

**Government Polytechnic Korea**  
Department- Mechanical Engineering

Subject - Industrial Maintenance and safety

Jan - June 2025

S.no.	Topic to taught	No. of Lecture required (L+T+P)	Date of Theory Delivery	Topic Covered	Remark
CO-1	Use relevant maintenance method to maintain the equipments.	6			
1	Definition and aim of maintenance engineering.		07/01/25	Engg. maintenance	
2	Primary and secondary functions and responsibility of maintenance department		09/01/25	Responsibility of main. dept.	
3	Types of maintenance - Preventive, Periodic, Predictive, Condition based monitoring		11/01/25	Types of maint.	
4	Types and applications of tools and equipments		14/01/25	Types of tool Equip.	
5	Maintenance cost & its relation with replacement economy.		16/01/25	cost of maint.	
6	Doubt class/ Quiz / Discussion		18/01/25	Quiz ques,	
CO-2	Prepare preventive and periodic maintenance schedule.	9			
1	Periodic maintenance - concept and need.		21/01/25	Periodic maint.	
2	Preventive maintenance - concept, need, steps and advantages.		28/01/25		
3	Repair cycle - concept and importance.		30/01/25	Preventive maint.	
4	Doubt class/ Quiz / Discussion		04/02/25	Repair Cycle	
			06/02/25	Quiz Quiz	
CO-3	Use relevant lubrication and lubrication method as per the situation.	7			
1	Basic fundamentals of friction and Wear		08/02/25	wear and friction	
2	Wear Mechanism.		11/02/25	wear mechanism	
3	General sketch, working and applications of Lubrication methods.		13/02/25	Lubrication method	
4	Definition, principle and factors affecting the corrosion.		15/02/25	corrosion	
5	Types of corrosion preventive method		18/02/25	Types of corrosion	

1	Diagnoses faults in the inoperative machine.					
2	Fault tracing-concept and importance, concept, need, applications					
3	Draw decision tree for problems in machine tools, hydraulic, Types of faults in machine tools and their general causes					
4						
5						
6						
CO-5	Use recovery, reconditioning and retrofitting as per the situation.					
1	Definition of recovery, reconditioning and retrofitting.	8	25/02/25	Recovery, Reconditioning		
2	Methods of recovery and their applications.		27/02/25	Method of Recovery		
3	Selection criteria of recovery methods		04/03/25	Selection criteria of Rec. meth		
4	Reconditioning - process, features and advantages.		06/03/25	Reconditioning		
5	Doubt class/ Quiz / Discussion		08/03/25	Process and advantages of Rec.		
6			11/03/25	Quiz		
CO-6	Apply Industrial safety and Safety Acts.	8				
1	Need, Aim, Objective and Four E's of Industrial Safety.		13/03/25	Industrial Safety		
2	Mechanical and electrical hazards - types, causes and preventive steps/procedure		15/03/25	Mech & Electrical Hazard		
3	Features of Factory Act,		18/03/25	Factory Act		
4	Industrial hygiene and Occupational safety		22/03/25	Hygiene & Occupational Safety		
5	Engineering methods of controlling chemical hazards,		27/03/25	Hygiene & Occupational Safety		
6	Doubt class/ Quiz / Discussion		29/03/25	Chemical Hazard		
			03/04/25	Quiz		

Faculty Name & Signature

Rajesh Kumar Thakur

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Principal

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# Government Polytechnic Korea

## Session Plan Jan - Jun 2025

Department- Mechanical Engineering      Subject - Engineering Metrology

Sno.	Topic to taught	No. of Lecture required (L+T+P)	Date of Theory Delivery	Topic Covered	Remark
CO 1	<b>Select the suitable inspection process for engineering situations</b>	8			
1	Inspection, its objective and purpose,		28/01/25	Inspection types, obj	
2	Metrology: Correlation of inspection and metrology		29/01/25	Metrology	
3	Accuracy and Precision		30/01/25	Accuracy	
4	Elements of measuring systems-		31/01/25	measuring system	
5	relationship between cost and accuracy		03/02/25	Cost & accuracy	
6	classification of standards - primary, secondary, tertiary		02/02/25	type of standard	
CO-2	<b>Use appropriate instrument(s) for linear measurements.</b>	14			
1	Standards of length -		05/02/25	Linear mea.	
2	Classification of linear measurement instruments		10/02/25	Linear mea	
3	Indirect measuring instruments:		13/02/25	Indirect mea. In	
4	Dial Gauge, slip gauge		19/02/25	Direct Mea. In	
CO-3	<b>Use relevant instruments for angular measurements.</b>	15			
1	Need for angle measurement		24/02/25	angle measurement	
2	direct angle measurement:		25/02/25	direct angle mea.	
3	Indirect angle measurement:		29/02/25	Indirect angle measurement	
CO-4	<b>Use relevant geometric tolerance and surface roughness</b>	14	06/03/25	Geometric Tole.	

10/03/25

1	Concept of straightness, flatness, squareness and roundness, importance of their measurement		11/03/25 12/03/25	straightness flatness
2	C.L.A value, R.M.S.		13/03/25	CLA & R.M.S
3	Measurement of surface roughness		17/03/25	Surface & Roughness
4	Relationship of Machining processes		18/03/25	Machining Processes
CO-5	Use relevant instruments for screw thread measurements and gear measurements.	15		
1	Thread nomenclature, Various types of threads,		19/03/25 - 20/03/25	Types of threads
2	Methods of measuring external screw thread elements, Measurement of gear elements		24/03/25 - 26/03/25	Screw thread
3	Methods of internal thread measurement, Gear Measurement		27/03/25 - 31/03/25	Gear measurement
CO-6	relevant comparators and limit gauges for various situations	14		
1	Comparators : Definition, working principle,		1/04/25 - 7/04/25	Comparators
2	Limit Gauges Recall the terminology associated with limits		8/04/25 - 21/04/25	Limit Gauge
3	Fixed size gauges- Plug, ring, snap and thread gauges, their sketches		22/04/25 - 27/04/25	Plug, ring, thread

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Department- Mechanical Engineering

Subject - CAMM

Term - June 2025

S.no.	Topic to taught	No. of Lecture required	Date of Theory Delivery	Topic Covered	Remark
	CO-01 Identify various elements of Computer aided Design and Manufacturing.	14			
1	CADdefinition, conceptandneed.		06/01/25	Study CAD	
2	CAD process and Functionalareasof CAD		08/01/25	Basics of CAD	
3	CADWorkstation- types,functionionsand configuration.		09/01/25	Types of CADWorkstation	
4	CAD Software: types, features,strengthsand limitations		15/01/25	Types of Software	
5	CAM-conceptand definition		16/01/25	cam concept	
6	NC concept, features		20/01/25	NC feature	
7	CNC concept, features		22/01/25	CNC feature	
8	DNC concept, features		23/01/25	DNC feature	
9	CNC machines: Advantages,limitations		27/01/25	Adv. lim of CNC	
	CO- 2 Use Computer aided Design Software to model components	17			
1	Workingin3D environment-		29/01/25 to 03/02/25	Process of 3Dworking	
2	Part Editing tool: Trim, Extend, Erase, Mirror, Chamfer, Round, Copy, Move, Draft,		05/02/25 to 10/02/25	Editing tool	
3	Exploded view:Explode the assembly		12/02/25 to 19/02/25	Process of Exploded	
	CO-3 Use CAD Software	17			
1	All types of views -		20/02/25	Types of views	
2	Dimensioning Commands		24/02/25	Types of Commands	

3	Preparation of Assembly drawing using assembly features			21/02/25	Preced of assembly
4	Exploded view - Explodethassembly.			03/03/25	Preced of Explodeth
5	Working in Drafting Mode.			05/03/25	Preced of Working
	CO 4 Develop components using CNC turning machine		24		
1	CNC machines			06/03/25	Identification of CNC
2	Elements of CNC machines			10/03/25	Parts of CNC
3	ATC & APC			12/03/25	Study of ATC & APC
4	CNC tooling			13/03/25	CNC Tooling
5	CNC Turning centres:			17/03/25	CNC Turning
6	CNC part programming			19/03/25	Programming in CNC
7	ISO G and M codes			20/03/25	Codes in CNC
8	Simple part programming			24/03/25	Preced of SP
9	formatting using ISO			26/03/25	Block of ISO
				27/03/25	
	CO-5 Develop components using CNC milling machine.		24		
1	CNC milling centres:			07/04/25	CNC Milling
2	CNC part Programming			09/04/25	Programming of CNC parts
3	ISO G and M codes for milling -			23/04/25	Grand M code of Milling
4	Importance, types, applications and format for: Canned cycles			24/04/25	Application of canned cycle
5	CNC milling part programming using canned cycle			28/04/25	Part Programming in Canned cycle
6	Need and importance of various compensations			30/04/25	Working of Compensation
7	length compensation;			01/05/25	length of compensation
8	pitch error compensation;			05/04/25	error in compensation
9	tool radius compensation;			07/04/25	Tool compensation
10	Tool offset			08/5/25	offset of tool

quiz and revision

14/05/25  
to  
25/02/25

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Department- Mechanical Engineering

Subject - Fluid Power Engineering

JULY DEC 2024

Sno.	Topic to taught	No. of Lecture required	Date of Theory Delivery	Topic Covered	Remark
CO-1	Apply the basic concepts of fluid flow to Fluid Power Systems	14			
	1 Power transmission modes and their comparison		03/09/24	Power transmission	
	2 Application and advantages of fluid power.		05/10/24		
	3 Basic components of a fluid power system – Reservoir or Receiver, Pump or compressor		06/10/24	Adv. of fluid	
	4 Oil, Hydraulic & Pneumatic systems: General layout, symbols used, Applications, Merits, Limitations.		09/10/24	Components of FPS	
CO-2	5 Hydraulic Fluids-Functions and properties, Types, ISO and SAE grades of oils, Selection of hydraulic	15	12/10/24	Adv. of Hydraulic fluid system	
	1 Explain the operation of various components of hydraulic systems.		13/10/24	Function of Fluid	
	2 Pumps: Classification of pumps, Comparison of positive (Hydrodynamic) & non-positive displacement pumps		14/10/24		
	3 Construction and working of Gear, vane, Screw, piston pumps( axial and radial)		19/10/24		
	4 Performance characteristics and Selection of pumps		20/10/24		
CO-3	5 Actuators: Reservoirs, Accumulators and pressure Intensifiers	18	21/09/24	Types of Pump	
	1 Select components required for making hydraulic circuits for simple applications.		24/10/24	Working of Pumps	
	2 Contro of single and Double acting Hydraulic cylinders.		26/10/24	Selection of Pump	
	3 Speed control double acting cylinder		27/10/24	Working of Actuator	
	4 Meter- In, Meter-out, Bleed Off circuit.		28/10/24	Working of Meter, Accum & PI	
CO-4	5 Unloading circuits, Regenerative circuits	15			
	6 speed control of bidirectional hydraulic motor, braking and				
	7 synchronizing circuits, Sequencing Circuits.				
	8 ISO Symbols used in hydraulic circuits.				
Common troubles in hydraulic systems, their causes					
15					
15					

1	AirCompressors-RecallTypes, construction & working of Reciprocating & Rotary			15/10/24	working of Air compressor	
2	Airtreatment-Airreceiver, MoistureseparatorandAir dryer, FRL unit, Pressure regulator			16/10/24	Study of FRL unit & PR	
3	Pneumaticactuators:Pneumatic Cylinders - Single & double acting cylinders, Air Motors			18/10/24	Components of Pneumatic	
4	Pneumatic control valves: Classification-Direction control valves-2/2,3/2,4/2,4/3,5/2,5/3			20/10/24	Working of pneumatic CV & DV	
5	Accessories: Pipes, hoses, fittings, Seals and gaskets, Accumulators, heatexchanger, muffler.			23/10/24	Types of fittings	
				24/10/24		
CO-5	Selec tomponents required for making pneumatic circuits for simple applications.		18			
1	Direct/IndirectControlof single and Double acting Air cylinders.			05/11/24	Working of Air cylinder	
2	Actuation of Pneumatic motor (Air Motor)			07/11/24	Working of Air motor	
3	Speed control of double acting cylinder and Bi- directional Air motor			09/11/24	Controlling of double acting	
4	Hydro-pneumatic applications Air-Oil reservoir			12/11/24	Working of Air Oil reser	
5	Common troubles in pneumaticsystems,their causes and remedies.			15/11/24	Troubles in pneumatic system	
				16/11/24		

23/11/24

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# Government Polytechnic Korea

JUN - Dec 2024

**Department- Mechanical Engineering**

**Subject - Material Technology**

S.no.	Topic to taught	No. of Lecture required	Date of Theory Delivery	Topic Covered	Remark
1	<p><b>CO-1 Interpret properties and structure of various engineering materials</b></p> <p><i>Unit-1.0 Properties and Structure of Engineering Materials</i></p> <p>Classification of engineering materials – Metals and Non-metals</p> <p>Properties of engineering materials Physical, Thermal, Electrical, Magnetic and Mechanical properties</p>	10hr	<p>03/09/24</p> <p>04/09/24</p> <p>05/09/24</p> <p>09/09/24</p> <p>12/09/24</p>	<p>Properties and structure of E.M.</p> <p>C-E-M, - Metals and Non-metals.</p> <p>metals types</p> <p>properties of eng. material phy.</p> <p>Thermal, Electrical, mag, M. proper</p>	
	<p>Structure of crystalline solids: Concept of Amorphous and crystalline structure, Crystallization of liquid into solid state, nucleation and growth, formation of polycrystalline and single crystals, effect of grain size on material properties</p>		<p>17/09/24</p> <p>18/09/24</p> <p>19/09/24</p>	<p>S, Co S.: concept of amorphous and crystalline structure, effect of liquid into solid, nucleation and growth, formation of poly. and single crys, eff. of grain size on MP</p>	
	<p>Crystal Structure – space lattice, unit cell, BCC, FCC, HCP lattice</p>		23/09/24	<p>cryst. str. - space lattice, BCC, FCC</p>	
	<p>Structural imperfections: impurity atoms, point imperfection, line imperfection, dislocations, surface imperfection, volume defects</p>		24/09/24	<p>structural imp.: impurity atoms, P, S, Al, by diso, sur imp, volume def.</p>	
	<p>Metallurgical microscope, its use and care</p>			<p>Metallurgical mic. scope, use and care</p>	
2	<p><b>CO-2 Analyze the plastic deformation of metals</b></p> <p>Unit-2.0 Plastic deformation</p> <p>Elastic and Plastic deformation</p> <p>Mechanisms of deformation in crystalline materials – Slip and Twinning</p> <p>Stress – Strain curves for polycrystalline materials</p> <p>Yield point phenomena</p> <p>Strain hardening</p> <p>Recovery, recrystallisation and grain growth</p>	13hr	<p>25/09/24</p> <p>26/09/24</p> <p>30/09/24</p> <p>01/10/24</p> <p>03/10/24</p> <p>07/10/24</p> <p>08/10/24</p>	<p>plastic deformation.</p> <p>elastic and plastic deformation</p> <p>Md. C.M. - slip and twinning.</p> <p>stress-strain curve. P. M.</p> <p>yield point phenomena</p> <p>strain hardening.</p> <p>Rec., recrystallisation and grain growth</p>	
3	<p><b>CO-3 Interpret the Phase diagrams</b></p> <p>Unit-3.0 Phase diagrams</p> <p>Concept, definitions and need</p>	13hr	<p>09/10/24</p> <p>09/10/24</p> <p>09/10/24</p>	<p>Phase diagrams</p> <p>con. definition and need</p>	

	Solid Solution - Types				14   10   24	Solid Solution - Types	
	Alloy - need for alloying, effect on material properties				15   10   24	Alloy - need for alloying, e.m.p.	
	Cooling curves and their importance				16   10   24	cooling curve and their imp.	
	Types of phase equilibrium diagram - monotectic, Eutectic, Hyper eutectic, hypoeutectic, eutectoid, Hyper and Hypo eutectoid, peritectic and peritectoid system				21   10   24 22   10   24 23   10   24	T.P.e.d. - Mono, eutectic, Hyper, hypo, eutec, Hyper and Hypo eutecoid, peritectoid system.	
	Iron-carbon equilibrium diagram: Development of microstructure - Carbon system, Allotropic transformations in Iron and Steel				24   10   24 26   10   24 24   11   25	Iron carbon equl. diag. ; DO. micro structure + carbon sys. allotropic; transform. in iron and steel.	
	Microstructure examination: Preparation of microspecimen, selecting the specimen, grinding and polishing, Etching and etching reagents. use and care of microscope				08   11   25 06   11   25 09   11   25	mic.exam. ; P.O.M., selecting Sp and polishing, etching and etc. steel use and care of microscope.	
4	CO-4 Select ferrous and non ferrous materials as per the requirement		10hr				
	Unit-4.0 Metallic Materials				11   11   24	Metallic materials.	
	Micro- Structure, Properties and application, designation and coding methods				12   11   24	Mic. str. p.ro. and APPL., DES. & Coding method.	
	Cast Iron: Gray, White, Malleable, Nodular Cast iron				13   11   24	C.I. Gray, white, M.N.C.I.	
	Steels: Low, medium and high carbon steels, Stainless steel, High speed steel, Tool steel, Alloy steels				14   11   24	Steels: low, med, high C.S. S.M.N. resisteel, H.S.S. TS. alloy steels.	
	Copper, Aluminum, Zinc and their alloys, Bearing materials, Alloying elements				25   11   24	Copper, Alu., zinc and their alloy. Bearing m.o, alloy etc.	
5	CO-5 Select non-metallic materials as per the requirement		10hr				
	Unit-5.0 Non-metallic Materials				26   11   24	Non-metallic materials.	
	Polymers: Types, properties and industrial applications				27   11   24 28   11   24	Polymers: Types, properties and industrial Applications	
	Industrial applications						
	Ceramic and refractory: Types, properties and applications				02   12   24 03   12   24	Ceramic and refractory: Type p.ro. and Applications.	

	Composites: types, properties and applications					
	Nano and Smart materials: Definition, types - piezoelectric, thermoresponsive, shape memory alloys, polychromic, chromogenic or halochromic materials, Applications		04/12/24	05/12/24	Compos.: Types, Prop, and appl. N.S.M. Definition. Piezoele. Memory shape memory alloy, Pily chromo, or halochromic materials Applic.	
6	CO-6 select relevant heat treatment processes	13hr				
	unit 06 Heat treatment process of steel		09/12/24		H.T. P.S.	
	Introduction, purpose and advantage of heat treatment		09/12/24		& introduction of heat treat	
	TTT Curve : significance and construction of TTT curve for eutectoid steel		10/12/24		TTT curve - sign. and con. of TTT	
	Introduction to pearlite, bainite and martensitic transformation		10/12/24		Instr. of transformation in TTT curve	
	heat treatment process annealing, normalizing, hardening, tempering		11/12/24		heat treatment	
	heat treatment furnace-muffle furnace, box furnace		11/12/24		heat treatment	
7	CO-6 select relevant material testing method	11hr				
	unit-7 Testing of materials					
	Destructive and non destructive testing		12/12/24		Types of testing	
	hardness test, rockwell test		16/12/24		Methods of testing	
	non destructive testing		19/12/24		Uses of testing	

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**Government Polytechnic Korea**  
**Session Plan Jul-Dec 2024**

**Department- Mechanical Engineering**

**Subject - Machine Tool Technology**

S.no.	Topic to taught	No. of Lecture required (L+T+P)	Date of Theory Delivery	Topic Covered	Remark
	<b>CO-1 Apply the basics of metal cutting and machine tools in machining processes.</b>				
	<b>Metal cutting</b>	18hr			
1	Cutting Tools – types, requirements, specification & application of different cutting tools, cutting tool materials – high carbon steels, high speed steels, non-ferrous cast alloys, cemented carbides, ceramics, diamond, Cubic Boron Nitride, properties and applications		02/09/24 03/09/24 04/09/24 07/09/24	Cutting Tools, Tool life, Types of Tool applications of tool	
2	Geometry of Single Point Cutting Tool - Tool angle, Tool geometry and influence of tool angles, tool signature, Tool angle specification system, ASA, ORS and inter-relationship.		09/09/24 10/09/24	Geometry of SPC T Types of angle in SPC T	
3	Mechanics of Metal Cutting - Theories of metal cutting, Chip formation, types of chips, BUE formation condition and its effect upon surface finish, chip breakers, Orthogonal and Oblique cutting, stress and strain in the chip, velocity relations, power and energy requirement in metal cutting.		11/09/24 14/09/24 17/09/24 18/09/24	Chip formation types of chip Types of cutting	
	<b>CO-2 Supervise production of jobs on Shaper, Planner and Drilling machines.</b>	18 hr			
	<b>Mechanics of machining</b>				
1	diagram, dynamometer, force and velocity relationship, Tool wear, Factors causing wear, tool life, tool life equation, variables affecting tool life, Cutting parameters -speed, feed, depth of cut and machining time, economical cutting speed		21/09/24 to	Working of dynamometer velocity relation, Tool wear and other cutting parameters	
2	Machinability - Concept and evaluation of Machinability, Mechanism of Tool failure, Machinability index, factors affecting machinability		28/09/24 to 01/10/24	Process of Machinability	
3	Thermal Aspects in Machining- Sources of heat generation in machining and its effects, Temperature Measurement techniques in machining, types of cutting fluids, Functions of cutting fluid, Characteristics of cutting fluid, Application of cutting fluids.		05/10/24 to	Properties of cutting fluid application of cutting fluid	
	<b>CO-3 Supervise production of jobs on Shaper, Planner and Drilling machines.</b>	26 hr			
	<b>Shaper, Planner and Drilling machine</b>				
1	Shaper: Principle of operation, classification, specification, Basic parts and their functions and Applications, safety precautions.		12/10/24 to 15/10/24	operation and its types	
2	Slotter: Principle of working, classification, specification. Basic parts of Slotting machine and their functions		16/10/24 to 21/10/24	working, classification's parts	
3	Planer: Principle of operation, Classification, Basic parts and their functions,		22/10/24 to	parts and types	

20/10/24

4	Drilling: Principle of operation, Classification, Basic parts and functions, drill nomenclature					
	<b>CO-4 Supervise production of jobs on Milling and Broaching machines.</b>					
	Milling and Broaching operations	20 hr				
1	Milling: Principle of operation, Classification of milling machines, Basic parts and their functions					
2	cutters used in milling, face milling cutter, end milling cutter, Slaggered tooth milling cutter					
3	Milling operations – Plain milling, face milling, side milling, end milling, straddle milling, gang milling					
4	Dividing head – types, function of dividing head, method of indexing, index plates					
5	Broaching: Principle of operation, types of broaches- horizontal, vertical, pull					
	<b>CO-5 Supervise grinding and finishing operations.</b>	15 hr				
	Grinding and Finishing Processes					
1	Grinder and types of grinding wheel, Types of abrasive materials and their properties, Bonding materials, Grinding wheel classification, condition for selection of grinding wheels, balancing of grinding wheels, glazing, loading dressing and Truing. Designation of grinding wheel					
2	Grinder and types of grinding wheel, Types of abrasive materials and their properties, Bonding materials, Grinding wheel classification, condition for selection of grinding wheels, balancing of grinding wheels, glazing, loading dressing and Truing. Designation of grinding wheel					
3	Grinder and types of grinding wheel, Types of abrasive materials and their properties, Bonding materials, Grinding wheel classification, condition for selection of grinding wheels, balancing of grinding wheels, glazing, loading dressing and Truing. Designation of grinding wheel	15 hr				
	<b>CO-6 Perform installation and testing of machine tools.</b>					
	Installation and Testing of Machine Tools					
1	Foundations, leveling and alignment, Factors affecting the working accuracy of machine tool					

28/10/24

13/11/24  
18/11/24  
19/11/27  
20/11/27

25/11/24  
to

Types of tool & operation

operation and tool used

types of milling

types of operation

Parts of milling

operation of Broaching

Working of grinder  
Types of grinders

Structure of grinding  
wheel, abrasive of grinding  
wheel

operation in grinding  
wheel

Foundation work

30/11/24

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