# CAPITAL SCHOOL OF ENGINEERING

PLOT NO. 1288, MAHATAPALLA, BAJAPUR, KHURDA,PIN-752060

**Session: 2023-2024**

Course Name: DIPLOMA
Theory/Practical: Theory

Section : A
Semester : 6

Branch Name: MECHANICAL
Subject Name: Th 4: ADVANCE MANUFACTURING PROCESSES
Teacher Name: RUDRANARAYAN BEHERA

Credit " External Evaluation(Marked) '80' Internal Evaluation(Marked) '20'

**Text Books:**

| Sl.No | Text Books |
|---|---|
| 1 | Production technology –Vol-II.O.P.KHANNA,Dhanpat Rai Publication |
| 2 | Workshop Technology, Vol – II.B.S. Raghuwanshi.Dhanpat Rai Publication |

**Reference books:**

| Sl.No | Reference books |
|---|---|
| 1 | Manufacturing technology, Vol- I,P.C.Sharma,S. Chand |

**Course Outcomes:**

| Sl.No | Course Outcomes |
|---|---|
| 1 | Understand the working principle of modern machining processes. |
| 2 | Understand the Plastic Processing |
| 3 | Understand the additive manufacturing process |
| 4 | Understand the Special Purpose Machines |
| 5 | Understand the Maintenance of Machine Tools |

| SL No. | Lecture No. | Module/Unit No. | Topic To Be Taught | Cos | Reference Material Links |
|---|---|---|---|---|---|
| 1 | 1 | 1 | Modern Machining Processes:Introduction – comparison with traditional machining. | Cos 1 | |
| 2 | 2 | 1 | Ultrasonic Machining: principle | Cos 1 | |
| 3 | 3 | 1 | Ultrasonic MachiningDescription of equipment, applications. | Cos 1 | |
| 4 | 4 | 1 | Electric Discharge Machining: Principle, Description of equipment, | Cos 1 | |
| 5 | 5 | 1 | Dielectric fluid, tools (electrodes), Process parameters, | Cos 1 | |

| SL No. | Lecture No. | Module/Unit No. | Topic To Be Taught | Cos | Reference Material Links |
|---|---|---|---|---|---|
| 6 | 6 | 1 | Electric Discharge Machining Output characteristics, applications. | Cos 1 | |
| 7 | 7 | 1 | Wire cut EDM: Principle, Description of equipment, controlling parameters ;applications. | Cos 1 | |
| 8 | 8 | 1 | Abrasive Jet Machining: principle, description of equipment | Cos 1 | |
| 9 | 9 | 1 | Abrasive Jet Machining:Material removal rate, application. | Cos 1 | |
| 10 | 10 | 1 | Laser Beam Machining: principle, description of equipment, | Cos 1 | |
| 11 | 11 | 1 | Laser Beam Machining:Material removal rate,application. | Cos 1 | |
| 12 | 12 | 1 | Electro Chemical Machining: principle, description of equipment | Cos 1 | |
| 13 | 13 | 1 | Electro Chemical MachiningMaterial removal rate,applications | Cos 1 | |
| 14 | 14 | 1 | Plasma Arc Machining – principle, description of equipment | Cos 1 | |
| 15 | 15 | 1 | Material removal rate,Process parameters, | Cos 1 | |
| 16 | 16 | 1 | performance characterization, Applications. | Cos 1 | |
| 17 | 17 | 1 | Electron Beam Machining - principle, description of equipment | Cos 1 | |
| 18 | 18 | 1 | Material removal rate, Process parameters, | Cos 1 | |

| SL No. | Lecture No. | Module/Unit No. | Topic To Be Taught | Cos | Reference Material Links |
|---|---|---|---|---|---|
| 19 | 19 | 1 | performance characterization, Applications. | Cos 1 | |
| 20 | 20 | 1 | Question and answars | Cos 1 | |
| 21 | 21 | 2 | Plastic Processing:Processing of plastics. | Cos 2 | |
| 22 | 22 | 2 | Processing of plastics. | Cos 2 | |
| 23 | 23 | 2 | Moulding processes: Injection moulding, | Cos 2 | |
| 24 | 24 | 2 | Compression moulding, | Cos 2 | |
| 25 | 25 | 2 | Transfer moulding. | Cos 2 | |
| 26 | 26 | 2 | Extruding; Casting; Calendering. | Cos 2 | |
| 27 | 27 | 2 | Extruding; Casting; Calendering. | Cos 2 | |
| 28 | 28 | 2 | Fabrication methods-Sheet forming | Cos 2 | |
| 29 | 29 | 2 | Blow moulding, Laminating plastics (sheets, rods& tubes), Reinforcing. | Cos 2 | |
| 30 | 30 | 2 | Applications of Plastics ,Question answars | Cos 2 | |
| 31 | 31 | 3 | Additive Manufacturing ProcessIntroduction, Need for Additive Manufacturing | Cos 3 | |
| 32 | 32 | 3 | Fundamentals of Additive Manufacturing | Cos 3 | |
| 33 | 33 | 3 | AM Process Chain | Cos 3 | |
| 34 | 34 | 3 | Advantages and Limitations of AM,Commonly used Terms | Cos 3 | |
| 35 | 35 | 3 | Classification of AM process, | Cos 3 | |
| 36 | 36 | 3 | Fundamental Automated Processes, | Cos 3 | |
| 37 | 37 | 3 | Distinction betweenAM and CNC.other related technologies. | Cos 3 | |

| SL No. | Lecture No. | Module/Unit No. | Topic To Be Taught | Cos | Reference Material Links |
|---|---|---|---|---|---|
| 38 | 38 | 3 | Application –Application in Design. | Cos 3 | |
| 39 | 39 | 3 | Aerospace Industry, Automotive Industry | Cos 3 | |
| 40 | 40 | 3 | Jewelry,Industry, Arts and Architecture. | Cos 3 | |
| 41 | 41 | 3 | RP Medical and Bioengineering Applications. | Cos 3 | |
| 42 | 42 | 3 | Web Based Rapid Prototyping Systems. | Cos 3 | |
| 43 | 43 | 3 | Concept of Flexible manufacturing process | Cos 3 | |
| 44 | 44 | 3 | concurrent engineering, production toolslike capstan and turret lathes | Cos 3 | |
| 45 | 45 | 3 | rapid prototyping processes. | Cos 3 | |
| 46 | 46 | 4 | Special Purpose Machines (SPM):Concept, General elements of SPM | Cos 4 | |
| 47 | 47 | 4 | Productivity improvement by SPM, | Cos 4 | |
| 48 | 48 | 4 | Principles of SPM design. | Cos 4 | |
| 49 | 49 | 4 | Productivity improvement by SPM | Cos 4 | |
| 50 | 50 | 4 | Principles of SPM design. | Cos 4 | |
| 51 | 51 | 4 | question and answer | Cos 4 | |
| 52 | 52 | 4 | question and answer | Cos 4 | |
| 53 | 53 | 5 | Maintenance of Machine Tools:Types of maintenance | Cos 5 | |
| 54 | 54 | 5 | Repair cycle analysis | Cos 5 | |
| 55 | 55 | 5 | Repair complexity, | Cos 5 | |
| 56 | 56 | 5 | Maintenance manual, | Cos 5 | |
| 57 | 57 | 5 | Maintenance records, | Cos 5 | |
| 58 | 58 | 5 | Maintenance records, Housekeeping | Cos 5 | |
| 59 | 59 | 5 | Introduction to Total | Cos 5 | |

| SL No. | Lecture No. | Module/Unit No. | Topic To Be Taught | Cos | Reference Material Links |
|---|---|---|---|---|---|
| | | | Productive Maintenance (TPM). | | |
| 60 | 60 | 5 | question and answer | Cos 5 | |

Subject Teacher

HOD

Principal

# CAPITAL SCHOOL OF ENGINEERING

**PLOT NO. 1288, MAHATAPALLA, BAJAPUR, KHURDA,PIN-752060**
**Session: 2023-2024**

Course Name: DIPLOMA
Theory/Practical: Theory

Branch Name: MECHANICAL
Subject Name: Th.2: AUTOMOBILE ENGINEERING AND HYBRID VEHICLES
Teacher Name: RAKESH KU SAHU

Section : A
Semester : 6

Credit " External Evaluation(Marked) '80' Internal Evaluation(Marked) '20'

**Text Books:**

| Sl.No | Text Books |
|---|---|
| 1 | R.B.Gupta Automobile Engineering Satya Prakashan |
| 2 | Dr Kirpal Singh Automobile Engineering Vol- I & II Standard Publishers |

**Reference books:**

| Sl.No | Reference books |
|---|---|
| 1 | C.P.Nakra Automobile Engineering Dhanpat Rai Publication |
| 2 | W.H.Course Automotive Engine McGraw Hill |

**Course Outcomes:**

| Sl.No | Course Outcomes |
|---|---|
| 1 | Understand automobile chassis, transmission, breaking and fuel system etc. |
| 2 | Understand the basics of electric vehicle kinematics. |
| 3 | Understand the concepts of hybrid electric vehicles. |

| SL No. | Lecture No. | Module/Unit No. | Topic To Be Taught | Cos | Reference Material Links |
|---|---|---|---|---|---|
| 1 | 1 | 1 | Automobiles: Definition, need and classification: Layout of automobile chassis with major components (Line diagram) | Cos 1 | |
| 2 | 2 | 1 | Automobiles: Definition, need and classification: Layout of automobile chassis with major components (Line diagram) | Cos 1 | |
| 3 | 3 | 1 | Clutch System: Need, Types (Single & Multiple) and Working principle with sketch | Cos 1 | |

| SL No. | Lecture No. | Module/Unit No. | Topic To Be Taught | Cos | Reference Material Links |
|---|---|---|---|---|---|
| 4 | 4 | 1 | Clutch System: Need, Types (Single & Multiple) and Working principle with sketch | Cos 1 | |
| 5 | 5 | 1 | Gear Box: Purpose of gear box, Construction and working of a 4 speed gear box | Cos 1 | |
| 6 | 6 | 1 | Gear Box: Purpose of gear box, Construction and working of a 4 speed gear box | Cos 1 | |
| 7 | 7 | 1 | Concept of automatic gear changing mechanisms | Cos 1 | |
| 8 | 8 | 1 | Concept of automatic gear changing mechanisms | Cos 1 | |
| 9 | 9 | 1 | Propeller shaft: Constructional features | Cos 1 | |
| 10 | 10 | 1 | Propeller shaft: Constructional features | Cos 1 | |
| 11 | 11 | 1 | Differential: Need, Types and Working principle | Cos 1 | |
| 12 | 12 | 1 | Differential: Need, Types and Working principle | Cos 1 | |
| 13 | 13 | 2 | Braking systems in automobiles: Need and types | Cos 1 | |
| 14 | 14 | 2 | Mechanical Brake | Cos 1 | |
| 15 | 15 | 2 | Hydraulic Brake | Cos 1 | |
| 16 | 16 | 2 | Air Brake, Air assisted Hydraulic Brake | Cos 1 | |
| 17 | 17 | 2 | Vacuum Brake | Cos 1 | |
| 18 | 18 | 3 | Describe the Battery ignition and Magnet ignition system | Cos 2 | |
| 19 | 19 | 3 | Spark plugs: Purpose, construction and specifications | Cos 2 | |
| 20 | 20 | 3 | Spark plugs: Purpose, | Cos 2 | |

| SL No. | Lecture No. | Module/Unit No. | Topic To Be Taught | Cos | Reference Material Links |
|---|---|---|---|---|---|
| | | | construction and specifications | | |
| 21 | 21 | 3 | Spark plugs: Purpose, construction and specifications | Cos 2 | |
| 22 | 22 | 3 | State the common ignition troubles and its remedies | Cos 2 | |
| 23 | 23 | 3 | State the common ignition troubles and its remedies | Cos 2 | |
| 24 | 24 | 3 | Description of the conventional suspension system for Rear and Front axle | Cos 2 | |
| 25 | 25 | 3 | Description of the conventional suspension system for Rear and Front axle | Cos 2 | |
| 26 | 26 | 3 | Description of independent suspension system used in cars (coil spring and tension bars) | Cos 2 | |
| 27 | 27 | 3 | Constructional features and working of a telescopic shock absorber | Cos 2 | |
| 28 | 28 | 4 | Engine cooling: Need and classification | Cos 2 | |
| 29 | 29 | 4 | Engine cooling: Need and classification | Cos 2 | |
| 30 | 30 | 4 | Describe defects of cooling and their remedial measures | Cos 2 | |
| 31 | 31 | 4 | Describe defects of cooling and their remedial measures | Cos 2 | |
| 32 | 32 | 4 | Describe the Function of lubrication | Cos 2 | |
| 33 | 33 | 4 | Describe the Function of lubrication | Cos 2 | |
| 34 | 34 | 4 | Describe the lubrication System of I.C. engine | Cos 2 | |
| 35 | 35 | 4 | Describe the | Cos 2 | |

| Sl. No. | Lecture No. | Module/Unit No | Topic To Be Taught | Cos | Reference Material Links |
|---|---|---|---|---|---|
| | | | lubrication System of I.C. engine | | |
| 36 | 36 | 5 | Describe Air fuel ratio | Cos 2 | |
| 37 | 37 | 5 | Describe Air fuel ratio | Cos 2 | |
| 38 | 38 | 5 | Describe Carburetion process for Petrol Engine | Cos 2 | |
| 39 | 39 | 5 | Describe Carburetion process for Petrol Engine | Cos 2 | |
| 40 | 40 | 5 | Describe Multipoint fuel injection system for Petrol Engine | Cos 2 | |
| 41 | 41 | 5 | Describe the working principle of fuel injection system for multi cylinder Engine 5.5 Filter for Diesel engine | Cos 2 | |
| 42 | 42 | 5 | Describe the working principle of fuel injection system for multi cylinder Engine 5.5 Filter for Diesel engine | Cos 2 | |
| 43 | 43 | 5 | Describe the working principle of fuel injection system for multi cylinder Engine 5.5 Filter for Diesel engine | Cos 2 | |
| 44 | 44 | 5 | Describe the working principle of Fuel feed pump and Fuel Injector for Diesel engine | Cos 2 | |
| 45 | 45 | 5 | Describe the working principle of Fuel feed pump and Fuel Injector for Diesel engine | Cos 2 | |
| 46 | 46 | 6 | Introduction, Social and Environmental importance of Hybrid and Electric Vehicles | Cos 3 | |
| 47 | 47 | 6 | Introduction, Social and Environmental importance of Hybrid | Cos 3 | |

| SL No. | Lecture No. | Module/Unit No. | Topic To Be Taught | Cos | Reference Material Links |
|---|---|---|---|---|---|
| | | | and Electric Vehicles | | |
| 48 | 48 | 6 | Introduction, Social and Environmental importance of Hybrid and Electric Vehicles | Cos 3 | |
| 49 | 49 | 6 | Description of Electric Vehicles, operational advantages, present performance and applications of Electric Vehicles | Cos 3 | |
| 50 | 50 | 6 | Description of Electric Vehicles, operational advantages, present performance and applications of Electric Vehicles | Cos 3 | |
| 51 | 51 | 6 | Description of Electric Vehicles, operational advantages, present performance and applications of Electric Vehicles | Cos 3 | |
| 52 | 52 | 6 | Battery for Electric Vehicles, Battery types and fuel cells | Cos 3 | |
| 53 | 53 | 6 | Battery for Electric Vehicles, Battery types and fuel cells | Cos 3 | |
| 54 | 54 | 6 | Battery for Electric Vehicles, Battery types and fuel cells | Cos 3 | |
| 55 | 55 | 6 | Hybrid vehicles, Types of Hybrid and Electric Vehicles: Parallel, Series, Parallel and Series configurations;6.5 Drive train | Cos 3 | |
| 56 | 56 | 6 | Hybrid vehicles, Types of Hybrid and Electric Vehicles: Parallel, Series, Parallel and Series configurations;6.5 Drive train | Cos 3 | |
| 57 | 57 | 6 | Hybrid vehicles, Types of Hybrid and | Cos 3 | |

| SL No. | Lecture No. | Module/Unit No. | Topic To Be Taught | Cos | Reference Material Links |
|---|---|---|---|---|---|
| | | | Electric Vehicles: Parallel, Series, Parallel and Series configurations;6.5 Drive train | | |
| 58 | 58 | 6 | Solar powered vehicles | Cos 3 | |
| 59 | 59 | 6 | Solar powered vehicles | Cos 3 | |
| 60 | 60 | 6 | Solar powered vehicles | Cos 3 | |

Subject Teacher

HOD

Principal

# CAPITAL SCHOOL OF ENGINEERING

PLOT NO. 1288, MAHATAPALLA, BAJAPUR, KHURDA,PIN-752060

**Session: 2023-2024**

Course Name: DIPLOMA
Theory/Practical: Theory

Section : A
Semester : 6

Branch Name: MECHANICAL
Subject Name: Th.1: INDUSTRIAL ENGINEERING & MANAGEMENT
Teacher Name: RUDRANARAYAN BEHERA

Credit " External Evaluation(Marked) '80' Internal Evaluation(Marked) '20'

## Text Books:

| Sl.No | Text Books |
|---|---|
| 1 | INDUSTRIAL ENGINEERING & MANAGEMENT,O.P.KHANNA ,DHANPAT RAI & SONS |
| 2 | INDUSTRIAL ENGG & PRODUCTION MANAGEMENT,MARTAND TELSANG,S.CHAND |

## Reference books:

| Sl.No | Reference books |
|---|---|
| 1 | Manufacturing technology, Vol- I,P.C.Sharma,S. Chand |

## Course Outcomes:

| Sl.No | Course Outcomes |
|---|---|
| 1 | .Identify the place for a new plant set up and systematic arrangement of machinery and shop for smooth production |
| 2 | .Take right decisions to optimize resources utilizations by improving productivity of the lands ,buildings,people,material,machi |
| 3 | 3.Understanding of stock management and maintenance to reduce plant ideal time. |
| 4 | To use the charts to record the quality of products. |
| 5 | To eliminate unproductive activities under the control of the management supervisor, worker and the design of products and proce |

| SL No. | Lecture No. | Module/Unit No. | Topic To Be Taught | Cos | Reference Material Links |
|---|---|---|---|---|---|
| 1 | 1 | 1 | . PLANT ENGINEERING:Selection of Site of Industry | Cos 1 | |
| 2 | 2 | 1 | Define plant layout.Describe the objective and principles of plant layout. | Cos 1 | |
| 3 | 3 | 1 | Explain Process Layout, Product Layout and Combination Layout. | Cos 1 | |
| 4 | 4 | 1 | Explain Process Layout, Product | Cos 1 | |

| SL No. | Lecture No. | Module/Unit No. | Topic To Be Taught | Cos | Reference Material Links |
|---|---|---|---|---|---|
| | | | Layout and Combination Layout. | | |
| 5 | 5 | 1 | Techniques to improve layout | Cos 1 | |
| 6 | 6 | 1 | Techniques to improve layout | Cos 1 | |
| 7 | 7 | 1 | Principles of material handling equipment. | Cos 1 | |
| 8 | 8 | 1 | Plant maintenance. | Cos 1 | |
| 9 | 9 | 1 | Importance of plant m aintenance,Preventive maintenance | Cos 1 | |
| 10 | 10 | 1 | Break down maintenance, Scheduled maintenance | Cos 1 | |
| 11 | 11 | 2 | Introduction to Operations Research and its applications. | Cos 2 | |
| 12 | 12 | 2 | Define Linear Programming Problem, | Cos 2 | |
| 13 | 13 | 2 | Solution of L.P.P. by graphical method. | Cos 2 | |
| 14 | 14 | 2 | Linear Programming Problem | Cos 2 | |
| 15 | 15 | 2 | LPP Problem solving | Cos 2 | |
| 16 | 16 | 2 | LPP Problem solving | Cos 2 | |
| 17 | 17 | 2 | LPP Problem solving | Cos 2 | |
| 18 | 18 | 2 | Evaluation of Project completion time by Critical Path Method and PERT | Cos 2 | |
| 19 | 19 | 2 | Evaluation of Project completion time by Critical Path Method and PERT | Cos 2 | |
| 20 | 20 | 2 | Problem solving related to PERT and CPM5Explain distinct features of PERT with respect to CPM | Cos 2 | |
| 21 | 21 | 3 | . INVENTORY CONT ROL:Classification of inventory | Cos 3 | |
| 22 | 22 | 3 | Objective of inventory control. | Cos 3 | |

| SL No. | Lecture No. | Module/Unit No. | Topic To Be Taught | Cos | Reference Material Links |
|---|---|---|---|---|---|
| 23 | 23 | 3 | Describe the functions of inventories. | Cos 3 | |
| 24 | 24 | 3 | Benefits of inventory control | Cos 3 | |
| 25 | 25 | 3 | Costs associated with inventory | Cos 3 | |
| 26 | 26 | 3 | Terminology in inventory control | Cos 3 | |
| 27 | 27 | 3 | Terminology in inventory control | Cos 3 | |
| 28 | 28 | 3 | Explain and Derive economic order quantity for Basic model. | Cos 3 | |
| 29 | 29 | 3 | Solve numerical | Cos 3 | |
| 30 | 30 | 3 | Define and Explain ABC analysis | Cos 3 | |
| 31 | 31 | 4 | INSPECTION AND QUALITY CONTROL:Define Inspection and Quality control | Cos 4 | |
| 32 | 32 | 4 | Describe planning of inspection. | Cos 4 | |
| 33 | 33 | 4 | Describe types of inspection. | Cos 4 | |
| 34 | 34 | 4 | Advantages and disadvantages of quality control. | Cos 4 | |
| 35 | 35 | 4 | Study of factors influencing the quality of manufacture | Cos 4 | |
| 36 | 36 | 4 | Explain the Concept of statistical quality control, Control charts (X, R, P and C - charts). | Cos 4 | |
| 37 | 37 | 4 | Explain the Concept of statistical quality control, Control charts (X, R, P and C - charts). | Cos 4 | |
| 38 | 38 | 4 | Methods of attributes | Cos 4 | |
| 39 | 39 | 4 | Concept of ISO 9001-2008 | Cos 4 | |
| 40 | 40 | 4 | Quality management system, Registration | Cos 4 | |

| SL No. | Lecture No. | Module/Unit No. | Topic To Be Taught | Cos | Reference Material Links |
|---|---|---|---|---|---|
| | | | /certification procedure. | | |
| 41 | 41 | 4 | Quality management system, Registration /certification procedure. | Cos 4 | |
| 42 | 42 | 4 | Benefits of ISO to the organization | Cos 4 | |
| 43 | 43 | 4 | JIT, Six sigma,7S, Lean manufacturing. | Cos 4 | |
| 44 | 44 | 4 | Solve related problems | Cos 4 | |
| 45 | 45 | 4 | Solve related problems | Cos 4 | |
| 46 | 46 | 5 | INTRODUCTION TOPRODUCTION PLANNING AND CONTROL | Cos 5 | |
| 47 | 47 | 5 | Major functions of production planning and control | Cos 5 | |
| 48 | 48 | 5 | Methods of forecasting | Cos 5 | |
| 49 | 49 | 5 | Routing | Cos 5 | |
| 50 | 50 | 5 | Scheduling | Cos 5 | |
| 51 | 51 | 5 | Dispatching | Cos 5 | |
| 52 | 52 | 5 | Controlling | Cos 5 | |
| 53 | 53 | 5 | Types of production | Cos 5 | |
| 54 | 54 | 5 | Mass production | Cos 5 | |
| 55 | 55 | 5 | Batch production | Cos 5 | |
| 56 | 56 | 5 | Job order production | Cos 5 | |
| 57 | 57 | 5 | Principles of product and process planning | Cos 5 | |
| 58 | 58 | 5 | Principles of product and process planning | Cos 5 | |
| 59 | 59 | 5 | Problem related to forecating | Cos 5 | |
| 60 | 60 | 5 | Question and Answer | Cos 5 | |

**Subject Teacher** **HOD** **Principal**

# CAPITAL SCHOOL OF ENGINEERING

PLOT NO. 1288, MAHATAPALLA, BAJAPUR, KHURDA,PIN-752060
Session: 2023-2024

Course Name: DIPLOMA
Theory/Practical: Theory
Section : A
Semester : 6

Branch Name: MECHANICAL
Subject Name: Th.3 : POWER STATION ENGINEERING
Teacher Name: RAKESH KU SAHU

Credit " External Evaluation(Marked) '80' Internal Evaluation(Marked) '20'

**Text Books:**

| Sl.No | Text Books |
|---|---|
| 1 | R.K Rajput Power Plant Engineering Laxmi Publication |
| 2 | P.K.NAG Power Plant Engineering TMH |

**Reference books:**

| Sl.No | Reference books |
|---|---|
| 1 | Nag pal G,R Power plant Engineering Khanna Publisher |
| 2 | P.C.SHARMA Power Plant Engineering S.K KATARIA &SONS |

**Course Outcomes:**

| Sl.No | Course Outcomes |
|---|---|
| 1 | Understand the generation of power by utilizing various energy sources |
| 2 | Understand the use of steam, its operation in thermal power stations. |
| 3 | Understand the nuclear energy sources and power developed in nuclear power station. |
| 4 | Understand the basics of diesel electric power station and hydroelectric power station. |
| 5 | Understand the basics of gas turbine power station |

| SL No. | Lecture No. | Module/Unit No. | Topic To Be Taught | Cos | Reference Material Links |
|---|---|---|---|---|---|
| 1 | 1 | 1 | Describe sources of energy. | Cos 1 | |
| 2 | 2 | 1 | Explain concept of Central and Captive power station. | Cos 1 | |
| 3 | 3 | 1 | Classify power plants. | Cos 1 | |
| 4 | 4 | 1 | Importance of electrical power in day today life | Cos 1 | |
| 5 | 5 | 1 | Overview of method of electrical power generation. | Cos 1 | |
| 6 | 6 | 2 | Layout of steam power stations. | Cos 2 | |
| 7 | 7 | 2 | Layout of steam power stations. | Cos 2 | |

| SL No. | Lecture No. | Module/Unit No. | Topic To Be Taught | Cos | Reference Material Links |
|---|---|---|---|---|---|
| 8 | 8 | 2 | Steam power cycle. Explain Carnot vapour power cycle with P-V, T-s diagram and determine thermal efficiency. | Cos 2 | |
| 9 | 9 | 2 | Steam power cycle. Explain Carnot vapour power cycle with P-V, T-s diagram and determine thermal efficiency. | Cos 2 | |
| 10 | 10 | 2 | Explain Rankine cycle with P-V, T-S & H-s diagram and determine thermal efficiency, Work done, work ratio, and specific steam Co | Cos 2 | |
| 11 | 11 | 2 | Explain Rankine cycle with P-V, T-S & H-s diagram and determine thermal efficiency, Work done, work ratio, and specific steam Co | Cos 2 | |
| 12 | 12 | 2 | Explain Rankine cycle with P-V, T-S & H-s diagram and determine thermal efficiency, Work done, work ratio, and specific steam Co | Cos 2 | |
| 13 | 13 | 2 | Solve Simple Problems. | Cos 2 | |
| 14 | 14 | 2 | Solve Simple Problems. | Cos 2 | |
| 15 | 15 | 2 | List of thermal power stations in the state with their capacities. | Cos 2 | |
| 16 | 16 | 2 | Boiler Accessories: Operation of Air pre heater, Operation of Economiser, Operation Electrostatic precipitator and Operation of | Cos 2 | |

| SL No. | Lecture No. | Module/Unit No. | Topic To Be Taught | Cos | Reference Material Links |
|---|---|---|---|---|---|
| 17 | 17 | 2 | Boiler Accessories: Operation of Air pre heater, Operation of Economiser, Operation Electrostatic precipitator and Operation of | Cos 2 | |
| 18 | 18 | 2 | Boiler Accessories: Operation of Air pre heater, Operation of Economiser, Operation Electrostatic precipitator and Operation of | Cos 2 | |
| 19 | 19 | 2 | Boiler Accessories: Operation of Air pre heater, Operation of Economiser, Operation Electrostatic precipitator and Operation of | Cos 2 | |
| 20 | 20 | 2 | Draught systems (Natural draught, Forced draught & balanced draught) with their advantages & disadvantages | Cos 2 | |
| 21 | 21 | 2 | Draught systems (Natural draught, Forced draught & balanced draught) with their advantages & disadvantages | Cos 2 | |
| 22 | 22 | 2 | Steam prime movers: Advantages & disadvantages of steam turbine, Elements of steam turbine, governing of steam turbine. Performa | Cos 2 | |
| 23 | 23 | 2 | Steam prime movers: Advantages & disadvantages of steam turbine, | Cos 2 | |

| SL No. | Lecture No. | Module/Unit No. | Topic To Be Taught | Cos | Reference Material Links |
|---|---|---|---|---|---|
| | | | Elements of steam turbine, governing of steam turbine. Performa | | |
| 24 | 24 | 2 | Steam condenser: Function of condenser, Classification of condenser. function of condenser auxiliaries such as hot well, conden | Cos 2 | |
| 25 | 25 | 2 | Cooling Tower: Function and types of cooling tower, and spray ponds, Selection of site for thermal power stations. | Cos 2 | |
| 26 | 26 | 3 | Classify nuclear fuel (Fissile & fertile material) | Cos 3 | |
| 27 | 27 | 3 | Classify nuclear fuel (Fissile & fertile material) | Cos 3 | |
| 28 | 28 | 3 | Explain fusion and fission reaction. | Cos 3 | |
| 29 | 29 | 3 | Explain working of nuclear power plants with block diagram | Cos 3 | |
| 30 | 30 | 3 | Explain working of nuclear power plants with block diagram | Cos 3 | |
| 31 | 31 | 3 | Explain the working and construction of nuclear reactor | Cos 3 | |
| 32 | 32 | 3 | Explain the working and construction of nuclear reactor | Cos 3 | |
| 33 | 33 | 3 | Compare the nuclear and thermal plants. | Cos 3 | |
| 34 | 34 | 3 | Explain the disposal of nuclear waste. | Cos 3 | |
| 35 | 35 | 3 | 7 Selection of site for nuclear power stations, List of nuclear power stations. | Cos 3 | |

| SL No. | Lecture No. | Module/Unit No. | Topic To Be Taught | Cos | Reference Material Links |
|---|---|---|---|---|---|
| 36 | 36 | 4 | State the advantages and disadvantages of diesel electric power stations. | Cos 4 | |
| 37 | 37 | 4 | State the advantages and disadvantages of diesel electric power stations. | Cos 4 | |
| 38 | 38 | 4 | Explain briefly different systems of diesel electric power stations: Fuel storage and fuel supply system, Fuel injection system, | Cos 4 | |
| 39 | 39 | 4 | Explain briefly different systems of diesel electric power stations: Fuel storage and fuel supply system, Fuel injection system, | Cos 4 | |
| 40 | 40 | 4 | Explain briefly different systems of diesel electric power stations: Fuel storage and fuel supply system, Fuel injection system, | Cos 4 | |
| 41 | 41 | 4 | Explain briefly different systems of diesel electric power stations: Fuel storage and fuel supply system, Fuel injection system, | Cos 4 | |
| 42 | 42 | 4 | Selection of site for diesel electric power stations. | Cos 4 | |
| 43 | 43 | 4 | Performance and thermal efficiency of diesel electric power stations. | Cos 4 | |
| 44 | 44 | 4 | Performance and thermal efficiency of diesel electric power stations. | Cos 4 | |
| 45 | 45 | 4 | Performance and | Cos 4 | |

| SL No. | Lecture No. | Module/Unit No. | Topic To Be Taught | Cos | Reference Material Links |
|---|---|---|---|---|---|
| | | | thermal efficiency of diesel electric power stations. | | |
| 46 | 46 | 5 | State advantages and disadvantages of hydroelectric power plant. | Cos 4 | |
| 47 | 47 | 5 | Classify and explain the general arrangement of storage type hydroelectric project and explain its operation. | Cos 4 | |
| 48 | 48 | 5 | Classify and explain the general arrangement of storage type hydroelectric project and explain its operation. | Cos 4 | |
| 49 | 49 | 5 | Selection of site of hydel power plant. | Cos 4 | |
| 50 | 50 | 5 | List of hydro power stations with their capacities and number of units in the state. | Cos 4 | |
| 51 | 51 | 5 | Types of turbines and generation used. | Cos 4 | |
| 52 | 52 | 5 | Types of turbines and generation used. | Cos 4 | |
| 53 | 53 | 5 | Types of turbines and generation used. | Cos 4 | |
| 54 | 54 | 5 | Simple problems. | Cos 4 | |
| 55 | 55 | 5 | Simple problems. | Cos 4 | |
| 56 | 56 | 6 | Selection of site for gas turbine stations | Cos 5 | |
| 57 | 57 | 6 | Fuels for gas turbine | Cos 5 | |
| 58 | 58 | 6 | Elements of simple gas turbine power plantsElements of simple gas turbine power plants | Cos 5 | |
| 59 | 59 | 6 | Elements of simple gas turbine power plants | Cos 5 | |
| | | | | | |

| SL No. | Lecture No. | Module/Unit No. | Topic To Be Taught | Cos | Reference Material Links |
|---|---|---|---|---|---|
| 60 | 60 | 6 | Merits, demerits and application of gas turbine power plants. | Cos 5 | |

Subject Teacher

HOD

Principal