

**GOVERNMENT POLYTECHNIC, NUAPADA**  
**Academic Lesson Plan for Winter semester- 2021**

Name of the teaching faculty: Er. Banamali Deep  
 Semester: 3rd  
 No. of periods per week: 4  
 End semester exam: 80  
 Total Marks: 100

Department: Mechanical Engineering  
 Subject: Engineering Material  
 Total Periods: 60  
 Class test: 20

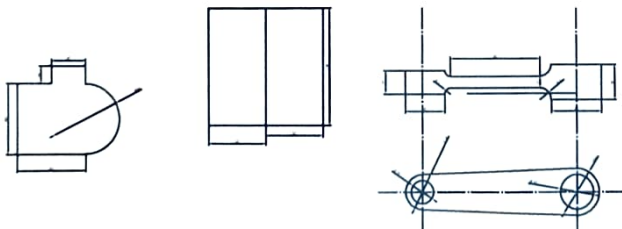
Sl. No.	Week	Period	Topic to be covered
1.	1 <sup>st</sup>	1 <sup>st</sup>	Explain about engineering and engineers
2.		2 <sup>nd</sup>	Explain about material and it's type
3.		3 <sup>rd</sup>	Ferrous and non ferrous materials
4.		4 <sup>th</sup>	Properties of material chemical, mechanical, physical
5.	2 <sup>nd</sup>	1 <sup>st</sup>	Material reliability and safety
6.		2 <sup>nd</sup>	Alloy
7.		3 <sup>rd</sup>	Ferrous materials and alloys
8.		4 <sup>th</sup>	Characteristics ana application of ferrous materials
9.	3 <sup>rd</sup>	1 <sup>st</sup>	Carbon steel
10.		2 <sup>nd</sup>	Medium carbon steel and high carbon steel
11.		3 <sup>rd</sup>	Do
12.		4 <sup>th</sup>	Alloy steel, low alloys steel
13.	4 <sup>th</sup>	1 <sup>st</sup>	High alloy steel, medium alloy steel
14.		2 <sup>nd</sup>	Iron carbon Dogram discuss
15.		3 <sup>rd</sup>	Concept and phase diagram of curves
16.		4 <sup>th</sup>	Features of iron carbon diagram
17.	5 <sup>th</sup>	1 <sup>st</sup>	Micro constitute of iron and steel
18.		2 <sup>nd</sup>	Definition of crystal and concept
19.		3 <sup>rd</sup>	Crystal imperfections
20.		4 <sup>th</sup>	Ideal crystal and crystal imperfections
21.	6 <sup>th</sup>	1 <sup>st</sup>	Classification of imperfections line defects, surface and volume
22.		2 <sup>nd</sup>	Vacancies and types of cause
23.		3 <sup>rd</sup>	Edge dislocation and screw dislocation
24.		4 <sup>th</sup>	Effects of imperfections and materials properties
25.	7 <sup>th</sup>	1 <sup>st</sup>	Do
26.		2 <sup>nd</sup>	Heat treatment
27.		3 <sup>rd</sup>	Annealing, normalised, hardening and tempering
28.		4 <sup>th</sup>	Do
29.	8 <sup>th</sup>	1 <sup>st</sup>	Do
30.		2 <sup>nd</sup>	Purposes of heat treatment
31.		3 <sup>rd</sup>	Process of heat treatment
32.		4 <sup>th</sup>	Stress relieving measure
33.	9 <sup>th</sup>	1 <sup>st</sup>	Carburizing and nitriding
34.		2 <sup>nd</sup>	Do
35.		3 <sup>rd</sup>	Do
36.		4 <sup>th</sup>	Do
37.	10 <sup>th</sup>	1 <sup>st</sup>	Effects of heat treatment
38.		2 <sup>nd</sup>	Harden ability of steel
39.		3 <sup>rd</sup>	Do

40.		4 <sup>th</sup>	Do
41.	11 <sup>th</sup>	1 <sup>st</sup>	Alloy
42.		2 <sup>nd</sup>	Non-ferrous alloy meaning
43.		3 <sup>rd</sup>	Composition and use of duralium
44.		4 <sup>th</sup>	Copper alloys composition and usage
45.	12 <sup>th</sup>	1 <sup>st</sup>	Alluminium brass, tin Babbitt, phosphorus
46.		2 <sup>nd</sup>	Predominating elements of lead alloys, Zinc alloys and Nickel alloys
47.		3 <sup>rd</sup>	Do
48.		4 <sup>th</sup>	Do
49.	13 <sup>th</sup>	1 <sup>st</sup>	Do
50.		2 <sup>nd</sup>	Low alloy materials like P-91, P-22 for power plants and other
51.		3 <sup>rd</sup>	Do
52.		4 <sup>th</sup>	Do
53.	14 <sup>th</sup>	1 <sup>st</sup>	Do
54.		2 <sup>nd</sup>	Do
55.		3 <sup>rd</sup>	High alloy Material like stainless steel
56.		4 <sup>th</sup>	Low alloy material like p-99, p-22
57.	15 <sup>th</sup>	1 <sup>st</sup>	Meaning of Bearing
58.		2 <sup>nd</sup>	Function and uses of Bearing and application
59.		3 <sup>rd</sup>	Polymer, thermosetting poly thermo plastic polymer
60.		4 <sup>th</sup>	Meaning of composite and ceramic

The lesson plan prepared by the concerned faculty

*Banamali Deep*  
Banamali Deep

PTGF, MECHANICAL DEPARTMENT



**GOVERNMENT POLYTECHNIC, NUAPADA**  
**Academic Lesson Plan for Winter semester- 2021**

Name of the teaching faculty: Er. Banamali Deep

Department: Mechanical Engineering

Semester: 5th

Subject: CAD/CAM Lab

No. of periods per week: 4

Total Periods: 60

End semester exam: 50

Session I: 50

Total Marks: 100

Sl. No.	Week	Period	Topic to be covered
1.	1 <sup>st</sup>	1 <sup>st</sup>	Introduction to CAD CAM
2.		2 <sup>nd</sup>	Definition of CAD and CAM
3.		3 <sup>rd</sup>	Making of straight line polygon , circles etc
4.		4 <sup>th</sup>	Take dimensions
5.	2 <sup>nd</sup>	1 <sup>st</sup>	2D Drawings of Rectangle, circle, polygon and its dimensions
6.		2 <sup>nd</sup>	Do
7.		3 <sup>rd</sup>	Do
8.		4 <sup>th</sup>	Connecting rod draw
9.	3 <sup>rd</sup>	1 <sup>st</sup>	Do
10.		2 <sup>nd</sup>	Do
11.		3 <sup>rd</sup>	Do
12.		4 <sup>th</sup>	Do
13.	4 <sup>th</sup>	1 <sup>st</sup>	Do
14.		2 <sup>nd</sup>	Print out the diagram and make screw jack
15.		3 <sup>rd</sup>	Definition and meaning of screw jack
16.		4 <sup>th</sup>	Do
17.	5 <sup>th</sup>	1 <sup>st</sup>	Do
18.		2 <sup>nd</sup>	Do
19.		3 <sup>rd</sup>	Do
20.		4 <sup>th</sup>	Do
21.	6 <sup>th</sup>	1 <sup>st</sup>	Do
22.		2 <sup>nd</sup>	Do
23.		3 <sup>rd</sup>	Do
24.		4 <sup>th</sup>	Do
25.	7 <sup>th</sup>	1 <sup>st</sup>	Print the orthographic view from the above assembled 3D
26.		2 <sup>nd</sup>	Machine and it's meaning
27.		3 <sup>rd</sup>	Why machine is needed
28.		4 <sup>th</sup>	Study of CNC machine
29.	8 <sup>th</sup>	1 <sup>st</sup>	Study of CNC Milling
30.		2 <sup>nd</sup>	Do
31.		3 <sup>rd</sup>	Do
32.		4 <sup>th</sup>	Do
33.	9 <sup>th</sup>	1 <sup>st</sup>	Do
34.		2 <sup>nd</sup>	Do
35.		3 <sup>rd</sup>	Do
36.		4 <sup>th</sup>	Do
37.	10 <sup>th</sup>	1 <sup>st</sup>	Do
38.		2 <sup>nd</sup>	Study of international codes G-code and m-code
39.		3 <sup>rd</sup>	Do

40.		4 <sup>th</sup>	Do
41.	11 <sup>th</sup>	1 <sup>st</sup>	Do
42.		2 <sup>nd</sup>	Dimensions method
43.		3 <sup>rd</sup>	Editing the programme in the CNC MACHINES discuss
44.		4 <sup>th</sup>	Do
45.	12 <sup>th</sup>	1 <sup>st</sup>	Do
46.		2 <sup>nd</sup>	Some exercise
47.		3 <sup>rd</sup>	Printed the program and make the CNC machine
48.		4 <sup>th</sup>	Study of mirror and eraser
49.	13 <sup>th</sup>	1 <sup>st</sup>	Giving colour to object
50.		2 <sup>nd</sup>	Do
51.		3 <sup>rd</sup>	Do
52.		4 <sup>th</sup>	Do
53.	14 <sup>th</sup>	1 <sup>st</sup>	Do
54.		2 <sup>nd</sup>	Do
55.		3 <sup>rd</sup>	Do
56.		4 <sup>th</sup>	Explain about CNC turning machine
57.	15 <sup>th</sup>	1 <sup>st</sup>	Do
58.		2 <sup>nd</sup>	Do
59.		3 <sup>rd</sup>	Do
60.		4 <sup>th</sup>	Do

The lesson plan prepared by the concerned faculty

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PTGF, MECHANICAL DEPARTMENT

**GOVERNMENT POLYTECHNIC, NUAPADA**  
**Academic Lesson Plan for Winter semester- 2021**

Name of the teaching faculty: Er. Siddhant Singh Babu  
 Semester: 5th  
 No. of periods per week: 4  
 End semester exam: 50  
 Total Marks: 75

Department: Mechanical Engineering  
 Subject: Hydraulic Machine Lab  
 Total Periods: 60  
 Sessional: 25

Sl. No.	Week	Period	Topic to be covered
1.	1 <sup>st</sup>	1 <sup>st</sup>	Performance test on impulse turbine
2.		2 <sup>nd</sup>	and to find out the efficiency
3.		3 <sup>rd</sup>	Study of characteristic graph
4.		4 <sup>th</sup>	Animation view of working of pelton wheel turbine
5.	2 <sup>nd</sup>	1 <sup>st</sup>	Performance test on Kaplan turbine
6.		2 <sup>nd</sup>	and to find out the efficiency
7.		3 <sup>rd</sup>	Study of characteristic graph
8.		4 <sup>th</sup>	Animation view of working of kaplan turbine
9.	3 <sup>rd</sup>	1 <sup>st</sup>	Performance test on Francis turbine
10.		2 <sup>nd</sup>	and to find out the efficiency
11.		3 <sup>rd</sup>	Study of characteristic graph
12.		4 <sup>th</sup>	Animation view of working of francis turbine
13.	4 <sup>th</sup>	1 <sup>st</sup>	Performance test on centrifugal pump
14.		2 <sup>nd</sup>	Findout the power required
15.		3 <sup>rd</sup>	and to find out the characteristic curves
16.		4 <sup>th</sup>	Animation view of working of centrifugal pump
17.	5 <sup>th</sup>	1 <sup>st</sup>	Direct operation of single acting pneumatic cylinder.
18.		2 <sup>nd</sup>	Direct operation of double acting pneumatic cylinder
19.		3 <sup>rd</sup>	Study of different connection in single acting pneumatic cylinder
20.		4 <sup>th</sup>	Study of different connection in double acting pneumatic cylinder
21.	6 <sup>th</sup>	1 <sup>st</sup>	Operating double acting pneumatic cylinder
22.		2 <sup>nd</sup>	with quick exhaust valve
23.		3 <sup>rd</sup>	Meter-in connection
24.		4 <sup>th</sup>	Meter-out connection
25.	7 <sup>th</sup>	1 <sup>st</sup>	Speed control double acting pneumatic cylinder
26.		2 <sup>nd</sup>	using metering in circuits
27.		3 <sup>rd</sup>	metering out circuits.
28.		4 <sup>th</sup>	Animation view of actual working
29.	8 <sup>th</sup>	1 <sup>st</sup>	Direct operation of single acting hydraulic cylinder
30.		2 <sup>nd</sup>	double acting hydraulic cylinder
31.		3 <sup>rd</sup>	Connection establishment
32.		4 <sup>th</sup>	Meter-in and out connection
33.	9 <sup>th</sup>	1 <sup>st</sup>	Direct operation of hydraulic motor
34.		2 <sup>nd</sup>	Study of different parts
35.		3 <sup>rd</sup>	Connection establishment
36.		4 <sup>th</sup>	Animation view of its working
37.	10 <sup>th</sup>	1 <sup>st</sup>	Speed control double acting hydraulic cylinder

38.		2 <sup>nd</sup>	using metering in
39.		3 <sup>rd</sup>	& metering out circuits.
40.		4 <sup>th</sup>	Connection establishment
41.	11 <sup>th</sup>	1 <sup>st</sup>	Viva voce test-1 (experiment-1)
42.		2 <sup>nd</sup>	Viva voce test-1 (experiment-2)
43.		3 <sup>rd</sup>	Viva voce test-1 (experiment-3)
44.		4 <sup>th</sup>	Viva voce test-1 (experiment-4)
45.	12 <sup>th</sup>	1 <sup>st</sup>	Viva voce test-1 (experiment-5)
46.		2 <sup>nd</sup>	Viva voce test-1 (experiment-6)
47.		3 <sup>rd</sup>	Viva voce test-1 (experiment-7)
48.		4 <sup>th</sup>	Viva voce test-1 (experiment-8)
49.	13 <sup>th</sup>	1 <sup>st</sup>	Viva voce test-1 (experiment-9)
50.		2 <sup>nd</sup>	Viva voce test-1 (experiment-10)
51.		3 <sup>rd</sup>	Record checking of the students 1
52.		4 <sup>th</sup>	Record checking of the students 2
53.	14 <sup>th</sup>	1 <sup>st</sup>	Study of Application of turbines by using smart class room
54.		2 <sup>nd</sup>	Study of Application of pump by using smart class room
55.		3 <sup>rd</sup>	Study of Application of hydraulic system by using smart class room
56.		4 <sup>th</sup>	Study of Application of pneumatic system by using smart class room
57.	15 <sup>th</sup>	1 <sup>st</sup>	Grand viva voce test- 1
58.		2 <sup>nd</sup>	Grand viva voce test- 2
59.		3 <sup>rd</sup>	Record submission by student
60.		4 <sup>th</sup>	Record checking and final Marking

The lesson plan prepared by the concerned faculty

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PTGF, MECHANICAL DEPARTMENT

**GOVERNMENT POLYTECHNIC, NUAPADA**  
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Name of the teaching faculty: Er. Siddhant Singh Babu  
Semester: 5th  
No. of periods per week: 4  
End semester exam: 80  
Total Marks: 100

Department: Mechanical Engineering  
Subject: Hydraulic Machine & industrial fluid power  
Total Periods: 60  
Class test: 20

Sl. No.	Week	Period	Topic to be covered
1.	1 <sup>st</sup>	1 <sup>st</sup>	Definition and classification of turbines
2.		2 <sup>nd</sup>	Impulse turbine with parts involved
3.		3 <sup>rd</sup>	Working of impulse turbine-Pelton wheel turbine
4.		4 <sup>th</sup>	Velocity diagram, working principle
5.	2 <sup>nd</sup>	1 <sup>st</sup>	Derivation of work done and efficiency
6.		2 <sup>nd</sup>	Solved problems on pelton wheel turbine
7.		3 <sup>rd</sup>	Study of reaction turbines-fransis turbine
8.		4 <sup>th</sup>	Working of fransis turbine with parts
9.	3 <sup>rd</sup>	1 <sup>st</sup>	Velocity diagram, working principle
10.		2 <sup>nd</sup>	Derivation of work done and efficiency
11.		3 <sup>rd</sup>	Solved problems on fransis turbine
12.		4 <sup>th</sup>	Study of reaction turbines-kaplan turbine
13.	4 <sup>th</sup>	1 <sup>st</sup>	kaplan turbine with parts involved
14.		2 <sup>nd</sup>	Working of turbine-kaplan turbine
15.		3 <sup>rd</sup>	Velocity diagram, working principle
16.		4 <sup>th</sup>	Derivation of work done and efficiency
17.	5 <sup>th</sup>	1 <sup>st</sup>	Solved problems on kaplan turbine
18.		2 <sup>nd</sup>	Comparison between impulse vs reaction turbine
19.		3 <sup>rd</sup>	All the efficiencies involved in turbines
20.		4 <sup>th</sup>	Semester based question solved
21.	6 <sup>th</sup>	1 <sup>st</sup>	Definition of pumps, classification of pumps
22.		2 <sup>nd</sup>	Centrifugal pumps working principle
23.		3 <sup>rd</sup>	Different types of head used
24.		4 <sup>th</sup>	Parts involved in centrifugal pump
25.	7 <sup>th</sup>	1 <sup>st</sup>	Derivation of work done and efficiency
26.		2 <sup>nd</sup>	Solved problems on pumps
27.		3 <sup>rd</sup>	Reciprocating pumps ,head used in it
28.		4 <sup>th</sup>	Working of single acting reciprocating pump
29.	8 <sup>th</sup>	1 <sup>st</sup>	Derivation of power required
30.		2 <sup>nd</sup>	Solved problems on pumps
31.		3 <sup>rd</sup>	Working of double acting reciprocating pump
32.		4 <sup>th</sup>	Derivation of power required
33.	9 <sup>th</sup>	1 <sup>st</sup>	Solved problems on pumps
34.		2 <sup>nd</sup>	Concept of slip, negative slip
35.		3 <sup>rd</sup>	Relationship between slip and discharge
36.		4 <sup>th</sup>	Hydraulic system, its merit and demerits
37.	10 <sup>th</sup>	1 <sup>st</sup>	Pressure control valves ,its types
38.		2 <sup>nd</sup>	Pressure relief valves, its types
39.		3 <sup>rd</sup>	Pressure regulation valves and its types

40.		4 <sup>th</sup>	Direction control valves and its types
41.	11 <sup>th</sup>	1 <sup>st</sup>	Flow control valves ,throttle valves
42.		2 <sup>nd</sup>	Fluid power pumps,vane pump
43.		3 <sup>rd</sup>	External and internal gear pumps
44.		4 <sup>th</sup>	ISO symbols of hydraulic components
45.	12 <sup>th</sup>	1 <sup>st</sup>	Actuator and its types
46.		2 <sup>nd</sup>	Direct operation of single acting cylinder
47.		3 <sup>rd</sup>	Direct operation of double acting cylinder
48.		4 <sup>th</sup>	pneumatic system,its merit and demerits
49.	13 <sup>th</sup>	1 <sup>st</sup>	Pressure control valves ,its types
50.		2 <sup>nd</sup>	Pressure relief valves, its types
51.		3 <sup>rd</sup>	Pressure regulation valves and its types
52.		4 <sup>th</sup>	Direction control valves and its types
53.	14 <sup>th</sup>	1 <sup>st</sup>	Flow control valves ,throttle valves
54.		2 <sup>nd</sup>	3/2 DCV,5/2 DCV
55.		3 <sup>rd</sup>	Lubrication unit
56.		4 <sup>th</sup>	ISO symbols of pneumatic components
57.	15 <sup>th</sup>	1 <sup>st</sup>	Actuator and its types
58.		2 <sup>nd</sup>	Direct operation of single acting cylinder
59.		3 <sup>rd</sup>	Direct operation of double acting cylinder
60.		4 <sup>th</sup>	Comparison between both system

The lesson plan prepared by the concerned faculty

*Siddhant Singh Babu*  
Siddhant Singh Babu

PTGF, MECHANICAL DEPARTMENT

**GOVERNMENT POLYTECHNIC,NUAPADA**  
**Academic Lesson Plan for Winter semester- 2021**

Name of the teaching faculty: Er. Siddhant Singh Babu  
 Semester: 5th  
 No. of periods per week: 4  
 End semester exam: 80  
 Total Marks: 100

Department: Mechanical Engineering  
 Subject: Mechatronics  
 Total Periods: 60  
 Class test: 20

Sl. No.	Week	Period	Topic to be covered
1.	1 <sup>st</sup>	1 <sup>st</sup>	Definition of Mechatronics, Advantages & disadvantages of Mechatronics
2.		2 <sup>nd</sup>	Application of Mechatronics, Scope of Mechatronics in Industrial Sector
3.		3 <sup>rd</sup>	Components of a Mechatronics System, examples of different Mechatronics system
4.		4 <sup>th</sup>	Importance of mechatronics in automation
5.	2 <sup>nd</sup>	1 <sup>st</sup>	Defination of Transducers, Classification of Transducers
6.		2 <sup>nd</sup>	Electromechanical Transducers, Transducers Actuating Mechanisms
7.		3 <sup>rd</sup>	Velocity and motion sensors
8.		4 <sup>th</sup>	force and pressure sensors
9.	3 <sup>rd</sup>	1 <sup>st</sup>	Temperature and light sensor
10.		2 <sup>nd</sup>	Displacement & Positions Sensors
11.		3 <sup>rd</sup>	Mechanical Actuators, Machine, Kinematic Link,
12.		4 <sup>th</sup>	Kinematic Pair, Mechanism
13.	4 <sup>th</sup>	1 <sup>st</sup>	Slider crank Mechanism, Gear Drive
14.		2 <sup>nd</sup>	Spur gear, Bevel gear, Helical gear, worm gear
15.		3 <sup>rd</sup>	Examples of all types of gears arrangement
16.		4 <sup>th</sup>	Belt, types of belts
17.	5 <sup>th</sup>	1 <sup>st</sup>	Belt drives, classification
18.		2 <sup>nd</sup>	Power transmission in belt drives
19.		3 <sup>rd</sup>	Bearings, types of bearings
20.		4 <sup>th</sup>	Journal bearing, foot step bearings
21.	6 <sup>th</sup>	1 <sup>st</sup>	Electrical Actuator with Diagrams
22.		2 <sup>nd</sup>	Switches, its types and working
23.		3 <sup>rd</sup>	Relay and its function
24.		4 <sup>th</sup>	Solenoid valve and its function
25.	7 <sup>th</sup>	1 <sup>st</sup>	D.C Motors and A.C Motors
26.		2 <sup>nd</sup>	Its types and working principle
27.		3 <sup>rd</sup>	Comparison between two motors
28.		4 <sup>th</sup>	Stepper Motors and its working
29.	8 <sup>th</sup>	1 <sup>st</sup>	Specification and control of stepper motors
30.		2 <sup>nd</sup>	Servo Motors D.C & A.C
31.		3 <sup>rd</sup>	Working of servo motors
32.		4 <sup>th</sup>	Introduction, Advantages of PLC
33.	9 <sup>th</sup>	1 <sup>st</sup>	Selection and uses of PLC
34.		2 <sup>nd</sup>	Input/output Processing and Programming
35.		3 <sup>rd</sup>	Architecture basic internal structures
36.		4 <sup>th</sup>	Mnemonic
37.	10 <sup>th</sup>	1 <sup>st</sup>	Master and Jump Controllers

38.		2 <sup>nd</sup>	Introduction to Numerical Control of machines
39.		3 <sup>rd</sup>	NC machines AND CNC machines
40.		4 <sup>th</sup>	CAD/CAM , CAD,CAM
41.	11 <sup>th</sup>	1 <sup>st</sup>	Software and hardware for CAD/CAM
42.		2 <sup>nd</sup>	Functioning of CAD/CAM system
43.		3 <sup>rd</sup>	Features and characteristics of CAD/CAM system
44.		4 <sup>th</sup>	Application areas for CAD/CAM
45.	12 <sup>th</sup>	1 <sup>st</sup>	elements of CNC machines
46.		2 <sup>nd</sup>	Introduction to Machine Structure
47.		3 <sup>rd</sup>	Guideways/Slide ways
48.		4 <sup>th</sup>	Introduction and Types of Guideways
49.	13 <sup>th</sup>	1 <sup>st</sup>	Factors of design of guideways
50.		2 <sup>nd</sup>	Drives and Spindle drives
51.		3 <sup>rd</sup>	Feed drive
52.		4 <sup>th</sup>	Spindle and Spindle Bearings
53.	14 <sup>th</sup>	1 <sup>st</sup>	Definition and Function
54.		2 <sup>nd</sup>	laws of robotics
55.		3 <sup>rd</sup>	Types of industrial robots
56.		4 <sup>th</sup>	Explanation of industrial robots
57.	15 <sup>th</sup>	1 <sup>st</sup>	Robotic systems
58.		2 <sup>nd</sup>	Advantages and Disadvantages of robots
59.		3 <sup>rd</sup>	Previous Semester question discussion 1
60.		4 <sup>th</sup>	Previous Semester question discussion 2

The lesson plan prepared by the concerned faculty

Siddhant Singh Babu  
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PTGF, MECHANICAL DEPARTMENT

**GOVERNMENT POLYTECHNIC, NUAPADA**

**Academic Lesson Plan for Winter semester- 2021**

Name of the teaching faculty: Er. Abhisek Khamari

Department: Mechanical Engineering

Semester: 3th

Subject: Mechanical Engineering Drawing

No. of periods per week: 6

Total Periods: 90

End semester exam: 75

Sessional: 25

Total Marks: 100

Sl. No	Week	Period	Topic to be covered
1	1 <sup>st</sup>	1 <sup>st</sup>	Revision of Engineering Drawing of 1st Year
2		2 <sup>nd</sup>	Do
3		3 <sup>rd</sup>	Do
4		4 <sup>th</sup>	Do
5		5 <sup>th</sup>	Do
6		6 <sup>th</sup>	Do
7	2 <sup>nd</sup>	1 <sup>st</sup>	Draw plan, elevation and side view of different machine elements from their isometric view using AutoCAD & mini drafter (Minimum 5 Drawings).
8		2 <sup>nd</sup>	Do
9		3 <sup>rd</sup>	Do
10		4 <sup>th</sup>	Do
11		5 <sup>th</sup>	Do
12		6 <sup>th</sup>	Do
13	3 <sup>rd</sup>	1 <sup>st</sup>	Bolt, nut and threads
14		2 <sup>nd</sup>	Do
15		3 <sup>rd</sup>	Do
16		4 <sup>th</sup>	Do
17		5 <sup>th</sup>	Do
18		6 <sup>th</sup>	Do
19	4 <sup>th</sup>	1 <sup>st</sup>	Do
20		2 <sup>nd</sup>	Cotter joint
21		3 <sup>rd</sup>	Do
22		4 <sup>th</sup>	Do
23		5 <sup>th</sup>	Do
24		6 <sup>th</sup>	Do
25	5 <sup>th</sup>	1 <sup>st</sup>	Do
26		2 <sup>nd</sup>	Do
27		3 <sup>rd</sup>	Knuckle joint
28		4 <sup>th</sup>	Do
29		5 <sup>th</sup>	Do
30		6 <sup>th</sup>	Do
31	6 <sup>th</sup>	1 <sup>st</sup>	Do
32		2 <sup>nd</sup>	Do
33		3 <sup>rd</sup>	Do
34		4 <sup>th</sup>	Rigid pedestal bearing
35		5 <sup>th</sup>	Do
36		6 <sup>th</sup>	Do
37	7 <sup>th</sup>	1 <sup>st</sup>	Do
38		2 <sup>nd</sup>	Do
39		3 <sup>rd</sup>	Do
40		4 <sup>th</sup>	Do
41		5 <sup>th</sup>	Foot step bearing
42		6 <sup>th</sup>	Do
43	8 <sup>th</sup>	1 <sup>st</sup>	Do

44		2 <sup>nd</sup>	Do
45		3 <sup>rd</sup>	Do
46		4 <sup>th</sup>	Do
47		5 <sup>th</sup>	Simple Screw jack
48		6 <sup>th</sup>	Do
49	9 <sup>th</sup>	1 <sup>st</sup>	Do
50		2 <sup>nd</sup>	Do
51		3 <sup>rd</sup>	Do
52		4 <sup>th</sup>	Do
53		5 <sup>th</sup>	Do
54		6 <sup>th</sup>	Connecting rod of IC Engine
55	10 <sup>th</sup>	1 <sup>st</sup>	Do
56		2 <sup>nd</sup>	Do
57		3 <sup>rd</sup>	Do
58		4 <sup>th</sup>	Do
59		5 <sup>th</sup>	Do
60		6 <sup>th</sup>	Do
61	11 <sup>th</sup>	1 <sup>st</sup>	do
62		2 <sup>nd</sup>	Boiler safety valve
63		3 <sup>rd</sup>	Do
64		4 <sup>th</sup>	Do
65		5 <sup>th</sup>	Do
66		6 <sup>th</sup>	Do
67	12 <sup>th</sup>	1 <sup>st</sup>	Do
68		2 <sup>nd</sup>	Do
69		3 <sup>rd</sup>	Do
70		4 <sup>th</sup>	Spring loaded valve
71		5 <sup>th</sup>	Do
72		6 <sup>th</sup>	Do
73	13 <sup>th</sup>	1 <sup>st</sup>	Do
74		2 <sup>nd</sup>	Do
75		3 <sup>rd</sup>	Do
76		4 <sup>th</sup>	Do
77		5 <sup>th</sup>	Hydraulic non return valve
78		6 <sup>th</sup>	Do
79	14 <sup>th</sup>	1 <sup>st</sup>	Do
80		2 <sup>nd</sup>	Do
81		3 <sup>rd</sup>	Do
82		4 <sup>th</sup>	Do
83		5 <sup>th</sup>	Do
84		6 <sup>th</sup>	Flat belt pulley
85	15 <sup>th</sup>	1 <sup>st</sup>	Do
86		2 <sup>nd</sup>	Do
87		3 <sup>rd</sup>	Do
88		4 <sup>th</sup>	Do
89		5 <sup>th</sup>	Do
90		6 <sup>th</sup>	Do

The lesson plan prepared by the concerned faculty

Abhishek Khamari  
Abhisek Khamari

Name of the teacher:  
Semester: 3<sup>rd</sup>  
No. of pages:  
End

**GOVERNMENT POLYTECHNIC, NUAPADA**

**Academic Lesson Plan for Winter semester- 2021**

Name of the teaching faculty: Er. Abhisek Khamari

Department: Mechanical Engineering

Semester: 3rd

Subject: Mechanical Engineering Lab-1

No. of periods per week: 6

Total Periods: 60

End semester exam: 75

Sessional: 25 Total Marks: 100

Sl. No	Week	Period	Topic to be covered
1	1 <sup>st</sup>	1 <sup>st</sup>	Determine end reactions in a simply supported beam using parallel force apparatus.
2		2 <sup>nd</sup>	Do
3		3 <sup>rd</sup>	Do
4		4 <sup>th</sup>	Do
5		5 <sup>th</sup>	Do
6		6 <sup>th</sup>	Do
7	2 <sup>nd</sup>	1 <sup>st</sup>	Do
8		2 <sup>nd</sup>	Determination of Young's modulus using Searle's apparatus
9		3 <sup>rd</sup>	Do
10		4 <sup>th</sup>	Do
11		5 <sup>th</sup>	Do
12		6 <sup>th</sup>	Do
13	3 <sup>rd</sup>	1 <sup>st</sup>	Do
14		2 <sup>nd</sup>	Do
15		3 <sup>rd</sup>	Determination of torsional rigidity of the shaft using torsion testing machine
16		4 <sup>th</sup>	Do
17		5 <sup>th</sup>	Do
18		6 <sup>th</sup>	Do
19	4 <sup>th</sup>	1 <sup>st</sup>	Do
20		2 <sup>nd</sup>	Do
21		3 <sup>rd</sup>	Determination of salient points (Young's modulus, yield point, fracture point) from stress- strain curve using Universal Testing Machine
22		4 <sup>th</sup>	Do
23		5 <sup>th</sup>	Do
24		6 <sup>th</sup>	Do
25	5 <sup>th</sup>	1 <sup>st</sup>	Do
26		2 <sup>nd</sup>	Do
27		3 <sup>rd</sup>	Do
28		4 <sup>th</sup>	Do
29		5 <sup>th</sup>	Do
30		6 <sup>th</sup>	do
31	6 <sup>th</sup>	1 <sup>st</sup>	Determination of hardness number by Rockwell/Vickers hardness testing machine
32		2 <sup>nd</sup>	Do
33		3 <sup>rd</sup>	Do
34		4 <sup>th</sup>	Do
35		5 <sup>th</sup>	Do
36		6 <sup>th</sup>	Do
37		1 <sup>st</sup>	Do
38	7 <sup>th</sup>	2 <sup>nd</sup>	Do
39		3 <sup>rd</sup>	Do
40		4 <sup>th</sup>	Determination of toughness using Impact testing machine (Charpy/Izod)
41		5 <sup>th</sup>	Do

42		6 <sup>th</sup>	Do
43	8 <sup>th</sup>	1 <sup>st</sup>	Do
44		2 <sup>nd</sup>	Do
45		3 <sup>rd</sup>	Do
46		4 <sup>th</sup>	Do
47		5 <sup>th</sup>	Do
48		6 <sup>th</sup>	Determination of Flash point and fire point
49	9 <sup>th</sup>	1 <sup>st</sup>	Do
50		2 <sup>nd</sup>	Do
51		3 <sup>rd</sup>	Do
52		4 <sup>th</sup>	Do
53		5 <sup>th</sup>	Do
54		6 <sup>th</sup>	Joule's experiment
55	10 <sup>th</sup>	1 <sup>st</sup>	Do
56		2 <sup>nd</sup>	Do
57		3 <sup>rd</sup>	Do
58		4 <sup>th</sup>	Do
59		5 <sup>th</sup>	Do
60		6 <sup>th</sup>	Do

The lesson plan prepared by the concerned faculty

*Abhisek Khamari*

**Abhisek Khamari**

**PTGF, MECHANICAL DEPARTMENT**

Name of the  
Semester  
No. of

**GOVERNMENT POLYTECHNIC, NUAPADA**  
**Academic Lesson Plan for Winter semester- 2021**

Name of the teaching faculty: Er. Abhisek Khamari  
 Semester: 3rd  
 No. of periods per week: 4  
 End semester exam: 80  
 Total Marks: 100

Department: Mechanical Engineering  
 Subject: Production Technology  
 Total Periods: 60  
 Class test: 20

Sl. No.	Week	Period	Topic to be covered
1.	1 <sup>st</sup>	1 <sup>st</sup>	Extrusion: Definition & Classification
2.		2 <sup>nd</sup>	Explain direct, indirect and impact extrusion process.
3.		3 <sup>rd</sup>	Define rolling. Classify it.
4.		4 <sup>th</sup>	do
5.	2 <sup>nd</sup>	1 <sup>st</sup>	Differentiate between cold rolling and hot rolling process.
6.		2 <sup>nd</sup>	List the different types of rolling mills used in Rolling process.
7.		3 <sup>rd</sup>	do
8.		4 <sup>th</sup>	Define welding and classify various welding processes.
9.	3 <sup>rd</sup>	1 <sup>st</sup>	do
10.		2 <sup>nd</sup>	do
11.		3 <sup>rd</sup>	Explain fluxes used in welding
12.		4 <sup>th</sup>	Explain Oxy-acetylene welding process
13.	4 <sup>th</sup>	1 <sup>st</sup>	Explain various types of flames used in Oxy-acetylene welding process.
14.		2 <sup>nd</sup>	do
15.		3 <sup>rd</sup>	Explain Arc welding process.
16.		4 <sup>th</sup>	Specify arc welding electrodes
17.	5 <sup>th</sup>	1 <sup>st</sup>	Define resistance welding and classify it.
18.		2 <sup>nd</sup>	Describe various resistance welding processes such as butt welding, spot welding, flash welding, projection welding and seam welding.
19.		3 <sup>rd</sup>	do
20.		4 <sup>th</sup>	Explain TIG and MIG welding process
21.	6 <sup>th</sup>	1 <sup>st</sup>	do
22.		2 <sup>nd</sup>	do
23.		3 <sup>rd</sup>	State different welding defects with causes and remedies.
24.		4 <sup>th</sup>	Define Casting and Classify the various Casting processes.
25.	7 <sup>th</sup>	1 <sup>st</sup>	do
26.		2 <sup>nd</sup>	Explain the procedure of Sand mould casting.
27.		3 <sup>rd</sup>	Explain different types of molding sands with their composition and properties.
28.		4 <sup>th</sup>	do
29.	8 <sup>th</sup>	1 <sup>st</sup>	Classify different pattern and state various pattern allowances
30.		2 <sup>nd</sup>	Do
31.		3 <sup>rd</sup>	Classify core
32.		4 <sup>th</sup>	Describe construction and working of cupola and crucible furnace.
33.	9 <sup>th</sup>	1 <sup>st</sup>	do
34.		2 <sup>nd</sup>	Explain die casting method
35.		3 <sup>rd</sup>	do
36.		4 <sup>th</sup>	Explain centrifugal casting such as true centrifugal casting, centrifuging with advantages, limitation and area of application
37.	10 <sup>th</sup>	1 <sup>st</sup>	do

38.		2 <sup>nd</sup>	do
39.		3 <sup>rd</sup>	Explain various casting defects with their causes and remedies
40.		4 <sup>th</sup>	Define powder metallurgy process.
41.	11 <sup>th</sup>	1 <sup>st</sup>	State advantages of powder metallurgy technology technique
42.		2 <sup>nd</sup>	Describe the methods of producing components by powder metallurgy technique
43.		3 <sup>rd</sup>	do
44.		4 <sup>th</sup>	do
45.	12 <sup>th</sup>	1 <sup>st</sup>	Explain sintering
46.		2 <sup>nd</sup>	Economics of powder metallurgy
47.		3 <sup>rd</sup>	Describe Press Works: blanking, piercing and trimming.
48.		4 <sup>th</sup>	List various types of die and punch
49.	13 <sup>th</sup>	1 <sup>st</sup>	Explain simple, Compound & Progressive dies
50.		2 <sup>nd</sup>	do
51.		3 <sup>rd</sup>	Describe the various advantages & disadvantages of above dies
52.		4 <sup>th</sup>	Define jigs and fixtures, State advantages of using jigs and fixtures
53.	14 <sup>th</sup>	1 <sup>st</sup>	State the principle of locations
54.		2 <sup>nd</sup>	do
55.		3 <sup>rd</sup>	Describe the methods of location with respect to 3-2-1 point location of rectangular jig
56.		4 <sup>th</sup>	do
57.	15 <sup>th</sup>	1 <sup>st</sup>	List various types of jig and fixtures.
58.		2 <sup>nd</sup>	do
59.		3 <sup>rd</sup>	do
60.		4 <sup>th</sup>	do

The lesson plan prepared by the concerned faculty

Abhisek Khamari

Abhisek Khamari

PTGF, MECHANICAL DEPARTMENT

**GOVERNMENT POLYTECHNIC, NUAPADA**  
**Academic Lesson Plan for Winter semester- 2021**

Name of the teaching faculty: Er. Abhisek Khamari

Semester: 5th

No. of periods per week: 4

End semester exam: 80

Total Marks : 100

Department: Mechanical Engineering

Subject: Entrepreneurship & Management Studies

Total Periods: 60

Class test: 20

Sl. No.	Week	Period	Topic to be covered
1.	1 <sup>st</sup>	1 <sup>st</sup>	Concept /Meaning of Entrepreneurship
2.		2 <sup>nd</sup>	Need of Entrepreneurship
3.		3 <sup>rd</sup>	Characteristics, Qualities and Types of entrepreneur, Functions
4.		4 <sup>th</sup>	Barriers in entrepreneurship
5.	2 <sup>nd</sup>	1 <sup>st</sup>	Entrepreneurs vrs. Manager
6.		2 <sup>nd</sup>	Forms of Business Ownership: Sole proprietorship, partnership forms and other
7.		3 <sup>rd</sup>	Types of Industries, Concept of Start-ups
8.		4 <sup>th</sup>	Entrepreneurial support agencies at National, State, District Level( sources): DIC, NSIC,OSIC, SIDBI, NABARD, Commercial Banks, KVIC etc.
9.	3 <sup>rd</sup>	1 <sup>st</sup>	do
10.		2 <sup>nd</sup>	Technology Business Incubators (TBI) and Science and Technology Entrepreneur Parks
11.		3 <sup>rd</sup>	Business Planning
12.		4 <sup>th</sup>	SSI, Ancillary Units, Tiny Units, Service sector Units
13.	4 <sup>th</sup>	1 <sup>st</sup>	Time schedule Plan, Agencies to be contacted for Project Implementation
14.		2 <sup>nd</sup>	do
15.		3 <sup>rd</sup>	Assessment of Demand and supply and Potential areas of Growth
16.		4 <sup>th</sup>	Identifying Business Opportunity
17.	5 <sup>th</sup>	1 <sup>st</sup>	do
18.		2 <sup>nd</sup>	Final Product selection
19.		3 <sup>rd</sup>	Preliminary project report
20.		4 <sup>th</sup>	Detailed project report, Techno economic Feasibility
21.	6 <sup>th</sup>	1 <sup>st</sup>	do
22.		2 <sup>nd</sup>	Project Viability
23.		3 <sup>rd</sup>	Definitions of management, Principles of management
24.		4 <sup>th</sup>	Functions of management (planning, organising, staffing, directing and controlling etc.)
25.	7 <sup>th</sup>	1 <sup>st</sup>	do
26.		2 <sup>nd</sup>	Level of Management in an Organisation
27.		3 <sup>rd</sup>	do
28.		4 <sup>th</sup>	Production management
29.	8 <sup>th</sup>	1 <sup>st</sup>	do
30.		2 <sup>nd</sup>	Inventory Management
31.		3 <sup>rd</sup>	do
32.		4 <sup>th</sup>	Financial Management
33.	9 <sup>th</sup>	1 <sup>st</sup>	do
34.		2 <sup>nd</sup>	Marketing Management
35.		3 <sup>rd</sup>	do
36.		4 <sup>th</sup>	Human Resource Management

37.	10 <sup>th</sup>	1 <sup>st</sup>	do
38.		2 <sup>nd</sup>	Leadership
39.		3 <sup>rd</sup>	do
40.		4 <sup>th</sup>	do
41.	11 <sup>th</sup>	1 <sup>st</sup>	Motivation
42.		2 <sup>nd</sup>	do
43.		3 <sup>rd</sup>	do
44.		4 <sup>th</sup>	Human relationship and Performance in Organization
45.	12 <sup>th</sup>	1 <sup>st</sup>	Relations with Peers, Superiors and Subordinates
46.		2 <sup>nd</sup>	TQM concepts: Quality Policy, Quality Management, Quality system
47.		3 <sup>rd</sup>	Accidents and Safety, Cause, preventive measures, General Safety Rules , Personal Protection Equipment(PPE)
48.		4 <sup>th</sup>	do
49.	13 <sup>th</sup>	1 <sup>st</sup>	Intellectual Property Rights(IPR), Patents, Trademarks, Copyrights
50.		2 <sup>nd</sup>	do
51.		3 <sup>rd</sup>	do
52.		4 <sup>th</sup>	do
53.	14 <sup>th</sup>	1 <sup>st</sup>	Features of Factories Act 1948 with Amendment (only salient points)
54.		2 <sup>nd</sup>	Features of Payment of Wages Act 1936 (only salient points)
55.		3 <sup>rd</sup>	Concept of IOT, How IOT works
56.		4 <sup>th</sup>	Components of IOT, Characteristics of IOT, Categories of IOT
57.	15 <sup>th</sup>	1 <sup>st</sup>	do
58.		2 <sup>nd</sup>	Applications of IOT- Smart Cities, Smart Transportation, Smart Home, Smart Healthcare, Smart Industry, Smart Agriculture, Smart Energy Management etc
59.		3 <sup>rd</sup>	do
60.		4 <sup>th</sup>	do

The lesson plan prepared by the concerned faculty

Abhisek Khamari

ABHISEK KHAMARI

PTGF, MECHANICAL DEPARTMENT

Name of the teaching  
Semester: 3rd  
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**GOVERNMENT POLYTECHNIC, NUAPADA**  
**Academic Lesson Plan for Winter semester- 2022**

Name of the teaching faculty: Er.Siddhant Singh Babu

Department: Mechanical Engineering

Semester: 3rd

Subject: Thermal Engg-1

No. of periods per week: 4

Total Periods: 60

End semester exam: 80

Class test: 20

Total Marks : 100

Sl. No.	Week	Period	Topic to be covered
1.	1 <sup>st</sup>	1 <sup>st</sup>	Thermodynamic Systems (closed, open, isolated)
2.		2 <sup>nd</sup>	Thermodynamic properties of a system (pressure, volume, temperature
3.		3 <sup>rd</sup>	entropy, enthalpy, Internal energy and units of measurement).
4.		4 <sup>th</sup>	Intensive and extensive properties Define thermodynamic processes, path, cycle, state, path function, point function.
5.	2 <sup>nd</sup>	1 <sup>st</sup>	Thermodynamic Equilibrium. Quasi-static Process
6.		2 <sup>nd</sup>	Conceptual explanation of energy and its sources
7.		3 <sup>rd</sup>	Work, heat and comparison between the two. Mechanical Equivalent of Heat.
8.		4 <sup>th</sup>	Work transfer, Displacement work
9.	3 <sup>rd</sup>	1 <sup>st</sup>	State & explain Zeroth law of thermodynamics.
10.		2 <sup>nd</sup>	State & explain First law of thermodynamics. Limitations of First law of thermodynamics
11.		3 <sup>rd</sup>	Application of First law of Thermodynamics (steady flow energy equation and its application to turbine and compressor)
12.		4 <sup>th</sup>	Second law of thermodynamics (Clausius & Kelvin Planck statements).
13.	4 <sup>th</sup>	1 <sup>st</sup>	Application of second law in heat engine, heat pump, refrigerator & determination of efficiencies & C.O.P
14.		2 <sup>nd</sup>	solve simple numerical
15.		3 <sup>rd</sup>	Laws of perfect gas, Boyle's law, Charles's law, Avogadro's law,
16.		4 <sup>th</sup>	Dalton's law of partial pressure, Guy Lussac Law
17.	5 <sup>th</sup>	1 <sup>st</sup>	General gas equation, characteristic gas constant, Universal gas constant.
18.		2 <sup>nd</sup>	Explain specific heat of gas (Cp and Cv) Relation between Cp & Cv.
19.		3 <sup>rd</sup>	Enthalpy of a gas. Work done during a non-flow process.
20.		4 <sup>th</sup>	Application of first law of thermodynamics to various non flow process (Isothermal, Isobaric, Isentropic and polytrophic process)
21.	6 <sup>th</sup>	1 <sup>st</sup>	Solve simple problems on above.
22.		2 <sup>nd</sup>	Free expansion & throttling process.

	3 <sup>rd</sup>	Explain & classify I.C engine.
	4 <sup>th</sup>	Terminology of I.C Engine such as bore, dead centers, stroke volume, piston speed & RPM.
25.	7 <sup>th</sup>	1 <sup>st</sup> Explain the working principle of 2-stroke engines
26.		2 <sup>nd</sup> Explain the working principle of 4- stroke engine S.I engine
27.		3 <sup>rd</sup> Explain the working principle of 2-stroke & 4- stroke engine C.I engine.
28.		4 <sup>th</sup> Differentiate between 2-stroke & 4- stroke engine C.I engine
29.	8 <sup>th</sup>	1 <sup>st</sup> Differentiate between 2-stroke & 4- stroke engine S.I engine
30.		2 <sup>nd</sup> Study of valve timing diagram
31.		3 <sup>rd</sup> What is thermodynamic cycle
32.		4 <sup>th</sup> Carnot cycle
33.	9 <sup>th</sup>	1 <sup>st</sup> p-v diagram with process.
34.		2 <sup>nd</sup> . Solve simple numerical
35.		3 <sup>rd</sup> Otto cycle.
36.		4 <sup>th</sup> p-v diagram with process
37.	10 <sup>th</sup>	1 <sup>st</sup> . Solve simple numerical
38.		2 <sup>nd</sup> Diesel cycle
39.		3 <sup>rd</sup> p-v diagram with process
40.		4 <sup>th</sup> . Solve simple numerical
41.	11 <sup>th</sup>	1 <sup>st</sup> Dual cycle
42.		2 <sup>nd</sup> p-v diagram with process
43.		3 <sup>rd</sup> . Solve simple numerical
44.		4 <sup>th</sup> Efficiency comparison between all
45.	12 <sup>th</sup>	1 <sup>st</sup> Comparison between all cycles
46.		2 <sup>nd</sup> Define Fuel.Types of fuel
47.		3 <sup>rd</sup> Application of different types of fuel.
48.		4 <sup>th</sup> Do
49.	13 <sup>th</sup>	1 <sup>st</sup> Do
50.		2 <sup>nd</sup> Heating values of fuel
51.		3 <sup>rd</sup> Quality of I.C engine fuels
52.		4 <sup>th</sup> Octane number, Cetane number
53.	14 <sup>th</sup>	1 <sup>st</sup> Previous years paper discussion
54.		2 <sup>nd</sup> Previous years paper discussion
55.		3 <sup>rd</sup> Previous years paper discussion
56.		4 <sup>th</sup> Previous years paper discussion
57.	15 <sup>th</sup>	1 <sup>st</sup> Revision
58.		2 <sup>nd</sup> Revision
59.		3 <sup>rd</sup> Revision
60.		4 <sup>th</sup> Revision

Siddhant Singh Babu  
Siddhant Singh Babu  
PTGF., MECHANICAL DEPARTMENT

The lesson plan prepared by the concerned faculty