapter 4 :** Introduction; classification of steam turbine |
| 12th |  | impulse turbine; working principal; compounding of impulse turbine;;;;;;;;; |  | Checking of files and Viva Voce and remedial measures regarding the practical performed ( If any) |
|  | Velocity diagram; calculation of power output and efficiency |
|  | Maximum efficiency of a single stage impulse turbine |
| 13th |  | Design of impulse turbine blade section |  | To study the various Parts of Cooling Tower |
|  | Impulse reaction turbine; working principle, degree of reaction |
|  | Parsons turbine; velocity diagram |
| 14th |  | Calculation of power output; t |  | To study the various parts of a Condenser |
|  | Efficiency of blade height, condition of maximum efficiency |
|  | Internal losses in steam turbine |
| 15th |  | Governing of steam turbine |  | Checking of files and Viva Voce and remedial measures regarding the practical performed ( If any) |
|  | Governing of steam turbine |
|  | Numericals & Problems |