

Discipline Mechanical  
Engineering

5th Semester

Name Of The Faculty: SRI SAGAR KUMAR BEHERA(LECT., MECH)

Subject : Refrigeration  
& Air Conditioning

Semester from 01/08/2023

Week	Class days	Theory Topic
1st	1st 2nd 3rd 4th	Definition of refrigeration and unit of refrigeration. Definition of COP, Refrigerating effect (R.E) Principle of working of open and closed air system of refrigeration Calculation of COP of Bell-Coleman cycle and numerical on it.
2nd	1st 2nd 3rd 4th	Revision schematic diagram of simple vapors compression refrigeration system Cycle with dry saturated vapors after compression Cycle with wet vapors after compression.
3rd	1st 2nd 3rd 4th	Cycle with superheated vapors after compression Cycle with superheated vapors before compression Cycle with sub cooling of refrigerant Representation of above cycle on temperature entropy and pressure enthalpy diagram
4th	1st 2nd 3rd 4th	Numerical on above (determination of COP, mass flow) Simple vapor absorption refrigeration system Practical vapor absorption refrigeration system COP of an ideal vapor absorption refrigeration system
5th	1st 2nd 3rd 4th	Numerical on COP REFRIGERANT COMPRESSORS Principle of working and constructional details of reciprocating and rotary compressors Centrifugal compressor only theory
6th	1st 2nd 3rd 4th	Important terms Hermetically and semi hermetically sealed compressor. Principle of working and constructional details of air cooled and water cooled condenser Heat rejection ratio Cooling tower and spray pond.

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Principle of working and constructional details of an evaporator.

Types of evaporator

Bare tube coil evaporator, finned evaporator, shell and tube evaporator

Capillary tube

Automatic expansion valve

Thermostatic expansion valve

Classification of refrigerants

Desirable properties of an ideal refrigerant.

Designation of refrigerant.

Thermodynamic Properties of Refrigerants.

Chemical properties of refrigerants

commonly used refrigerants, R-11, R-12, R-22, R-134a, R-717

Psychometric terms

Adiabatic saturation of air by evaporation of water

Psychometric chart and uses.

Psychometric processes

Sensible heating and Cooling

Heating and Humidification

Adiabatic cooling with humidification

Total heating of a cooling process

SHF, BPF

Adiabatic mixing

Factors affecting comfort air conditioning

Equipment used in an air-conditioning.

Classification of air-conditioning system

Winter Air Conditioning System

Summer air-conditioning system

Numerical on above

Revision

7th

8th

9th

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11th

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15th

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4th

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5th Semester

Name Of The Faculty: SAKTI RANJAN BHUYAN(SR. LECT. , MECH)

Subject : Mechatronics  
No of Days per week  
class allotted (4 nos)  
Semester from 01/08/2023

Week	Class days	Theory Topic
1st	1st 2nd 3rd 4th	Definition of Mechatronics Advantages & disadvantages of Mechatronics Application of Mechatronics Scope of Mechatronics in Industrial Sector
2nd	1st 2nd 3rd 4th	Importance of mechatronics in automation Introduction to Transducers Definition of Transducers Classification of Transducers Electromechanical Transducers
3rd	1st 2nd 3rd 4th	Transducers Actuating Mechanisms Displacement & Positions Sensors Velocity, motion, force and pressure sensor Velocity, motion, force and pressure sensor Temperature and light sensors.
4th	1st 2nd 3rd 4th	Mechanical Actuators Machine, Kinematic Link, Kinematic Pair Mechanism, Slider crank Mechanism
5th	1st 2nd 3rd 4th	Gear Drive, Spur gear, Bevel gear, Helical gear, worm gear Belt & Belt drive Bearings
6th	1st 2nd 3rd 4th 1st	Electrical Actuator Switches and relay Solenoid D.C Motors A.C Motors

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7th	2nd	Stepper Motors
	3rd	Specification and control of stepper motors
	4th	Servo Motors D.C & A.C
	1st	PROGRAMMABLE LOGIC CONTROLLERS(PLC)
8th	2nd	Advantages of PLC
	3rd	Selection and uses of PLC
	4th	Architecture basic internal structures
	1st	Input/output Processing and Programming
	2nd	Mnemonics
	3rd	Master and Jump Controllers
	4th	Master and Jump Controllers
	1st	Introduction to Numerical Control of machines and CAD/CAM
10th	2nd	NC machines
	3rd	CNC machines
	4th	CAD/CAM
	1st	Software and hardware for CAD/CAM
11th	2nd	Functioning of CAD/CAM system
	3rd	Features and characteristics of CAD/CAM system
	4th	Application areas for CAD/CAM
	1st	elements of CNC machines
12th	2nd	Guideways/Slide ways
	3rd	Introduction and Types of Guideways
	4th	Factors of design of guideways
	1st	Spindle drives
13th	2nd	Spindle and Spindle Bearings
	3rd	Definition, Function and laws of robotics
	4th	Types of industrial robots
	1st	Robotic systems
14th	2nd	Advantages and Disadvantages of robots
	3rd	
	4th	
	1st	
	2nd	

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5th Semester

Name Of The Faculty: SRI SANTOSH KUMAR SAHU(PTGF, MECH)

Subject : Hydraulic  
Machine & Industrial  
Fluid Power

No of Days per week  
class allotted (4 nos)

Semester from 01/08/2023

Week	Class days	Theory Topic
1st	1st 2nd 3rd 4th	Introduction to Hydraulic Turbines Defination of Hydraulic Turbines Classification of Hydraulic Turbines Construction of Impulse Turbine
2nd	1st 2nd 3rd 4th	Working Principle of Impulse Turbine Velocity Diagram of Working blades Workdone of Impulse Turbine Derivation of various efficiencies of impulse turbine Velocity Diagram of Moving blades
3rd	1st 2nd 3rd 4th	Workdone of Francis Turbine Derivation of various efficiencies of Francis turbine Velocity diagram of moving blades Workdone of Kaplan Turbine
4th	1st 2nd 3rd 4th	Derivations of various Efficiencies of Kaplan Turbine Revision Introduction to Centrifugal Pump Construction and working principle of centrifugal pumps
5th	1st 2nd 3rd 4th	Workdone of Centrifugal Pump Various efficiencies of centrifugal pumps Numerical on Centrifugal Pump Introduction to Reciprocating Pump
6th	1st 2nd 3rd 4th 1st	Describe Construction to Resiprocating Pump Working of single acting reciprocating pump Describe Construction to Double acting Resiprocating Pump Define formula for power required to drive the pump for single acting

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7th	2nd	Define formula for power required to drive the pump for single acting
	3rd	Define formula for power required to drive the pump for double acting
	4th	Define formula for power required to drive the pump for double acting
	1st	State positive &
8th	2nd	State negative slip &
	3rd	Relation between slip and coefficient of Discharge
	4th	Numerical on Single acting and double acting
	1st	Introduction to Pneumatic Control System
9th	2nd	Elements – filter-regulator-lubrication unit
	3rd	Pressure control valves
	4th	Pressure relief valves
	1st	Pressure regulation valves
10th	2nd	Direction control valves
	3rd	3/2DCV, 5/2 DCV, 5/3DCV
	4th	Flow control valves
	1st	Throttle valves
11th	2nd	ISO Symbols of pneumatic components
	3rd	Pneumatic circuits
	4th	Direct control of single acting cylinder
	1st	Operation of double acting cylinder
12th	2nd	Operation of double acting cylinder with metering in and metering out control
	3rd	Operation of double acting cylinder with metering in and metering out control
	4th	Operation of double acting cylinder with metering in and metering out control
	1st	Hydraulic system, its merit and demerits
13th	2nd	Hydraulic accumulator
	3rd	Pressure control valves
	4th	Pressure relief valves
	1st	Pressure regulation valves
14th	2nd	Direction control valves
	3rd	3/2DCV, 5/2 DCV, 5/3DCV
	4th	Flow control valves
	1st	Fluid power pumps
15th	2nd	ISO Symbols for hydraulic components.

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3rd  
4th

Actuators  
Comparison of hydraulic and pneumatic system

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Discipline Mechanical Engineering		5th Semester		Name Of The Faculty : SRI GANESH PARICHHA(PTGF, MECH)	
Subject : Design Of Machine Elements		No of Days per week class allotted (4 nos)		Semester from 01/08/2023	
Week		Class days		Theory Topic	
1st		1st		Introduction to Machine Design	
		2nd		Classification of Machine Design	
		3rd		Different mechanical engineering materials used in design	
		4th		Engineering materials Physical Properties	
2nd		1st		Engineering materials Mechanical Properties	
		2nd		Define Working Stress	
		3rd		Define yield Stress	
		4th		Define Ultimate Stress	
3rd		1st		Factor of Safety	
		2nd		Modes of Failure (By elastic deflection, general yielding & fracture)	
		3rd		State the factors governing the design of machine elements.	
		4th		Describe design procedure.	
4th		1st		Joints and their classification.	
		2nd		State types of welded joints	
		3rd		State advantages of welded joints over other joints	
		4th		Design of welded joints for eccentric loads.	
5th		1st		State types of riveted joints	
		2nd		Describe failure of riveted joints.	
		3rd		Determine strength riveted joint	
		4th		Design riveted joints for pressure vessel	
6th		1st		Solve numerical on Welded Joint	
		2nd		Solve numerical on Riveted Joint	
		3rd		Solve numerical on Welded Joint and Riveted Joints.	
		4th		Solve numerical on Welded Joint and Riveted Joints.	
		1st		State function of shafts.	

  
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7th	2nd	State materials for shafts
	3rd	Design solid & hollow shafts to transmit a given power at given rpm based on Strength
	4th	Design solid & hollow shafts to transmit a given power at given rpm based on Rigidity
	1st	State standard size of shaft as per I.S.
8th	2nd	State function of Keys & Types of Keys
	3rd	Materials of Keys
	4th	Describe failure of key, effect of key way
	1st	Design rectangular sunk key considering its failure against shear & crushing.
9th	2nd	Design rectangular sunk key by using empirical relation for given diameter of shaft.
	3rd	State specification of parallel key, gib-head key, taper key as per
	4th	Solve numerical on Design of Shaft and keys.
	1st	Introduction to Design of Shaft Coupling
10th	2nd	Requirements of a good shaft coupling
	3rd	Types of Coupling.
	4th	Design of Sleeve or Muff-Coupling
	1st	Design of Sleeve or Muff-Coupling
11th	2nd	Design of Clamp or Compression Coupling.
	3rd	Design of Clamp or Compression Coupling.
	4th	Revision
	1st	Solve simple Numerical on Sleeve
12th	2nd	Solve simple Numerical on Sleeve
	3rd	Solve simple Numerical on Compression Coupling
	4th	Solve simple Numerical on Compression Coupling
	1st	Introduction to Helical Springs
13th	2nd	Materials used for helical spring.
	3rd	Standard size spring wire. (SWG).
	4th	Standard size spring wire. (SWG).
	1st	Terms used in Compression Spring
14th	2nd	Stress in helical spring of a circular wire.
	3rd	Deflection of helical spring of circular wire.
	4th	Surge in spring.
	1st	Solve numerical on design of closed coil helical compression spring.
15th	2nd	Solve numerical on design of closed coil helical compression spring.

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3rd	Solve numerical on design of closed coil helical compression spring.
4th	Solve numerical on design of closed coil helical compression spring.

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