Mechanical 6th

TEACHING-CUM-LESSON PLAN

1) **Subject Code:Th-1** 2) **Subject Title:** INDUSTRIAL ENGINEERING & MANAGEMENT

3) **Semester:6th** 4) **Branch:** MECHANICAL ENGG.

5) **No. of Classes / Week: 05**

6) **Pre Requisite for the Subject: NIL / YES, If YES, give details: NIL**

7) **Text Book to be referred by students:**

Sl No.	Book	Author	Publication	Year (Edition)	Whether available in Library
i	INDUSTRIAL ENGINEERING & MANAGEMENT	O.P.KHANNA	DHANPAT RAI & SONS	9th	YES
ii	STATISTICAL QUALITY CONTROL	M.MAHAJAN	DHANPAT RAI &SONS	3rd	YES

8) **Course Coverage Schedule:**

Sl No.	Week No.	Ch. No	No. of classes planed	Topic to be covered	Article		Expected Date of Completion	Remark
					From	To		
i	1	1	05	PLANT ENGINEERING	1.1	1.4		
ii	2	1	05	PLANT ENGINEERING	1.5	1.7.4,1001	04.04.22	
iii	3	2	05	OPERATIONS RESEARCH	2.1	2.2		
iv	4	2	05	OPERATIONS RESEARCH	2.3	2.4		
v	5	2	05	OPERATIONS RESEARCH	2.5	1002	27.04.22	
vi	6	3	05	INVENTORY CONTROL	3.1	3.8,1003	03.05.22	
vii	7	4	05	INSPECTION AND QUALITY CONTROL	4.1	4.6		
viii	8	4	05	INSPECTION AND QUALITY CONTROL	4.7	4.9.4,1004	20.05.22	
ix	9	5	05	PRODUCTION PLANNING AND CONTROL	5.1	5.3.4		
x	10	5	05	PRODUCTION PLANNING AND CONTROL	5.4	5.5,1005	03.06.22	
Total:		5	50					

9) **Detail Class wise Plan:**

Detailed Topic Plan:

Chapter No: 01 Chapter Name: PLANT ENGINEERING

1.1 Selection of Site of Industry. 1.2 Define plant layout. 1.3 Describe the objective and principles of plant layout. 1.4 Explain Process Layout, Product Layout and Combination Layout. 1.5 Techniques to improve layout. 1.6 Principles of material handling equipment. 1.7 Plant maintenance. 1.7.1 Importance of plant maintenance. 1.7.2 Break down maintenance. 1.7.3 Preventive maintenance. 1.7.4 Scheduled maintenance.

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	1	1	Selection of Site of Industry.	1.1		
2		2	Define plant layout,Describe the objective and principles of plant layout	1.2,1.3		
3		3	Explain Process Layout, Product Layout and Combination Layout	1.4		
4		4	Explain Process Layout, Product Layout and Combination Layout	1.4		
5		5	Techniques to improve layout	1.5		
7	2	6	Principles of material handling equipment	1.6		
8		7	Plant maintenance,Importance of plant maintenance	1.7,1.7.1		
9		8	Break down maintenance. Preventive maintenance	1.7.2,1.7.3		
10		9	Scheduled maintenance, **Revision**	1.7.4,1001		
11		10	**Teachers Exam./ Doubt Clear/Revision:**	1001		

REVIEW:

Detailed Topic Plan:

Chapter No: 02 Chapter Name: OPERATIONS RESEARCH

2.1 Introduction to Operations Research and its applications. 2.2 Define Linear Programming Problem. 2.3Solution of L.P.P. by graphical method. 2.4 Evaluation of Project completion time by Critical Path Method and PERT (Simple problems)- 2.5Explain distinct features of PERT with respect to CPM.

	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1		1	Introduction to Operations Research and its applications	2.1		
2		2	Define Linear Programming Problem	2.2		
3	3	3	Define Linear Programming Problem	2.2		
4		4	Solution of L.P.P. by graphical method.	2.3		
5		5	Solution of L.P.P. by graphical method.	2.3		
6		6	Solution of L.P.P. by graphical method.	2.3		
7	4	7	Solution of L.P.P. by graphical method.	2.3		
8		8	Solution of L.P.P. by graphical method.	2.3		
9		9	Evaluation of Project completion time by Critical Path Method and PERT	2.4		
10		10	Simple problems related to PERT& Critical Path Method	2.4		
11		11	Simple problems related to PERT& Critical Path Method	2.4		
12		12	Simple problems related to PERT& Critical Path Method	2.4		
13	5	13	Simple problems related to PERT& Critical Path Method	2.4		
14		14	Explain distinct features of PERT with respect to CPM.	2.5		
15		15	**Teachers Exam./ Doubt Clear/Revision:**	1002		

REVIEW:

Detailed Topic Plan:

Chapter No:03 Chapter Name: INVENTORY CONTROL

3.1 Classification of inventory. 3.2 Objective of inventory control. 3.3 Describe the functions of inventories. 3.4 Benefits of inventory control. 3.5 Costs associated with inventory. 3.6 Terminology in inventory control 3.7 Explain and Derive economic order quantity for Basic model. (Solve numerical) 3.8 Define and Explain ABC analysis

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1		1	Classification of inventory ,Objective of inventory control ,Describe the functions of	3.1,3.2,3.3		

	6		inventories			
2		2	Benefits of inventory control ,Costs associated with inventory	3.4,3.5		
3		3	Terminology in inventory control, Explain and Derive economic order quantity for Basic model. (Solve numerical	3.6,3.7		
4		4	Explain and Derive economic order quantity for Basic model. (Solve numerical	3.7		
5		5	Define and Explain ABC analysis **Revision**	3.8,1003		

REVIEW:

Detailed Topic Plan:

Chapter No: 04 Chapter Name: INSPECTION AND QUALITY CONTROL

4.1Define Inspection and Quality control. 4.2Describe planning of inspection. 4.3 Describe types of inspection. 4.4 Advantages and disadvantages of quality control. 4.5 Study of factors influencing the quality of manufacture. 4.6 Explain the Concept of statistical quality control, Control charts (X, R, P and C - charts). 4.7 Methods of attributes. 4.8 Concept of ISO 9001-2008. 4.9.1 Quality management system, Registration /certification procedure. 4.9.2 Benefits of ISO to the organization. 4.9.3 JIT, Six sigma,7S, Lean manufacturing 4.9.4 Solve related problems.

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	7	1	Define Inspection and Quality control. Describe planning of inspection	4.1,4.2		
2		2	Describe types of inspection ,Advantages and disadvantages of quality control	4.3,4.4		
3		3	Study of factors influencing the quality of manufacture	4.5		
4		4	Explain the Concept of statistical quality control, Control charts (X, R, P and C - charts). Solve related problems	4.6,4.9.4		
5		5	Explain the Concept of statistical quality control, Control charts (X, R, P and C - charts). Solve related problems	4.6,4.9.4		
6		6	Explain the Concept of statistical quality control, Control charts (X, R, P and C -	4.6,4.9.4		

	8		charts). Solve related problems			
		7	Methods of attributes, Concept of ISO 9001-2008	4.7,4.8		
8		8	Quality management system, Registration /certification procedure, Benefits of ISO to the organization.	4.9.1,4.9.2		
9		9	JIT, Six sigma,7S, Lean manufacturing	4.9.3		
10		10	**Teachers Exam./ Doubt Clear/Revision**	1004		

REVIEW:

Detailed Topic Plan:

Chapter No: 05 Chapter Name:PRODUCTION PLANNING AND CONTROL

5.1 Introduction 5.2 Major functions of production planning and control 5.3 Methods of forecasting 5.3.1 Routing 5.3.2Scheduling 5.3.3 Dispatching 5.3.4 Controlling 5.4 Types of production 5.4.1 Mass production 5.4.2 Batch production 5.4.3 Job order production 5.5 Principles of product and process planning

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	9	1	Introduction, Major functions of production planning and control,	5.1,5.2		
2		2	Methods of forecasting	5.3		
3		3	Methods of forecasting	5.3		
4		4	Routing, Scheduling, Dispatching	5.3.1,5.3.2,5.3.3		
5		5	Controlling, Types of production	5.3.4,5.4		
6	10	6	Mass production, Batch production	5.4.1,5.4.2		
7		7	Job order production	5.4.3		
8		8	Principles of product and process planning	5.5		
9		9	Principles of product and process planning	5.5		
10		10	**Teachers Exam./ Doubt Clear/Revision:**	1005		

10) **Examination Schedule:**

Sl No.	Particulars of Test	Schedule	Type
1	Weekly Test (2^{nd} Week onwards)	Wednesday (4^{th} Sem.) & Thursday (6^{th} sem.)	10 Short Questions (02 Marks):
2	Internal Exam.-1	4^{th} Week	30 Marks (Long Questions)
3	Internal Exam.-2	8^{th} Week	30 Marks (Long Questions)

11) **Assignment Collection/ Evaluation:**

Sl No.	Assignment No.	Content	Schedule
1	Assignment-1	Long Questions 7 Nos.(10 Marks) Short Questions 6 Nos. (5 Marks)	3^{rd} Week
2	Assignment-2	Long Questions 8 Nos.(10 Marks) Short Questions 6 Nos. (5 Marks)	6^{th} Week
3	Assignment-3	Long Questions 11 Nos.(10 Marks) Short Questions 8 Nos. (5 Marks)	9^{th} Week
4	Assignment-4	VST 100 Marks	10^{th}/11^{th} Week

26.03.22
Signature of Faculty

J. Mishra 26/03/22
Signature of Asst. HOD

28/03/2022
Signature of HOD

Dayalm 08/04/2022
Principal

TEACHING-CUM-LESSON PLAN

1) **Subject Code: Th-02**
2) **Subject Title: AE&HV**
3) **Semester: 6th**
4) **Branch: Mechanical**
5) **No. of Classes / Week: 06**
6) **Pre Requisite for the Subject: NIL / YES, If YES, give details:**

- Basic knowledge of engineering material, particularly their properties, compositions and uses.
- Basic knowledge about working and constructional details of IC engines.

7) **Text Book to be referred by students:**

Sl. No.	Book	Author	Publication	Year (Edition)	Whether available in Library
i	Automobile Engineering	R.B.Gupta	Satya Prakashan	2011	Yes
ii	Automobile Engineering Vol- I & II	Dr Kirpal Singh	Standard Publishers	2009	Yes
iii	Statistical Electric & Hybrid Vehicles	A.K. Babu	Khanna Publishing House, New Delhi, 2018	2019	In soft copy

8) **Course Coverage Schedule:**

Sl. No.	Week No.	Ch. No	No. of classes planed	Topic to be covered	Article From	Article To	Expected Date of Completion	Remark
i	01	01	06	Chapter-01	1.1	1.3		
ii	02	01	06		1.3	1.6		
iii	03	01	03		1.6	1001	13.04.2022	
		02	03	Chapter-02	2.1	2.3		
iv	04	02	06		2.3	1002	20.04.2022	
v	05	03	06	Chapter-03	3.1	3.3		
vi	06	03	06		3.3	1003	03.05.2022	
vii	07	04	06	Chapter-04	4.1	1004	10.05.2022	
viii	08	05	06	Chapter-05	5.1	5.4		
		05	03		5.4	1005	27.05.2022	
ix	09	06	03	Chapter-06	6.1	6.2		
x	10	06	06		6.3	1006	03.06.22	
Total:			**60**					

9) **Detail Class wise Plan:**

Detailed Topic Plan:

Chapter No: 01 Chapter Name: INTRODUCTION & TRANSMISSION SYSTEM

- Automobiles: Definition, need and classification: Layout of automobile chassis with major components (Line diagram),
- Clutch System: Need, Types (Single & Multiple) and Working principle with sketch
- Gear Box: Purpose of gear box, Construction and working of a 4 speed gear box
- Concept of automatic gear changing mechanisms
- Propeller shaft: Constructional features
- Differential: Need, Types and Working principle

Sl. No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
01	01	01	Automobiles: Definition, need and classification: Layout of automobile chassis with major components (Line diagram)	1.1		
02		02	Automobiles: Definition, need and classification: Layout of automobile chassis with major components (Line diagram)	1.1		
03		03	Clutch System: Need, Types (Single & Multiple) and Working principle with sketch	1.2		
04		04	Clutch System: Need, Types (Single & Multiple) and Working principle with sketch	1.2		
05		05	Clutch System: Need, Types (Single & Multiple) and Working principle with sketch	1.2		
06		06	Gear Box: Purpose of gear box, Construction and working of a 4 speed gear box	1.3		
07	2	07	Gear Box: Purpose of gear box, Construction and working of a 4 speed gear box	1.3		
08		08	Gear Box: Purpose of gear box, Construction and working of a 4 speed gear box	1.3		
09		09	Concept of automatic gear changing mechanisms	1.4		
10		10	Propeller shaft: Constructional features	1.5		
11		11	Propeller shaft: Constructional features	1.5		
12		12	Differential: Need, Types and Working principle	1.6		
13	3	13	Differential: Need, Types and Working principle	1.6		
14		14	Differential: Need, Types and Working principle	1.6		
15		**Last Class**	**Teachers Exam./ Doubt Clear/Revision:**	**1001**		

Review:-

Detailed Topic Plan:

Chapter No: 02 Chapter Name: BRAKING SYSTEM

- Braking systems in automobiles: Need and types
- Mechanical Brake
- Hydraulic Brake
- Air Brake
- Air assisted Hydraulic Brake
- Vacuum Brake

Sl. No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
01	3	01	Braking systems in automobiles: Need and types	2.1		
02		02	Mechanical Brake	2.2		
03		03	Hydraulic Brake	2.3		
04	4	04	Hydraulic Brake	2.3		
05		05	Air Brake	2.4		
06		06	Air Brake	2.4		
07		07	Air assisted Hydraulic Brake	2.5		
08		08	Vacuum Brake	2.6		
09		**Last Class**	**Teachers Exam./ Doubt Clear/Revision:**	**1002**		

Review:-

Detailed Topic Plan:

Chapter No: 03 Chapter Name: IGNITION & SUSPENSION SYSTEM

- Describe the Battery ignition and Magnet ignition system
- Spark plugs: Purpose, construction and specifications
- State the common ignition troubles and its remedies
- Description of the conventional suspension system for Rear and Front axle
- Description of independent suspension system used in cars (coil spring and tension bars)
- Constructional features and working of a telescopic shock absorber

Sl. No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
01	5	01	Describe the Battery ignition and Magnet ignition system	3.1		
02		02	Describe the Battery ignition and Magnet ignition system	3.1		

03		03	Describe the Battery ignition and Magnet ignition system	3.1		
04		04	Spark plugs: Purpose, construction and specifications	3.2		
05		05	Spark plugs: Purpose, construction and specifications	3.2		
06		06	State the common ignition troubles and its remedies	3.3		
07		07	State the common ignition troubles and its remedies	3.3		
08		08	Description of the conventional suspension system for Rear and Front axle	3.4		
09	6	09	Description of the conventional suspension system for Rear and Front axle	3.4		
10		10	Description of independent suspension system used in cars (coil spring and tension bars)	3.5		
11		11	Constructional features and working of a telescopic shock absorber	3.6		
12		**Last Class**	**Teachers Exam./ Doubt Clear/Revision:**	**1003**		

Review:-

Detailed Topic Plan:

Chapter No: 04 Chapter Name:COOLING AND LUBRICATION

- Engine cooling: Need and classification
- Describe defects of cooling and their remedial measures
- Describe the Function of lubrication
- Describe the lubrication System of I.C. engine

Sl. No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
01		01	Engine cooling: Need and classification	4.1		
02		02	Describe defects of cooling and their remedial measures	4.2		
03		03	Describe the Function of lubrication	4.3		
04	7	04	Describe the lubrication System of I.C. engine	4.4		
05		05	Describe the lubrication System of I.C. engine	4.4		
06		**Last Class**	**Teachers Exam./ Doubt Clear/Revision:**	**1004**		

N:-

Detailed Topic Plan:

Chapter No: 05 Chapter Name:FUEL SYSTEM

- Describe Air fuel ratio
- Describe Carburetion process for Petrol Engine
- Describe Multipoint fuel injection system for Petrol Engine
- Describe the working principle of fuel injection system for multi cylinder Engine, Filter for Diesel engine
- Describe the working principle of Fuel feed pump and Fuel Injector for Diesel engine

Sl. No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
01	8	01	Describe Air fuel ratio	5.1		
02		02	Describe Carburetion process for Petrol Engine	5.2		
03		03	Describe Multipoint fuel injection system for Petrol Engine	5.3		
04		04	Describe Multipoint fuel injection system for Petrol Engine	5.3		
05		05	Describe the working principle of fuel injection system for multi cylinder Engine	5.4		
06		06	Describe the working principle of fuel injection system for multi cylinder Engine	5.4		
07	9	07	Filter for Diesel engine	5.5		
08		08	Describe the working principle of Fuel feed pump and Fuel Injector for Diesel engine	5.6		
09		**Last Class**	**Teachers Exam./ Doubt Clear/Revision:**	**1005**		

Review:-

Detailed Topic Plan:

Chapter No: 06 Chapter Name:ELECTRIC AND HYBRID VEHICLES

- Introduction, Social and Environmental importance of Hybrid and Electric Vehicles
- Description of Electric Vehicles, operational advantages, present performance and applications of Electric Vehicles
- Battery for Electric Vehicles, Battery types and fuel cells
- Hybrid vehicles, Types of Hybrid and Electric Vehicles: Parallel, Series, Parallel and Series configurations
- Drive train
- Solar powered vehicles

Sl. No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
01	9	01	Introduction, Social and	6.1		

			Environmental importance of Hybrid and Electric Vehicles			
02		02	Introduction, Social and Environmental importance of Hybrid and Electric Vehicles	6.1		
03		03	Description of Electric Vehicles, operational advantages, present performance and applications of Electric Vehicles	6.2		
04	10	04	Battery for Electric Vehicles, Battery types and fuel cells	6.3		
05		05	Hybrid vehicles, Types of Hybrid and Electric Vehicles: Parallel, Series, Parallel and Series configurations;	6.4		
06		06	Hybrid vehicles, Types of Hybrid and Electric Vehicles: Parallel, Series, Parallel and Series configurations;	6.4		
07		07	Drive train	6.5		
08		08	Solar powered vehicles	6.6		
09		**Last Class**	**Teachers Exam./ Doubt Clear/Revision:**	**1006**		

Below:-

Examination Schedule:

Particulars of Test	Schedule	Type
Weekly Test (2nd Week onwards)	Wednesday (4th Sem.) & Thursday (6th sem.)	10 Short Questions (02 Marks):
Internal Exam.-1	4th Week	30 Marks (Long Questions)
Internal Exam.-2	8th Week	30 Marks (Long Questions)

Assignment Collection/ Evaluation:

Sl. No.	Assignment No.	Content	Schedule
1	Assignment-1	Long Questions 7 Nos.(10 Marks) Short Questions 6 Nos. (5 Marks)	3rd Week
2	Assignment-2	Long Questions 8 Nos.(10 Marks) Short Questions 6 Nos. (5 Marks)	6th Week
3	Assignment-3	Long Questions 11 Nos.(10 Marks) Short Questions 8 Nos. (5 Marks)	9th Week
4	Assignment-4	VST 100 Marks	10th/11th Week

Signature of Faculty

26/03/22
Signature of Asst. HOD

28/05/2022
Signature of HOD

28/5/2022
Principal

TEACHING-CUM-LESSON PLAN

1) Subject Code:Th- 3 2)Subject Title: POWER STATION ENGINEERING

3) Semester: 6th 4) Branch: Mechanical Engg.

5) No. of Classes / Week: 06

6) Pre Requisite for the Subject: NIL / YES, If YES, give details:YES

- Basic knowledge of Properties of thermodynamics ,heat& work,
- Basic knowledge of Laws of thermodynamics, thermodynamic processes and ideal gas law
- Basic knowledge of various properties of steam and vapour power cycle

7) Text Book to be referred by students:

Sl No.	Book	Author	Publication	Year (Edition)	Whether available in Library
i	Power Plant Engineering	R.K Rajput	Laxmi Publication	4th	YES
ii	Power Plant Engineering	P.K.NAG	TMH	9th	YES
iii	Acourse of Power plant Engg. By	Arora and Domkundwar	DHANPAT RAI &CO.	2008	YES

8) Course Coverage Schedule:

Sl No.	Week No.	Ch. No	No. of classes planed	Topic to be covered	Article		Expected Date of Completion	Remark
					From	To		
i	1	1	06	INTRODUCTION	1.1	1.5,1001	26.03.22	
ii	2	2	06	THERMAL POWER STATIONS	2.1	2.2		
iii	3		06	THERMAL POWER STATIONS	2.3	2.4		
iv	4		06	THERMAL POWER STATIONS	2.5	2.7		
v	5		06	THERMAL POWER STATIONS	2.8	2.11,1002	27.04.22	
vi	6	3	06	NUCLEAR POWER STATIONS	3.1	3.8,1003	03.05.22	
vii	7	4	06	DIESEL ELECTRIC POWER STATIONS	4.1	4.2		

viii	8	4	02	DIESEL ELECTRIC POWER STATIONS	4.3	4.4,1004	12.05.22	
		5	04	HYDEL POWER STATIONS:	5.1	5.3		
ix	9	5	06	HYDEL POWER STATIONS:	5.4	5.4,1005	27.05.22	
x	10	6	06	GAS TURBINE POWER STATIONS:	6.1	6.4,1006	03.06.22	
Total:		6	60					

9) **Detail Class wise Plan:**

Detailed Topic Plan:

Chapter No: 01 Chapter Name: INTRODUCTION

1.1 Describe sources of energy. 1.2 Explain concept of Central and Captive power station. 1.3 Classify power plants. 1.4 Importance of electrical power in day today life. 1.5 Overview of method of electrical power generation.

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	1	1	Describe sources of energy	1.1		
2		2	Explain concept of Central and Captive power station	1.2		
3		3	Classify power plants	1.3		
4		4	Importance of electrical power in day today life	1.4		
5		5	Overview of method of electrical power generation.	1.5		
6		6	**Teachers Exam./ Doubt Clear/Revision:**	1001		

Review:

Detailed Topic Plan:

Chapter No: 02 Chapter Name: THERMAL POWER STATIONS:

2.1 Layout of steam power stations. 2.2 Steam power cycle. Explain Carnot vapour power cycle with P-V, T-s diagram and determine thermal efficiency. 2.3 Explain Rankine cycle with P-V, T-S & H-s diagram and determine thermal efficiency, Work done, work ratio, and specific steam Consumption. 2.4 Solve Simple Problems. 2.5. List of thermal power stations in the state with their capacities. 2.6 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 2.7 Draught systems (Natural draught, Forced draught & balanced draught) with their advantages & disadvantages. 2.8 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. 2.9 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. 2.10 Cooling Tower: Function and types of cooling tower, and spray ponds 2.11 Selection of site for thermal power stations.

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1		1	Layout of steam power stations	2.1		
2		2	Steam power cycle. Explain Carnot vapour power cycle with P-V, T-s diagram and determine thermal efficiency	2.2		
3		3	Solve Simple Problems	2.4		
4	2	4	Solve Simple Problems	2.4		
5		5	Solve Simple Problems	2.4		
6		6	Explain Rankine cycle with P-V, T-S & H-s diagram and determine thermal efficiency, Work done, work ratio, and specific steam Consumption.	2.3		
7		7	Explain Rankine cycle with P-V, T-S & H-s diagram and determine thermal efficiency, Work done, work ratio, and specific steam Consumption.	2.3		
8		8	Solve Simple Problems	2.4		
9	3	9	Solve Simple Problems	2.4		
10		10	Solve Simple Problems	2.4		
11		11	Solve Simple Problems	2.4		
12		12	List of thermal power stations in the state with their capacities.	2.5		
13		13	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	2.6		
14		14	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	2.6		
15	4	15	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	2.6		
16		16	Draught systems (Natural draught, Forced draught & balanced draught) with their advantages & disadvantages	2.7		
17		17	Steam prime movers: Advantages & disadvantages of steam turbine, Elements of steam turbine, governing of steam	2.8		

			turbine. Performance of steam turbine: Explain Thermal efficiency, Stage efficiency and Gross efficiency			
18		18	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	2.8		
19	5	19	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.	2.9		
20		20	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	2.9		
21		21	Cooling Tower: Function and types of cooling tower, and spray ponds	2.10		
22		22	Cooling Tower: Function and types of cooling tower, and spray ponds	2.10		
23		23	Selection of site for thermal power stations.	2.11		
24		24	**Teachers Exam./ Doubt Clear/Revision:**	1002		

Review:

Detailed Topic Plan:

Chapter No:03 Chapter Name: NUCLEAR POWER STATIONS:

3.1 Classify nuclear fuel (Fissile & fertile material) 3.2 Explain fusion and fission reaction. 3.3 Explain working of nuclear power plants with block diagram . 3.4 Explain the working and construction of nuclear reactor . 3.5 Compare the nuclear and thermal plants. 3.6 Explain the disposal of nuclear waste. 3.7 Selection of site for nuclear power stations. 3.8 List of nuclear power station

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	6	1	Classify nuclear fuel (Fissile & fertile material) Explain fusion and fission reaction	3.1,3.2		
2		2	Explain working of nuclear power plants with block diagram	3.3		
3		3	Explain the working and construction of nuclear reactor . 3.5 Compare the nuclear and thermal plants	3.4		
4		4	Compare the nuclear and thermal	3.5,3.6		

			plants Explain the disposal of nuclear waste.			
5		5	Selection of site for nuclear power stations List of nuclear power station	3.8		
6		6	**Teachers Exam./ Doubt Clear/Revision:**	1003		

Review:

Detailed Topic Plan:

Chapter No: 04 Chapter Name: DIESEL ELECTRIC POWER STATIONS:

4.1 State the advantages and disadvantages of diesel electric power stations. 4.2 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. 4.3 Selection of site for diesel electric power stations. 4.4 Performance and thermal efficiency of diesel electric power stations.

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	7	1	State the advantages and disadvantages of diesel electric power stations	4.1		
2		2	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	4.2		
3		3	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	4.2		
4		4	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	4.2		
5		5	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	4.2		

6		6	Selection of site for diesel electric power stations	4.3		
7	8	7	Performance and thermal efficiency of diesel electric power stations.	4.4		
8		8	**Teachers Exam./ Doubt Clear/Revision:**	1004		

Review:

Detailed Topic Plan:

Chapter No: 05 Chapter Name: HYDEL POWER STATIONS:

5.1 State advantages and disadvantages of hydroelectric power plant. 5.2 Classify and explain the general arrangement of storage type hydroelectric project and explain its operation. 5.3 Selection of site of hydel power plant. 5.4 List of hydro power stations with their capacities and number of units in the state. 5.5 Types of turbines and generation used. 5.6 Simple problems

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	8	1	State advantages and disadvantages of hydroelectric power plant Classify and explain the general arrangement of storage type hydroelectric project and explain its operation	5.1 5.2		
2		2	Classify and explain the general arrangement of storage type hydroelectric project and explain its operation	5.2		
3		3	Selection of site of hydel power plant. List of hydro power stations with their capacities and number of units in the state	5.3 5.4		
4		4	Types of turbines and generation used	5.5		
5	9	5	Types of turbines and generation used	5.5		
6		6	Simple problems	5.6		
7		7	Simple problems	5.6		
8		8	Simple problems	5.6		
9		9	Simple problems	5.6		
10		10	**Teachers Exam./ Doubt Clear/Revision:**	1005		

Review:

ailed Topic Plan:

Chapter No: 06 Chapter Name: GAS TURBINE POWER STATIONS

6.1 Selection of site for gas turbine stations. 6.2 Fuels for gas turbine 6.3 Elements of simple gas turbine power plants 6.4 Merits, demerits and application of gas turbine power plants.

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	10	1	Selection of site for gas turbine stations. Fuels for gas turbine	6.1 6.2		
2		2	Elements of simple gas turbine power plants	6.3		
3		3	Elements of simple gas turbine power plants	6.3		
4		4	Elements of simple gas turbine power plants	6.3		
5		5	Merits, demerits and application of gas turbine power plants	6.4		
6		6	**Teachers Exam./ Doubt Clear/Revision:**	1006		

Review:

10) Examination Schedule:

Sl No.	Particulars of Test	Schedule	Type
1	Weekly Test (2^{nd} Week onwards)	Wednesday (4^{th} Sem.) & Thursday (6^{th} sem.)	10 Short Questions (02 Marks):
2	Internal Exam.-1	4^{th} Week	30 Marks (Long Questions)
3	Internal Exam.-2	8^{th} Week	30 Marks (Long Questions)

11) Assignment Collection/ Evaluation:

Sl No.	Assignment No.	Content	Schedule
1	Assignment-1	Long Questions 7 Nos.(10 Marks) Short Questions 6 Nos. (5 Marks)	3^{rd} Week
2	Assignment-2	Long Questions 8 Nos.(10 Marks) Short Questions 6 Nos. (5 Marks)	6^{th} Week
3	Assignment-3	Long Questions 11 Nos.(10 Marks) Short Questions 8 Nos. (5 Marks)	9^{th} Week
4	Assignment-4	VST 100 Marks	$10^{th}/11^{th}$ Week

26/3/22

Signature of Faculty

26/03/22

Signature of Asst. HOD

28/03/2022

Signature of HOD

28/3/2022

Principal

TEACHING-CUM-LESSON PLAN

1) **Subject Code:Th 4 b** **2) Subject Title: ADVANCE MANUFACTURING PROCESSES**

3) **Semester:6th** **4) Branch:Mechanical Engineering**

5) **No. of Classes / Week: 05**

6) **Pre Requisite for the Subject: NIL**

7) **Text Book to be referred by students:**

Sl No.	Book	Author	Publication	Year (Edition)	Whether available in Library
i	Production technology Vol-II	O.P.KHANNA	Dhanpat Rai Publication		Yes
ii	Workshop Technology, Vol – II	B.S. Raghuwanshi	Dhanpat Rai Publication		Yes

8) **Course Coverage Schedule:**

Sl No.	Week No.	Ch. No	No. of classes planed	Topic to be covered	Article		Expected Date of Completion	Remark
					From	To		
i	1	1	05	Modern Machining Processes	1.1	1.3		
ii	2	1	05	Modern Machining Processes	1.3	1.5		
iii	3	1	05	Modern Machining Processes	1.5	1.6		
iv	4	1	05	Modern Machining Processes	1.7	1.8		
v	5	1	02	Modern Machining Processes	1.8	1001	22.04.2022	
	5	2	03	Plastic Processing	2.1	2.2		
vi	6	2	05	Plastic Processing	2.3	1002	03.05.2022	
vii	7	3	05	Additive Manufacturing Process	3.1	3.4		
viii	8	3	05	Additive Manufacturing Process	3.5	1003	20.05.2022	
ix	9	4	04	Special Purpose Machines (SPM):	4.1	1004	24.05.2022	
		5	01	Maintenance of Machine Tools:	5.1	5.1		

X	10	5	04	Maintenance of Machine Tools:	5.1	1005	03.06.2022	
Total:		5	50					

9) Detail Class wise Plan

Detailed Topic Plan:

Chapter No: 01 Chapter Name: Modern Machining Processes:

1.1 Introduction – comparison with traditional machining.
1.2 Ultrasonic Machining: principle, Description of equipment, applications.
1.3 Electric Discharge Machining: Principle, Description of equipment, Dielectric fluid, tools (electrodes), Process parameters, Output characteristics, applications.
1.4 Wire cut EDM: Principle, Description of equipment, controlling parameters; applications.
1.5 Abrasive Jet Machining: principle, description of equipment, Material removal rate, application.
1.5 Laser Beam Machining: principle, description of equipment, Material removal rate, application.
1.6 Electro Chemical Machining: principle, description of equipment, Material removal rate, application.
1.7 Plasma Arc Machining – principle, description of equipment, Material removal rate, Process parameters, performance characterization, Applications.
1.8 Electron Beam Machining - principle, description of equipment, Material removal rate, Process parameters, performance characterization, Applications.

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	1	1	Introduction – comparison with traditional machining.	1.1		
2		2	Ultrasonic Machining: principle, Description of equipment, applications.	1.2		
3		3	Ultrasonic Machining: principle, Description of equipment, applications.	1.2		
4		4	Electric Discharge Machining: Principle, Description of equipment.	1.3		
5		5	Electric Discharge Machining: Dielectric fluid, tools (electrodes).	1.3		
6	2	6	Electric Discharge Machining: Process parameters, Output characteristics, applications.	1.3		
7		7	Wire cut EDM: Principle, Description of equipment.	1.4		
8		8	Wire cut EDM: Description of equipment, controlling parameters; applications.	1.4		
9		9	Wire cut EDM:controlling parameters; applications.	1.4		
10		10	Abrasive Jet Machining: principle, description of equipment.	1.5		
11	3	11	Abrasive Jet Machining: description of equipment, Material removal rate, application.	1.5		
12		12	Abrasive Jet Machining: Material removal rate, application.	1.5		
13		13	Electro Chemical Machining: principle, description of equipment.	1.6		
14		14	Electro Chemical Machining: description of equipment, Material removal rate.	1.6		
15		15	Electro Chemical Machining: Material removal rate, application.	1.6		
16		16	Plasma Arc Machining – principle, description of equipment.	1.7		

17	4	17	Plasma Arc Machining –, Material removal rate, Process parameters.	1.7		
18		18	Plasma Arc Machining –performance characterization, Applications.	1.7		
19		19	Electron Beam Machining - principle, description of equipment.	1.8		
20		20	Electron Beam Machining - Material removal rate, Process parameters.	1.8		
21	5	21	Electron Beam Machining - performance characterization, Applications.	1.8		
22		22	**Teachers Exam./ Doubt Clear/Revision:**	**1001**		

Review:

Detailed Topic Plan:

Chapter No: 02 Chapter Name: Plastic Processing

2.1 Processing of plastics., 2.2 Moulding processes: Injection moulding, Compression moulding, Transfer moulding, 2.3 Extruding; Casting; Calendering, 2.4 Fabrication methods-Sheet forming, Blow moulding, Laminating plastics (sheets, rods & tubes), Reinforcing. 2.5 Applications of Plastics.

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
23	5	23	Processing of plastics	2.1		
24		24	Moulding processes: Injection moulding, Compression moulding,	2.2		
25		25	Moulding processes: Compression moulding, Transfer moulding	2.2		
26	6	26	Extruding; Casting., Calendering.	2.3		
27		27	Fabrication methods-Sheet forming, Blow moulding.	2.4		
28		28	Fabrication methods-Laminating plastics (sheets, rods & tubes), Reinforcing.	2.4		
29		29	Applications of Plastics.	2.5		
30		30	**Teachers Exam./ Doubt Clear/Revision**	**1002**		

Review:

Detailed Topic Plan:

Chapter No: 03 Chapter Name: Additive Manufacturing Process

3.1 Introduction, Need for Additive Manufacturing
3.2 Fundamentals of Additive Manufacturing, AM Process Chain
3.3 Advantages and Limitations of AM, Commonly used Terms
3.4 Classification of AM process, Fundamental Automated Processes, Distinction between AM and CNC, other related technologies.
3.5 Application –Application in Design, Aerospace Industry, Automotive Industry, Jewelry Industry,

Arts and Architecture. RP Medical and Bioengineering Applications.
3.6 Web Based Rapid Prototyping Systems.
3.7 Concept of Flexible manufacturing process, concurrent engineering, production tools like capstan and turret lathes, rapid prototyping processes.

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
31	7	31	Introduction, Need for Additive Manufacturing	3.1		
32		32	Fundamentals of Additive Manufacturing, AM Process Chain	3.2		
33		33	Advantages and Limitations of AM, Commonly used Terms	3.3		
34		34	Classification of AM process, Fundamental Automated Processes.	3.4		
35		35	Distinction between AM and CNC, other related technologies.	3.4		
36	8	36	Application –Application in Design, Aerospace Industry, Automotive Industry, Jewelry Industry, Arts and Architecture. RP Medical and Bioengineering Applications.	3.5		
37		37	Web Based Rapid Prototyping Systems.	3.6		
38		38	Concept of Flexible manufacturing process, concurrent engineering.	3.7		
39		39	production tools like capstan and turret lathes, rapid prototyping processes.	3.7		
40		40	**Teachers Exam./ Doubt Clear/Revision**	**1003**		

Review:

Detailed Topic Plan:

Chapter No: 04 Chapter Name: Special Purpose Machines (SPM):

4.1 Concept, General elements of SPM, Productivity improvement by SPM, Principles of SPM design

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
41	9	31	Concept, General elements of SPM, Productivity improvement by SPM, Principles of SPM design.	4.1		
42		32	Concept, General elements of SPM, Productivity improvement by SPM, Principles of SPM design.	4.1		
43		33	Concept, General elements of SPM, Productivity improvement by SPM, Principles of SPM design.	4.1		
44		34	**Teachers Exam./ Doubt Clear/Revision**	**1004**		

Review:

Detailed Topic Plan:

Chapter No: 05 Chapter Name: Maintenance of Machine Tools:

5.1 Types of maintenance, Repair cycle analysis, Repair complexity, Maintenance manual, Maintenance records, Housekeeping. Introduction to Total Productive Maintenance (TPM).

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
45	9	45	Types of maintenance, Repair cycle analysis, Repair complexity, Maintenance manual, Maintenance records, Housekeeping. Introduction to Total Productive Maintenance (TPM).	5.1		
46	10	46	5.1 Types of maintenance, Repair cycle analysis, Repair complexity, Maintenance manual, Maintenance records, Housekeeping. Introduction to Total Productive Maintenance (TPM).	5.1		
47		47	5.1 Types of maintenance, Repair cycle analysis, Repair complexity, Maintenance manual, Maintenance records, Housekeeping. Introduction to Total Productive Maintenance (TPM).	5.1		
48		48	5.1 Types of maintenance, Repair cycle analysis, Repair complexity, Maintenance manual, Maintenance records, Housekeeping. Introduction to Total Productive Maintenance (TPM).	5.1		
49		49	5.1 Types of maintenance, Repair cycle analysis, Repair complexity, Maintenance manual, Maintenance records, Housekeeping. Introduction to Total Productive Maintenance (TPM).	5.1		
50		50	**Teachers Exam./ Doubt Clear/Revision**	1005		

Review:

10) Examination Schedule:

Sl No.	Particulars of Test	Schedule	Type
1	Weekly Test (2^{nd} Week onwards)	Wednesday (4^{th} Sem.) & Thursday (6^{th} sem.)	10 Short Questions (02 Marks):
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11) **Assignment Collection/ Evaluation:**

Sl No.	Assignment No.	Content	Schedule
1	Assignment-1	Long Questions 7 Nos.(10 Marks) Short Questions 6 Nos. (5 Marks)	3rd Week
2	Assignment-2	Long Questions 8 Nos.(10 Marks) Short Questions 6 Nos. (5 Marks)	6th Week
3	Assignment-3	Long Questions 11 Nos.(10 Marks) Short Questions 8 Nos. (5 Marks)	9th Week
4	Assignment-4	VST 100 Marks	10th/11th Week

S. Nahar
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28/03/22
Signature of Asst. HOD

28/03/2022
Signature of HOD

08/04/2022
Principal