Lesson Plan on

(TH-1)Entrepreneurship management & Smart Technology (5th sem)

Prepared by

DEBI PRASAD PATRA

PTGF,MECHANICAL ENGG.

GOVERNMENT POLYTECHNIC, PURIDEPARTMENTOFMECHANICALENGINEERING

Discipline:MECHANICALENGG	Semester: 5TH	Name of the Teaching Faculty: **Mr. DEBI PEASAD PATRA, PTGFINMECH.ENGG.**
Subject: **EM&ST**	No. ofdays/perweek classallotted:**04**	**Semester From date: 01.08.2023 To Date: 30.11.2023** **No. of Weeks: 15**
PRE-REQUISITE	Basic knowledge about Entrepreneurship, Management, different qualities like leadership,motivation and know the concept of smart technology.	
COURSEOUTCOMES	**CO1:** Know about Entrepreneurship, Types of Industries and Start up. **CO2:** Know about various schemes of assistance by entrepreneurial support agencies. **CO3:** Conduct market survey &Prepare project report **CO4:** Know the management Principles and functional areas of management **CO5:** Inculcate leadership qualities to motivate self and others. **CO6:** Maintain and be a part of healthy work culture in an organisation. **CO7:** Use modern concepts like TQM & Know the General Safety Rules. **CO8:** Know about IOT and its Application in SMART Environment	

Week	Class Day	Theory/Practical Topics	DELIVERY METHOD
1ST	1ST	Concept /Meaning of Entrepreneurship, Need of Entrepreneurship	Whiteboard
	2ND	Characteristics, Qualities and Types of entrepreneur, Functions	Whiteboard
	3RD	Barriers in entrepreneurship, Entrepreneurs vs. Manager	Whiteboard
	4TH	Forms of Business Ownership: Sole proprietorship, partnership forms and others	Whiteboard
2ND	1ST	Types of Industries, Concept of Start-ups	Whiteboard
	2ND	Entrepreneurial support agencies at National, State, District Level (Sources): DIC, NSIC,OSIC, SIDBI, NABARD, Commercial Banks, KVIC etc	Whiteboard
	3RD	Technology Business Incubators (TBI) and Science and Technology Entrepreneur Parks	Whiteboard
	4TH	**QUIZ&ASSIGNMENT-I**	Lecturenotes
3RD	1ST	Business Planning	Whiteboard
	2ND	SSI, Ancillary Units, Tiny Units, Service sector Units	Whiteboard
	3RD	Time schedule Plan,Agencies to be contacted for Project Implementation	Whiteboard
	4TH	Assessment of Demand and supply and Potential areas of Growth	Whiteboard
4TH	1ST	Identifying Business Opportunity, Final Product selection	Whiteboard
	2ND	Preliminary project report	Whiteboard
	3RD	Detailed project report, Techno economic Feasibility,Project Viability	Whiteboard
	4TH	**QUIZ &ASSIGNMENT-II**	Whiteboard
5TH	1ST	Definitions of management, Principles of management	Whiteboard
	2ND	Functions of management (planning, organising, staffing, directing and controlling etc.)	Whiteboard

	3RD	Level of Management in an Organisation	PPT
	4TH	Production management (Functions, Activities)	Whiteboard
6TH	1ST	Productivity, Quality control	Whiteboard
	2ND	Production Planning and control	Whiteboard
	3RD	Inventory Management (Needs, Model)	Whiteboard
	4TH	Functions of Financial management, Management of Working capital, Costing	Lecturenotes
7TH	1ST	Costing (only concept), Break even Analysis	Whiteboard
	2ND	Brief idea about Accounting Terminologies (Book Keeping, Journal entry, Petty Cash book	Whiteboard
	3RD	P&L Accounts, Balance Sheets, Concept of Marketing and Marketing Management	Whiteboard
	4TH	Marketing Techniques, Concept of 4P s (Price, Place, Product, Promotion)	PPT
8TH	1ST	Functions of Personnel Management	Whiteboard
	2ND	Manpower Planning, Recruitment, Sources of manpower, Selection process.	Whiteboard
	3RD	Method of Testing, Methods of Training & Development, Payment of Wages	Whiteboard
	4TH	**QUIZ&ASSIGNMENT-III**	Whiteboard
9TH	1ST	Definition and need of leadership	Whiteboard
	2ND	Qualities and functions of a leader,Manager Vs Leader	Whiteboard
	3RD	Style of Leadership (Autocratic, Democratic, Participative)	Whiteboard
	4TH	MotivationDefinition and characteristics	Lecturenotes
10TH	1ST	Importance of motivation, Factors affecting motivation	Whiteboard
	2ND	Theories of motivation (Maslow), Methods of Improving Motivation	Whiteboard
	3RD	Importance of Communication in Business,Types and Barriers of Communication	Whiteboard
	4TH	**QUIZ & ASSIGNMENT-IV**	Google form
11TH	1ST	Human relationship and Performance in Organization	Whiteboard
	2ND	Relations with Peers, Superiors and Subordinates	Whiteboard
	3RD	TQM concepts: Quality Policy, Quality Management, Quality system	Lecturenotes
	4TH	Accidents and Safety, Cause, preventive measures, General Safety Rules, Personal Protection Equipment(PPE)	Whiteboard
12TH	1ST	Intellectual Property Rights(IPR), Patents, Trademarks, Copyrights	Whiteboard
	2ND	Features of Factories Act 1948 with Amendment	Whiteboard
	3RD	Features of Payment of Wages Act 1936	Whiteboard
	4TH	**QUIZ & ASSIGNMENT-V**	Whiteboard
13TH	1ST	Concept of IOT, How IOT works	Whiteboard
	2ND	Components of IOT, Characteristics of IOT	Whiteboard
	3RD	Categories of IOT, Applications of IOT- Smart Cities, Smart Transportation	Whiteboard
	4TH	Smart Home, Smart Healthcare	Lecturenotes
14TH	1ST	Smart Industry, Smart Agriculture, Smart Energy Management	
	2ND	**QUIZ & ASSIGNMENT-VI**	
	3RD	**REVISION**	Whiteboard
	4TH	**REVISION**	Whiteboard
15TH	1ST	**REVISION**	Whiteboard
	2ND	**QUIZ & ASSIGNMENT-VII**	Google form
	3RD	**REVISION**	Whiteboard
	4TH	**REVISION**	Whiteboard

LEARNINGRESOUCES:

Entrepreneurship Development and Management by R.K Singhal, Katson Books., New Delhi

Entrepreneurship Development and Management by U Saroj and V Mahendiratta, Abhishek Publications, Chandigarh

Internet of Things by Jeeva Jose, Khanna Publications, New Delhi

WEBSITERESOUCES:

01: https://www.fundable.com/learn/resources/guides/startup

02: https://youtube.com/playlist?list=PL7oBzLzHZ1wXW3mtolxV5nlGn48NLKwrb

Debi Prasad Patra

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Principal
Govt Polytech
Puri

Lesson Plan on

(TH-4) MECHATRONICS

(5^{th} sem)

Prepared by

LOKANATH SAHU

SR. LECT. MECHANICAL ENGG.

GOVERNMENT POLYTECHNIC, PURI

DEPARTMENT OF MECHANICAL ENGINEERING

Discipline: MECHANICAL ENGG	Semester: 5TH	Name of the Teaching Faculty: MR LOKANATH SAHU, SR LECTURER, MECH. ENGG.
Subject: TH.4 MECHATRONICS	No. of days/per week class allotted: 04	Semester From date: 01.08.2023 To Date: 30.11.2023 No. of Weeks: 15
PRE-REQUISITE	Basic knowledge about Link&Mechanism,Lathe machine.	
COURSE OUTCOMES	CO1: Study the definition and elements of mechatronics syste. CO2: Learn how to apply the principle of mechatronics for the development of productive system. CO3:Defining different types of system and Sensors and solve simple problems. CO4:Explain the concept of Mechanical actuation,Electrical actuation and solve the simple problem. CO5:Learn the Industrial robotics.	

Week	Class Day	Theory / Practical Topics	DELIVERY METHOD
1ST	1ST	Definition of Mechatronics	Whiteboard
	2ND	Advantages & disadvantages of Mechatronics	Whiteboard
	3RD	Application of Mechatronics	Whiteboard
	4TH	Scope of Mechatronics in Industrial Sector	Whiteboard
2ND	1ST	Components of a Mechatronics System	Whiteboard
	2ND	Importance of mechatronics in automation	Whiteboard
	3RD	**QUIZ & ASSIGNMENT-I**	Whiteboard
	4TH	Defination of Transducers	Whiteboard
3RD	1ST	Classification of Transducers	Whiteboard
	2ND	Electromechanical Transducers	Whiteboard
	3RD	Electromechanical Transducers	Whiteboard
	4TH	Transducers Actuating Mechanisms	PPT
4TH	1ST	Transducers Actuating Mechanisms	Whiteboard
	2ND	Displacement &Positions Sensors	PPT
	3RD	Velocity, motion, force and pressure sensors.	Whiteboard
	4TH	Temperature and light sensors.	Whiteboard
5TH	1ST	ACTUATORS-MECHANICAL, ELECTRICAL	Whiteboard
	2ND	Machine, Kinematic Link, Kinematic Pair	Whiteboard
	3RD	Mechanism, Slider crank Mechanism	Whiteboard
	4TH	Gear Drive, Spur gear, Bevel gear, Helical gear, worm gear	Whiteboard
6TH	1ST	Belt & Belt drive	Whiteboard
	2ND	Bearings	Whiteboard
	3RD	**QUIZ & ASSIGNMENT-II**	PPT
	4TH	Switches and relay	Whiteboard
	1ST	Solenoid	Whiteboard
	2ND	D.C Motors	Whiteboard
	3RD	A.C Motors	Whiteboard

7TH	4TH	Stepper Motors	Whiteboard
8TH	1ST	Specification and control of stepper motors	Whiteboard
	2ND	Servo Motors D.C & A.C	PPT
	3RD	PROGRAMMABLE LOGIC CONTROLLERS(PLC)	Whiteboard
	4TH	Introduction,Advantages of PLC	Whiteboard
9TH	1ST	Selection and uses of PLC,Architecture basic internal structures	Whiteboard
	2ND	Input/output Processing and Programming	Whiteboard
	3RD	Mnemonics, Master and Jump Controllers	Whiteboard
	4TH	Introduction to Numerical Control of machines and CAD/CAM	PPT
10TH	1ST	NC machines,CNC machines,CAD/CAM	Whiteboard
	2ND	Software and hardware for CAD/CAM	Whiteboard
	3RD	Functioning of CAD/CAM system,Features and characteristics of CAD/CAM system	PPT
	4TH	Application areas for CAD/CAM, elements of CNC machines	PPT
11TH	1ST	Introduction and Types of Guideways, Factors of design of guideways	Whiteboard
	2ND	**QUIZ & ASSIGNMENT-III**	Whiteboard
	3RD	Drives,Spindle drives, Feed drive	Whiteboard
	4TH	Spindle and Spindle Bearings	Whiteboard
12TH	1ST	ROBOTICS	PPT
	2ND	Definition, Function and laws of robotics	Whiteboard
	3RD	Types of industrial robots	Whiteboard
	4TH	Types of industrial robots	Whiteboard
13TH	1ST	**QUIZ & ASSIGNMENT-IV**	Whiteboard
	2ND	Robotic systems	Whiteboard
	3RD	Robotic systems	Whiteboard
	4TH	Advantages and Disadvantages of robots	Whiteboard
14TH	1ST	Advantages and Disadvantages of robots	Whiteboard
	2ND	Advantages and Disadvantages of robots	Whiteboard
	3RD	Problemsolving	Whiteboard
	4TH	Problemsolving	Whiteboard
15TH	1ST	**QUIZ & ASSIGNMENT-V**	Whiteboard
	2ND	**REVISION**	
	3RD		
	4TH		

LEARNING RESOURCES:

01.Mechatronics By W. Bolton

02.CAD/CAM/CIM By R.RADHAKRISHNA,S,SUBRAMANIAN

03.CAD/CAM By MIKELL GROVER

WEBSITE RESOURCES:

https://www.youtube.com/watch?v=zVVITxiec7g&list=PLLy_2iUCG87BNHXRb6L2pWEpMcLoFay_U

https://www.youtube.com/watch?v=v-3TmN4HhLc&list=PLwdnzlV3ogoW31clPN6Dn6c8la-n36vXk

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Puri

Lesson Plan on

(PR-1) REFRIGERATION & AIR CONDITIONING LAB

(5^{th} sem)

Prepared by

Chinmayee Jayasingh

PTGF ,MECHANICAL ENGG.

GOVERNMENT POLYTECHNIC, PURI

DEPARTMENT OF MECHANICAL ENGINEERING

Discipline: MECHANICAL ENGG	Semester: 5TH	Name of the Teaching Faculty: MISS CHINMAYEE JAYASINGH, PTGF IN MECH. ENGG.
Subject: Pr.1 REFRIGERATION AND AIR CONDITIONING LAB	No. of days/per week class allotted: 04	Semester From date: 01.08.2023 To Date: 30.11.2023 No. of Weeks: 15
PRE-REQUISITE	Basic knowledge about domestic refrigerator,vapor absorption,vapor compression refrigeration,window air conditioner and split air conditioner.	
COURSE OUTCOMES	CO1:Study the construction features of Domestic Refrigerator, water cooler, Window Air Conditioner, Split Air Conditioner. CO2:.Determining the capacity, COP, of Refrigerator Test Rig, Window air Conditioner, Split Air Conditioner, Water cooler. CO3:Locating the leakage,Charging of the refrigerating system.	

Week	Class Day	Theory / Practical Topics	DELIVERY METHOD
1ST	1ST	Study the construction features of Domestic Refrigerator.	Lab Manual / LAB
	2ND	Study the construction features of Domestic Refrigerator.	Lab Manual / LAB
	3RD	Study the construction features of Domestic Refrigerator.	Lab Manual / LAB
	4TH	Study the construction features of Domestic Refrigerator.	Lab Manual / LAB
2ND	1ST	Study the construction features of Domestic Refrigerator.	Lab Manual / LAB
	2ND	Study the construction features of Domestic Refrigerator.	Lab Manual / LAB
	3RD	Study the construction features of water cooler.	Lab Manual / LAB
	4TH	Study the construction features of water cooler.	Lab Manual / LAB
3RD	1ST	Study the construction features of water cooler.	Lab Manual / LAB
	2ND	Study the construction features of water cooler.	Lab Manual / LAB
	3RD	Study the construction features of water cooler.	Lab Manual / LAB
	4TH	Study the construction features of water cooler.	Lab Manual / LAB
4TH	1ST	Study the construction features of window air conditioner	Lab Manual / LAB
	2ND	Study the construction features of window air conditioner	Lab Manual / LAB
	3RD	Study the construction features of window air conditioner	Lab Manual / LAB
	4TH	Study the construction features of window air conditioner	Lab Manual / LAB
5TH	1ST	Study the construction features of window air conditioner	Lab Manual / LAB
	2ND	Study the construction features of window air conditioner	Lab Manual / LAB
	3RD	Study the construction features of split air conditioner	Lab Manual / LAB
	4TH	Study the construction features of split air conditioner	Lab Manual / LAB
6TH	1ST	Study the construction features of split air conditioner	Lab Manual / LAB
	2ND	Study the construction features of split air conditioner	Lab Manual / LAB
	3RD	Study the construction features of split air conditioner	Lab Manual / LAB
	4TH	Study the construction features of split air conditioner	Lab Manual / LAB
	1ST	Determine the capacity and cop of vapour compression Refrigerator test rig.	Lab Manual / LAB
	2ND	Determine the capacity and cop of vapour compression Refrigerator test rig.	Lab Manual / LAB

7TH	3RD	Determine the capacity and cop of vapour compression Refrigerator test rig.	Lab Manual / LAB
	4TH	Determine the capacity and cop of vapour compression Refrigerator test rig.	Lab Manual / LAB
8TH	1ST	Determine the capacity and cop of vapour compression Refrigerator test rig.	Lab Manual / LAB
	2ND	Determine the capacity and cop of vapour compression Refrigerator test rig.	Lab Manual / LAB
	3RD	Determine the capacity and cop of water cooler	Lab Manual / LAB
	4TH	Determine the capacity and cop of water cooler	Lab Manual / LAB
9TH	1ST	Determine the capacity and cop of water cooler	Lab Manual / LAB
	2ND	Determine the capacity and cop of water cooler	Lab Manual / LAB
	3RD	Determine the capacity and cop of water cooler	Lab Manual / LAB
	4TH	Determine the capacity and cop of water cooler	Lab Manual / LAB
10TH	1ST	Determine the capacity and cop of window air conditioner	Lab Manual / LAB
	2ND	Determine the capacity and cop of window air conditioner	Lab Manual / LAB
	3RD	Determine the capacity and cop of window air conditioner	Lab Manual / LAB
	4TH	Determine the capacity and cop of window air conditioner	Lab Manual / LAB
11TH	1ST	Determine the capacity and cop of window air conditioner	Lab Manual / LAB
	2ND	Determine the capacity and cop of window air conditioner	Lab Manual / LAB
	3RD	Determine the capacity and cop of split air conditioner	Lab Manual / LAB
	4TH	Determine the capacity and cop of split air conditioner	Lab Manual / LAB
12TH	1ST	Determine the capacity and cop of split air conditioner	Lab Manual / LAB
	2ND	Determine the capacity and cop of split air conditioner	Lab Manual / LAB
	3RD	Determine the capacity and cop of split air conditioner	Lab Manual / LAB
	4TH	Determine the capacity and cop of split air conditioner	Lab Manual / LAB
13TH	1ST	Determine the capacity and cop of vapour absorption Refrigerator test rig.	Lab Manual / LAB
	2ND	Determine the capacity and cop of vapour absorption Refrigerator test rig.	Lab Manual / LAB
	3RD	Determine the capacity and cop of vapour absorption Refrigerator test rig.	Lab Manual / LAB
	4TH	Determine the capacity and cop of vapour absorption Refrigerator test rig.	Lab Manual / LAB
14TH	1ST	Determine the capacity and cop of vapour absorption Refrigerator test rig.	Lab Manual / LAB
	2ND	Determine the capacity and cop of vapour absorption Refrigerator test rig.	Lab Manual / LAB
	3RD	Complete charging of a domestic refrigerator and its leak test.	Lab Manual / LAB
	4TH	Complete charging of a domestic refrigerator and its leak test.	Lab Manual / LAB
15TH	1ST	Complete charging of a domestic refrigerator and its leak test.	Lab Manual / LAB
	2ND	Complete charging of a domestic refrigerator and its leak test.	Lab Manual / LAB
	3RD	Complete charging of a domestic refrigerator and its leak test.	Lab Manual / LAB
	4TH	Complete charging of a domestic refrigerator and its leak test.	Lab Manual / LAB

Chinmayee Jayasingh 31/07/23
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Puri

Lesson Plan on

(TH-5) REFRIGERATION & AIR CONDITIONING

(5^{th} sem)

Prepared by

Chinmayee Jayasingh

PTGF ,MECHANICAL ENGG.

GOVERNMENT POLYTECHNIC, PURIDEPARTMENTOFMECHANICALENGINEERING

Discipline:MECHANICALENGG	Semester: 5TH	Name of the Teaching Faculty: MS CHINMAYEE JAYASINGH,PTGF IN MECH.ENGG.
Subject: REFRIGERATION AND AIR CONDITIONING	No. ofdays/per week classallotted:04	SemesterFromdate: 01.08.2023 ToDate:30.11.2023 No.of Weeks:15
PRE-REQUISITE	Basic knowledge about different refrigeration system, air conditioning and its application.	
COURSEOUTCOMES	CO1:Explain the working of open &closed air refrigeration system. CO2:Describe the working and construction of compressor, Condenser, Evaporator expansion valve used for air conditioning and refrigeration. CO3: Explain Vapor Compression refrigeration system and Vapor Absorption refrigeration system. CO4:Compare different refrigerants properties. CO5: Describe equipment for air conditioning and explain the cooling load.	

Week	Class Day	Theory/Practical Topics	DELIVERY METHOD
1ST	1ST	Definition of refrigeration, unit of refrigeration,COP and Refrigerating Effect.	Whiteboard
	2ND	Principle of working of open and closed air system of refrigeration.	Whiteboard
	3RD	Calculation of COP of Bell-Coleman cycle.	Whiteboard
	4TH	Numerical based on Bell-Coleman Cycle.	Whiteboard
2ND	1ST	Schematic diagram of simple vapors compression refrigeration system and its types,Cycle with dry saturated vapors after compression.	Whiteboard
	2ND	Cycle with wet vapor after compression,Cycle with superheated vapor after compression. Cycle with superheated vapors before compression.	Whiteboard
	3RD	Representation of all the cycle on temperature entropy and pressure enthalpy diagram and numerical on it.	Whiteboard
	4TH	**QUIZ&ASSIGNMENT-I**	Lecturenotes
3RD	1ST	Simple vapor absorption refrigeration system.	Whiteboard
	2ND	Practical vapor absorption refrigeration system.	Whiteboard
	3RD	COP of an ideal vapor absorption refrigeration system and numerical on it.	Whiteboard
	4TH	**QUIZ & ASSIGNMENT-II**	Whiteboard
4TH	1ST	Principle of working and constructional details of reciprocating and rotary compressors.	Whiteboard
	2ND	Centrifugal compressor and terms related to it.Hermetically and semi hermetically sealed compressor.	Whiteboard
	3RD	Principle of working and constructional details of air cooled and watercooled condenser,Heat rejection ratio.	Whiteboard
	4TH	Cooling tower and spray pond, Principle of working and constructional details of an evaporator.	Whiteboard
5TH	1ST	Types of evaporator, Bare tube coil evaporator, finned	Whiteboard

		evaporator, shell and tube evaporator.	
	2ND	Expansion Valves, Capillary tube	Whiteboard
	3RD	Automatic expansion valve, Thermostatic expansion valve	PPT
	4TH	Classification of refrigerants, Desirable properties of an ideal refrigerant, Designation of refrigerant	Whiteboard
6TH	1ST	Thermodynamic Properties of Refrigerants, Chemical properties of refrigerants	Whiteboard
	2ND	Commonly used refrigerants, R-11, R-12, R-22, R-134a, R-717 , Substitute for CFC	Whiteboard
	3RD	Applications of refrigeration,cold storage, dairy refrigeration, ice plant, water cooler, frost free refrigerator	Whiteboard
	4TH	**QUIZ&ASSIGNMENT-III**	Lecturenotes
7TH	1ST	PSYCHOMETRIC & AIR CONDITIONING SYSTEM	Whiteboard
	2ND	Psychometric terms, Adiabatic saturation of air by evaporation of water	Whiteboard
	3RD	Psychometric chart and uses.	Whiteboard
	4TH	Psychometric processes i.e. Sensible heating and Cooling, Cooling and Dehumidification,Heating and Humidification,	Whiteboard
8TH	1ST	Adiabatic cooling with humidification, Total heating of a cooling process, SHF, BPF, Adiabatic mixing	Whiteboard
	2ND	Numerical on all the process	Whiteboard
	3RD	Effective temperature and Comfort chart	Whiteboard
	4TH	**QUIZ & ASSIGNMENT-IV**	Whiteboard
9TH	1ST	AIR CONDITIONING SYSTEMS	Whiteboard
	2ND	Factors affecting comfort air conditioning, Equipment used in an air-conditioning.	Whiteboard
	3RD	Classification of air-conditioning system, Winter Air Conditioning System	Whiteboard
	4TH	Summer air-conditioning system, Numerical on different air conditioning system	Lecturenotes
10TH	1ST	REVISION	Whiteboard
	2ND	REVISION	Whiteboard
	3RD	REVISION	Whiteboard
	4TH	REVISION	Whiteboard
11TH	1ST	REVISION	Whiteboard
	2ND	Problemsolving	Whiteboard
	3RD	**QUIZ&ASSIGNMENT-V**	Lecturenotes
	4TH	REVISION	Whiteboard
12TH	1ST	REVISION	Whiteboard
	2ND	REVISION	Whiteboard
	3RD	REVISION	Whiteboard
	4TH	REVISION	Whiteboard
13TH	1ST	Problemsolving	Whiteboard
	2ND	Problemsolving	Whiteboard
	3RD	Problemsolving	Whiteboard
	4TH	**QUIZ&ASSIGNMENT-VI**	Lecturenotes
14TH	1ST	REVISION	
	2ND	REVISION	
	3RD	REVISION	
	4TH	REVISION	
15TH	1ST	REVISION	
	2ND	REVISION	
	3RD	REVISION	
	4TH	REVISION	

LEARNINGRESOUCES:

01.REFRIGERATION AND AIR CONDITIONING BY C.P ARORA

02;REFRIGERATION AND AIR CONDITIONINGBY R.S.KHURMI &J.K.GOPTA

WEBSITERESOUCES:

01. https://youtube.com/playlist?=PLfUUbFVTz-XcXbSUD0BXdOcGxFGkcdLXa(NPTEL)
02. https://youtube.com/playlist?list=PLEaHqdgEVu6rgimtDDFGVeCfMPLp1q(NPTEL)

Chinmayee Jayasingh 31/07/23

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G.PPuri

Principal
Govt Polytechnic
Puri

Lesson Plan on

(TH-3) HYDRAULIC MACHINE & INDUSTRIAL FLUID POWER

(5^{th} sem)

Prepared by

BISWAJIT NAYAK

PTGF, MECHANICAL ENGG.

GOVERNMENT POLYTECHNIC, PURI

DEPARTMENT OF MECHANICAL ENGINEERING

Discipline: MECHANICAL ENGG	Semester: 3RD	Name of the Teaching Faculty: MR. BISWAJIT NAYAK, PTGF IN MECH. ENGG.
Subject:TH.3 HYDRAULIC MACHINES &INDUSTRIAL FLUID POWER	No. of days/per week class allotted: 04	Semester From date: 01.08.2023 To Date: 30.11.2023 No. of Weeks: 15
PRE-REQUISITE	Basic knowledge about hydraulic machine and use of hydraulic control and pneumatic control system in automation	
COURSE OUTCOMES	CO1:Distinguish the working principle of pumps and turbines. CO2:Explain the working of centrifugal pumps and gear pumps CO3:Compare pneumatic system with hydraulic system. CO4:Draw pneumatic circuits for industrial application. CO5:State the properties of hydraulic system&develop hydraulic circuit for machine tool operation.	

Week	Class Day	Theory / Practical Topics	DELIVERY METHOD
1ST	1ST	HYDRAULIC TURBINES.	Whiteboard
	2ND	Construction and working principle of impulse turbine.	Whiteboard
	3RD	Velocity diagram of moving blades, work done and derivation of various efficiencies of impulse turbine.	Whiteboard
	4TH	Velocity diagram of moving blades, work done and derivation of various efficiencies of impulse turbine.	Whiteboard
2ND	1ST	Numerical based on impulse turbine	Whiteboard
	2ND	Velocity diagram of moving blades, work done and derivation of various efficiencies of Francis turbine.	Whiteboard
	3RD	Velocity diagram of moving blades, work done and derivation of various efficiencies of Francis turbine.	Whiteboard
	4TH	Numerical based on Francis turbine.	Whiteboard
3RD	1ST	Velocity diagram of moving blades, work done and derivation of various efficiencies of Kaplan turbine	Whiteboard
	2ND	Numerical based on Kaplan turbine.	Whiteboard
	3RD	Distinguish between impulse turbine and reaction turbine.	PPT
	4TH	Derivation of hoop stress, longitudinal stress, hoop strain, longitudinal strain and volumetric strain.	
4TH	1ST	QUIZ & ASSIGNMENT-I	PPT
	2ND	CENTRIFUGAL PUMPS	Whiteboard
	3RD	Construction and working principle of centrifugal pumps	Whiteboard
	4TH	work done and derivation of various efficiencies of centrifugal pumps	Whiteboard
5TH	1ST	work done and derivation of various efficiencies of centrifugal pumps	Whiteboard
	2ND	Numerical on Centrifugal pump.	Whiteboard
	3RD	Numerical on Centrifugal pump.	Whiteboard
	4TH	RECIPROCATING PUMPS	Whiteboard
6TH	1ST	Describe construction & working of single acting reciprocating pump	Whiteboard
	2ND	Describe construction & working of double acting reciprocating pump.	PPT
	3RD	Derive the formula foe power required to drive the pump(Single acting & double acting)	Whiteboard
	4TH	Derive the formula foe power required to drive the pump(Single acting & double acting)	Whiteboard
	1ST	Define slip	Whiteboard
	2ND	State positive & negative slip&amp	Whiteboard
	3RD	Establish relation between slip & coefficient of discharge.	

7TH	4TH	Solve numerical on reciprocating pump.	Whiteboard
8TH	1ST	**QUIZ & ASSIGNMENT-II**	Whiteboard
	2ND	PNEUMATIC CONTROL SYSTEM	PPT
	3RD	Elements –filter-regulator-lubrication unit	Whiteboard
	4TH	Pressure control valves(Pressure relief valves&Pressure regulation valves)	Whiteboard
9TH	1ST	Direction control valves(3/2DCV,5/2 DCV,5/3DCV)	Whiteboard
	2ND	Direction control valves(3/2DCV,5/2 DCV,5/3DCV)	Whiteboard
	3RD	Flow control valves	PPT
	4TH	Throttle valves	Whiteboard
10TH	1ST	ISO Symbols of pneumatic components	Whiteboard
	2ND	**QUIZ & ASSIGNMENT-III**	PPT
	3RD	Pneumatic circuits Direct control of single acting cylinder.	PPT
	4TH	Operation of double acting cylinder	
11TH	1ST	Operation of double acting cylinder with metering in and metering out control	Whiteboard
	2ND	Hydraulic system, its merit and demerits	Whiteboard
	3RD	Hydraulic accumulators (Pressure control valves,Pressure relief valves,Pressure regulation valves)	Whiteboard
	4TH	Direction control valves(3/2DCV,5/2 DCV,5/3DCV,Flow control valves&Throttle valve	PPT
12TH	1ST	External and internal gear pumps	Whiteboard
	2ND	Vane pump&Radial piston pumps	Whiteboard
	3RD	ISO Symbols for hydraulic components.	Whiteboard
	4TH	Actuators	Whiteboard
13TH	1ST	**QUIZ & ASSIGNMENT-IV**	Whiteboard
	2ND	Direct control of single acting cylinder	Whiteboard
	3RD	Operation of double acting cylinder	Whiteboard
	4TH	Operation of double acting cylinder with metering in and metering out control	Whiteboard
14TH	1ST	Operation of double acting cylinder with metering in and metering out control	Whiteboard
	2ND	Comparison of hydraulic and pneumatic system	Whiteboard
	3RD	Comparison of hydraulic and pneumatic system	Whiteboard
	4TH	REVISION	
15TH	1ST	**QUIZ & ASSIGNMENT-V**	
	2ND		
	3RD	**REVISION**	
	4TH		

LEARNING RESOURCES:

01. HYDRAULIC MACHINES BY DR.JAGDISH LAL
02. HYDRAULIC &PNEUMATIC CONTROL BY K SHANMUGA,SUNDARAM,S.CHAND PUBLICATION
03. FLUID POWER CONTROL BY J.F. BLACKBURN,G.REETHOF &J.LSHEARER

WEBSITE RESOURCES:

https://www.youtube.com/playlist?list=PL0b9qDcBZ_Xu_JXKrVfzp6oOQODoaOyf0

https://www.youtube.com/watch?v=JXJc0m_AqR0&list=PL1xA-pZWMKpNPSMRZa0TVpszM7VUAdhrw

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Lesson Plan on

(TH-2)DESIGN OF MACHINE ELEMENT

(5^{th} sem)

Prepared by

Ranjan Kumar Nayak

PTGF, MECHANICAL ENGG.

GOVERNMENT POLYTECHNIC, PURI

DEPARTMENT OF MECHANICAL ENGINEERING

Discipline: MECHANICAL ENGG	Semester: 3RD	Name of the Teaching Faculty: Mr RANJAN KUMAR NAYAK, PTGF IN MECH. ENGG.
Subject:DESIGN OF MACHINE ELEMENTS(TH.2)	No. of days/per week class allotted: 04	Semester From date: 01.08.2023 To Date: 30.11.2023 No. of Weeks: 15
PRE-REQUISITE	Basic knowledge about design of fastening element,shaft and keys, coupling and closed coil helical spring.	
COURSE OUTCOMES	CO1: . Understanding the behaviours of material and their uses. CO2: Understanding the design of various fastening elements and their industrial uses. CO3: Understanding the different failures of design elements CO4: Understanding the change of design to accomplish the different field of applications. CO5:Design closed coil helical spring and .shafts, keys, couplings required for power transmission	

Week	Class Day	Theory / Practical Topics	DELIVERY METHOD
1ST	1ST	Introduction to Machine Design and Classify it.	Whiteboard
	2ND	Different mechanical engineering materials used in design with their uses and their mechanical and physical properties	Whiteboard
	3RD	Define working stress, yield stress, ultimate stress & factor of safety and stress –strain curve for M.S & C.I	Whiteboard
	4TH	Define working stress, yield stress, ultimate stress & factor of safety and stress –strain curve for M.S & C.I	Whiteboard
2ND	1ST	Modes of Failure (By elastic deflection, general yielding & fracture)	Whiteboard
	2ND	State the factors governing the design of machine elements	Whiteboard
	3RD	Describe design procedure	Whiteboard
	4TH	**QUIZ & ASSIGNMENT-I**	Whiteboard
3RD	1ST	Design of fastening elements:	Whiteboard
	2ND	Joints and their classification.	Whiteboard
	3RD	State types of welded joints .	PPT
	4TH	State advantages of welded joints over other joints.	
4TH	1ST	Design of welded joints for eccentric loads	PPT
	2ND	numerical	Whiteboard
	3RD	numerical	Whiteboard
	4TH	State types of riveted joints and types of rivets.	Whiteboard
5TH	1ST	Describe failure of riveted joints.	Whiteboard
	2ND	Determine strength & efficiency of riveted joints	Whiteboard
	3RD	Design riveted joints for pressure vessel.	Whiteboard
	4TH	Solve numerical on riveted joint	Whiteboard
6TH	1ST	**QUIZ & ASSIGNMENT-II**	Whiteboard
	2ND	Design of shafts and Keys:	PPT
	3RD	State function of shafts.	Whiteboard
	4TH	State materials for shafts.	
	1ST	Design solid & hollow shafts to transmit a given power at given rpm based on a) Strength: (i) Shear stress, (ii) Combined bending tension; b) Rigidity: (i) Angle of twist, (ii) Deflection, (iii) Modulus of rigidity	Whiteboard

7TH	2ND	Design solid & hollow shafts to transmit a given power at given rpm based on a) Strength: (i) Shear stress, (ii) Combined bending tension; b) Rigidity: (i) Angle of twist, (ii) Deflection, (iii) Modulus of rigidity	Whiteboard
	3RD	State standard size of shaft as per I.S.	Whiteboard
	4TH	Solve numerical on design of shaft.	Whiteboard
8TH	1ST	Solve numerical on design of shaft.	Whiteboard
	2ND	State function of keys, types of keys & material of key	PPT
	3RD	Describe failure of key, effect of key way.	Whiteboard
	4TH	Design rectangular sunk key considering its failure against shear & crushing	Whiteboard
9TH	1ST	Design rectangular sunk key by using empirical relation for given diameter of shaft.	Whiteboard
	2ND	State specification of parallel key, gib-head key, taper key as per I.S.	Whiteboard
	3RD	Solve numerical on Design of keys.	Whiteboard
	4TH	**QUIZ & ASSIGNMENT-III**	PPT
10TH	1ST	Design of Shaft Coupling	Whiteboard
	2ND	Requirements of a good shaft coupling	Whiteboard
	3RD	Types of Coupling.	PPT
	4TH	Design of Sleeve or Muff-Coupling	PPT
11TH	1ST	Design of Clamp or Compression Coupling	
	2ND	Solve simple numerical on above.	Whiteboard
	3RD	**QUIZ & ASSIGNMENT-IV**	Whiteboard
	4TH	Design a closed coil helical spring	Whiteboard
12TH	1ST	Materials used for helical spring	PPT
	2ND	Standard size spring wire. (SWG).	Whiteboard
	3RD	Terms used in compression spring	Whiteboard
	4TH	Stress in helical spring of a circular wire	Whiteboard
13TH	1ST	Deflection of helical spring of circular wire.	Whiteboard
	2ND	Surge in spring	Whiteboard
	3RD	Solve numerical on design of closed coil helical compression spring	Whiteboard
	4TH	**QUIZ & ASSIGNMENT-V**	Whiteboard
14TH	1ST	REVISION	Whiteboard
	2ND	REVISION	Whiteboard
	3RD	REVISION	Whiteboard
	4TH	REVISION	
15TH	1ST	REVISION	
	2ND		
	3RD	**REVISION**	
	4TH		

LEARNING RESOURCES:

01. A TEXT BOOK OF MACHINE DESIGN BYR.S.KHURMI &J.K.GOPTA

02.MACHINE DESIGN BY PANDYA AND SHAH

03. DESIGN DATA BOOK BY S.MD.JALAUDEEN

WEBSITE RESOURCES:

https://www.youtube.com/watch?v=hYGEBQphtkw&list=PLiSPNzs4fD9s131_cBI_G4DLkG-GrinLb

https://www.youtube.com/watch?v=nghyCzrFp1s&list=PLm_MSCIsnwm-QwOu8EkbM7C-DOUB4DxLD

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Lesson Plan on

(PR-3) CAD/CAM LAB (5^{th} sem)

Prepared by

LOKANATH SAHU

SR.LECT. MECHANICAL ENGG.

GOVERNMENT POLYTECHNIC, PURI

DEPARTMENT OF MECHANICAL ENGINEERING

Discipline: MECHANICAL ENGG	Semester: 5TH	Name of the Teaching Faculty: MR LOKANATH SAHU, SR LECTURE, MECH. ENGG.
Subject:Pr.3 CAD/CAM LAB	No. of days/per week class allotted: 04	Semester From date: 01.08.2023 To Date: 30.11.2023 No. of Weeks: 15
PRE-REQUISITE	Basic knowledge of engineering and machine drawing.	
COURSE OUTCOMES	CO1:Understand the fundamentals and use of CAD.. CO2:Conceptualize drafting and modelling in CAD. CO3:Interpret the various features in the menu of solid modelling package. CO4:Synthesize various parts or components in an assembly. CO5: Prepare CNC programmes for various jobs	

Week	Class Day	Theory / Practical Topics	DELIVERY METHOD
1ST	1ST	INTRODUCTION	Software
	2ND	Part modelling	Software
	3RD	Datum plane	Software
	4TH	Constraint	Software
2ND	1ST	Dimensioning	Software
	2ND	Extrude	Software
	3RD	Revolve	Software
	4TH	Sweep	Software
3RD	1ST	Protrusion	Software
	2ND	Extrusion	Software
	3RD	Rib	Software
	4TH	Shell	Software
4TH	1ST	Hole	Software
	2ND	Round	Software
	3RD	Chamfer	Software
	4TH	Copy	Software
5TH	1ST	Mirror	Software
	2ND	Assembly	Software
	3RD	Assembly	Software
	4TH	Assembly	Software
6TH	1ST	Assembly	Software
	2ND	Allign	Software
	3RD	Allign	Software
	4TH	Orient	Software
	1ST	Orient	Software
	2ND	2D Drawings of Rectangle, circle, polygon and its dimensioning	Software
	3RD	2D Drawings of Rectangle, circle, polygon and its dimensioning	Software

7TH	4TH	3D Drawings of Gib and cutter joint	Software
8TH	1ST	Gib and cutter joint	Software
	2ND	Screw Jack.	Software
	3RD	Screw Jack.	Software
	4TH	Connecting Rod	Software
9TH	1ST	Bearing Block	Software
	2ND	Application areas for CAD/CAM	Software
	3RD	Application areas for CAD/CAM	Software
	4TH	CNC Programming and Machining	Whiteboard
10TH	1ST	CNC Programming and Machining	Whiteboard
	2ND	Study of CNC lathe, milling	Whiteboard
	3RD	Study of CNC lathe, milling	Whiteboard
	4TH	Study of CNC lathe, milling	Whiteboard
11TH	1ST	Study of international codes; G-Codes and M –Codes	Whiteboard
	2ND	Study of international codes; G-Codes and M –Codes	Whiteboard
	3RD	Study of international codes; G-Codes and M –Codes	Whiteboard
	4TH	.Format –Dimensioning methods	Whiteboard
12TH	1ST	.Format –Dimensioning methods	Whiteboard
	2ND	.Format –Dimensioning methods	Whiteboard
	3RD	Programme writing –Turning Simulator-Milling simulator IS practice-commands menus	Whiteboard
	4TH	Programme writing –Turning Simulator-Milling simulator IS practice-commands menus	Whiteboard
13TH	1ST	Programme writing –Turning Simulator-Milling simulator IS practice-commands menus	Whiteboard
	2ND	Programme writing –Turning Simulator-Milling simulator IS practice-commands menus	Whiteboard
	3RD	Programme writing –Turning Simulator-Milling simulator IS practice-commands menus	Whiteboard
	4TH	Editing the programme in the CNC MACHINES	Whiteboard
14TH	1ST	Editing the programme in the CNC MACHINES	Whiteboard
	2ND	Editing the programme in the CNC MACHINES	Whiteboard
	3RD	Execute the programme in the CNC machines	Whiteboard
	4TH	Execute the programme in the CNC machines	Whiteboard
15TH	1ST	Execute the programme in the CNC machines	
	2ND		
	3RD	**REVISION**	
	4TH		

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Lesson Plan on

(PR-2) HYDRAULIC & INDUDTRIAL FLUID POWER LAB (5th sem)

Prepared by

SUSHRI PRIYANKA PANIGRAHI

W/S SUPTD.

GOVERNMENT POLYTECHNIC, PURI

DEPARTMENT OF MECHANICAL ENGINEERING

Discipline: MECHANICAL ENGG	Semester: 3RD	Name of the Teaching Faculty: MRS SUSHRI PRIYANKA PANIGRAHI,W/S SUPTD.
Subject:Pr 2. HYDRAULIC MACHINES &INDUSTRIAL FLUID POWER LAB	No. of days/per week class allotted: 04	Semester From date: 01.08.2023 To Date: 30.11.2023 No. of Weeks: 15
PRE-REQUISITE	Basic knowledge about hydraulic machine and use of hydraulic control and pneumatic control system.	
COURSE OUTCOMES	CO1: Conducting performance test on impulse and reaction turbine CO2: Conducting performance test on centrifugal pump. CO3: Designing &operating pneumatic circuits. CO4:Designing &operating industrial fluid power circuits.	

Week	Class Day	Theory / Practical Topics	DELIVERY METHOD
1ST	1ST	Performance test on impulse turbine and to find out the efficiency	Lab Manual / LAB
	2ND	Performance test on impulse turbine and to find out the efficiency	Lab Manual / LAB
	3RD	Performance test on impulse turbine and to find out the efficiency	Lab Manual / LAB
	4TH	Performance test on impulse turbine and to find out the efficiency	Lab Manual / LAB
2ND	1ST	Performance test on impulse turbine and to find out the efficiency	Lab Manual / LAB
	2ND	Performance test on impulse turbine and to find out the efficiency	Lab Manual / LAB
	3RD	Performance test on Kaplan turbine and to find out the efficiency	Lab Manual / LAB
	4TH	Performance test on Kaplan turbine and to find out the efficiency	Lab Manual / LAB
3RD	1ST	Performance test on Kaplan turbine and to find out the efficiency	Lab Manual / LAB
	2ND	Performance test on Kaplan turbine and to find out the efficiency	Lab Manual / LAB
	3RD	Performance test on Kaplan turbine and to find out the efficiency	Lab Manual / LAB
	4TH	Performance test on Kaplan turbine and to find out the efficiency	Lab Manual / LAB
4TH	1ST	Performance test on Francis turbine and to find out the efficiency	Lab Manual / LAB
	2ND	Performance test on Francis turbine and to find out the efficiency	Lab Manual / LAB
	3RD	Performance test on Francis turbine and to find out the efficiency	Lab Manual / LAB
	4TH	Performance test on Francis turbine and to find out the efficiency	Lab Manual / LAB
5TH	1ST	Performance test on Francis turbine and to find out the efficiency	Lab Manual / LAB
	2ND	Performance test on Francis turbine and to find out the efficiency	Lab Manual / LAB
	3RD	Performance test on centrifugal pump and to find out the characteristic curves	Lab Manual / LAB
	4TH	Performance test on centrifugal pump and to find out the characteristic curves	Lab Manual / LAB
6TH	1ST	Performance test on centrifugal pump and to find out the characteristic curves	Lab Manual / LAB
	2ND	Performance test on centrifugal pump and to find out the characteristic curves	Lab Manual / LAB
	3RD	Performance test on centrifugal pump and to find out the characteristic curves	Lab Manual / LAB
	4TH	Performance test on centrifugal pump and to find out the characteristic curves	Lab Manual / LAB
7TH	1ST	Direct operation of single &double acting pneumatic cylinder	Lab Manual / LAB
	2ND	Direct operation of single &double acting pneumatic cylinder	Lab Manual / LAB
	3RD	Direct operation of single &double acting pneumatic cylinder	Lab Manual / LAB
	4TH	Direct operation of single &double acting pneumatic cylinder	Lab Manual / LAB

8TH	1ST	Direct operation of single &double acting pneumatic cylinder	Lab Manual / LAB
	2ND	Direct operation of single &double acting pneumatic cylinder	Lab Manual / LAB
	3RD	Operating double acting pneumatic cylinder with quick exhaust valve	Lab Manual / LAB
	4TH	Operating double acting pneumatic cylinder with quick exhaust valve	Lab Manual / LAB
9TH	1ST	Operating double acting pneumatic cylinder with quick exhaust valve	Lab Manual / LAB
	2ND	Operating double acting pneumatic cylinder with quick exhaust valve	Lab Manual / LAB
	3RD	Operating double acting pneumatic cylinder with quick exhaust valve	Lab Manual / LAB
	4TH	Operating double acting pneumatic cylinder with quick exhaust valve	Lab Manual / LAB
10TH	1ST	Speed control double acting pneumatic cylinder using metering in and metering out circuits.	Lab Manual / LAB
	2ND	Speed control double acting pneumatic cylinder using metering in and metering out circuits.	Lab Manual / LAB
	3RD	Speed control double acting pneumatic cylinder using metering in and metering out circuits.	Lab Manual / LAB
	4TH	Speed control double acting pneumatic cylinder using metering in and metering out circuits.	Lab Manual / LAB
11TH	1ST	Speed control double acting pneumatic cylinder using metering in and metering out circuits.	Lab Manual / LAB
	2ND	Speed control double acting pneumatic cylinder using metering in and metering out circuits.	Lab Manual / LAB
	3RD	Direct operation of single &double acting hydraulic cylinder	Lab Manual / LAB
	4TH	Direct operation of single &double acting hydraulic cylinder	Lab Manual / LAB
12TH	1ST	Direct operation of single &double acting hydraulic cylinder	Lab Manual / LAB
	2ND	Direct operation of single &double acting hydraulic cylinder	Lab Manual / LAB
	3RD	Direct operation of single &double acting hydraulic cylinder	Lab Manual / LAB
	4TH	Direct operation of single &double acting hydraulic cylinder	Lab Manual / LAB
13TH	1ST	Direct operation of hydraulic motor	Lab Manual / LAB
	2ND	Direct operation of hydraulic motor	Lab Manual / LAB
	3RD	Direct operation of hydraulic motor	Lab Manual / LAB
	4TH	Direct operation of hydraulic motor	Lab Manual / LAB
14TH	1ST	Direct operation of hydraulic motor	Lab Manual / LAB
	2ND	Direct operation of hydraulic motor	Lab Manual / LAB
	3RD	Speed control double acting hydraulic cylinder using metering in & metering out circuits.	Lab Manual / LAB
	4TH	Speed control double acting hydraulic cylinder using metering in & metering out circuits.	Lab Manual / LAB
15TH	1ST	Speed control double acting hydraulic cylinder using metering in & metering out circuits.	Lab Manual / LAB
	2ND	Speed control double acting hydraulic cylinder using metering in & metering out circuits.	Lab Manual / LAB
	3RD	Speed control double acting hydraulic cylinder using metering in & metering out circuits.	Lab Manual / LAB
	4TH	Speed control double acting hydraulic cylinder using metering in & metering out circuits.	Lab Manual / LAB

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