

Lesson Plan for 2025-26 (W)

Discipline Mechanical Engg.	Semester :5 th	Name of the Faculty- SRI MANASH KUMAR BEHERA
Subject :HYDRAULIC MACHINES AND INDUSTRIAL FLUID POWER	No. of days/ per weeks class Allotted weeks: 04	Semester from date : 14/07/2025 To date : 15/11/2025 No. of weeks : 18 W.e.f : 14/07/2025 (18 Weeks)
Weeks (18)	CLASS DAYS	TOPICS TO BE COVERED
01 ST	1ST	Hydraulic Turbines Definition and classification of hydraulic turbines
	2ND	Construction and working principle of impulse turbine
	3RD	Velocity diagram, work done & efficiencies of impulse turbine
	4TH	Continue: efficiencies and numerical on impulse turbine
02 ND	1ST	Construction and working principle of Francis turbine
	2ND	Velocity diagram & efficiencies of Francis turbine
	3RD	Construction & working of Kaplan turbine
	4TH	Velocity diagram & efficiencies of Kaplan turbine
03 RD	1ST	Numericals on Francis & Kaplan turbines
	2ND	Distinction between impulse and reaction turbines
	3RD	Centrifugal pumps Construction & working principle of centrifugal pumps
	4TH	Work done & efficiencies of centrifugal pumps
04 TH	1ST & 2ND	Numerical on centrifugal pumps
	3RD	Reciprocating Pumps Construction & working of single acting reciprocating pump
	4TH	Construction & working of Double acting reciprocating pump
05 TH	1ST	Power requirement formula derivation
	2ND	Define slip; positive & negative slip
	3RD	Relation between slip & coefficient of discharge
	4TH	Numerical on reciprocating pump
06 TH	1ST	Pneumatic Control System Elements Filter-regulator-lubricator unit
	2ND	Pressure control valves
	3 RD & 4 TH	Pressure relief valves & pressure regulation valves
07 TH	1 ST & 2 ND	Direction control valves 3/2 DCV
	3 RD & 4 TH	5/2 DCV , 5/3 DCV
08 TH	1 ST & 2 ND	Flow control valves
	3 RD & 4 TH	Throttle valves
09 TH	1 ST & 2 ND	ISO Symbols of Pneumatic components
	3 RD & 4 TH	Introduction to Pneumatic circuits
10 TH	1 ST	Direct control of single acting cylinder
	2 ND	Operation of double acting
	4 TH	Operation of double acting cylinder with metering in and metering out control

11 TH	1 ST & 2 ND	HYDRAULIC CONTROL SYSTEM Hydraulic system , its merit and demerits
	3 RD & 4 TH	Introduction to Hydraulic accumulators and Pressure control valves
12 TH	1 ST & 2 ND	Pressure relief valves
	3 RD & 4 TH	Pressure regulation valves
13 TH	1ST	Introduction to directional control valves
	2 ND & 3 RD	3/2 DCV , 5/2 DCV ,5/3 DCV
	4 TH	Flow control valves
14 TH	1ST	Throttle valves
	2ND	Introduction to Power Fluid Pumps & External and Internal Gear pumps
	3RD	Vane pump & Radial Piston Pumps
	4TH	ISO Symbols for Hydraulic components & Actuators
15 TH	1ST	Introduction to Hydraulic circuits
	2ND	Direct control of single acting cylinder and operation of double acting cylinder
	3RD	Operation of double acting cylinder with metering in and metering out control
	4TH	Comparison of hydraulic and Pneumatic system
16 TH	1 ST & 2 ND	Review of turbines
	3 RD & 4 TH	Review of Centrifugal & reciprocating pumps
17 TH	1 ST & 2 ND	Review of Pneumatic control system
	3 RD & 4 TH	Review of Hydraulic control system
18 TH	1 ST & 2 ND	Doubt clearing session
	3 RD & 4 TH	Solving numericals

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Lesson Plan 2025-26 (Winter)

Discipline : Mechanical Engg.	5TH Semester	Name of the Faculty- SRI MANASH KUMAR BEHERA	
Subject: Design of Machine elements	No. of classes per week allotted (04 Nos)	Semester from date : 14/07/2025 No. of weeks : 18	To date : 15/11/2025 W.e.f : 14/07/2025 (18 Weeks)
Weeks (18)	CLASS DAYS	TOPICS TO BE COVERED	
01 ST	1ST & 2ND	Introduction Introduction to Machine Design and its classification	
	3 RD & 4TH	Different mechanical engineering materials used in design and their uses and their mechanical and physical properties	
02 ND	1 ST	Working stress, yield stress, ultimate stress, factor of safety	
	2 ND	Stress-strain curve for M.S. & C.I.	
	3 RD & 4 TH	Modes of Failure (elastic deflection, general yielding, fracture)	
03 RD	1 ST & 2 ND	State factors governing design of machine elements	
	3 RD & 4TH	Describe design procedures	
04 TH	1 ST & 2 ND	Design of fastening elements Joints and their classification	
	3 RD	State types of welded joints	
	4 TH	State advantages of welded joints over other joints	
05 TH	1 ST & 2 ND	Design of welded joints for eccentric loads	
	3 RD & 4 TH	State types of riveted joints and types of rivets	
06 TH	1 ST	Failure of riveted joints Strength & efficiency of riveted joints	
	2 ND	Design riveted joints for pressure vessel	
	3 RD & 4 TH	Numericals on welded and riveted joints	
07 TH	1ST	Design of shaft and Keys Function & material of shafts	
	2 ND 3 RD & 4 TH	Design of solid & hollow shafts for given power at given RPM based on Strength, Shear stress, combined tension, Rigidity, angle of twist, deflection and modulus of rigidity	
08 TH	1ST	State standard size of shaft as per I.S	
	2ND	Function of keys, types of keys & materials of keys	
	3RD	Describe failure of key and effect of key	
	4TH	Design of rectangular sunk key considering its failure against shear and crushing	
09 TH	1- ST	Design of rectangular sunk key by using empirical relation for given diameter of shaft	
	2 ND	State specification of parallel key, gib head key, taper key as per I.S	
	3 RD & 4 TH	Solve numerical on Design of shafts and Keys	
10 TH	1 ST & 2 ND	Design of Coupling Design of shaft couplings	
	3 RD & 4 TH	Requirement of a good shaft coupling	

11 TH	1 ST & 2 ND	Types of Coupling
12 TH	3 RD & 4 TH	Design of Sleeve or Muff coupling
	1 ST & 2 ND	Design of Sleeve or muff Coupling
	3 RD & 4 TH	Solve Numericals
13 TH	1 ST	Design of closed coiled helical springs
	2 ND	Introduction & materials used for helical spring
	3 RD	Standard spring wire gauge (SWG)
	4 TH	Terms used in compression wire
14 TH	1 ST	Stress in helical spring of a circular wire
	2 ND & 3 RD	Deflection of helical spring of circular wire
	4 TH	Surge in springs
15 TH	1 ST & 2 ND	Solve numericals ion design of closed cpil helical compression spring
	3 RD & 4 TH	Solve numericals ion design of closed coil helical compression spring
16 TH	1 ST	Doubt clearing classes
	2 ND	Problem solving classes
	3 RD & 4 TH	Extra classes
17 TH	1 ST	Doubt clearing classes
	2 ND	Problem solving classes
	3 RD & 4 TH	Extra classes
18 TH	1 ST & 2 ND	Doubt clearing classes
	3 RD & 4 TH	Revision.

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Lesson Plan 2025-26 (Winter)

Discipline Mechanical Engg.	Semester: 3rd	Name of the Faculty- SRI MANASH KUMAR BEHERA	
Subject: Thermal Engineering-I (MEPC209)	No. of days/ week class Allotted class:03	Semester from date -14 .07.2025 No. of Weeks : 18	To date 15.11.2025 W.e.f: 14/07/2025 (18Weeks)
Weeks	CLASS DAYS	Theory	
01 ST	1 ST	<u>Introduction to Thermodynamics:</u> Thermodynamic Systems (closed, open, isolated)	
	2 ND	Thermodynamic properties of a system (pressure, volume, temperature, entropy, enthalpy, Internal energy and units of measurement) ;	
	3 RD	Intensive and extensive properties Define thermodynamic processes, path, cycle , state path function, point function	
02 ND	1 ST	Thermodynamic Equilibrium ; Quasi-static Process	
	2 ND	Laws of thermodynamics (statements only)	
	3 RD	<u>Sources of Energy</u> Brief description of energy Sources: Classification of energy sources: Renewable, Non-Renewable	
03 RD	1 ST	Fossil fuels (CNG & LPG) ; Solar Energy: Flat plate and concentrating collectors & its applications	
	2 ST	working principles of Solar Water Heater, Photovoltaic Cell, Solar Distillation	
	3 RD	Definitions of Wind Energy; Tidal Energy; Ocean Thermal Energy; Geothermal Energy	
04 TH	1 ST	Biogas, Biomass, Biodiesel; Hydraulic Energy, Nuclear Energy; Fuel cell	
	2 ND	<u>Internal Combustion Engines</u> Assumptions made in air standard cycle analysis; Brief description of Carnot, Otto and Diesel cycles with P-V and T-S diagrams	
	3 RD	Internal and external combustion engines; advantages of I.C. engines over external combustion engines;	
05 TH	1 ST	Classification of I.C. engines; neat sketch pf I.C. engine indicating component parts	
	2 ND & 3 RD	Function of each part and materials used for the component parts - Cylinder, crank case, crank pin , crank, crank shaft connecting rod, wrist pin, piston, cooling pins cylinder heads, exhaust valve, inlet valve	
06 TH	1 ST	Working of four-stroke and two stroke petrol and diesel engines;	
	2 ND & 3 RD	Working of four-stroke and two stroke diesel engines; Comparison of two stroke and four stroke engines Comparison of C.I. and S.I. engines	
07 TH	1 ST	Valve timing and port timing diagrams for four stroke and two stroke engines.	
	2 ND	<u>I.C. Engine System</u> Fuel system of Petrol engines; Principle of operation of simple and Zenith carburettors.	
	3 RD	Fuel systems of Diesel engines & Types of injectors and fuel pumps	

08 TH	1 ST	Cooling system: air cooling, water cooling system with thermo siphon method of circulation
	2 ND	Water cooling system with radiator and forced circulation (description with line diagram).
	3 RD	Comparison of air cooling and water cooling system
09 TH	1 ST & 2 ND	Ignition systems – Battery coil ignition and magneto ignition (description and working) Comparison of two systems; Types of lubricating systems used in I.C. engines with line diagram
	3 RD	Types of governing of I.C. engines – hit and miss method, quantitative method, qualitative method and combination methods of governing; their applications;
10 TH	1ST	Application of governing & objective of super charging
	2ND	Performance of I.C. Engines Brake power; Indicated power; Frictional power
	3RD	Brake and Indicated mean effective pressures
11 TH	1ST	Brake and Indicated thermal efficiencies
	2ND	Mechanical efficiency; Relative efficiency
	3RD	Performance test, Morse test
12 TH	1ST	Heat balance sheet.
	2 ND	Methods of determination of B.P., I.P. and F.P.
	3RD	Simple numerical problems on performance of I.C. engines
13 TH	1ST	Simple numerical problems on performance of I.C. engines
	2ND	Air Compressors Functions of air compressor; Uses of compressed air
	3RD	Types of air compressors; Single stage reciprocating air compressor
14 TH	1ST	construction and working (with line diagram) using P-V diagram; Multi stage compressors – Advantages over single stage compressors;
	2ND	Rotary compressors: Centrifugal compressor, axial flow type compressor and vane type compressors
	3RD	Refrigeration & Air-conditioning: Refrigeration; Refrigerant; COP, Air Refrigeration system: components, working & applications
15 TH	1 ST	Vapour Compression system: components, working & applications
	2 ND & 3 RD	Air conditioning; Classification of Air-conditioning systems; Comfort and Industrial Air-Conditioning; Window Air Conditioner; Summer Air-Conditioning system, Winter Air-Conditioning system, Year-round Air-Conditioning system
16 TH	1 ST, 2 ND & 3 RD	Course review and discussions
17 TH	1 ST, 2 ND & 3 RD	Extra classes, doubt clearing class & Numerical solve
18 TH	1 ST, 2 ND & 3 RD	Extra classes, doubt clearing class & Numerical solve

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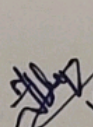
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
Lesson Plan 2025-26 (Winter)

Discipline Mechanical Engg.	Semester: 3rd	Name of the Faculty- SRI MANASH KUMAR BEHERA	
Subject: Thermal Engineering-I LAB (MEPC 217)	No. of days/ week class Allotted class:04	Semester from date -14 .07.2025 No. of Weeks : 18	To date 15.11.2025 W.e.f: 14/07/2025 (18Weeks)
Weeks	CLASS DAYS ,	Practical	
01 ST	1 ST	Flash & Fire point tests using Able's Cleveland/ Penskey Martin Apparatus	
	2 ND	Flash & Fire point tests using Able's Cleveland/ Penskey Martin Apparatus	
	3 RD	Flash & Fire point tests using Able's Cleveland/ Penskey Martin Apparatus	
	4 TH	Flash & Fire point tests using Able's Cleveland/ Penskey Martin Apparatus	
02 ND	1 ST	Record Checking & Viva-Voce	
	2 ND	Viscosity measurement using Saybolt Viscometer	
	3 RD	Viscosity measurement using Saybolt Viscometer	
	4 TH	Viscosity measurement using Saybolt Viscometer	
03 RD	1 ST	Record Checking & Viva-Voce	
	2 ND	Calorific value tests using Bomb Calorimeter (solid and Liquid Fuels)	
	3 RD	Calorific value tests using Junkers Gas calorimeter (Gaseous Fuel)	
	4 TH	Calorific value tests using Junkers Gas calorimeter (Gaseous Fuel)	
04 TH	1 ST	Record Checking & Viva-Voce	
	2 ND	Carbon residue test using Conrad son's apparatus	
	3 RD	Carbon residue test using Conrad son's apparatus	
	4 TH	Carbon residue test using Conrad son's apparatus	
05 TH	1 ST	Record Checking & Viva-Voce	
	2 ND	Assembling and Disassembling of IC engines	
	3 RD	Assembling and Disassembling of IC engines	
	4 TH	Assembling and Disassembling of IC engines	
06 TH	1 ST	Record Checking & Viva-Voce	
	2 ND	Port timing diagram of Petrol engine	
	3 RD	Port timing diagram of Petrol engine	
	4 TH	Port timing diagram of Petrol engine	
07 TH	1 ST	Record Checking & Viva-Voce	
	2 ND	Port timing diagram of Diesel engine	
	3 RD	Port timing diagram of Diesel engine	
	4 TH	Port timing diagram of Diesel engine	
08 TH	1 ST	Record Checking & Viva-Voce	
	2 ND	Valve timing diagram of Petrol engine	
	3 RD	Valve timing diagram of Petrol engine	
	4 TH	Valve timing diagram of Petrol engine	
09 TH	1 ST	Record Checking & Viva-Voce	
	2 ND	Valve timing diagram of diesel engine	
	3 RD	Valve timing diagram of diesel engine	
	4 TH	Valve timing diagram of diesel engine	
10 TH	1 ST	Record Checking & Viva-Voce	
	2 ND	Study of Petrol and Diesel engine components and Models	
	3 RD	Study of Petrol and Diesel engine components and Models	
	4 TH	Study of Petrol and Diesel engine components and Models	

11 TH	1 ST	Record Checking & Viva-Voce
	2 ND	Revision
	3 RD	Revision
	4 TH	Viva-voce
12 TH	1 ST	Revision
	2 ND	Revision
	3 RD	Revision
	4 TH	Viva-voce
13 TH	1 ST	Revision
	2 ND	Revision
	3 RD	Revision
	4 TH	Viva-voce
14 TH	1 ST	Revision
	2 ND	Revision
	3 RD	Revision
	4 TH	Viva-voce
15 TH	1 ST	Revision
	2 ND	Revision
	3 RD	Revision
	4 TH	Viva-voce
16 TH	1 ST	Revision
	2 ND	Revision
	3 RD	Revision
	4 TH	Viva-voce
17 TH	1 ST	Revision
	2 ND	Revision
	3 RD	Revision
	4 TH	Viva-voce
18 TH	1 ST	Revision
	2 ND	Viva-voce
	3 RD	Viva-voce
	4 TH	Viva-voce

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