# Lesson Plan on
# (PR-2) POWER STATION ENGINEERING LAB
# (6th sem) (S-2024)

Prepared by

Mr. DEBIPRASAD PATRA

PTGF GP,PURI

# GOVERNMENT POLYTECHNIC, PURI

## DEPARTMENT OF MECHANICAL ENGINEERING

| | | |
|---|---|---|
| **Discipline:** MECHANICAL ENGG | **Semester:** 6TH | **Name of the Teaching Faculty:** MR.DEBIPRASAD PATRA, PTGF IN MECH. ENGG. |
| **Subject:** POWER STATION ENGG. LAB (PR. 2) | **No. of days/per week class allotted:** 04 | **Semester From date:** 16.01.2024 **To Date:** 26.04.2024 <br> **No. of Weeks:** 15 |
| **PRE- REQUISITE** | Basic knowledge about power plant, boilers, and various parts and fuctions of a power plant. | |
| **COURSE OUTCOMES** | CO1: Understand the modern steam power plant with a model.<br>CO2: Understanding the various efficiencies of steam turbine.<br>CO3: Understanding function of cooling tower, jet condenser.<br>CO4: Understaing different types of boilers with model. | |

| Week | Class Day | Theory / Practical Topics | DELIVERY METHOD |
|---|---|---|---|
| 1ST | 1ST | To study the modern steam power plant with model. | Lab Manual / LAB |
| | 2ND | To study the modern steam power plant with model. | Lab Manual / LAB |
| | 3RD | To study the modern steam power plant with model. | Lab Manual / LAB |
| | 4TH | To study the modern steam power plant with model. | Lab Manual / LAB |
| 2ND | 1ST | To study the modern steam power plant with model. | Lab Manual / LAB |
| | 2ND | To study the modern steam power plant with model. | Lab Manual / LAB |
| | 3RD | To study the modern steam power plant with model. | Lab Manual / LAB |
| | 4TH | To study the modern steam power plant with model. | Lab Manual / LAB |
| 3RD | 1ST | To determine the various efficiencies of steam turbine. | Lab Manual / LAB |
| | 2ND | To determine the various efficiencies of steam turbine. | Lab Manual / LAB |
| | 3RD | To determine the various efficiencies of steam turbine. | Lab Manual / LAB |
| | 4TH | To determine the various efficiencies of steam turbine. | Lab Manual / LAB |
| 4TH | 1ST | To determine the various efficiencies of steam turbine. | Lab Manual / LAB |
| | 2ND | To determine the various efficiencies of steam turbine. | Lab Manual / LAB |
| | 3RD | To determine the various efficiencies of steam turbine. | Lab Manual / LAB |
| | 4TH | To determine the various efficiencies of steam turbine. | Lab Manual / LAB |
| 5TH | 1ST | To study the cooling tower. | Lab Manual / LAB |
| | 2ND | To study the cooling tower. | Lab Manual / LAB |
| | 3RD | To study the cooling tower. | Lab Manual / LAB |
| | 4TH | To study the cooling tower. | Lab Manual / LAB |
| 6TH | 1ST | To study the cooling tower. | Lab Manual / LAB |
| | 2ND | To study the cooling tower. | Lab Manual / LAB |
| | 3RD | To study the cooling tower. | Lab Manual / LAB |
| | 4TH | To study the cooling tower. | Lab Manual / LAB |
| 7TH | 1ST | Study of jet condenser. | Lab Manual / LAB |
| | 2ND | Study of jet condenser. | Lab Manual / LAB |
| | 3RD | Study of jet condenser. | Lab Manual / LAB |
| | 4TH | Study of jet condenser. | Lab Manual / LAB |
| 8TH | 1ST | Study of jet condenser. | Lab Manual / LAB |
| | 2ND | Study of jet condenser. | Lab Manual / LAB |
| | 3RD | Study of jet condenser. | Lab Manual / LAB |
| | 4TH | Study of jet condenser. | Lab Manual / LAB |
| 9TH | 1ST | Study of De-lavel turbine. | Lab Manual / LAB |
| | 2ND | Study of De-lavel turbine. | Lab Manual / LAB |
| | 3RD | Study of De-lavel turbine. | Lab Manual / LAB |
| | 4TH | Study of De-lavel turbine. | Lab Manual / LAB |

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|---|---|---|---|
| 10TH | 1ST | Study of De-lavel turbine. | Lab Manual / LAB |
| | 2ND | Study of De-lavel turbine. | Lab Manual / LAB |
| | 3RD | Study of De-lavel turbine. | Lab Manual / LAB |
| | 4TH | Study of De-lavel turbine. | Lab Manual / LAB |
| 11TH | 1ST | Study of De-lavel turbine. | Lab Manual / LAB |
| | 2ND | To study the spring loaded safety valve. | Lab Manual / LAB |
| | 3RD | To study the spring loaded safety valve. | Lab Manual / LAB |
| | 4TH | To study the spring loaded safety valve. | Lab Manual / LAB |
| 12TH | 1ST | To study the spring loaded safety valve. | Lab Manual / LAB |
| | 2ND | To study the spring loaded safety valve. | Lab Manual / LAB |
| | 3RD | To study the spring loaded safety valve. | Lab Manual / LAB |
| | 4TH | To study the spring loaded safety valve. | Lab Manual / LAB |
| 13TH | 1ST | To study the Lancashire boiler using a model. | Lab Manual / LAB |
| | 2ND | To study the Lancashire boiler using a model. | Lab Manual / LAB |
| | 3RD | To study the Cornish boiler using a model. | Lab Manual / LAB |
| | 4TH | To study the Cornish boiler using a model. | Lab Manual / LAB |
| 14TH | 1ST | To study the Babcock & Wilcox Boiler using a model. | Lab Manual / LAB |
| | 2ND | To study the Babcock & Wilcox Boiler using a model. | Lab Manual / LAB |
| | 3RD | To study the Vertical water tube boiler using a model. | Lab Manual / LAB |
| | 4TH | To study the Vertical water tube boiler using a model. | Lab Manual / LAB |
| 15TH | 1ST | **REVISION** | |
| | 2ND | | |
| | 3RD | | |
| | 4TH | | |

D. Patel 10-1-24

**Sign. Of Concerned Faculty**

16/01/24

**Sign. Of HOD**

16/01/24

**Principal**

**G.P. Puri**

# Lesson Plan on
# ( PR-1) AUTOMOBILE ENGINEERING LAB
## (6th sem) (3-2024)

Prepared by
Mr. LOKANATH SAHU

SR. LECT. MECHANICAL ENGG.

# GOVERNMENT POLYTECHNIC, PURI

## DEPARTMENT OF MECHANICAL ENGINEERING

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|---|---|---|
| Discipline: MECHANICAL ENGG | Semester: 6TH | Name of the Teaching Faculty: MR. LOKANATH SAHU, SENIOR LECTURER MECH. ENGG. |
| Subject: AUTOMOBILE ENGG. LAB (PR. 1) ✓ | No. of days/per week class allotted: 04 | Semester From date: 16.01.2024 To Date: 26.04.2024 ✓<br>No. of Weeks: 15 |
| PRE- REQUISITE | Basic knowledge about various parts of a veichle, mechanisms, braking systems, fuel pumps, gear box and study of engines. | |
| COURSE OUTCOMES | CO1: Understand the differential mechanism of tractor.<br>CO2: Understand the hydraulic braking systems of a automobile.<br>CO3: Understand the gear box.<br>Understand the study of car engine. | CO4: |

| Week | Class Day | Theory / Practical Topics | DELIVERY METHOD |
|---|---|---|---|
| 1ST | 1ST | Study of Automobile chassis. | Lab Manual / LAB |
| | 2ND | Study of Automobile chassis. | Lab Manual / LAB |
| | 3RD | Study of Automobile chassis. | Lab Manual / LAB |
| | 4TH | Study of Automobile chassis. | Lab Manual / LAB |
| 2ND | 1ST | Study of Automobile chassis. | Lab Manual / LAB |
| | 2ND | Study of Automobile chassis. | Lab Manual / LAB |
| | 3RD | Study of Automobile chassis. | Lab Manual / LAB |
| | 4TH | Study of Automobile chassis. | Lab Manual / LAB |
| 3RD | 1ST | Study the differential mechanism of the Tractor. | Lab Manual / LAB |
| | 2ND | Study the differential mechanism of the Tractor. | Lab Manual / LAB |
| | 3RD | Study the differential mechanism of the Tractor. | Lab Manual / LAB |
| | 4TH | Study the differential mechanism of the Tractor. | Lab Manual / LAB |
| 4TH | 1ST | Study the differential mechanism of the Tractor. | Lab Manual / LAB |
| | 2ND | Study the differential mechanism of the Tractor. | Lab Manual / LAB |
| | 3RD | Study the differential mechanism of the Tractor. | Lab Manual / LAB |
| | 4TH | Study the differential mechanism of the Tractor. | Lab Manual / LAB |
| 5TH | 1ST | Study the hydraulic braking system of automobile. | Lab Manual / LAB |
| | 2ND | Study the hydraulic braking system of automobile. | Lab Manual / LAB |
| | 3RD | Study the hydraulic braking system of automobile. | Lab Manual / LAB |
| | 4TH | Study the hydraulic braking system of automobile. | Lab Manual / LAB |
| 6TH | 1ST | Study the hydraulic braking system of automobile. | Lab Manual / LAB |
| | 2ND | Study the hydraulic braking system of automobile. | Lab Manual / LAB |
| | 3RD | Study the hydraulic braking system of automobile. | Lab Manual / LAB |
| | 4TH | Study the hydraulic braking system of automobile. | Lab Manual / LAB |
| 7TH | 1ST | Study the cut section model of carburetor solex type and maruti car type. | Lab Manual / LAB |
| | 2ND | Study the cut section model of carburetor solex type and maruti car type. | Lab Manual / LAB |
| | 3RD | Study the cut section model of carburetor solex type and maruti car type. | Lab Manual / LAB |
| | 4TH | Study the cut section model of carburetor solex type and maruti car type. | Lab Manual / LAB |
| 8TH | 1ST | Study the cut section model of carburetor solex type and maruti car type. | Lab Manual / LAB |
| | 2ND | Study the cut section model of carburetor solex type and maruti car type. | Lab Manual / LAB |
| | 3RD | Study the cut section model of carburetor solex type and maruti car type. | Lab Manual / LAB |
| | 4TH | Study the cut section model of carburetor solex type and maruti car type. | Lab Manual / LAB |
| 9TH | 1ST | Study the fuel pump cut section model. | Lab Manual / LAB |
| | 2ND | Study the fuel pump cut section model. | Lab Manual / LAB |
| | 3RD | Study the fuel pump cut section model. | Lab Manual / LAB |
| | 4TH | Study the fuel pump cut section model. | Lab Manual / LAB |

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| 10TH | 1ST | Study the fuel pump cut section model. | Lab Manual / LAB |
| | 2ND | Study the fuel pump cut section model. | Lab Manual / LAB |
| | 3RD | Study the fuel pump cut section model. | Lab Manual / LAB |
| | 4TH | Study the fuel pump cut section model. | Lab Manual / LAB |
| 11TH | 1ST | Study the actual cut section of gear box. | Lab Manual / LAB |
| | 2ND | Study the actual cut section of gear box. | Lab Manual / LAB |
| | 3RD | Study the actual cut section of gear box. | Lab Manual / LAB |
| | 4TH | Study the actual cut section of gear box. | Lab Manual / LAB |
| 12TH | 1ST | Study the actual cut section of gear box. | Lab Manual / LAB |
| | 2ND | Study the actual cut section of gear box. | Lab Manual / LAB |
| | 3RD | Study the actual cut section of gear box. | Lab Manual / LAB |
| | 4TH | Study the actual cut section of gear box. | Lab Manual / LAB |
| 13TH | 1ST | Study of actual car engine. | Lab Manual / LAB |
| | 2ND | Study of actual car engine. | Lab Manual / LAB |
| | 3RD | Study of actual car engine. | Lab Manual / LAB |
| | 4TH | Study of actual car engine. | Lab Manual / LAB |
| 14TH | 1ST | Study of actual car engine. | Lab Manual / LAB |
| | 2ND | Study of actual car engine. | Lab Manual / LAB |
| | 3RD | Study of actual car engine. | Lab Manual / LAB |
| | 4TH | Study of actual car engine. | Lab Manual / LAB |
| 15TH | 1ST | REVISION | |
| | 2ND | | |
| | 3RD | | |
| | 4TH | | |

16/01/24.

Sign. Of Concerned Faculty

16/01/24.

Principal
G.P. Puri

16/01/24.

Sign. Of HOD

# Lesson Plan on
# (TH-4b) ADVANCE MANUFACTURING PROCESSES
## (6th sem) (S-2024)

Prepared by
Mr. LOKANATH SAHU

SR. LECT. MECHANICAL ENGG.

# GOVERNMENT POLYTECHNIC, PURI

## DEPARTMENT OF MECHANICAL ENGINEERING

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|---|---|---|
| Discipline: MECHANICAL ENGG | Semester: 6TH | Name of the Teaching Faculty: MR. LOKANATH SAHU, SENIOR LECTURER MECH. ENGG. |
| Subject: ADVANCE MANUFACTURING PROCESSES (TH.4(B)) | No. of days/per week class allotted: 04 | Semester From date: 16.01.2024 To Date: 26.04.2024<br>No. of Weeks: 15 |
| PRE- REQUISITE | Basic knowledge about various machining process, moulding process, NC and CNC technologies and maintainance. | |
| COURSE OUTCOMES | CO1: Understand the working principle of modern machining processes.<br>CO2: Understand the Plastic Processing.<br>CO3: Understand the additive manufacturing process.<br>CO4:Understand the Special Purpose Machines | |

| Week | Class Day | Theory / Practical Topics | DELIVERY METHOD |
|---|---|---|---|
| 1ST | 1ST | Modern Machining Processes - Introduction | Whiteboard |
| | 2ND | Introduction – comparison with traditional machining. | Whiteboard |
| | 3RD | Ultrasonic Machining: principle, Description of equipment, applications. | Whiteboard |
| | 4TH | Ultrasonic Machining: principle, Description of equipment, applications. | PPT |
| 2ND | 1ST | Electric Discharge Machining: Principle, Description of equipment, Dielectric fluid, tools (electrodes), Process parameters, Output characteristics, applications. | PPT |
| | 2ND | Electric Discharge Machining: Principle, Description of equipment, Dielectric fluid, tools (electrodes), Process parameters, Output characteristics, applications. | Whiteboard |
| | 3RD | Wire cut EDM: Principle, Description of equipment, controlling parameters; applications. | Whiteboard |
| | 4TH | Wire cut EDM: Principle, Description of equipment, controlling parameters; applications. | PPT |
| 3RD | 1ST | Abrasive Jet Machining: principle, description of equipment, Material removal rate, application. | Whiteboard |
| | 2ND | Abrasive Jet Machining: principle, description of equipment, Material removal rate, application. | PPT |
| | 3RD | Laser Beam Machining: principle, description of equipment, Material removal rate, application. | PPT |
| | 4TH | Laser Beam Machining: principle, description of equipment, Material removal rate, application. | Whiteboard |
| 4TH | 1ST | Electro Chemical Machining: principle, description of equipment, Material removal rate, application. | Whiteboard |
| | 2ND | Electro Chemical Machining: principle, description of equipment, Material removal rate, application. | PPT |
| | 3RD | Plasma Arc Machining – principle, description of equipment, Material removal rate, Process parameters, performance characterization, Applications. | Whiteboard |
| | 4TH | Plasma Arc Machining – principle, description of equipment, Material removal rate, Process parameters, performance characterization, Applications. | Whiteboard |
| 5TH | 1ST | Electron Beam Machining - principle, description of equipment, Material removal rate, Process parameters, performance characterization, Applications. | Whiteboard |
| | 2ND | Electron Beam Machining - principle, description of equipment, Material removal rate, Process parameters, performance characterization, Applications. | PPT |
| | 3RD | **QUIZ & ASSIGNMENT-I** | GOOGLE FORMS |
| | 4TH | Processing of plastics. | Whiteboard |
| 6TH | 1ST | Moulding processes: Injection moulding, Compression moulding, Transfer moulding. | PPT |
| | 2ND | Moulding processes: Injection moulding, Compression moulding, Transfer moulding. | Whiteboard |
| | 3RD | Extruding; Casting; Calendering. | PPT |
| | 4TH | Extruding; Casting; Calendering. | Whiteboard |
| | 1ST | Fabrication methods-Sheet forming, Blow moulding, Laminating plastics (sheets, rods & tubes), Reinforcing. | Whiteboard |

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|---|---|---|---|
| 7TH | 2ND | Fabrication methods-Sheet forming, Blow moulding, Laminating plastics (sheets, rods & tubes), Reinforcing. | PPT |
| | 3RD | Introduction, Need for Additive Manufacturing | Whiteboard |
| | 4TH | Fundamentals of Additive Manufacturing, AM Process Chain | Whiteboard |
| 8TH | 1ST | Fundamentals of Additive Manufacturing, AM Process Chain | Whiteboard |
| | 2ND | Advantages and Limitations of AM, Commonly used Terms | Whiteboard |
| | 3RD | Advantages and Limitations of AM, Commonly used Terms | Whiteboard |
| | 4TH | **QUIZ & ASSIGNMENT-II** | GOOGLE FORMS |
| 9TH | 1ST | Classification of AM process, Fundamental Automated Processes, Distinction between AM and CNC, other related technologies. | Whiteboard |
| | 2ND | Classification of AM process, Fundamental Automated Processes, Distinction between AM and CNC, other related technologies. | Whiteboard |
| | 3RD | Application –Application in Design, Aerospace Industry, Automotive Industry, Jewelry Industry, Arts and Architecture. RP Medical and Bioengineering Applications. | Whiteboard |
| | 4TH | Application –Application in Design, Aerospace Industry, Automotive Industry, Jewelry Industry, Arts and Architecture. RP Medical and Bioengineering Applications. | Whiteboard |
| 10TH | 1ST | Web Based Rapid Prototyping Systems. | PPT |
| | 2ND | Concept of Flexible manufacturing process, concurrent engineering, production tools like capstan and turret lathes, rapid prototyping processes. | Whiteboard |
| | 3RD | Concept of Flexible manufacturing process, concurrent engineering, production tools like capstan and turret lathes, rapid prototyping processes. | Whiteboard |
| | 4TH | Special Purpose Machines (SPM). | PPT |
| 11TH | 1ST | Concept of SPM. | Whiteboard |
| | 2ND | Concept, General elements of SPM. | Whiteboard |
| | 3RD | Productivity improvement by SPM. | Whiteboard |
| | 4TH | **QUIZ & ASSIGNMENT-III** | GOOGLE FORMS |
| 12TH | 1ST | Principles of SPM design. | Whiteboard |
| | 2ND | Principles of SPM design. | Whiteboard |
| | 3RD | Maintenance of Machine Tools. | Whiteboard |
| | 4TH | Types of maintenance, Repair cycle analysis, Repair complexity. | PPT |
| 13TH | 1ST | Types of maintenance, Repair cycle analysis, Repair complexity. | Whiteboard |
| | 2ND | Maintenance manual, Maintenance records. | Whiteboard |
| | 3RD | Maintenance manual, Maintenance records. | Whiteboard |
| | 4TH | Housekeeping. Introduction to Total Productive Maintenance (TPM). | Whiteboard |
| 14TH | 1ST | Housekeeping. Introduction to Total Productive Maintenance (TPM). | Whiteboard |
| | 2ND | Housekeeping. Introduction to Total Productive Maintenance (TPM). | Whiteboard |
| | 3RD | **QUIZ & ASSIGNMENT-V** | GOOGLE FORMS |
| | 4TH | **REVISION** | |
| 15TH | 1ST | **REVISION** | |
| | 2ND | | |
| | 3RD | | |
| | 4TH | | |

**LEARNING RESOURCES:**


01. Production Technology Vol-II By O.P. Khanna, Dhanpat Rai & Sons Publisher.
02. Workshop Technology Vol-II By B.S. Raghubansi, Dhanpat Rai & Sons Publisher.
03. Production Technology By HMT, Banglore, Tata Mc-Hill Publisher.
04. Rapid Prototyping: Principles & Applications By Chua C.K, Leong K.F And LIM C.S , By World Scientific Publication, 3rd Edition.
05. Exploring Advanced Manufacturing Technologies By Stephen F. Krar & Arthur Gil, By Industrial Press Publication.


**WEBSITE RESOURCES:**

https://www.youtube.com/watch?v=SjwKD8uuE84&list=PLFe9iOZ1HkC6B7V96Nlc4rmaxkRVRFDgP

https://www.youtube.com/watch?v=oI3RIAvyVxc&list=PLbMVogVj5nJSzoQXmu7dsj9ZKJyZ1P4O8

# Lesson Plan on
# (TH-3) POWER STATION ENGINEERING
# (6th sem) (S-2024)

Prepared by
Mr. DEBIPRASAD PATRA

PTGF GP,PURI

# GOVERNMENT POLYTECHNIC, PURI
## DEPARTMENT OF MECHANICAL ENGINEERING

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|---|---|---|
| Discipline: MECHANICAL ENGG | Semester: 6TH | Name of the Teaching Faculty: MR DEBIPRASAD PATRA , GF IN MECH. ENGG. |
| Subject: POWER STATION ENGINEERING (TH.3) | No. of days/per week class allotted: 04 | Semester From date: 16.01.2024 To Date: 26.04.2024<br>No. of Weeks: 15 |
| PRE- REQUISITE | Basic knowledge about various energy sources, different type of power stations and nuclear energy sources. | |
| COURSE OUTCOMES | CO1: Understand the generation of power by utilizing various energy sources.<br>CO2: Understand the use of steam, its operation in thermal power stations.<br>CO3: Understand the nuclear energy sources and power developed in nuclear power station.<br>CO4: Understand the basics of diesel electric power station and hydroelectric power station.<br>CO5: Understand the basics of gas turbine power station. | |

| Week | Class Day | Theory / Practical Topics | DELIVERY METHOD |
|---|---|---|---|
| 1ST | 1ST | Describe sources of energy. | Whiteboard |
| | 2ND | Explain concept of Central and Captive power station. | Whiteboard |
| | 3RD | Classify power plants. Importance of electrical power in day today life. | Whiteboard |
| | 4TH | Overview of method of electrical power generation. | Whiteboard |
| 2ND | 1ST | THERMAL POWER STATIONS - INTRODUCTION | PPT |
| | 2ND | Layout of steam power stations. | Whiteboard |
| | 3RD | Steam power cycle. Explain Carnot vapour power cycle with P-V, T-s diagram and determine thermal efficiency. | Whiteboard |
| | 4TH | Explain Rankine cycle with P-V, T-S & H-s diagram and determine thermal efficiency, Work done, work ratio, and specific steam Consumption. | Whiteboard |
| 3RD | 1ST | Problem Solving. | Whiteboard |
| | 2ND | List of thermal power stations in the state with their capacities. | Whiteboard |
| | 3RD | **QUIZ & ASSIGNMENT-I** | GOOGLE FORMS |
| | 4TH | 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. | PPT |
| 4TH | 1ST | 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. | Whiteboard |
| | 2ND | Draught systems (Natural draught, Forced draught & balanced draught) with their advantages & disadvantages. | PPT |
| | 3RD | Steam prime movers: Advantages & disadvantages of steam turbine, Elements of steam turbine, governing of steam turbine. | Whiteboard |
| | 4TH | Performance of steam turbine: Explain Thermal efficiency, Stage efficiency and Gross efficiency. | Whiteboard |
| 5TH | 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. | Whiteboard |
| | 2ND | Cooling Tower: Function and types of cooling tower, and spray ponds. | Whiteboard |
| | 3RD | Selection of site for thermal power stations. | Whiteboard |
| | 4TH | **QUIZ & ASSIGNMENT-II** | GOOGLE FORMS |
| 6TH | 1ST | NUCLEAR POWER STATIONS - INTRODUCTION | Whiteboard |
| | 2ND | Classify nuclear fuel (Fissile & fertile material), Explain fusion and fission reaction. | Whiteboard |
| | 3RD | Classify nuclear fuel (Fissile & fertile material), Explain fusion and fission reaction | PPT |

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|---|---|---|---|
| 7TH | 2ND | Explain the working and construction of nuclear reactor, Compare the nuclear and thermal plants. | PPT |
| | 3RD | Explain the disposal of nuclear waste. | Whiteboard |
| | 4TH | Selection of site for nuclear power stations, List of nuclear power stations. | Whiteboard |
| 8TH | 1ST | **QUIZ & ASSIGNMENT-IV** | GOOGLE FORMS |
| | 2ND | DIESEL ELECTRIC POWER STATIONS - INTRODUCTION | PPT |
| | 3RD | State the advantages and disadvantages of diesel electric power stations. | Whiteboard |
| | 4TH | Fuel storage and fuel supply system. | Whiteboard |
| 9TH | 1ST | Fuel injection system, Air supply system. | Whiteboard |
| | 2ND | Exhaust system, cooling system, Lubrication system, starting system, governing system. | PPT |
| | 3RD | Selection of site for diesel electric power stations. | Whiteboard |
| | 4TH | Performance and thermal efficiency of diesel electric power stations. | PPT |
| 10TH | 1ST | Performance and thermal efficiency of diesel electric power stations. | Whiteboard |
| | 2ND | **QUIZ & ASSIGNMENT-V** | GOOGLE FORMS |
| | 3RD | HYDEL POWER STATIONS - INTRODUCTION | Whiteboard |
| | 4TH | State advantages and disadvantages of hydroelectric power plant. | Whiteboard |
| 11TH | 1ST | General arrangement of storage type hydroelectric project and explain its operation. | Whiteboard |
| | 2ND | Criteria for selecting of grinding wheels | Whiteboard |
| | 3RD | Selection of site of hydel power plant. | Whiteboard |
| | 4TH | **QUIZ & ASSIGNMENT-VI** | GOOGLE FORMS |
| 12TH | 1ST | Selection of site of hydel power plant. | PPT |
| | 2ND | List of hydro power stations with their capacities and number of units in the state. | Whiteboard |
| | 3RD | List of hydro power stations with their capacities and number of units in the state. | Whiteboard |
| | 4TH | Types of turbines and generation used. | Whiteboard |
| 13TH | 1ST | Simple problems. | Whiteboard |
| | 2ND | Simple problems. | Whiteboard |
| | 3RD | GAS TURBINE POWER STATIONS - INTRODUCTION | PPT |
| | 4TH | Selection of site for gas turbine stations. | Whiteboard |
| 14TH | 1ST | Fuels for gas turbine, Elements of simple gas turbine power plants. | Whiteboard |
| | 2ND | Merits, demerits and application of gas turbine power plants. | Whiteboard |
| | 3RD | **QUIZ & ASSIGNMENT-VII** | GOOGLE FORMS |
| | 4TH | **REVISION** | |
| 15TH | 1ST | **REVISION** | |
| | 2ND | | |
| | 3RD | | |
| | 4TH | | |

**LEARNING RESOURCES:**

1. Power Plant Engineering By R.K Rajput, Laxmi Publication.
2. Power Plant Engineering By P.K Nag, TMH Publication.
3. Power Plant Engineering By Nag Pal G.R, Khanna Publication.
4. Power Plant Engineering By P.C. Sharma, S.K Kataria & Sons Publication.

**WEBSITE RESOURCES:**

1. https://www.youtube.com/watch?v=bld-5ObEHS8&list=PLiSPNzs4fD9tCrwOZolKZ5J2WoWt4qDIF
2. https://www.youtube.com/watch?v=VGYvnkbIVS4&list=PL9RcWoqXmzaJdkO3ML-AiOwytjGx0JBxU
3. https://www.youtube.com/watch?v=tYBg-zsli98&list=PLLy_2iUCG87BT8H9uMufjrcPF5e6Qd2bz

10.1.24

**Sign. Of Concerned Faculty**

16/01/24

**Principal**
**G.P. Puri**

16/01/24.

**Sign. Of HOD**

# Lesson Plan on
# (TH-2) AUTOMOBILE ENGINEERING AND HYBRID VEHICLES
## (6th sem) (Summer - 2024)

Prepared by
Mr. BISWAJIT NAYAK

PTGF GP,PURI

# GOVERNMENT POLYTECHNIC, PURI
## DEPARTMENT OF MECHANICAL ENGINEERING

| | | |
|---|---|---|
| Discipline: MECHANICAL ENGG | Semester: 6TH | Name of the Teaching Faculty: MR BISWAJIT NAYAK, GF IN MECH. ENGG. |
| Subject: AUTOMOBILE ENGINEERING AND HYBRID VEHICLES (TH.2) | No. of days/per week class allotted: 04 | Semester From date: 16.01.2024 To Date: 26.04.2024<br>No. of Weeks: 15 |
| PRE- REQUISITE | Basic knowledge about various energy sources, different type of power stations and nuclear energy sources. | |
| COURSE OUTCOMES | CO1: Understand automobile chassis, transmission, breaking and fuel system etc.<br>CO2: Understand the basics of electric vehicle kinematics.<br>CO3: Understand the concepts of hybrid electric vehicles. | |

| Week | Class Day | Theory / Practical Topics | DELIVERY METHOD |
|---|---|---|---|
| 1ST | 1ST | INTRODUCTION & TRANSMISSION SYSTEM. | PPT |
| | 2ND | Automobiles: Definition, need and classification. | Whiteboard |
| | 3RD | Layout of automobile chassis with major components (Line diagram). | Whiteboard |
| | 4TH | Clutch System: Need, Types (Single & Multiple) and Working principle with sketch. | Whiteboard |
| 2ND | 1ST | Clutch System: Need, Types (Single & Multiple) and Working principle with sketch. | PPT |
| | 2ND | Gear Box: Purpose of gear box. | PPT |
| | 3RD | Construction and working of a 4 speed gear box. | Whiteboard |
| | 4TH | Construction and working of a 4 speed gear box. | Whiteboard |
| 3RD | 1ST | Concept of automatic gear changing mechanisms. | Whiteboard |
| | 2ND | Concept of automatic gear changing mechanisms. | Whiteboard |
| | 3RD | Propeller shaft: Constructional features. | Whiteboard |
| | 4TH | Differential: Need, Types and Working principle. | PPT |
| 4TH | 1ST | **QUIZ & ASSIGNMENT-I** | GOOGLE FORMS |
| | 2ND | BRAKING SYSTEM - INTRODUCTION | PPT |
| | 3RD | Braking systems in automobiles: Need and types, Mechanical Brake | Whiteboard |
| | 4TH | Performance of steam turbine: Explain Thermal efficiency, Stage efficiency and Gross efficiency. | Whiteboard |
| 5TH | 1ST | Hydraulic Brake, Air Brake. | Whiteboard |
| | 2ND | Air assisted Hydraulic Brake, Vacuum Brake. | Whiteboard |
| | 3RD | **QUIZ & ASSIGNMENT-II** | GOOGLE FORMS |
| | 4TH | IGNITION & SUSPENSION SYSTEM - INTRODUCTION. | PPT |
| 6TH | 1ST | Spark plugs: Purpose, construction and specifications. | Whiteboard |
| | 2ND | State the common ignition troubles and its remedies. | Whiteboard |
| | 3RD | Description of the conventional suspension system for Rear and Front axle. | PPT |
| | 4TH | Description of independent suspension system used in cars (coil spring and tension bars). | Whiteboard |
| 7TH | 1ST | Constructional features and working of a telescopic shock absorber. | Whiteboard |
| | 2ND | **QUIZ & ASSIGNMENT-III** | GOOGLE FORMS |
| | 3RD | COOLING AND LUBRICATION - INTRODUCTION. | Whiteboard |
| | 4TH | Engine cooling: Need and classification. | Whiteboard |
| 8TH | 1ST | Describe defects of cooling and their remedial measures. | Whiteboard |
| | 2ND | Describe the Function of lubrication. | PPT |

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| | 3RD | Describe the Function of lubrication. | Whiteboard |
| | 4TH | Fuel storage and fuel supply system. | Whiteboard |
| 9TH | 1ST | Describe the lubrication System of I.C. engine. | Whiteboard |
| | 2ND | Describe the lubrication System of I.C. engine. | PPT |
| | 3RD | FUEL SYSTEM - INTRODUCTION | Whiteboard |
| | 4TH | Describe Air fuel ratio. | PPT |
| 10TH | 1ST | Describe Air fuel ratio. | Whiteboard |
| | 2ND | **QUIZ & ASSIGNMENT-IV** | GOOGLE FORMS |
| | 3RD | Describe Carburetion process for Petrol Engine. | Whiteboard |
| | 4TH | Describe Carburetion process for Petrol Engine. | Whiteboard |
| 11TH | 1ST | Describe Multipoint fuel injection system for Petrol Engine. | Whiteboard |
| | 2ND | Describe the working principle of fuel injection system for multi cylinder Engine, Filter for Diesel engine. | Whiteboard |
| | 3RD | Describe the working principle of Fuel feed pump and Fuel Injector for Diesel engine. | Whiteboard |
| | 4TH | **QUIZ & ASSIGNMENT-V** | GOOGLE FORMS |
| 12TH | 1ST | ELECTRIC AND HYBRID VEHICLES - INTRODUCTION. | PPT |
| | 2ND | Social and Environmental importance of Hybrid and Electric Vehicles. | Whiteboard |
| | 3RD | Description of Electric Vehicles, operational advantages, present performance and applications of Electric Vehicles. | Whiteboard |
| | 4TH | Battery for Electric Vehicles, Battery types and fuel cells. | Whiteboard |
| 13TH | 1ST | Battery for Electric Vehicles, Battery types and fuel cells. | Whiteboard |
| | 2ND | Hybrid vehicles, Types of Hybrid and Electric Vehicles: Parallel, Series, Parallel and Series configurations. | Whiteboard |
| | 3RD | Hybrid vehicles, Types of Hybrid and Electric Vehicles: Parallel, Series, Parallel and Series configurations. | PPT |
| | 4TH | Drive train. | Whiteboard |
| 14TH | 1ST | Solar powered vehicles. | Whiteboard |
| | 2ND | Solar powered vehicles. | Whiteboard |
| | 3RD | **QUIZ & ASSIGNMENT-VI** | GOOGLE FORMS |
| | 4TH | **REVISION** | |
| 15TH | 1ST | **REVISION** | |
| | 2ND | | |
| | 3RD | | |
| | 4TH | | |

**LEARNING RESOURCES:**

01. Automobile Engineering By R.B. Gupta, Satya Prakashan Publisher.
02. Automobile Engineering Vol-I & Vol-II By Dr. Kripal Singh, Standard Publisher.
03. Automobile Engineering By C.P. Nakra, Dhanpat Rai Publisher.
04. Automobile Engineering By W.H. Course, McGraw Hill Publisher.
05. Electric & Hybrid Vehicles – Design Fundamentals By Iqbal Hussain, CRC Press, 2, Publisher.
06. Statistical Electric & Hybrid Vehicles By A.K. Babu, Khanna Publishing House Publisher.

**WEBSITE RESOURCES:**

https://www.youtube.com/watch?v=uRYkSucD_Bc&list=PLFe9iOZ1HkC4nL8HbnBAiY4jVpfEhiGyx
https://www.youtube.com/watch?v=x5oGxwJZf2Q&list=PLelAg9xzEDXBaKqVv4IwbdBLKwgYK4GRR

10/07/2024
**Sign. Of Concerned Faculty**

16/07/24

# Lesson Plan On

## (TH-1) INDUSTRIAL ENGINEERING & MANAGEMENT

(6TH SEM) (Summer-2024)

Prepared by

Mr. DEBIPRASAD PATRA

PTGF GP,PURI

# GOVERNMENT POLYTECHNIC, PURI

## DEPARTMENT OF MECHANICAL ENGINEERING

| | | |
|---|---|---|
| Discipline: MECHANICAL ENGG | Semester: 6TH | Name of the Teaching Faculty: MR DEBIPRASAD PATRA, GF IN MECH. ENGG. |
| Subject: INDUSTRIAL ENGINEERING & MANAGEMENT (TH.1) | No. of days/per week class allotted: 04 | Semester From date: 16.01.2024 To Date: 26.04.2024<br>No. of Weeks: 15 |
| PRE- REQUISITE | Basic knowledge about operation research, inventory control, quality control, production control and plant engineering. | |
| COURSE OUTCOMES | CO1: Identify the place for a new plant set up and systematic arrangement of machinery and shop for smooth production.<br>CO2: Understanding of stock management and maintenance to reduce plant ideal time.<br>CO3: To use the charts to record the quality of products.<br>CO4:To eliminate unproductive activities under the control of the management, supervisor, worker and the design of products and processes. | |

| Week | Class Day | Theory / Practical Topics | DELIVERY METHOD |
|---|---|---|---|
| 1ST | 1ST | PLANT ENGINEERING - INTRODUCTION | Whiteboard |
| | 2ND | Selection of Site of Industry. | Whiteboard |
| | 3RD | Define plant layout. | Whiteboard |
| | 4TH | Describe the objective and principles of plant layout. | Whiteboard |
| 2ND | 1ST | Explain Process Layout, Product Layout and Combination Layout. | PPT |
| | 2ND | Techniques to improve layout. | Whiteboard |
| | 3RD | Principles of material handling equipment. | Whiteboard |
| | 4TH | Plant maintenance. | Whiteboard |
| 3RD | 1ST | Importance of plant maintenance. Break down maintenance. | Whiteboard |
| | 2ND | Preventive maintenance. Scheduled maintenance. | Whiteboard |
| | 3RD | **QUIZ & ASSIGNMENT-I** | GOOGLE FORMS |
| | 4TH | Introduction to Operations Research and its applications. | Whiteboard |
| 4TH | 1ST | Introduction to Operations Research and its applications. | Whiteboard |
| | 2ND | Flat collar bearing of single and multiple types. | Whiteboard |
| | 3RD | Define Linear Programming Problem, | Whiteboard |
| | 4TH | Define Linear Programming Problem, | Whiteboard |
| 5TH | 1ST | 2.3Solution of L.P.P. by graphical method. | PPT |
| | 2ND | 2.3Solution of L.P.P. by graphical method. | PPT |
| | 3RD | Evaluation of Project completion time by Critical Path Method and PERT (Simple problems). | Whiteboard |
| | 4TH | Explain distinct features of PERT with respect to CPM. | Whiteboard |
| 6TH | 1ST | Explain distinct features of PERT with respect to CPM. | Whiteboard |
| | 2ND | **QUIZ & ASSIGNMENT-II** | GOOGLE FORMS |
| | 3RD | Classification of inventory. | PPT |
| | 4TH | Objective of inventory control. | Whiteboard |
| 7TH | 1ST | Describe the functions of inventories. | Whiteboard |
| | 2ND | Benefits of inventory control. | Whiteboard |
| | 3RD | Costs associated with inventory. | Whiteboard |
| | 4TH | Terminology in inventory control. | Whiteboard |

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| 8TH | 1ST | Explain and Derive economic order quantity for Basic model. (Solve numerical). | Whiteboard |
| | 2ND | Explain and Derive economic order quantity for Basic model. (Solve numerical). | Whiteboard |
| | 3RD | Define and Explain ABC analysis. | Whiteboard |
| | 4TH | **QUIZ & ASSIGNMENT-III** | GOOGLE FORMS |
| 9TH | 1ST | Define Inspection and Quality control. | Whiteboard |
| | 2ND | Describe planning of inspection. | Whiteboard |
| | 3RD | Describe types of inspection. | Whiteboard |
| | 4TH | Advantages and disadvantages of quality control. | Whiteboard |
| 10TH | 1ST | Study of factors influencing the quality of manufacture. | Whiteboard |
| | 2ND | Explain the Concept of statistical quality control, Control charts (X, R, P and C - charts). | PPT |
| | 3RD | Methods of attributes. | PPT |
| | 4TH | Concept of ISO 9001-2008. | Whiteboard |
| 11TH | 1ST | Quality management system, Registration /certification procedure. | Whiteboard |
| | 2ND | Benefits of ISO to the organization. | Whiteboard |
| | 3RD | JIT, Six sigma,7S, Lean manufacturing & Problem Solving | Whiteboard |
| | 4TH | **QUIZ & ASSIGNMENT-IV** | GOOGLE FORMS |
| 12TH | 1ST | PRODUCTION PLANNING AND CONTROL - Introduction. | PPT |
| | 2ND | Major functions of production planning and control | Whiteboard |
| | 3RD | Methods of forecasting | Whiteboard |
| | 4TH | Routing, Scheduling, Dispatching | Whiteboard |
| 13TH | 1ST | Controlling | Whiteboard |
| | 2ND | Types of production | PPT |
| | 3RD | Mass production | PPT |
| | 4TH | Batch production | Whiteboard |
| 14TH | 1ST | Job order production | Whiteboard |
| | 2ND | Principles of product and process planning. | Whiteboard |
| | 3RD | **QUIZ & ASSIGNMENT-V** | GOOGLE FORMS |
| | 4TH | **REVISION** | |
| 15TH | 1ST | **REVISION** | |
| | 2ND | | |
| | 3RD | | |
| | 4TH | | |

**LEARNING RESOURCES:**

01. Industrial Engineering & Management By O.P. Khanna, Dhanpat Rai & Sons Publisher.
02. Industrial Engineering & Management By Martand Telsang, S Chand Publisher.
03. Statistical Quality Control By M. Mahajan, Dhanpat Rai & Sons Publisher.

**WEBSITE RESOURCES:**

https://www.youtube.com/watch?v=yhywrCChJBQ&list=PLLy_2iUCG87D5n9zraFS2QYajk0QAOlVK
https://www.youtube.com/watch?v=JW_bwRRu56w&list=PLNyPK_sfNdSTX5Z_V48T6U5WRlAtNYTnv

D. Yadav 18.1.24

**Sign. Of Concerned Faculty**

16/01/24.

**Principal**
**G.P. Puri**

16/01/24.

**Sign. Of HOD**