

## LESSON PLAN

**NAME OF FACULTY: SH. ASHWANI KUMAR**

**DISCIPLINE: MECHANICAL ENGINEERING - G.P. AMBALA**

**SEMESTER: V**

**SUBJECT: THEORY OF MACHINES**

**LESSON PLAN DURATION: 15 WEEKS**

**WORK LOAD (LECTURE/PRACTICAL) PER WEEK: (4 lectures)**

WEEK	THEORY	
	LECTURE NOS	TOPIC
1 <sup>st</sup>	1	<b>Unit -1.</b> Simple Mechanisms-Introduction to link
	2	kinematic pair, lower and higher pair Kinematic chain,
	3	mechanism, Inversions, Different types of mechanisms (with examples )
2 <sup>nd</sup>	4	Different types of mechanisms (with examples )
	5	<b>Unit-2</b> Power Transmission- Introduction to Belt and Rope drives
	6	Types of belt drives and types of pulleys
3 <sup>rd</sup>	7	Concept of velocity ratio, slip and creep; crowning of pulleys (simple numericals)
	8	Flat and V belt drive: Ratio of driving tensions, power transmitted, centrifugal tension,
	9	and condition for maximum horse power (simple numericals)
4 <sup>th</sup>	10	Different types of chains and their terminology
	11	Gear terminology, types of gears and their applications;
	12	simple and compound gear trains; power transmitted by simple spur gear
5 <sup>th</sup>	13	<b>SESSIONAL TEST -I</b>
	14	<b>Unit-3-</b> Flywheel, Principle
	15	applications of flywheel
6 <sup>th</sup>	16	Turning - moment diagram of flywheel for different engines
	17	Fluctuation of speed and fluctuation of energy - Concept only
	18	Coefficient of fluctuation of speed and coefficient of fluctuation of energy
7 <sup>th</sup>	19	Simple numerical problems on fluctuation of speed and fluctuation of energy
	20	<b>Unit-4-</b> Governor Principal of governor
	21	Simple description and working of Watt, Porter and
8 <sup>th</sup>	22	Hartnel governor (simple numericals based on watt governor
	23	Hunting, isochronism,

	24	stability, sensitiveness of a governor
9 <sup>th</sup>	25	<b>SESSIONAL TEST -II</b>
	26	<b>Unit-5- Balancing, Concept of balancing</b>
	27	Introduction to balancing of rotating masses (simple numerical)
10 <sup>th</sup>	28	Simple problems related to several masses rotating in different planes
	29	Simple problems related to several masses rotating in different planes
	30	<b>Unit-6- Vibrations</b>
11 <sup>th</sup>	31	Concept of vibrations and its types -
	32	longitudinal, transverse and
	33	torsional vibrations (simple numericals)
12 <sup>th</sup>	34	Damping of vibrations
	35	Causes of vibrations in machines
	36	their harmful effects and remedies
13 <sup>th</sup>	37	<b>SESSIONAL TEST -III</b>
	38	<b>Revised Sessional Test -1</b>
	39	<b>Revised Sessional Test -2</b>
14 <sup>th</sup>	40	<b>Revised Sessional Test -3</b>
	41	Seminar
	42	Seminar
15 <sup>th</sup>	43	Any Other Query

## LESSON PLAN

**NAME OF FACULTY: SH. HITESH CHAWLA**

**DISCIPLINE: MECHANICAL ENGINEERING - G.P. AMBALA**

**SEMESTER: V**

**SUBJECT: REFRIGERATION AND AIR CONDITIONING**

**LESSON PLAN DURATION: 15 WEEKS**

**WORK LOAD (LECTURE/PRACTICAL) PER WEEK: (4 lectures, 2 Practical)**

WEEK	THEORY		PRACTICALS
	LECTURE NOS	TOPIC	TOPIC
1 <sup>st</sup>	1	<b>Unit-1 – REFRIGERATION</b> , Fundamentals of Refrigeration	Practical-1 Identify various tools of refrigeration kit and practice in cutting, bending, flaring, swaging and brazing of tubes
	2	Introduction to refrigeration, and air conditioning	
	3	meaning of refrigerating effect, units of refrigeration, COP, methods of refrigeration	
2 <sup>nd</sup>	4	Introduction to air refrigerator working on reversed carnot cycle.	Practical-2 Study of thermostatic switch, LP/HP cut out overload protector filters, strainers and filter driers.
	5	<b>Unit-2</b> Vapour Compression System	
	6	Introduction, principle, function, parts and necessity of vapour compression system,	
3 <sup>rd</sup>	7	T- $\phi$ and p- H charts, dry, wet and superheated compression.	Practical-3 Identify various parts of a refrigerator and window air conditioner.
	8	Effect of sub cooling, super heating,	
	9	mass flow rate, entropy, enthalpy	
4 <sup>th</sup>	10	work done, Refrigerating effect and COP.	Practical-4 To find COP of Refrigeration system
	11	actual vapour compression system	
	12	Refrigerants, Functions,	
5 <sup>th</sup>	13	<b>SESSIONAL TEST -I</b>	Repeat Practical 1 to 4
	14	<b>Unit-3</b> Refrigerants, Functions, classification of refrigerants, properties of R - 717	
	15	R – 22, R–134 (a) and CO <sub>2</sub>	
6 <sup>th</sup>	16	Properties of ideal refrigerant, selection of refrigerant	Repeat Practical 1 to 4
	17	<b>Unit-4-</b> Vapour Absorption System	
	18	Introduction, principle and working of simple absorption system and domestic electrolux refrigeration systems	
7 <sup>th</sup>	19	Solar power refrigeration system, advantages and disadvantages of	Repeat Practical 1 to 4

		solar power refrigeration system over vapour compression system	
	20	<b>Unit-5-Refrigeration Equipment, Compressor - Function, various types of compressors</b>	
	21	Condenser - Function, various types of condensers, Evaporator - Function, types of evaporators	
8 <sup>th</sup>	22	Expansion Valve - Function, various types such as capillary tube, thermostatic	Practical-5 To detect trouble / faults in a refrigerator/window type air conditioner
	23	expansion valve, low side and high side float valves, application of various expansion valves	
	24	Safety Devices-Thermostat, overload protector LP, HP cut out switch	
9 <sup>th</sup>	25	<b>SESSIONAL TEST -II</b>	Practical-6 Charging of a refrigerator/window type air conditioner.
	26	<b>Unit-6- Psychrometry</b> Definition, importance,	
	27	specific humidity, relative humidity,	
10 <sup>th</sup>	28	degree of saturation DBT	Practical-7 Study of cut section of single cylinder compressor
	29	WBT, DPT,	
	30	sensible heat, latent heat	
11 <sup>th</sup>	31	Total enthalpy of air. Psychrometry chart and various processes of psychrometry	Practical-8 Visit to an ice plant, cold storage plant, central air conditioning plant
	32	<b>Unit-7-Air-Conditioner</b>	
	33	Study of window air-conditioning,	
12 <sup>th</sup>	34	split type air conditioning,	Repeat Practical 5 to 8
	35	concept of central aircondition,	
	36	automobile air-conditioning	
13 <sup>th</sup>	37	<b>SESSIONAL TEST -III</b>	Repeat Practical 5 to 8
	38	<b>Revised Sessional Test -1</b>	
	39	<b>Revised Sessional Test -2</b>	
14 <sup>th</sup>	40	<b>Revised Sessional Test -3</b>	Repeat Practical 5 to 8
	41	Seminar	
	42	Seminar	
15 <sup>th</sup>	43	Any Other Query	Repeat Practical

## LESSON PLAN

**NAME OF FACULTY: SH. F U REHMAN/ G.F 2**

**DISCIPLINE: MECHANICAL ENGINEERING - G.P. AMBALA**

**SEMESTER: V**

**SUBJECT: ENVIRONMENTAL EDUCATION**

**LESSON PLAN DURATION: 15 WEEKS**

**WORK LOAD (LECTURE/PRACTICAL) PER WEEK: (4 lectures)**

WEEK	THEORY	
	LECTURE NOS	TOPIC
1 <sup>st</sup>	1	<b>Unit-1-</b> Environmental Education ,Definition, Scope
	2	and Importance of Environmental Education
	3	<b>Unit-2-</b> Basics of ecology,
2 <sup>nd</sup>	4	Biodiversity
	5	Eco system and
	6	sustainable development
3 <sup>rd</sup>	7	<b>Unit-3-</b> Sources of pollution
	8	natural and manmade, causes,
	9	effects and control measures of pollution (air, water, noise, soil, radioactive and nuclear)
4 <sup>th</sup>	10	effects and control measures of pollution (, noise, soil,)
	11	effects and control measures of pollution (radioactive and nuclear)
	12	their units of measurement
5 <sup>th</sup>	13	<b>SESSIONAL TEST -I</b>
	14	<b>Unit-4-</b> Solid waste management – Causes,
	15	Effects and control measures of urban and
6 <sup>th</sup>	16	Industrial waste
	17	<b>Unit-5-</b> Mining
	18	deforestation – Causes
7 <sup>th</sup>	19	Effects and control measures
	20	<b>Unit-6-</b> Environmental Legislation
	21	Water (prevention and control of pollution) Act 1974,
8 <sup>th</sup>	22	and Environmental Protection Act 1986,
	23	Air (Prevention and Control of Pollution) Act 1981
	24	Environmental Protection Act 1986,
	25	<b>SESSIONAL TEST -II</b>

<b>9<sup>th</sup></b>	<b>26</b>	<b>Unit-6- Role and Function of State Pollution Control Board,</b>
	<b>27</b>	Environmental Impact Assessment (EIA)
<b>10<sup>th</sup></b>	<b>28</b>	<b>Unit-7- Role of Non-conventional Energy Resources Solar Energy,</b>
	<b>29</b>	Wind Energy,
	<b>30</b>	Bio Energy, Hydro Energy
<b>11<sup>th</sup></b>	<b>31</b>	<b>Unit-8- Current Issues in Environmental Pollution – Global Warming</b>
	<b>32</b>	Green House Effect, Depletion of Ozone Layer
	<b>33</b>	Recycling of Material
<b>12<sup>th</sup></b>	<b>34</b>	Environmental Ethics, Rain Water Harvesting,
	<b>35</b>	Maintenance of Groundwater
	<b>36</b>	Acid Rain, Carbon Credits.
<b>13<sup>th</sup></b>	<b>37</b>	<b>SESSIONAL TEST -III</b>
	<b>38</b>	<b>Revised Sessional Test -1</b>
	<b>39</b>	<b>Revised Sessional Test -2</b>
<b>14<sup>th</sup></b>	<b>40</b>	<b>Revised Sessional Test -3</b>
	<b>41</b>	Seminar
	<b>42</b>	Seminar
<b>15<sup>th</sup></b>	<b>43</b>	Any Other Query

## LESSON PLAN

**NAME OF FACULTY: SH. JAGJEET SING NARANG/ SH. F U REHMAN**

**DISCIPLINE: MECHANICAL ENGINEERING - G.P. AMBALA**

**SEMESTER: V**

**SUBJECT: CNC MACHINES AND AUTOMATION**

**LESSON PLAN DURATION: 15 WEEKS**

**WORK LOAD (LECTURE/PRACTICAL) PER WEEK: (3 lectures, 2 Practical)**

WEEK	THEORY		PRACTICALS
	LECTURE NOS	TOPIC	TOPIC
1 <sup>st</sup>	1	<b>Unit-1-</b> Introduction, Introduction to NC, CNC & DNC,	Practical-1 Study of constructional detail of CNC lathe.
	2	their advantages, disadvantages and	
	3	applications. Basic components of CNC machines, Machine Control Unit,	
2 <sup>nd</sup>	4	input devices, selection of components to be machined on CNC machines,	Practical-2 Study of constructional detail of CNC milling machine.
	5	Axis identification	
	6	<b>Unit-2-</b> Construction and Tooling	
3 <sup>rd</sup>	7	Design features, specification of CNC machines,	Practical-3 Study the constructional details and working of Automatic tool changer and Multiple pallets
	8	use of slideways, balls, rollers	
	9	coatings, motor and leadscrew, swarf removal,	
4 <sup>th</sup>	10	safety and guarding devices, various cutting tools for CNC machines,	Practical-4 Develop a part programme for following lathe operations and make the job on CNC lathe. - Plain turning and facing operation - Taper turning operation - Circular interpolation.
	11	Concept of CNC tool holder, different pallet systems	
	12	automatic tool changer system, management of a tool room.	
5 <sup>th</sup>	13	<b>SESSIONAL TEST –I</b>	Repeat Practical 1 to 4
	14	<b>Unit-3-</b> System Devices- Control System; Open Loop and Closed Loop System,	
	15	Concept of Actuators, Transducers and Sensors, Tachometer, LVDT,	
6 <sup>th</sup>	16	opto-interrupters, potentiometers for linear and angular position	Repeat Practical 1 to 4
	17	encoder and decoder and axis drives	
	18	<b>Unit-4-</b> Part Programming, Introduction to Part	

		programming, Basic concepts of part programming,	
7 <sup>th</sup>	19	NC words, part programming formats, simple programming for rational components, part programming using coned cycles,	Repeat Practical 1 to 4
	20	subroutines and do loops, tool off sets, cutter radius compensation and tool wear compensation	
	21	<b>Unit-5</b> -Problems in CNC Machines, Common problems in CNC machines related to mechanical,	
8 <sup>th</sup>	22	electrical and pneumatic, electronic components.	Practical-5 Develop a part programme for the following milling operation and make the job on CNC milling - Plain milling - Slot milling - Contouring - Pocket milling
	23	Study of common problems and remedies,	
	24	use of on-time fault finding diagnosis tools in CNC machines	
9 <sup>th</sup>	25	<b>SESSIONAL TEST -II</b>	Practical-6- Preparation of work instructions for machine operator
	26	<b>Unit-6-</b> Automation and NC system	
	27	Concept of automation,	
10 <sup>th</sup>	28	emerging trends in automation,	Practical-6- Preparation of preventive maintenance schedule for CNC machine.
	29	Automatic assembly.	
	30	Overview of FMS, Group technology,	
11 <sup>th</sup>	31	CAD/CAM	Practical-7 Demonstration through industrial visit for awareness of actual working of FMS in production
	32	CIM	
	33	<b>Unit-7-</b> Robot Technology	
12 <sup>th</sup>	34	Introduction to robot technology,	Repeat Practical 5 to 8
	35	basic robot motion	
	36	and its applications	
13 <sup>th</sup>	37	<b>SESSIONAL TEST -III</b>	Repeat Practical 5 to 8
	38	<b>Revised Sessional Test -1</b>	
	39	<b>Revised Sessional Test -2</b>	
14 <sup>th</sup>	40	<b>Revised Sessional Test -3</b>	Repeat Practical 5 to 8
	41	Seminar	
	42	Seminar	
15 <sup>th</sup>	43	Any Other Query	Repeat Practical

### LESSON PLAN



**NAME OF FACULTY: SH. SANJIV KUMAR**

**DISCIPLINE: MECHANICAL ENGINEERING - G.P. AMBALA**

**SEMESTER: V**

**SUBJECT: WORKSHOP TECHNOLOGY - III**

**LESSON PLAN DURATION: 15 WEEKS**

**WORK LOAD (LECTURE/PRACTICAL) PER WEEK: (3 lectures)**

WEEK	THEORY	
	LECTURE NOS	TOPIC
1 <sup>st</sup>	1	<b>Unit-1-</b> Milling, Specification and working principle of milling machine Classification, brief description and applications of milling machine
	2	Main parts of column and knee type milling machine, Milling machine accessories and attachment – Arbors, adaptors, collets, vices, circular table, indexing head and tail stock,
	3	vertical milling attachment, Milling methods - up milling and down milling, Identification of different milling cutters and work mandrels
2 <sup>nd</sup>	4	Work holding devices, Milling operations – face milling, angular milling, form milling,
	5	straddle milling and gang milling, Cutting parameters
	6	Indexing on dividing heads, plain and universal dividing heads.
3 <sup>rd</sup>	7	Indexing methods: direct, Plain or simple, compound
	8	differential and angular indexing, numerical problems on indexing
	9	<b>Unit-2-</b> Grinding, Purpose of grinding
4 <sup>th</sup>	10	Various elements of grinding wheel – Abrasive, Grade, structure, Bond
	11	Common wheel shapes and types of wheel – built up wheels, mounted wheels and Diamond wheels.
	12	Specification of grinding wheels as per BIS
5 <sup>th</sup>	13	<b>SESSIONAL TEST –I</b>
	14	<b>Unit-2-</b> Truing, dressing, balancing and mounting of wheel.
	15	2.5 Grinding methods – Surface grinding, cylindrical grinding and centreless grinding.
6 <sup>th</sup>	16	2.6 Grinding machine – Cylindrical grinder, surface grinder, internal grinder, centreless grinder, tool and cutter grinder.
	17	2.7 Selection of grinding wheel
	18	<b>Unit-3-</b> Gear Manufacturing and Finishing Processes 3.1 Gear hobbing 3.2 Gear shaping

7 <sup>th</sup>	19	<b>Unit-4-Modern Machining Processes-</b> Mechanical Process - Ultrasonic machining (USM): Introduction, principle, process,
	20	advantages and limitations, applications(USM) Electro Chemical Processes - Electro chemical machining (ECM) – Fundamental principle, process, applications
	21	Electro chemical Grinding (ECG) – Fundamental principle, process, application, Electrical Discharge Machining (EDM) - Introduction, basic EDM circuit, Principle,
8 <sup>th</sup>	22	metal removing rate, dielectric fluid, applications
	23	Laser beam machining (LBM) – Introduction, machining process and applications
	24	Electro beam machining (EBM)- Introduction, principle, process and applications
9 <sup>th</sup>	25	<b>SESSIONAL TEST -II</b>
	26	<b>Unit-5- Metallic Coating Processes-Metal spraying – Wire process</b>
	27	powder process, applications , Powder coating
10 <sup>th</sup>	28	<b>Unit-6-Metal Finishing Processes, Purpose of finishing surfaces</b>
	29	Surface roughness-Definition and units, Honing Process, its applications
	30	Description of hones, Brief idea of honing machines.
11 <sup>th</sup>	31	Lapping process, its applications.
	32	Description of lapping compounds and tools
	33	Brief idea of lapping machines
12 <sup>th</sup>	34	Super finishing process, its applications
	35	Polishing
	36	Buffing
13 <sup>th</sup>	37	<b>SESSIONAL TEST -III</b>
	38	<b>Revised Sessional Test -1</b>
	39	<b>Revised Sessional Test -2</b>
14 <sup>th</sup>	40	<b>Revised Sessional Test -3</b>
	41	Seminar
	42	Seminar
15 <sup>th</sup>	43	Any Other Query