GANDHI ACADEMY OF TECHNOLOGY AND ENGINEERING

LESSON PLAN

**Session (2023-2024)**

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| **Discipline:**  **Mechanical Engineering No. of Days/week:04** | **Semester:**  **5th** | **Name of the Teaching Faculty: SIMANCHALA PANDA**  **Hydraulic Machine & Industrial Fluid Power TH- 03**  **Email ID:** [**simanchal.panda.1@gmail.com**](mailto:simanchal.panda.1@gmail.com) |

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| **Week** | **Class Day** | **Theory/Practical Topics** |
| 1st | 1st | Introduction to hydraulic machine - Hydraulic turbine and Hydraulic pump, their  importance, and applications. |
| 2nd | Classification of hydraulic turbines |
| 3rd | Construction and working principle of impulse turbine (Pelton wheel) |
| 4th | Velocity diagram of moving blades. Determination of work done. |
| 2nd | 1st | Efficiencies of Pelton turbine. Numerical for Pelton turbine |
| 2nd | Numerical based on Pelton turbine. |
| 3rd | Construction and working principle of Francis turbine |
| 4th | Velocity diagram of moving blades. Determination of work done and efficiencies  of Francis turbine. |
| 3rd | 1st | Numerical based on Francis turbine. |
| 2nd | *Doubt Clearing class* |
| 3rd | Construction and working principle of Kaplan turbine |
| 4th | Velocity diagram of moving blades. Determination of work done and efficiencies  of Kaplan turbine. |
| 4th | 1st | Numerical based on Kaplan turbine |
| 2nd | Difference between Impulse and Reaction turbine, Draft tube |
| 3rd | *Doubt Clearing class* |
| 4th | *Class Test* |
| 5th | 1st | What is Centrifugal pump? Construction and working principle of centrifugal pump. |
| 2nd | Velocity diagram of moving blades, work done and efficiencies of Centrifugal  pump |
| 3rd | Numerical based on Centrifugal pump |
| 4th | *Doubt Clearing class* |
| 6th | 1st | *QUIZ Test-1* |
| 2nd | *Class Test/Assignment-01* |
| 3rd | Reciprocating pump: Classification, application & working Principle |
| 4th | Construction and working principle of single acting and double acting  reciprocating pump. |
| 7th | 1st | Determination of discharge and Power required for the pump (single & double  acting). Define Slip, positive and negative slip, Relation between slip and coefficient of discharge |
| 2nd | Numerical on above |

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|  | 3rd | *Doubt Clearing class* |
| 4th | Introduction to Pneumatic system, Application |
| 8th | 1st | Elements of Pneumatic system: Air Filter, Air regulator and Air lubricator |
| 2nd | Pressure control valves: |
| 3rd | Direction control valves: 3/2 DCV, 5/2 DCV. 5/3 DCV |
| 4th | Flow control valves, Throttle valves |
| 9th | 1st | ISO symbols for pneumatic circuits |
| 2nd | Pneumatic circuits |
| 3rd | Operation and Control of single acting cylinder |
| 4th | Operation and Control of double acting cylinder |
| 10th | 1st | Operation of double acting cylinder with Metering in and Metering out control |
| 2nd | *Doubt Clearing class* |
| 3rd | *Class Test* |
| 4th | Hydraulic system - its merit and demerit, Elements of Hydraulic system |
| 11th | 1st | Hydraulic Accumulators |
| 2nd | Pressure control valve, Relief valve, Regulation valve |
| 3rd | Direction control valve: 3/2 DCV, 5/2 DCV. 5/3 DCV |
| 4th | Flow control valves, Throttle valves |
| 12th | 1st | Gear Pumps – Working principle and their uses. External and Internal gear pumps. |
| 2nd | Vane pump – Working principle and uses |
| 3rd | Radial piston pump – Working principle and uses |
| 4th | Actuators: Function, types, Working of Actuators |
| 13th | 1st | ISO symbols for hydraulic components. Hydraulic circuits |
| 2nd | Operation and Control of single acting cylinder |
| 3rd | Operation and Operation of double acting cylinder |
| 4th | Operation of double acting cylinder with Metering in and Metering out control |
| 14th | 1st | Comparison of hydraulic and pneumatic system |
| 2nd | *Doubt Clearing class* |
| 3rd | *QUIZ Test-2* |
| 4th | *Class Test/Assignment-02* |
| 15th | 1st | *Revision: Chapter-1* |
| 2nd | *Revision: Chapter-2* |
| 3rd | *Revision: Chapter-3* |
| 4th | *Revision: Chapter-4* |