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GOVT. POLYTECHNIC BOLANGIR		LESSON PLAN
Discipline : Mechanical	Semester: 4th	Name of the Teaching Faculty : Anandananda Bisoyi
Subject : THEORY OF MACHINES	No. of Days / per week class allotted : 4	Semester From date : 16.01.2024 To Date : 26.04.2024 No. of Weeks: 15
Week	Class Day	Topics
16.01 - 20.01	1st	Simple mechanism
	2nd	Link ,kinematic chain, mechanism, machine
	3rd	Inversion, four bar link mechanism and its inversion
	4th	Lower pair and higher pair
22.01 - 27.01	1st	Cam and followers
	2nd	Friction between nut and screw for square thread, screw jack
	3rd	Bearing and its classification, Description of roller, needle roller& ball bearings.
	4th	Torque transmission in flat pivot& conical pivot bearings.
29.01- 03.02	1st	Flat collar bearing of single and multiple types.
	2nd	Torque transmission for single and multiple clutches
	3rd	Working of simple frictional brakes.
	4th	Working of Absorption type of dynamometer
05.02 - 10.02	1st	Concept of power transmission
	2nd	Type of drives, belt, gear and chain drive.
	3rd	Computation of velocity ratio, length of belts (open and cross)with and without slip.
	4th	Ratio of belt tensions, centrifugal tension and initial tension.
12.02 - 17.02	1st	Power transmitted by the belt.
	2nd	Determine belt thickness and width for given permissible stress for open and crossed belt considering centrifugal tension.
	3rd	V-belts and V-belts pulleys.
	4th	Concept of crowning of pulleys.
19.02 - 24.02	1st	Gear drives and its terminology.
	2nd	Gear trains, working principle of simple, compound, reverted and epicyclic gear trains.
	3rd	Governors and Flywheel
	4th	Function of governor
26.02 - 02.03	1st	Classification of governor
	2nd	Working of Watt, Porter, Proel and Hartnell governors.
	3rd	Conceptual explanation of sensitivity, stability and isochronisms.
	4th	Function of flywheel.
04.03 - 09.03	1st	Comparison between flywheel &governor.
	2nd	Fluctuation of energy and coefficient of fluctuation of speed.
	3rd	Concept of static and dynamic balancing.
	4th	Static balancing of rotating parts.
11.03- 16.03	1st	Principles of balancing of reciprocating parts.
	2nd	Causes and effect of unbalance.
	3rd	Difference between static and dynamic balancing
	4th	Vibration of machine parts
18.03- 23.03	1st	Introduction to Vibration and related terms (Amplitude, time period and
	2nd	Classification of vibration.
	3rd	Basic concept of natural, forced & damped vibration
	4th	Torsional and Longitudinal vibration.
25.03- 30.03	1st	Causes & remedies of vibration.
	2nd	Revision
	3rd	Class test
	4th	Q & A discaussion

GOVT. POLYTECHNIC BOLANGIR		LESSON PLAN
Discipline : Mechanical	Semester: 4th	Name of the Teaching Faculty: Ramai Ranjan Panigrahi
Subject : MANUFACTURING TECH NOLOGY	No. of Days / per week class allotted : 4	Semester From date : 16.01.2024 To Date : 26.04.2024 No. of Weeks: 15
Week	Class Day	Topics
16.01 - 20.01	1st	Composition of various tool materials
	2nd	Physical properties & uses of such tool materials.
	3rd	Cutting action of various hand tools such as Chisel, hack saw blade, dies and reamer
	4th	Machining process parameters (Speed, feed and depth of cut)
22.01 - 27.01	1st	Machining process parameters (Speed, feed and depth of cut)
	2nd	Turning tool geometry and purpose of tool angle
	3rd	Coolants and lubricants in machining and purpose
	4th	Major components of a lathe and their function
29.01- 03.02	1st	Operations carried out in a lathe (Turning, thread cutting, taper turning,
	2nd	Safety measures during machining
	3rd	Difference with respect to engine lathe
	4th	Major components and their function
05.02 - 10.02	1st	Define multiple tool holders
	2nd	Difference with respect to capstan lathe
	3rd	Major components and their function
	4th	Draw the tooling lay out for preparation of a hexagonal bolt & bush
12.02 - 17.02	1st	Potential application areas of a shaper machine
	2nd	Major components and their function
	3rd	Explain the automatic table feed mechanism
	4th	Explain the construction & working of tool head
19.02 - 24.02	1st	Explain the quick return mechanism through sketch
	2nd	State the specification of a shaping machine.
	3rd	Application area of a planar and its difference with respect to shaper
	4th	Major components and their functions
26.02 - 02.03	1st	The table drive mechanism
	2nd	Working of tool and tool support
	3rd	Clamping of work through sketch.
	4th	Types of milling machine and operations performed by them
04.03 - 09.03	1st	Types of milling machine and operations performed by them
	2nd	Explain work holding attachment
	3rd	Construction & working of simple dividing head, universal dividing head
	4th	Procedure of simple and compound indexing
11.03- 16.03	1st	Illustration of different indexing methods
	2nd	Major components and their function
	3rd	Construction and working of slotter machine
	4th	Tools used in slotter
18.03- 23.03	1st	Significance of grinding operations
	2nd	Manufacturing of grinding wheels
	3rd	Criteria for selecting of grinding wheels
	4th	Cylindrical Grinder
25.03- 30.03	1st	Centre less Grinder & Surface Grinder
	2nd	Bench drilling machine & Pillar drilling machine
	3rd	Radial drilling machine
	4th	Basic Principle of Boring
01.04- 06.04	1st	Different between Boring and drilling & Types of Broaching (pull type, push type)
	2nd	Definition of Surface finish, Define super finishing
	3rd	Description of lapping & explain their specific cutting.
	4th	

GOVT. POLYTECHNIC BOLANGIR LESSON PLAN		
Discipline : Mechanical	Semester: 4th	Name of the Teaching Faculty : Siddharth Swarup Tripathy
Subject : FLUID MECHANICS	No. of Days / per week class allotted : 4	Semester From date : 16.01.2024 To Date : 26.04.2024 No. of Weeks: 15
Week	Class Day	Topics
16.01 - 20.01	1st	Properties of Fluid
	2nd	Define fluid
	3rd	Description of fluid properties like Density, Specific weight, specific gravity, specific volume and solve simple problems.
	4th	Definitions and Units of Dynamic viscosity, kinematic viscosity, surface tension Capillary phenomenon
22.01 - 27.01	1st	Definitions and units of fluid pressure, pressure intensity and pressure
	2nd	Statement of Pascal's Law.
	3rd	Concept of atmospheric pressure, gauge pressure, vacuum pressure and
	4th	Pressure measuring instruments
29.01- 03.02	1st	Manometers (Simple and Differential)
	2nd	Bourdon tube pressure gauge(Simple Numerical)
	3rd	Solve simple problems on Manometer.
	4th	Hydrostatics
05.02 - 10.02	1st	Definition of hydrostatic pressure
	2nd	Total pressure and centre of pressure on
	3rd	immersed bodies(Horizontal and Vertical Bodies)
	4th	Solve Simple problems.
12.02 - 17.02	1st	Archimedes 'principle, concept of buoyancy, meta center and meta centric
	2nd	(Definition only)
	3rd	Concept of floatation
	4th	Kinematics of Flow
19.02 - 24.02	1st	Types of fluid flow
	2nd	Continuity equation(Statement and proof for one dimensional flow)
	3rd	Bernoulli's theorem(Statement and proof)
	4th	Applications and limitations of Bernoulli's theorem (Venturimeter, pitot
26.02 - 02.03	1st	Solve simple problems
	2nd	Orifices, notches & weirs
	3rd	Define orifice
	4th	Flow through orifice
04.03 - 09.03	1st	Orifices coefficient & the relation between the orifice coefficients
	2nd	Classifications of notches & weirs
	3rd	Discharge over a rectangular notch or weir
	4th	Discharge over a triangular notch or weir
11.03- 16.03	1st	Simple problems on above
	2nd	Flow through pipe
	3rd	Definition of pipe.
	4th	Loss of energy in pipes.

GOVT. POLYTECHNIC BOLANGIR		LESSON PLAN
Discipline : Mechanical	Semester: 4th	Name of the Teaching Faculty : Mr Suresh Kumbhar.
Subject : THERMAL ENGINEERING-II	No. of Days / per week class allotted : 4	Semester From date : 16.01.2024 To date : 26.04.2024 No. of Weeks: 15
Week	Class Day	Topics
16.01 - 20.01	1st	Performance of I.C engine
	2nd	Define mechanical efficiency, Indicated thermal efficiency,
	3rd	Relative Efficiency, brake thermal efficiency overall efficiency
	4th	Mean effective pressure &specific fuel consumption.
22.01 - 27.01	1st	Define air-fuel ratio & calorific value of fuel.
	2nd	Work out problems to determine efficiencies & specific fuel consumption.
	3rd	Explain functions of compressor & industrial use of compressor air
	4th	Classify air compressor & principle of operation.
29.01- 03.02	1st	Describe the parts and working principle of reciprocating Air compressor.
	2nd	2.4 Explain the terminology of reciprocating compressor such as bore, stroke,
	3rd	pressure ratio free air delivered &Volumetric efficiency.
	4th	Derive the work done of single stage & two stage compressor with and without
05.02 - 10.02	1st	Difference between gas & vapours.
	2nd	Formation of steam.
	3rd	Representation on P-V, T-S, H-S, & T-H diagram.
	4th	Definition & Properties of Steam.
12.02 - 17.02	1st	Use of steam table & mollier chart for finding unknown properties.
	2nd	3.6 Non flow & flow process of vapour.
	3rd	3.7 P-V, T-S & H-S, diagram.
	4th	3.8 Determine the changes in properties & solve simple numerical.
19.02 - 24.02	1st	Steam Generator
	2nd	Classification & types of Boiler.
	3rd	4.2 Important terms for Boiler.
	4th	4.3 Comparison between fire tube & Water tube Boiler.
26.02 - 02.03	1st	Description & working of common boilers (Cochran, Lancashire, Babcock &
	2nd	Wilcox Boiler)
	3rd	Boiler Draught (Forced, induced & balanced)
	4th	4.6 Boiler mountings & accessories.
04.03 - 09.03	1st	Steam Power Cycles
	2nd	Carnot cycle with vapour.
	3rd	5.2 Derive work & efficiency of the cycle.
	4th	5.3 Rankine cycle.
11.03- 16.03	1st	Representation in P-V, T-S & h-s diagram.
	2nd	5.3.2 Derive Work & Efficiency.
	3rd	5.3.3 Effect of Various end conditions in Rankine cycle.
	4th	5.3.4 Reheat cycle & regenerative Cycle.
18.03- 23.03	1st	Solve simple numerical on Carnot vapour Cycle & Rankine Cycle.
	2nd	Heat Transfer
	3rd	Modes of Heat Transfer (Conduction, Convection, Radiation).
	4th	6.2 Fourier law of heat conduction and thermal conductivity (k).
25.03- 30.03	1st	6.3 Newton's laws of cooling.
	2nd	6.4 Radiation heat transfer (Stefan, Boltzmann & Kirchhoff's law) only statement,
	3rd	
	4th	Black body Radiation, Definition of Emissivity, absorptivity, & transmissibility.

GOVT. POLYTECHNIC BOLANGIR		LESSON PLAN
Discipline : Mechanical	Semester: 6th	Name of the Teaching Faculty : MANABHANJAN BHOI
Subject :INDUSTRIAL ENGINEERING & MANAGEMENT	No. of Days / per week class allotted : 4	Semester From date : 16.01.2024 To Date : 26.04.2024 No. of Weeks: 15
Week	Class Day	Topics
16.01 - 20.01	1st	PLANT ENGINEERING:
	2nd	Selection of Site of Industry.
	3rd	Define plant layout.
	4th	Describe the objective and principles of plant layout.
22.01 - 27.01	1st	Explain Process Layout, Product Layout and Combination Layout.
	2nd	Techniques to improve layout.
	3rd	Principles of material handling equipment.
	4th	Plant maintenance.
29.01- 03.02	1st	Importance of plant maintenance.
	2nd	1.7.2 Break down maintenance.
	3rd	1.7.3 Preventive maintenance.
	4th	1.7.4 Scheduled maintenance
05.02 - 10.02	1st	OPERATIONS RESEARCH:
	2nd	Introduction to Operations Research and its applications.
	3rd	Define Linear Programming Problem
	4th	2.3Solution of L.P.P. by graphical method.
12.02 - 17.02	1st	Evaluation of Project completion time by Critical Path Method and PERT (Simple problems)-
	2nd	Explain distinct features of PERT with respect to CPM.
	3rd	INVENTORY CONTROL:
	4th	Classification of inventory.
19.02 - 24.02	1st	Objective of inventory control.
	2nd	Describe the functions of inventories.
	3rd	Benefits of inventory control.
	4th	Costs associated with inventory.
26.02 - 02.03	1st	Terminology in inventory control
	2nd	Explain and Derive economic order quantity for Basic model. (Solve numerical)
	3rd	Define and Explain ABC analysis.
	4th	INSPECTION AND QUALITY CONTROL:
04.03 - 09.03	1st	4.1Define Inspection and Quality control.
	2nd	4.2Describe planning of inspection.
	3rd	4.3 Describe types of inspection.
	4th	4.4 Advantages and disadvantages of quality control.
11.03- 16.03	1st	Study of factors influencing the quality of manufacture.
	2nd	4.6 Explain the Concept of statistical quality control, Control charts (X, R, P and C - charts).
	3rd	4.7 Methods of attributes.
	4th	4.8 Concept of ISO 9001-2008.

GOVT. POLYTECHNIC BOLANGIR		LESSON PLAN
Discipline : Mechanical	Semester: 6th	Name of the Teaching Faculty : Ashirbad Babu
Subject :AUTOMOBILE ENGINEERING AND HYBRID VEHICLES	No. of Days / per week class allotted : 4	Semester From date : 16.01.2024 To Date : 26.04.2024 No. of Weeks : 15
Week	Class Day	Topics
16.01 - 20.01	1st	Automobiles: Definition, need
	2nd	Automobiles: classification: Layout of automobile chassis with major components (Line diagram)
	3rd	Clutch System: Need, Types (Single & Multiple)
	4th	Clutch System: Working principle with sketch
22.01 - 27.01	1st	Gear Box: Purpose of gear box, Construction and
	2nd	Gear Box: working of a 4 speed gear box
	3rd	Concept of automatic gear changing mechanisms
	4th	Concept of automatic gear changing mechanisms
29.01- 03.02	1st	Propeller shaft: Constructional features
	2nd	Propeller shaft: Constructional features
	3rd	Differential: Need, Types
	4th	Differential: Working principle
05.02 - 10.02	1st	Braking systems in automobiles
	2nd	Braking systems in automobiles: Need and types
	3rd	Mechanical Brake
	4th	USES OF Mechanical Brake
12.02 - 17.02	1st	Hydraulic Brake
	2nd	Hydraulic Brake
	3rd	Air Brake
	4th	Air Brake
19.02 - 24.02	1st	Air assisted Hydraulic Brake
	2nd	Air assisted Hydraulic Brake
	3rd	Vacuum Brake
	4th	Vacuum Brake
26.02 - 02.03	1st	Describe the Battery ignition
	2nd	Describe the Magnet ignition system
	3rd	Spark plugs: Purpose, construction
	4th	Spark plugs: specifications
04.03 - 09.03	1st	State the common ignition troubles and its remedies
	2nd	State the its remedies
	3rd	Description of the conventional suspension system for Rear and Front axle
	4th	Description of the conventional suspension system for Rear and Front axle
11.03- 16.03	1st	Description of independent suspension system used in cars (coil spring and tension bars)
	2nd	Constructional features and working of a telescopic shock absorber
	3rd	Engine cooling: Need and classification
	4th	4.2 Describe defects of cooling and their remedial measures

GOVT. POLYTECHNIC BOLANGIR		LESSON PLAN
Discipline : Mechanical	Semester: 6th	Name of the Teaching Faculty : Siddharth Swarup Tripathy
Subject : POWER STATION ENGINEERING	No. of Days / per week class allotted : 4	Semester From date : 16.01.2024 To Date : 26.04.2024 No. of Weeks: 15
Week	Class Day	Topics
16.01 - 20.01	1st	Describe sources of energy.
	2nd	Explain concept of Central and Captive power station.
	3rd	Classify power plants.
	4th	Importance of electrical power in day today life.
22.01 - 27.01	1st	Layout of steam power stations
	2nd	Steam power cycle. Explain Carnot vapour power cycle with P-V, T-s diagram and determine thermal efficiency.
	3rd	Explain Rankine cycle with P-V, T-S & H-s diagram and determine thermal efficiency, Work done, work ratio, and specific steam Consumption.
	4th	Solve Simple Problems
29.01- 03.02	1st	List of thermal power stations in the state with their capacities.
	2nd	Boiler Accessories: Operation of Air pre heater, Operation of Economiser, Operation Electrostatic precipitator and Operation of super heater. Need of boiler mountings and operation of boiler
	3rd	Draught systems (Natural draught, Forced draught & balanced draught) with their advantages & disadvantages.
	4th	Steam prime movers: Advantages & disadvantages of steam turbine, Elements of steam turbine, governing of steam turbine. Performance of steam turbine: Explain Thermal efficiency, Stage efficiency and Gross efficiency.
05.02 - 10.02	1st	Steam condenser: Function of condenser, Classification of condenser. function of condenser auxiliaries such as hot well, condenser extraction pump, air extraction pump, and circulating pump.
	2nd	Cooling Tower: Function and types of cooling tower, and spray ponds
	3rd	Selection of site for thermal power stations.
	4th	Classify nuclear fuel (Fissile & fertile material)
12.02 - 17.02	1st	Potential application areas of a shaper machine
	2nd	Explain fusion and fission reaction.
	3rd	Explain working of nuclear power plants with block diagram .
	4th	Explain the working and construction of nuclear reactor .
19.02 - 24.02	1st	Explain the disposal of nuclear waste.
	2nd	Selection of site for nuclear power stations.
	3rd	List of nuclear power stations.
	4th	Major components and their functions
26.02 - 02.03	1st	State the advantages and disadvantages of diesel electric power stations.
	2nd	Explain briefly different systems of diesel electric power stations: Fuel storage and fuel supply system, Fuel injection system, Air supply system, Exhaust system, cooling system, Lubrication system, starting system, governing system.
	3rd	Selection of site for diesel electric power stations.
	4th	Performance and thermal efficiency of diesel electric power stations.
04.03 - 09.03	1st	State advantages and disadvantages of hydroelectric power plant.
	2nd	Classify and explain the general arrangement of storage type hydroelectric project and explain its operation.
	3rd	Selection of site of hydel power plant.
	4th	List of hydro power stations with their capacities and number of units in the state.

GOVT. POLYTECHNIC BOLANGIR		LESSON PLAN
Discipline : Mechanical	Semester: 6th	Name of the Teaching Faculty : Ramai Ranjan Panigrahi
Subject : ADVANCE MANUFACTURING PROCESS	No. of Days / per week class allotted : 4	Semester From date : 16.01.2024 To Date : 26.04.2024 No. of Weeks : 15
Week	Class Day	Topics
16.01 - 20.01	1st	Introduction – comparison with traditional machining.
	2nd	Ultrasonic Machining: principle, Description of equipment, applications.
	3rd	Ultrasonic Machining: principle, Description of equipment, applications.
	4th	Electric Discharge Machining: Principle, Description of equipment, Dielectric fluid, tools (electrodes), Process parameters, Output characteristics, applications.
22.01 - 27.01	1st	Electric Discharge Machining: Process parameters, Output characteristics, applications.
	2nd	Wire cut EDM: Principle, Description of equipment, controlling parameters; applications.
	3rd	Wire cut EDM: controlling parameters; applications.
	4th	DISCAUSS ABOUT INDUSTRIAL USES
29.01- 03.02	1st	Abrasive Jet Machining: principle, description of equipment, Material removal rate, application.
	2nd	Abrasive Jet Machining: Material removal rate, application.
	3rd	DISCAUSS ABOUT INDUSTRIAL USES
	4th	MRR CALCULATION
05.02 - 10.02	1st	Laser Beam Machining: principle, description of equipment, Material removal rate, application.
	2nd	Laser Beam Machining: Material removal rate, application.
	3rd	Electro Chemical Machining: principle, description of equipment, Material removal rate, application.
	4th	Electro Chemical Machining: Material removal rate, application.
12.02 - 17.02	1st	Plasma Arc Machining – principle, description of equipment, Material removal rate, Process parameters, performance characterization, Applications.
	2nd	Plasma Arc Machining – performance characterization, Applications.
	3rd	MRR CALCULATION
	4th	DISCAUSS ABOUT INDUSTRIAL USES
19.02 - 24.02	1st	INTRO TO Processing of plastics.
	2nd	Processing of plastics.
	3rd	Moulding processes: Injection moulding, Compression moulding, Transfer moulding.
	4th	Moulding processes: Transfer moulding.
26.02 - 02.03	1st	Extruding; Casting; Calendering.
	2nd	Fabrication methods-Sheet forming, Blow moulding,
	3rd	Fabrication methods-Laminating plastics (sheets, rods & tubes), Reinforcing.
	4th	DISCAUSS ABOUT INDUSTRIAL USES
04.03 - 09.03	1st	Applications of Plastics.
	2nd	Introduction, Need for Additive Manufacturing
	3rd	Fundamentals of Additive Manufacturing, AM Process Chain
	4th	Advantages and Limitations of AM, Commonly used Terms
11.03- 16.03	1st	Classification of AM process, Fundamental Automated Processes, Distinction between AM and CNC, other related technologies.
	2nd	Application –Application in Design, Aerospace Industry, Automotive Industry, Jewelry Industry, Arts and Architecture. RP Medical and Bioengineering Applications.
	3rd	Web Based Rapid Prototyping Systems.
	4th	Concept of Flexible manufacturing process, concurrent engineering, production tools like capstan and turret lathes, rapid prototyping processes.