Mechanical – 4th

— Silver Jubilee Year —
Nilachal Polytechnic
Achieving Excellence Together www.nilachalpolytechnic.ac.in

ନୀଳାଚଳ ପଲିଟେକ୍‌ନିକ୍
ଭୁବନେଶ୍ୱର

TEACHING-CUM-LESSON PLAN

1) **Subject Code: Theory 1**
2) **Subject Title: Theory of Machines**
3) **Semester:4th**
4) **Branch:Mechanical Enggineering**
5) **No. of Classes / Week: 06**
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	Text Book of Theory of Machine	R.S Khurmi	S.Chand	2008(14th)	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	Simple Mechanism	1.1	1.2		
ii	2	1	04	Simple Mechanism	1.3	1.4,1001	02.04.2022	
		2	02	Friction	2.1	2.1		
iii	3	2	06	Friction	2.1	2.4		
iv	4	2	06	Friction	2.4	2.7,1002	20.04.2022	
v	5	3	06	Power Transmission	3.1	3.6		
vi	6	3	06	Power Transmission	3.6	3.10		
vii	7	3	03	Power Transmission	3.10	1003	06.05.2022	
		4	03	Governor and Flywheel	4.1	4.3		
viii	8	4	06	Governor and Flywheel	4.3	1004	20.05.2022	
ix	9	5	06	Balancing of Machine	5.1	1005	27.05.2022	
x	10	6	06	Vibration of machine parts	6.1	1006	03.06.2022	
Total:		6	60					

9) **Detail Class wise Plan:**

Detailed Topic Plan:

Chapter No: 01 Chapter Name: Simple Mechanism

1.1 Link ,kinematic chain, mechanism, machine,1.2 Inversion, four bar link mechanism and its inversion,1.3 Lower pair and higher pair,1.4 Cam and followers

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	1	1	Introduction, Link ,kinematic chain,	1.1		
2		2	Link ,kinematic chain,	1.1		
3		3	mechanism, machine Inversion	1.1 1.2		
4		4	Inversion	1.2		
5		5	four bar link mechanism and its inversion	1.2		
6		6	four bar link mechanism and its inversion	1.2		
7	2	7	four bar link mechanism and its inversion	1.2		
8		8	Numerical Solve	1.2		
9		9	Lower pair and higher pair Cam and follower	1.3 1.4		
10		10	**Teachers Exam./ Doubt Clear/Revision:**	**1001**		

REVIEW:

Detailed Topic Plan:

Chapter No: 02 Chapter Name: Friction

2.1 Friction between nut and screw for square thread, screw jack ,2.2 Bearing and its classification, Description of roller, needle roller & ball bearings. ,2.3 Torque transmission in flat pivot& conical pivot bearings. ,2.4 Flat collar bearing of single and multiple types. ,2.5 Torque transmission for single and multiple clutches ,2.6 Working of simple frictional brakes. 2.7 Working of Absorption type of dynamometer

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
11	2	11	Friction between nut and screw for square thread, screw jack	2.1		
12		12	Friction between nut and screw for square thread, screw jack	2.1		
13	3	13	Friction between nut and screw for square thread, screw jack	2.1		

	3	14	Friction between nut and screw for square thread, screw jack	2.1		
		15	Numerical Solve	2.1		
ó		16	Bearing and its classification, Description of roller, needle roller& ball bearings.	2.2		
17		17	Torque transmission in flat pivot& conical pivot bearings	2.3		
18		18	Flat collar bearing of single and multiple types	2.4		
19	4	19	Numericals solve	2.4		
20		20	Torque transmission for single and multiple clutches	2.5		
21		21	Torque transmission for single and multiple clutches	2.5		
22		22	Numerical solve.	2.6		
23		23	Working of simple frictional brakes. Working of Absorption type of dynamometer	2.6 2.7		
24		24	**Teachers Exam./ Doubt Clear/Revision**	1002		

REVIEW:

Detailed Topic Plan:

Chapter No: 03 Chapter Name: Power Transmission

3.1 Concept of power transmission ,3.2 Type of drives, belt, gear and chain drive. 3.3 Computation of velocity ratio, length of belts (open and cross)with and without slip. 3.4 Ratio of belt tensions, centrifugal tension and initial tension. ,3.5 Power transmitted by the belt. 3.6 Determine belt thickness and width for given permissible stress for open and crossed belt considering centrifugal tension. 3.7 V-belts and V-belts pulleys. ,3.8 Concept of crowning of pulleys. 3.9 Gear drives and its terminology. ,3.10 Gear trains, working principle of simple, compound, reverted and epicyclic gear trains.

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
26	5	25	Concept of power transmission Type of drives, belt, gear and chain drive.	3.1 3.2		
27		26	Computation of velocity ratio, length of belts (open and cross)with and without slip.	3.3		
28		27	Computation of velocity ratio, length of belts (open and cross)with and without slip.	3.3		
29		28	Ratio of belt tensions, centrifugal tension and initial tension. Power transmitted by the belt.	3.4 3.5		
30		29	Determine belt thickness and width for given permissible stress for open and crossed belt considering centrifugal	3.6		

			tension			
31		30	Determine belt thickness and width for given permissible stress for open and crossed belt considering centrifugal tension	3.6		
32		31	Determine belt thickness and width for given permissible stress for open and crossed belt considering centrifugal tension	3.6		
33		32	Numerical solve GRC-1,4,7	3.6		
34	6	33	V-belts and V-belts pulleys. Concept of crowning of pulleys	3.7 3.8		
35		34	Concept of crowning of pulleys Numericals solve GRC-2	3.8		
36		35	Gear drives and its terminology.	3.9		
37		36	Gear trains, working principle of simple, compound, reverted and epicyclic gear trains	3.10		
38		37	working principle of simple, compound, reverted and epicyclic gear trains	3.10		
39	7	38	working principle of simple, compound, reverted and epicyclic gear trains	3.10		
40		39	**Teachers Exam./ Doubt Clear/Revision:**	1003		

REVIEW:

Detailed Topic Plan:

Chapter No: 04 Chapter Name: Governor and Flywheel

4.1 Function of governor ,4.2 Classification of governor ,4.3 Working of Watt, Porter, Proel and Hartnell governors. ,4.4 Conceptual explanation of sensitivity, stability and isochronisms. 4.5 Function of flywheel. ,4.6 Comparison between flywheel &governor. ,4.7 Fluctuation of energy and coefficient of fluctuation of speed.

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1		40	Function of governor	4.1		
2	7	41	Classification of governor Working of Watt, Porter, Proel and Hartnell governors	4.2 4.3		
3		42	Working of Watt, Porter, Proel and Hartnell governors	4.3		
4		43	Working of Watt, Porter, Proel and Hartnell governors	4.3		
5		44	Conceptual explanation of sensitivity,	4.4		

	8		stability and isochronisms			
		45	Function of flywheel. Comparison between flywheel &governor	4.5 4.6		
7		46	Fluctuation of energy and coefficient of fluctuation of speed.	4.7 4.8		
8		47	Numerical solve	4.8		
9		48	**Teachers Exam./ Doubt Clear/Revision:**	1004		

REVIEW:

Detailed Topic Plan:

Chapter No: 05 Chapter Name: Balancing of Machine

5.1 Concept of static and dynamic balancing. ,5.2 Static balancing of rotating parts. ,5.3 Principles of balancing of reciprocating parts. ,5.4 Causes and effect of unbalance. ,5.5 Difference between static and dynamic balancing

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	1	49	Concept of static and dynamic balancing. reciprocating parts.	5.1		
2	1	50	Static balancing of rotating parts	5.2		
3		51	Principles of balancing of	5.3		
4	1	52	Causes and effect of unbalance.	5.4		
5	1	53	Difference between static and dynamic balancing	5.5		
6	1	54	**Teachers Exam./ Doubt Clear/Revision**	1005		

Detailed Topic Plan:

Chapter No: 06 Chapter Name: Vibration of machine parts

6.1 Introduction to Vibration and related terms (Amplitude, time period and frequency, cycle)
6.2 Classification of vibration. ,6.3 Basic concept of natural, forced & damped vibration
6.4 Torsional and Longitudinal vibration. ,6.5 Causes & remedies of vibration.

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	1	1	Introduction to Vibration and related terms (Amplitude, time period and frequency, cycle)	6.1		
2	1	2	Classification of vibration	6.2		
3		3	Basic concept of natural, forced & damped vibration	6.3		
4	1	4	Torsional and Longitudinal vibration	6.4		
5	1	5	Causes & remedies of vibration	6.5		

6	1	6	Teachers Exam./ Doubt Clear/Revision	1006		

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

Subhadra P. Mohanty
Signature of Faculty

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

28/03/2022.
Signature of HOD

Ranjan 28/04/2022
Principal

TEACHING-CUM-LESSON PLAN

1) Subject Code: Th-2
2) Subject Title: Fluid Mechanics
3) Semester: 4th
4) Branch: Mechanical
5) No. of Classes / Week: 6
6) Pre Requisite for the Subject: NIL / YES, if YES, give details: Engineering Mechanics, Engineering Mathematics, Engg. Physics, Engg. Chemistry
7) Text Book to be referred by students:

Sl No.	Book	Author	Publication	Year (Edition)	Whether available in Library
i	Text Book of Fluid Mechanics & Hydraulic Machines (Ch. No.-1, 3, 5, 6, 7)	Dr. R K Bansal	S Chand Publication	Ninth Edition	Available
ii	Fluid Mechanics & Hydraulic Machines	A R Basu	Dhanpat Rai & Co.	First Edition	Available
iii					

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	01	06	Chapter-1	1.1	1.3	26.03.2022	
ii	2	02	06	Chapter-2	2.1	2.3		
iii	3	02	06		2.4	2.5	09.04.2022	
iv	4	03	06	Chapter-3	3.1	3.3		
v	5	03	06		3.3	3.5	23.04.2022	
vi	6	04	06	Chapter-4	4.1	4.3		
vii	7	04	04		4.3	4.4	05.05.2022	
		05	02	Chapter-5	5.1	5.3		
viii	8	05	02		5.4	5.7	10.05.2022	
		06	04	Chapter-6	6.1	6.5	14.05.2022	
ix	9	07	06	Chapter-7	7.1	7.2		
x	10	07	06		7.2	7.3	30.05.2022	
Total:		07	60					

9) **Detail Class wise Plan:**

Detailed Topic Plan:
Chapter No: 01 Chapter Name: Properties of Fluid
1.1 Define fluid
1.2 Description of fluid properties like Density, Specific weight, specific gravity, specific volume and solve simple problems.
1.3 Definitions and Units of Dynamic viscosity, kinematic viscosity, surface tension Capillary phenomenon

Sl No.	Week No.	Lect. No.	Topic to be Covered	Article No.	Date of Completion	Signature
01	01	01	Introduction to Fluid Mechanics Define fluid Description of fluid properties like 1. Density 2. Specific weight 3. Specific gravity 4. Specific volume	1.1,1.2		
02	01	02	Solve Simple Problems on Above 1. Density 2. Specific weight 3. Specific gravity 4. Specific volume	1.2		
03	01	03	Definitions and Units of Dynamic Viscosity Kinematic viscosity,Newton's Law of Viscosity	1.3		
04	01	04	Solve Simple Problems on Dynamic Viscosity Kinematic viscosity	1.3		
05	01	05	Definitions and Units of Surface Tension Capillary Phenomenon	1.3,1001		
06	01	06-Last Class	**Teachers Exam./ Doubt Clear/Revision:**	1001		

Detailed Topic Plan:
Chapter No: 2 Chapter Name: Fluid Pressure and its measurement
2.1 Definitions and units of fluid pressure, pressure intensity and pressure head.
2.2 Statement of Pascal's Law.
2.3 Concept of atmospheric pressure, gauge pressure, vacuum pressure and absolute pressure
2.4 Pressure measuring instruments Manometers (Simple and Differential)
2.4.1 Bourdon tube pressure gauge(Simple Numerical)
2.5 Solve simple problems on Manometer.

Sl No.	Week No.	Lect. No.	Topic to be Covered	Article No.	Date of Completion	Signature
01	02	7	Definitions and units of fluid pressure, pressure intensity and pressure head.	2.1		
02		8	Statement of Pascal's Law. Concept of atmospheric pressure, gauge pressure, vacuum pressure and absolute pressure	2.2 2.3		
03		9	vacuum pressure and absolute pressure Solve simple problems on Pressure head	2.3		
04		10	Pressure measuring instruments Manometers (Simple)	2.4		

05		11	Solve simple problems on Simple Manometer.	2.5		
06		12	Pressure measuring instruments Manometers (Simple)	2.4		
07	03	13	Solve simple problems on Simple Manometer.	2.5		
08		14	Pressure measuring instruments Manometers (Differential)	2.4		
09		15	Solve simple problems on Simple Manometer.	2.4,2.5		
10		16	Solve simple problems on Simple Manometer.	2.4,2.5		
11		17	Bourdon tube pressure gauge	2.4.1 2.5 1002		
12		18	**Teachers Exam./ Doubt Clear/Revision:**	1002		

Detailed Topic Plan:

Chapter No: 3 Chapter Name: Hydrostatics

3.1 Definition of hydrostatic pressure
3.2 Total pressure and centre of pressure on immersed bodies(Horizontal and Vertical Bodies)
3.3 Solve Simple problems.
3.4 Archimedes 'principle, concept of buoyancy, meta center and meta centric height (Definition only)
3.5 Concept of floatation

Sl No.	Week No.	Lect. No.	Topic to be Covered	Article No.	Date of Completion	Signature
01	04	19	Hydrostatics Definition of hydrostatic pressure Total pressure and center of pressure on immersed Vertical surface of Bodies	3.0 3.1 3.2		
02		20	Solve Simple problems.on Total pressure and center of pressure on immersed bodies(Horizontal and Vertical Bodies)	3.2,3.3		
03		21	Solve Simple problems. On Total pressure and center of pressure on immersed bodies(Horizontal and Vertical Bodies)	3.3		
04		22	Total pressure and center of pressure on immersed bodies Horizontal Surface	3.4		
05		23	Total pressure and center of pressure on immersed bodies Horizontal Surface	3.2 3.3		
06		24	Solve Simple problems. On Total pressure and center of pressure on immersed	3.3		
07	05	25	Archimedes 'principle	3.4		
08		26	concept of buoyancy, meta center and meta centric height(Definition only) Concept of floatation	3.4		
09		27	Problem on center of buoyancy, meta center and meta centric	3.4		
10		28	Problem on center of buoyancy, meta center and meta centric	3.3,3.4		
11		29	Concept of floatation	3.5 1003		
12		30	**Teachers Exam./ Doubt Clear/Revision:**	1003		

Detailed Topic Plan:
Chapter No: 4 Chapter Name: Kinematics of Flow
4.1 Types of fluid flow
4.2 Continuity equation(Statement and proof for one dimensional flow)
4.3 Bernoulli's theorem(Statement and proof) ,Applications and limitations of Bernoulli's theorem (Venturimeter, pitot tube)
4.4 Solve simple problems

Sl No.	Week No.	Lect. No.	Topic to be Covered	Article No.	Date of Completion	Signature
01	06	31	Types of fluid flow 1. Steady & Unsteady Flow 2. Uniform & Non uniform Flow 3. Laminar & Turbulent Flow	4.1		
02		32	Types of fluid flow 4. Compressible & Incompressible Flow 5. Rotational & Ire-rotational Flow 6. One, Two, Three Dimensional Flow	4.1		
03		33	Statement of Continuity Equation for One Dimensional Flow of Fluid & its Proof Definition of Discharge & its Unit	4.2		
04		34	Solve simple problems	4.4		
05		35	Assumptions taken ,State and Proof of Bernoulli's theorem	4.3		
06		36	Solve simple problems	4.4		
07	07	37	limitations of Bernoulli's theorem Applications of Bernoulli's theorem 1. Venturimeter , 2. Pitot tube 3. Orifice Meter Principle & Working of Venturimeter Derive of Expression for Discharge of Water through Venturimeter	4.3		
08		38	Solve simple problems on Venturimeter	4.3		
09		39	Principle & Working of Pitot tube Derive of Expression for Velocity of Water through Pitot tube Solve simple problems	4.4,1003		
10		40	**Teachers Exam./ Doubt Clear/Revision:**	1004		

Detailed Topic Plan:
Chapter No: 5 Chapter Name: Orifices, Notches & Weirs
5.1 Define orifice
5.2 Flow through orifice
5.3Orifices coefficient & the relation between the orifice coefficients
5.4 Classifications of notches & weirs
5.5 Discharge over a rectangular notch or weir
5.6 Discharge over a triangular notch or weir
5.7 Simple problems on above

Sl No.	Week No.	Lect. No.	Topic to be Covered	Article No.	Date of Completion	Signature
01	07	41	Define orifice Types of Orifice Flow through orifice and Point of Vena Contracta Definition Orifices coefficient & their relationship Classifications of notches & weirs	5.1 5.2		

			according to Shape/Size , Type of Shape opening	5.3 5.4		
02	07	42	Discharge over a rectangular notch or weir Simple problems on above	5.5		
03	08	43	Discharge over a triangular notch or weir	5.7,5.6,1005		
04	08	44	**Teachers Exam./ Doubt Clear/Revision:**	1005		

Detailed Topic Plan:
Chapter No: 6 Chapter Name: Flow Through pipes
6.1 Definition of pipe.
6.2 Loss of energy in pipes.
6.3 Head loss due to friction: Darcy's and Chezy's formula (Expression only)
6.4 Solve Problems using Darcy's and Chezy's formula.
6.5 Hydraulic gradient and total gradient line

Sl No.	Week No.	Lect. No.	Topic to be Covered	Article No.	Date of Completion	Signature
01	08	45	Flow through pipe Definition of pipe. Loss of energy in pipes. Head loss due to friction: Darcy's and Chezy's formula (Expression only)	6.0 6.1 6.2		
02		46	Solve Problems using Darcy's and Chezy's formula.	6.3,6.4		
03		47	Hydraulic gradient and total gradient line	6.5,1006		
04		48	**Teachers Exam./ Doubt Clear/Revision:**	1006		

Detailed Topic Plan:
Chapter No: 7 Chapter Name: Impact of Jet
7.1 Impact of jet on fixed and moving vertical flat plates
7.2 Derivation of work done on series of vanes and condition for maximum efficiency.
7.3 Impact of jet on moving curved vanes, illustration using velocity triangles, derivation of work done, efficiency

Sl. No.	Week No.	Lect. No.	Topic to be Covered	Article No.	Date of Completion	Signature
01	09	49	Impact of jets Impact of jet on fixed and moving vertical flat plates	7.0 7.1		
02		50	Derivation of work done on series of vanes and condition for maximum efficiency.	7.2		
03		51	Derivation of work done on series of vanes and condition for maximum efficiency.	7.2		
04		52	Impact of jet on moving curved vanes, illustration using velocity triangles, derivation of work done, efficiency.	7.3		
05		53	Impact of jet on moving curved vanes	7.3		
06		54	Impact of jet on moving curved vanes, illustration using velocity triangles, derivation of work done, efficiency.	7.3		
07		55	Impact of jet on moving curved vanes, illustration using velocity triangles, derivation of work done, efficiency.	7.3		
08		56	Impact of jet on moving curved vanes, illustration using velocity triangles,	7.3		

	10		derivation of work done, efficiency.			
09		57	Impact of jet on moving curved vanes, illustration using velocity triangles, derivation of work done, efficiency.	7.3		
10		58	Impact of jet on moving curved vanes, illustration using velocity triangles, derivation of work done, efficiency.	7.3		
11		59	Impact of jet on moving curved vanes, illustration using velocity triangles, derivation of work done, efficiency.	7.3,1007		
12		60	**Teachers Exam./ Doubt Clear/Revision:**	1007		

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

Signature of Faculty
26/03/22

Signature of Asst. HOD
26/03/22

Signature of HOD
28/03/2022

Principal
08/04/2022

TEACHING-CUM-LESSON PLAN

1) **Subject Code:TH-2**
2) **Subject Title:** MANUFACTURING TECHNOLOGY
3) **Semester:4TH**
4) **Branch:** MECHANICAL ENGINEERING
5) **No. of Classes / Week:** 06
6) **Pre Requisite for the Subject: NIL / YES, If YES, give details:**
7) **Text Book to be referred by students:**

Sl No.	Book	Author	Publication	Year (Edition)	Whether available in Library
i	Workshop technology	Hazra Choudhury Voll & II	MPP Pvt. Ltd.	9th	Yes
ii	Manufacturing Technology Reference book	P.N RAO	TMH	–	Yes
iii	Text Book of Workshop Technology	W.A.S Chapman Vol-I & II	–	–	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	03	Chapter 1	1.1	1.2	23.03.22	
		2	03	Chapter 2	2.1	2.3		
ii	2	2	03	Chapter 2	2.3	2.6	30.03.22	
		3	03	Chapter 3	3.1	3.1		
iii	3	3	03	Chapter 3	3.2	3.3		
iv	4	3	03	Chapter 3	3.3	3.4	17.04.22	
		4	03	Chapter 4	4.1	4.4		
v	5	4	03	Chapter 4	4.4	4.6	26.04.22	
		5	03	Chapter 5	5.1	5.3		
vi	6	5	03	Chapter 5	6.3	5.5	01.05.22	
		6	03	Chapter 6	6.1	6.2		
vii	7	6	03	Chapter 6	6.3	6.4	10.05.22	
viii	8	7	03	Chapter 7	7.1	7.2	17.05.22	
		8	03	Chapter 8	8.1	8.3		

ix	9	8	03	Chapter 8	8.4	8.4	24.05.22	
		9	03	Chapter 9	9.1	9.2		
x	10	9	03	Chapter 9	9.3	9.3	30.05.22	
		10	03	Chapter 10	10.1	10.1	03.06.22	
Total:10		10	60					

9) Detail Class wise Plan:

Detailed Topic Plan:

Chapter No: 01 Chapter Name: Tool Materials

Composition of various tool materials,Physical properties & uses of such tool materials.

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	01	1	Cutting Tool Materials (Decription and explanation of characteristics of ideal materials such as hot hardness ,wear resistance, Toughness, cost and easiness in fabrication)	1.1		
2		2	And uses such as (i) Carbon steels (ii) Medium alloy steels(iii) High speed steels The different tools materials properties, composition And uses such as (iv) Stellites (v) Cemented carbides. (vi) Ceramics. (vii) Diamonds. (viii) Abrasives,(ix)CBN	1.2		
3		**Last Class**	**Teachers Exam./ Doubt Clear/Revision:**	**1001**		

REVIEW:

Detailed Topic Plan:

Chapter No:02 Chapter Name: Cutting Tools

Cutting action of various and tools such as Chisel, hacksaw blade, dies and reamer,Turning tool geometry and purpose of tool angle, Machining process parameters (Speed, feed and depth of cut),Coolants and lubricants in machining and purpose

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	01	4	The Cutting Action of Hand Tools (To explain cutting action of various hand tools such as chisel, hack saw blade dies & reamer.)	2.1		
2		5	Turning tool geometry and purpose of tool angle	2.3		
3		6	Turning tool geometry and purpose of tool angle	2.3		

	02	7	Machining process parameters (Speed, feed and depth of cut)	2.5		
5		8	Coolants and lubricants in machining and purpose	2.6		
6		Last Class	**Teachers Exam./ Doubt Clear/Revision:**	**1002**		

REVIEW:

Detailed Topic Plan:

Chapter No: 03 Chapter Name: Lathe Machine

Construction and working of lathe and CNC lathe-Major components of a lathe and their function,Operations carried out in a lathe(Turning, thread cutting, taper turning,internal machining, parting off, facing, knurling) -Safety measures during machining,Capstan lathe-Difference with respect to engine lathe, Major components and their function,Define multiple tool holders,Turret Lathe-Difference with respect to capstan lathe,Major components and their function,Draw the tooling layout for preparation of a hexagonal bolt &bush.

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	02	10	Function of a Latheand CNC lathe Types of Lathe:speed lathe,engine lathe,bench lathe,Capstan andTurret lathe, Description and Functions of Various Lathe parts .i.e. Bed, Headstock, Tailstock Carriage,	3.1		
2		11	Description and Functions of Various Lathe parts: Feed Mechanism,Screw cutting Mechanism,Lathe Accessories and Attachments	3.1		
3		12	Lathe operation ,Centering,Turning,Taper turning,Thread cutting,Facing ,Internal thread cutting,Parting off,Knurling,Facing. Define ss &sc lathe. Capstan lathe:Difference between capstan and engine lathe	3.1		
4	03	13	principal parts of capstan lathe are :Head stock,cross slide toolpost,hexagonal turret,auxiliary slide,lathe bed,feed rod. Function of the principal parts of capstan lathe	3.2		
5		14	Capstan lathe mechanism(bar feeding mechanism) work holding device(Jaw chuck,collect chucks)	3.2		
6		15	Capstan lathe tools. Capstan lathe operation Cutting speed,Feed and depth of cut. ,Bar feeding mechanism	3.2		
7		16	Turret lathe(Diff between capstan and turret lathe) ,principal parts of turret lathe are(:Head stock,cross	3.3		

			slide toolpost,hexagonal turret,auxiliary slide,lathe bed,feed rod			
8		17	Turret lathe(Diff between capstan and turret lathe) , principal parts of turret lathe are(:Head stock,cross slide toolpost,hexagonal turret,auxiliary slide,lathe bed,feed rod	3.3		
9		18	Turret lathe(Diff between capstan and turret lathe) , principal parts of turret lathe are(:Head stock,cross slide toolpost,hexagonal turret,auxiliary slide,lathe bed,feed rod	3.3		
10	04	19	Turret lathe(Diff between capstan and turret lathe) ,principal parts of turret lathe are(:Head stock,cross slide toolpost,hexagonal turret,auxiliary slide,lathe bed,feed rod	3.3		
11		20	Production of aHexagonal bolt and bush, bar feeding mechanism	3.4		
12		**Last Class**	**Teachers Exam./ Doubt Clear/Revision:**	**1003**		

REVIEW:

Detailed Topic Plan:

Chapter No:04 Chapter Name: Shaper

Potential application areas of a shaper machine, Major components and their function,Explain the automatic able feed mechanism,Explain the construction &working of tool head,Explain the quick return mechanism through sketch,State the specification of a shaping machine.

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	04	22	Introduction of shaper. types of shaper-according to the type of mechanism used for giving reciprocating motion to the ram ,according to the position and travel of ram,according to the type of design of the table,according to the type of cutting stroke. principal parts of shaper size .	4.1 4.2		
2		23	shaper mechanism-Crank and slotted mechanism,Whitworth quick return mechanism) . Automatic table feed mechanism.	4.3		
3		24	Automatic table feed mechanism Work holding devices,Shaper operation(maching horizontal surface&Vertical surface)	4.3 4.4		
4	05	25	Work holding devices,Shaper operation(maching horizontal surface&Vertical surface)	4.4 4.6		

			Specification of shaper &cutting speed, feed &depth of cut.			
5		26	Work holding devices,Shaper operation(maching horizontal surface&Vertical surface) Specification of shaper &cutting speed, feed &depth of cut.	4.4 4.6		
6		**Last Class**	**Teachers Exam./ Doubt Clear/Revision:**	**1004**		

REVIEW:

Detailed Topic Plan:

Chapter No: 05 Chapter Name: Planning Machine Application area of a planer and its difference with respect to shaper, Major components and their functions,The table drive mechanism,Working of tool and tool support,Clamping of work through sketch.

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	05	28	Introduction of planning machine,size of planer Planing machine parts(bed,table,tool head,cross rail,housing,driving and feed mechanism)	5.1 5.2		
2		29	Planer mechanism-Table drive mechanism.	5.3		
3		30	Open &cross belt drive .	5.3		
4	06	31	Work holding devices.	5.3		
5		32	planer tools. cutting speed,feed &depth of cut,shaper vs planer.	5.4,5.5		
6		**Last Class**	**Teachers Exam./ Doubt Clear/Revision:**	**1005**		

REVIEW:

Detailed Topic Plan:

Chapter No:06 Chapter Name: Milling Machine

Types of milling machine and operations performed by them and also same for CNC milling machine,Explain work holding attachment,Construction & working of simple dividing head, universal dividing head,Procedure of simple and compound indexing,Illustration of different indexing methods

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	06	34	Def of milling machine.Types of milling machine(1 Column&Knee type.2.Manufacturing of fixed bed type.3.Planer type.4.Special type.	6.1 6.2		

			1Milling machine attachments.milling cutters.			
2		35	Types of milling machine(1 Column&Knee type.2.Manufacturing of fixed bed type.3.Planer type.4.Special type.	6.2		
3		36	Milling machine attachments.milling cutters.	6.2		
4	07	37	Construction &Working of simple dividing head,universal dividing head.	6.3		
5		38	Construction &Working of simple dividing head,universal dividing head.	6.3		
6		39	Def of indexing,Dividing heads(simple dividing head,Universa dividing head) .	6.4		
7		40	Indexing method-Simple,Compound&diff indexing	6.4		
8		41	Indexing method-Simple,Compound&diff indexing	6.4		
9		**Last Class**	**Teachers Exam./ Doubt Clear/Revision:**	**1006**		

REVIEW:

Detailed Topic Plan:

Chapter No: 7 Chapter Name: Slotter

Major components and their function,Construction and working of slotter machine,Tools used in slotter

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	08	43	Introduction about slotting machine,9.2-Types of slotting machine . Major components of sloter-base ,column, saddle, cross slide, rotating table, ram ,feed mechanism ,&their function	7.1		
2		44	Construction &working of slotter-whitworth quick return mechanism. Tools used in slotter.	7.1 7.2		
3		**Last Class**	**Teachers Exam./ Doubt Clear/Revision:**	**1007**		

REVIEW

Detailed Topic Plan:

Chapter No: 08 Chapter Name: Grinding

Significance of grinding operations,Manufacturing of grinding wheels,Criteria for selecting of grinding wheels,Specification of grinding wheels with example Working of (Cylindrical Grinder,Surface

,Centreless Grinder)

SI No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	08	46	introduction of grinding machine-Rough&precision grinders.	8.1		
2		47	manufacturing of grinding wheels-Abrasives(natural,artificial),bonds&bonding process,Grit grade&structure.	8.2		
3		48	Criteria for selecting a grinding wheels-standard marking system.	8.3		
4	09	49	Working of Cylindrical grinder,surface grinder	8.4		
5		50	surface grinder,enterless grinder.	8.4		
6		Last Class	**Teachers Exam./ Doubt Clear/Revision:**	1008		

REVIEW:

Detailed Topic Plan:

Chapter No: 09 Chapter Name: Internal Machining operations

Classification of drilling machines,Working of (Bench drilling machine ,Pillar drilling machine , Radial drilling machine) Boring (Basic Principle of Boring , Different between Boring and drilling), Broaching (Types of Broaching(pull type, push type) , Advantages of Broaching and applications).

SI No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	09	52	ntroduction about drilling machine Types of drilling machine	9.1		
2		53	Working of Bench drilling,pillar,radial drilling machine.	9.1		
3		54	Def of boring,types of boring machine ,Basic principle of boring,Difference between boring&drilling.	9.2		
4	10	55	Def of broaching,ypes of broaching(pull tupe,push type.	9.3		
5		56	Advantage of broaching&application.	9.3		
6		Last Class	**Teachers Exam./ Doubt Clear/Revision:**	1009		

REVIEW:

Detailed Topic Plan:

Chapter No: 10 Chapter Name: Surface finish, lapping

Definition of Surface finish,Description of lapping& explain their specific cutting.

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	10	58	Surface finishing operation process-	10.1		
2		59	Lapping,Honing,Superfinishing.	10.1		
3		Last Class	Teachers Exam./ Doubt Clear/Revision:	1010		

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

S. Nath
Signature of Faculty

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

28/03/2022.
Signature of HOD

08/04/2022
Principal

TEACHING-CUM-LESSON PLAN

1) Subject Code:Th-4
2) Subject Title: Thermal Engg-II
3) Semester: 4th
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
   - Basic knowledge of all the thermodynamic process and ideal gas law
7) Text Book to be referred by students:

Sl No.	Book	Author	Publication	Year (Edition)	Whether available in Library
i	Thermal Engineering	R.S. Khurmi	S.Chand	2012	YES
ii	Thermal Engineering	Mahesh M Rathore	TMH	2015(13th)	YES

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	1	1	06	Performance of I. C engine	1.1	1.3		
ii	2	1	02		1.3	1001	28.03.22	
		2	04	Air Compressor	2.1	2.3		
iii	3	2	06		2.4	2.6		
iv	4	2	02		2.6	1002	14.04.22	
		3	04	Properties of Steam	3.1	3.3		
v	5	3	06		3.4	3.6		
vi	6	3	02		3.7	3.8,1003	30.04.22	
		4	04	Steam Generator	4.1	4.3		
vii	7	4	06		4.4	4.5		
viii	8	4	02		4.6	1004	13.05.22	
		5	04	Vapour power cycle	5.1	5.2		
ix	9	5	06		5.3	5.4,1005	27.05.22	
x	10	6	06	Heat Transfer	6.1	6.5,1006	03.06.22	
Total:		6	60					

9) **Detail Class wise Plan:**

Detailed Topic Plan:

Chapter No: 01 Chapter Name:Performance of I. C engine

1.1Define mechanical efficiency, Indicated thermal efficiency, Relative Efficiency, brake thermal efficiency overall efficiency Mean effective pressure &specific fuel consumption. 1.2 Define air-fuel ratio & calorific value of fuel. 1.3 Work out problems to determine efficiencies & specific fuel consumption.

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	1	1	Define mechanical efficiency, Indicated thermal efficiency	1.1		
2		2	, Relative Efficiency, brake thermal efficiency overall efficiency	1.1		
3		3	Mean effective pressure &specific fuel consumption	1.1		
4		4	Define air-fuel ratio & calorific value of fuel.	1.2		
5		5	Work out problems to determine efficiencies & specific fuel consumption.	1.3		
6		6	Work out problems to determine efficiencies & specific fuel consumption.	1.3		
7	2	7	Work out problems to determine efficiencies & specific fuel consumption.	1.3		
8		8	**Teachers Exam./ Doubt Clear/Revision**	1001		

Review:

Detailed Topic Plan:

Chapter No: 02 Chapter Name: Air Compressor

2.1 Explain functions of compressor & industrial use of compressor air, 2.2 Classify air compressor & principle of operation. ,2.3 Describe the parts and working principle of reciprocating Air compressor. ,2.4 Explain the terminology of reciprocating compressor such as bore, stroke, pressure ratio free air delivered & Volumetric efficiency. ,2.5 Derive the work done of single stage & two stage compressor with and without clearance. ,2.6 Solve simple problems (without clearance only)

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	2	9	Explain functions of compressor & industrial use of compressor air	2.1		
2		10	Classify air compressor & principle of operation.	2.2		
3		11	Describe the parts and working principle of reciprocating Air compressor	2.3		
4		12	Explain the terminology of reciprocating compressor such as bore, stroke, pressure ratio free air delivered &Volumetric	2.4		

			efficiency			
5	3	13	Derive the work done of single stage with and without clearance	2.5		
6		14	Solve simple problems single stage without clearance	2.6		
7		15	Derive the work done of two stage compressor with and without clearance.	2.5		
8		16	Derive the work done of two stage compressor with and without clearance	2.5		
9		17	Solve simple problems two stage without clearance	2.6		
10		18	Solve simple problems single stage without clearance	2.6		
11	4	19	Solve simple problems two stage without clearance	2.6		
12		20	**Teachers Exam./ Doubt Clear/Revision**	1002		

Review:

Detailed Topic Plan:

Chapter No:03 Chapter Name: Properties of Steam

3.1 Difference between gas & vapours. , 3.2 Formation of steam., 3.3 Representation on P-V, T-S, H-S, & T-H diagram. , 3.4 Definition & Properties of Steam. , 3.5 Use of steam table & mollier chart for finding unknown properties. , 3.6 Non flow & flow process of vapour. , 3.7 P-V, T-S & H-S, diagram, 3.8 Determine the changes in properties & solve simple numerical.

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	4	21	Difference between gas & vapours, Formation of steam	3.1,3.2		
2		22	Formation of steam	3.2		
3		23	Representation on P-V, T-S, H-S, & T-H diagram.	3.3		
4		24	Definition & Properties of Steam	3.4		
5	5	25	Use of steam table & mollier chart for finding unknown properties.	3.5		
6		26	Use of steam table & mollier chart for finding unknown properties.	3.5		
7		27	Non flow & flow process of vapour, P-V, T-S & H-S, diagram, Determine the changes in properties	3.6, 3.7, 3.8		
8		28	Non flow & flow process of vapour, P-V, T-S & H-S, diagram,	3.6, 3.7,		

			Determine the changes in properties	3.8		
9		29	solve simple numerical	3.8		
10		30	solve simple numerical	3.8		
11	6	31	solve simple numerical	3.8		
12		32	**Teachers Exam./ Doubt Clear/Revision**	3.8,1003		

Review:

Detailed Topic Plan:

Chapter No: 04 Chapter Name: Steam Generator

4.1 Classification & types of Boiler. ,4.2 Important terms for Boiler. ,4.3 Comparison between fire tube & Water tube Boiler. ,4.4 Description & working of common boilers (Cochran, Lancashire, Babcock & Wilcox Boiler) ,4.5 Boiler Draught (Forced, induced & balanced) ,4.6 Boiler mountings & accessories.

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	6	33	Classification & types of Boiler	4.1		
2		34	Important terms for Boiler	4.2		
3		35	Comparison between fire tube & Water tube Boiler.	4.3		
4		36	Description & working of common boilers Cochran	4.4		
5	7	37	Description & working of common boilers Lancashire,	4.4		
6		38	Description & working of common boilers, Babcock & Wilcox Boiler	4.4		
7		39	Boiler Draught (Forced, induced & balanced)	4.5		
8		40	Boiler mountings & accessories.	4.6		
9		41	Boiler mountings & accessories.	4.6		
10		42	Boiler mountings & accessories.	4.6		
11	8	43	Boiler mountings & accessories.	4.6		
12		44	**Teachers Exam./ Doubt Clear/Revision**	1004		

Review:

Detailed Topic Plan:

Chapter No: 05 Chapter Name:

5.1 Carnot cycle with vapour. ,5.2 Derive work & efficiency of the cycle. , 5.3 Rankine cycle. 5.3.1 Representation in P-V, T-S & h-s diagram. ,5.3.2 Derive Work & Efficiency. , 5.3.3 Effect of

Various end conditions in Rankine cycle. , 5.3.4 Reheat cycle & regenerative Cycle. , 5.4 Solve simple numerical on Carnot vapour Cycle & Rankine Cycle.

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	08	45	Derive work & efficiency of Carnot cycle with vapour	5.1,5.2		
2		46	Solve simple numerical on Carnot vapour Cycle	5.4		
3		47	Rankine cycle, Representation in P-V, T-S & h-s diagram	5.3,5.3.1		
4		48	Derive Work & Efficiency of Rankine cycle	5.3.2		
5	9	49	Effect of Various end conditions in Rankine cycle. ,	5.3.3		
6		50	Reheat cycle & regenerative Cycle	5.3.4		
7		51	Reheat cycle & regenerative Cycle	5.3.4		
8		52	Solve simple numerical on Carnot vapour Cycle & Rankine Cycle.	5.4		
9		53	Solve simple numerical on Carnot vapour Cycle & Rankine Cycle.	5.4		
10		54	Solve simple numerical on Carnot vapour Cycle & Rankine Cycle	5.4		
11	10	55	Solve simple numerical on Carnot vapour Cycle & Rankine Cycle	5.4		
12		56	**Teachers Exam./ Doubt Clear/Revision Doubt Clear and Revision of topics**	5.4,1005		

Review:

Detailed Topic Plan:

Chapter No: 06 Chapter Name: Heat Transfer

6.1 Modes of Heat Transfer (Conduction, Convection, Radiation). , 6.2 Fourier law of heat conduction and thermal conductivity (k). ,6.3 Newton's laws of cooling. ,6.4 Radiation heat transfer (Stefan, Boltzmann & Kirchhoff's law) only statement, no derivation & no numerical problem. ,6.5 Black body Radiation, Definition of Emissivity, absorptivity, & transmissibility

Sl No.	Week No.	Lecture No.	Topic to be Covered	Article No.	Date of Completion	Signature
1	10	57	Modes of Heat Transfer Conduction, Convection, Radiation	6.1		
2		58	Fourier law of heat conduction and thermal conductivity (k), Newton's laws of cooling	6.2,6.3		
3		59	Radiation heat transfer (Stefan, Boltzmann & Kirchhoff's law) only	6.4,6.5		

			statement, Black body Radiation, Definition of Emissivity, absorptivity, & transmissibility			
4		60	**Teachers Exam./ Doubt Clear/Revision**	1006		

Review:

10) Examination Schedule:

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

Hrishikesh Mishra 26/03/22
Signature of Faculty

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

28/03/2022
Signature of HOD

08/04/2022
Principal