

"PVC" NSSK G.P. BILASPUR at KALOL SYLLABSE COVRAGE		Department :- Mechanical Engg. (3 rd Sem.)		Subject- BME (MEPC201)		
		Course- Diploma		Duration -3 Years		
		Total Periods – 56 (Lecture-42 + DCS- 14)		Theory-56 (Lecture-42 + DCS- 14)		
Sr no.	Period No's	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
1	1-12	Introduction to Thermodynamics	Role of Thermodynamics in Engineering and science, Types of Systems, Thermodynamic Equilibrium, Properties, State, Process and Cycle, Elementary introduction to Zeroth, First and Second laws of thermodynamics, Heat and Work Interactions for various processes; Concept of Heat Engine, Heat Pump & Refrigerator, Efficiency/COP; Kelvin-Planck and Clausius Statements, Carnot Cycle, Carnot Efficiency, T-S and P-V Diagrams, Concept of Entropy.	Basic Mechanical Engineering – M.P.Poonia & S.C. Sharma	Engineering Thermodynamics –Spalding and Cole	
2	13-23	Heat transfer & Thermal Power Plant	Heat Transfer, Modes of Heat Transfer; Conduction: Fourier Equation, Conduction heat transfer through Composite Walls, Simple Numerical Problems, Convection Heat transfer: : Natural and forced convection, Radiation: Absorption, Reflection and transmission of radiation, Concept of black body, Stefan-Boltzman Law (concept only , No derivation), Thermal Power Plant Layout; Rankine Cycle; Fire Tube and Water Tube boilers, Babcock& Wilcox, Cochran Boilers.	-----do-----	Engineering Heat Transfer–Gupta & Prakash	
3	24-34	Steam Turbines & Internal Combustion Engines	Impulse and Reaction Turbines; Condensers: Jet & Surface Condensers, Cooling Towers; Otto, Diesel and Dual cycles; P-V and T-S Diagrams; IC Engines:2-Stroke and 4-Stroke I.C. Engines, S.I. and C.I. Engines.	-----do-----	Elements of Mechanical Engineering– M.L. Mathur, F.S.Mehta and R.P. Tiwari	
4	35-45	Materials and Manufacturing Processes	Engineering Materials, Classification and their Properties; Metal Casting, Moulding, Patterns, Metal Working: Hot Working and Cold Working, Metal Forming: Extrusion, Forging, Rolling, Drawing, Gas Welding, Arc Welding, Soldering, and Brazing	-----do-----	Workshop Technology (Vol.1and2)– B.S. Raghuvanshi, Dhanpath Rai and Sons	
5	46-56	Machine Tools and Machining Processes	Machine Tools: Lathe Machine and types, Lathe Operations, Milling Machine and types, Milling Operations, Shaper and Planer Machines: Differences, Quick Return Motion Mechanism , Drilling Machine: Operations, Grinding Machine: Operations.	-----do-----	-----do-----	

Approved
 Date : 03/08/2026

HOD Sign

"PVC" NSSK GOVT POLYTECHNIC BILASPUR**PLANNED THEORY SYLLABUS COVERAGE & LESSON PLAN (SESSION:Aug-Dec-2026)**

Branch Mechanical Engg.

Subject: Material Science & Engineering

Sem. 3rd

Duration: 3 Year

Class
Schedule: 4 Days/Week (Mon, Tue, Wed, Fri)

Total Periods: 64 Hours / 56 Planned Lectures

SR. NO	Date & Day	Period No.	Topic / Unit	Details of Syllabus Coverage	Instruction Reference / Academic Activity	Remarks / Calendar Milestones
1	03-Aug-2026 (Mon)	Period 1	Unit-I: Crystal Structures & Bonds	Introduction to Crystal structures: Unit cell and space lattice concepts	A Text Book of Material Science & Metallurgy – O.P. Khanna	Commencement of Semester Classes
2	04-Aug-2026 (Tue)	Period 2	Unit-I: Crystal Structures & Bonds	Crystal system: The seven basic crystal systems overview	A Text Book of Material Science & Metallurgy – O.P. Khanna	Orientation Programme Week
3	05-Aug-2026 (Wed)	Period 3	Unit-I: Crystal Structures & Bonds	Crystal structure for metallic elements: Body-Centered Cubic (BCC)	A Text Book of Material Science & Metallurgy – O.P. Khanna	
4	07-Aug-2026 (Fri)	Period 4	Unit-I: Crystal Structures & Bonds	Crystal structure for metallic elements: Face-Centered Cubic (FCC)	A Text Book of Material Science & Metallurgy – O.P. Khanna	
5	10-Aug-2026 (Mon)	Period 5	Unit-I: Crystal Structures & Bonds	Crystal structure for metallic elements: Hexagonal Close-Packed (HCP)	Material Science & Engineering – R.K. Rajput	
6	11-Aug-2026 (Tue)	Period 6	Unit-I: Crystal Structures & Bonds	Coordination number definition and determination for Simple Cubic, BCC, and FCC	Material Science & Engineering – R.K. Rajput	
7	12-Aug-2026 (Wed)	Period 7	Unit-I: Crystal Structures & Bonds	Atomic radius definition and relationship for Simple Cubic, BCC, and FCC	Material Science & Engineering – R.K. Rajput	
8	14-Aug-2026 (Fri)	Period 8	Unit-I: Crystal Structures & Bonds	Atomic Packing Factor (APF) concept and formula for Simple Cubic	Material Science & Engineering – R.K. Rajput	
9	17-Aug-2026 (Mon)	Period 9	Unit-I: Crystal Structures & Bonds	Atomic Packing Factor (APF) for BCC structure (derivations omitted)	Material Science – R.S. Khurmi	
10	18-Aug-2026 (Tue)	Period 10	Unit-I: Crystal Structures & Bonds	Atomic Packing Factor (APF) for FCC and HCP structures (derivations omitted)	Material Science – R.S. Khurmi	



11	19-Aug-2026 (Wed)	Period 11	Unit-I: Crystal Structures & Bonds	Bonds in solids: Classification into primary (chemical) and secondary (molecular) bonds	Material Science – R.S. Khurmi	Academic Interaction Month 1
12	21-Aug-2026 (Fri)	Period 12	Unit-I: Crystal Structures & Bonds	Concept of types of primary bonds: Ionic bonding mechanism and properties	Material Science – R.S. Khurmi	-
13	24-Aug-2026 (Mon)	Period 13	Unit-I: Crystal Structures & Bonds	Types of primary bonds: Covalent bonding mechanism and properties	A Text Book of Material Science & Metallurgy – O.P. Khanna	-
14	25-Aug-2026 (Tue)	Period 14	Unit-I: Crystal Structures & Bonds	Types of primary bonds: Metallic bonding mechanism and properties	A Text Book of Material Science & Metallurgy – O.P. Khanna	Lesson Plan Review (Week 4)
15	26-Aug-2026 (Wed)	-	Academic Activity	Technical Seminar / Group Discussion / Quiz Contest	Co-Curricular / Student Activity	Monthly Activity (Calendar Item 7)
16	28-Aug-2026 (Fri)	Period 15	Unit-I: Crystal Structures & Bonds	Unit-I Review, comparative bonding analysis & numerical/conceptual problem solving	A Text Book of Material Science & Metallurgy – O.P. Khanna	Unit-I Complete (15 Hrs)
17	31-Aug-2026 (Mon)	Period 16	Unit-II: Phase Diagrams & Alloys	Introduction to Phase diagrams: Isomorphs, eutectic, and eutectoid systems	A Text Book of Material Science & Metallurgy – O.P. Khanna	-
18	01-Sep-2026 (Tue)	Period 17	Unit-II: Phase Diagrams & Alloys	Iron-Carbon binary phase diagram: Key micro-constituents and phases	A Text Book of Material Science & Metallurgy – O.P. Khanna	-
19	02-Sep-2026 (Wed)	Period 18	Unit-II: Phase Diagrams & Alloys	Iron-Carbon binary diagram: Critical temperatures and phase transformations	A Text Book of Material Science & Metallurgy – O.P. Khanna	-
20	04-Sep-2026 (Fri)	-	Revision / Prep	Revision & Problem Solving Session for 1st Class Test	Continuous Assessment Prep	Attendance Display by 05.09.2026
21	07-Sep-2026 (Mon)	-	Assessment	1ST CLASS TEST (Unit-I & Part Unit-II)	Centralized / Departmental Evaluation	Calendar Item 9 (2nd Week Sep)
22	08-Sep-2026 (Tue)	Period 19	Unit-II: Phase Diagrams & Alloys	Test Discussion + Iron and Carbon Steels classification & microstructures	Material Science & Engineering – R.K. Rajput	-
23	09-Sep-2026 (Wed)	Period 20	Unit-II: Phase Diagrams & Alloys	Iron ores and Pig iron: classification and composition	Material Science & Engineering – R.K. Rajput	-
24	11-Sep-2026 (Fri)	Period 21	Unit-II: Phase Diagrams & Alloys	Effects of impurities (S, P, Si, Mn) on iron properties	Material Science & Engineering – R.K. Rajput	-
25	14-Sep-2026 (Mon)	Period 22	Unit-II: Phase Diagrams & Alloys	Cast Iron: Classification (Grey, White, Malleable, Nodular)	Material Science & Engineering – R.K. Rajput	-
26	15-Sep-2026 (Tue)	Period 23	Unit-II: Phase Diagrams & Alloys	Cast Iron: Composition, mechanical properties, and engineering uses	Material Science & Engineering – R.K. Rajput	Academic Interaction Month 2

27	16-Sep-2026 (Wed)	Period 24	Unit-II: Phase Diagrams & Alloys	Wrought Iron: Properties, Industrial applications, and uses	Material Science – R.S. Khurmi	-
28	18-Sep-2026 (Fri)	Period 25	Unit-II: Phase Diagrams & Alloys	Standard commercial grades of steel as per BIS and AISI standards	Material Science – R.S. Khurmi	-
29	21-Sep-2026 (Mon)	Period 26	Unit-II: Phase Diagrams & Alloys	Alloy Steels: Purpose of alloying and mechanisms of property enhancement	Material Science – R.S. Khurmi	-
30	22-Sep-2026 (Tue)	Period 27	Unit-II: Phase Diagrams & Alloys	Effects of key alloying elements (Cr, Ni, Mo, V, W, Mn, Si)	A Text Book of Material Science & Metallurgy – O.P. Khanna	Lesson Plan Review (Week 4)
31	23-Sep-2026 (Wed)	-	Academic Activity	Technical Debate / Group Discussion / Seminar	Co-Curricular / Student Activity	Monthly Activity (Calendar Item 7)
32	25-Sep-2026 (Fri)	Period 28	Unit-II: Phase Diagrams & Alloys	Important alloy steels: Silicon steel and High Speed Steel (HSS)	A Text Book of Material Science & Metallurgy – O.P. Khanna	-
33	28-Sep-2026 (Mon)	Period 29	Unit-II: Phase Diagrams & Alloys	Important alloy steels: Heat resisting steel and Spring steel	A Text Book of Material Science & Metallurgy – O.P. Khanna	-
34	29-Sep-2026 (Tue)	Period 30	Unit-II: Phase Diagrams & Alloys	Important alloy steels: Stainless Steel (SS) types, properties, and applications	A Text Book of Material Science & Metallurgy – O.P. Khanna	Unit-II Complete (15 Hrs)
35	30-Sep-2026 (Wed)	Period 31	Unit-III: Non-Ferrous Metals	Properties and uses of aluminum and copper	A Text Book of Material Science & Metallurgy – O.P. Khanna	-
36	02-Oct-2026 (Fri)	-	HOLIDAY	GANDHI JAYANTI (National Holiday)	Institute Closed	Holiday
37	05-Oct-2026 (Mon)	-	Revision / Prep	Revision & Practice Session for 2nd Class Test	Continuous Assessment Prep	Attendance Display by 05.10.2026
38	06-Oct-2026 (Tue)	-	Assessment	2ND CLASS TEST (Unit-II & Part Unit-III)	Centralized / Departmental Evaluation	Calendar Item 11 (2nd Week Oct)
39	07-Oct-2026 (Wed)	Period 32	Unit-III: Non-Ferrous Metals	Test Discussion + Properties and uses of tin, lead, zinc, magnesium, and nickel	Material Science & Engineering – R.K. Rajput	-
40	09-Oct-2026 (Fri)	Period 33	Unit-III: Non-Ferrous Metals	Copper alloys: Brasses – composition, properties, and uses	Material Science & Engineering – R.K. Rajput	-
41	12-Oct-2026 (Mon)	Period 34	Unit-III: Non-Ferrous Metals	Copper alloys: Bronzes – composition, properties, and uses	Material Science & Engineering – R.K. Rajput	-
42	13-Oct-2026 (Tue)	Period 35	Unit-III: Non-Ferrous Metals	Aluminum alloys: Duralumin – composition, properties, and uses	Material Science & Engineering – R.K. Rajput	-
43	14-Oct-2026 (Wed)	Period 36	Unit-III: Non-Ferrous Metals	Aluminum alloys: Hindalium and Magnelium – composition, properties, and uses	Material Science & Engineering – R.K. Rajput	Exam Form Deadline (15.10)

44	16-Oct-2026 (Fri)	Period 37	Unit-III: Non-Ferrous Metals	Nickel alloys: Inconel – composition, high-temperature properties, and uses	Material Science – R.S. Khurmi	Academic Interaction Month 3
45	19-Oct-2026 (Mon)	Period 38	Unit-III: Non-Ferrous Metals	Nickel alloys: Monel and Nichrome – composition, properties, and uses	Material Science – R.S. Khurmi	
46	20-Oct-2026 (Tue)	Period 39	Unit-III: Non-Ferrous Metals	Anti-friction / Bearing alloys: Functions, requirements, and various bearing types	Material Science – R.S. Khurmi	
47	21-Oct-2026 (Wed)	Period 40	Unit-III: Non-Ferrous Metals	Bearing bronzes: Composition, properties, and industrial applications	Material Science – R.S. Khurmi	
48	23-Oct-2026 (Fri)	Period 41	Unit-III: Non-Ferrous Metals	Standard commercial grades of non-ferrous alloys as per BIS/ASME	A Text Book of Material Science & Metallurgy – O.P. Khanna	Lesson Plan Review (Week 4)
49	26-Oct-2026 (Mon)	Period 42	Unit-III: Non-Ferrous Metals	Unit-III Summary, selection criteria for non-ferrous alloys in industry	A Text Book of Material Science & Metallurgy – O.P. Khanna	Unit-III Complete (12 Hrs)
50	27-Oct-2026 (Tue)	Period 43	Unit-IV: Failure Analysis & Testing	Introduction to failure analysis: Fracture: ductile fracture mechanism	A Text Book of Material Science & Metallurgy – O.P. Khanna	
51	28-Oct-2026 (Wed)	-	Academic Activity	Technical Quiz Contest / Poster Presentation	Co-Curricular / Student Activity	Monthly Activity (Calendar Item 7)
52	30-Oct-2026 (Fri)	Period 44	Unit-IV: Failure Analysis & Testing	Brittle fracture, cleavage fracture, and notch sensitivity concept	A Text Book of Material Science & Metallurgy – O.P. Khanna	Internal Assessment Display (31.10)
53	02-Nov-2026 (Mon)	Period 45	Unit-IV: Failure Analysis & Testing	Fatigue failure mechanism, stress concentration, and concept of endurance limit	Material Science & Engineering – R.K. Rajput	Attendance Display by 05.11.2026
54	03-Nov-2026 (Tue)	-	Examination	CENTRALIZED HOUSE TEST	Centralized Board Assessment	Calendar Item 15 (1st Week Nov)
55	04-Nov-2026 (Wed)	Period 46	Unit-IV: Failure Analysis & Testing	House Test Discussion + Concept of creep, creep mechanisms, and creep curve	Material Science & Engineering – R.K. Rajput	
56	06-Nov-2026 (Fri)	Period 47	Unit-IV: Failure Analysis & Testing	Creep fracture; Destructive testing: Tensile testing procedure and stress-strain curve	Material Science & Engineering – R.K. Rajput	
57	09-Nov-2026 (Mon)	-	HOLIDAY	DIWALI VACATIONS	Institute Closed	Calendar Item 17 (3 Days)
58	10-Nov-2026 (Tue)	-	HOLIDAY	DIWALI VACATIONS	Institute Closed	Calendar Item 17 (3 Days)
59	11-Nov-2026 (Wed)	Period 48	Unit-IV: Failure Analysis & Testing	Compression testing, Bend test, and Torsion test procedures	Material Science & Engineering – R.K. Rajput	
60	13-Nov-2026 (Fri)	Period 49	Unit-IV: Failure Analysis & Testing	Hardness testing: Brinell hardness test procedure, apparatus, and calculations	Material Science – R.S. Khurmi	Parent Teacher Meeting (PTM Week)

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61	16-Nov-2026 (Mon)	Period 50	Unit-IV: Failure Analysis & Testing	Hardness testing: Rockwell hardness testing procedure and scales	Material Science – R.S. Khurmi	-
62	17-Nov-2026 (Tue)	Period 51	Unit-IV: Failure Analysis & Testing	Fatigue test and Creep test experimental procedures	Material Science – R.S. Khurmi	Academic Interaction Month 4
63	18-Nov-2026 (Wed)	Period 52	Unit-IV: Failure Analysis & Testing	Non-destructive testing (NDT): Visual Inspection and Magnetic particle inspection	Material Science – R.S. Khurmi	-
64	20-Nov-2026 (Fri)	Period 53	Unit-IV: Failure Analysis & Testing	Non-destructive testing (NDT): Liquid penetrant test and Ultrasonic inspection	A Text Book of Material Science & Metallurgy – O.P. Khanna	-
65	23-Nov-2026 (Mon)	Period 54	Unit-IV: Failure Analysis & Testing	Non-destructive testing (NDT): Radiography inspection & NDT methods comparison	A Text Book of Material Science & Metallurgy – O.P. Khanna	Unit-IV Complete (12 Hrs)
66	24-Nov-2026 (Tue)	Period 55	Unit-V: Corrosion & Surface Engg.	Nature of corrosion and its underlying causes; Electrolytes and electrochemical cells	A Text Book of Material Science & Metallurgy – O.P. Khanna	Rationalisation Committee Visit
67	25-Nov-2026 (Wed)	Period 56	Unit-V: Corrosion & Surface Engg.	Factors affecting corrosion: Environment, Material properties, and physical conditions	A Text Book of Material Science & Metallurgy – O.P. Khanna	Lesson Plan Review (Week 4)
68	27-Nov-2026 (Fri)	Period 57	Unit-V: Corrosion & Surface Engg.	Types of corrosion; Corrosion control; Material selection and environment control	A Text Book of Material Science & Metallurgy – O.P. Khanna	End of Classes (28.11.2026)

Prepared By: Faculty in Charge
Department of Mechanical Engineering

Checked & Approved By: HOD / IOC
"prc" NSSK Govt Polytechnic, Bilaspur (H.P.)

"PVCNSSK" G.P BILASPUR AT KALOL (H.P)



PLANNED SYLLABUS COVERAGE

Department: Mechanical Engg. Subject – Manufacturing Engineering

Course - Diploma

Duration – 3 Years

SYLLABUS COVERAGE

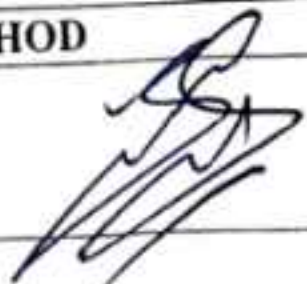
Total Periods -56

Theory –56 hours

Sr No	Period Nos	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
1	1-11	Cutting Fluids & Lubricants	Introduction; Types of cutting fluids, Fluids and coolants required in turning, drilling, shaping, sawing & broaching; Selection of cutting fluids, methods of application of cutting fluid; Classification of lubricants(solid, liquid, gaseous), Properties and applications of lubricants. Lathe Operations: Types of lathes – light duty, Medium duty and heavy duty geared lathe, CNC lathe (Concept only); Specifications; Basic parts and their functions; Operations and tools–Turning, parting off, Knurling, facing, Boring, drilling, threading, step turning, taper turning.	Workshop Technology by R.S Khurmi		
2.	12-22	Broaching Machines	Introduction to broaching; Types of broaching machines–Horizontal type (Single ram & duplex ram), Vertical type, Pull up, pull down, and push down; Elements of broach tool; Nomenclature; Tool materials for broaching. Drilling: Classification; Basic parts and their functions; Radial drilling machine; Types of operations; Specifications of drilling machine; Types of drills and reamers.	Workshop Technology by OP Khana		
3	23-34	Welding	Classification; Gas welding techniques; Types of welding flames; Arc Welding – Principle, Equipment, Applications; Shielded metal arc welding; Submerged arc welding; TIG / MIG welding; Resistance welding - Spot welding, Seam welding, Projection welding; Welding defects; Brazing and soldering. Milling: Introduction; Types of milling machines: plain, Universal, vertical; constructional details specifications; Milling operations: simple, compound and differential indexing (No Numerical); Milling cutters –types; Teeth materials; Tool signature in ASA; Tool & work holding devices.	Welding Technology by OP Khana		

SYLLABUS COVERAGE		Total Periods:56				Theory:56		Remark
Sr No	Period Nos	Topic	Details	Instruction Reference	Additional Study Recommended			
4	35-46	Gear Making	Manufacture of gears—by Casting, Moulding, Stamping, Coining, Extruding, Rolling, Machining; Gear generating methods: Gear Shaping with pinion cutter & rack cutter; Gear hobbing; Description of gear hob; Operation of gear hobbing machine; Gear finishing processes; Gear materials and specification; Heat treatment processes applied to gears. Press working (derivations and problems omitted): Types of presses and Specifications, Press working operations- Cutting, bending, drawing, punching, blanking, notching, lancing; Die set components- punch and die shoe, guide pin, bolster plate, stripper, stock guide, feed stock, pilot; Punch and die clearances for blanking and piercing, effect of clearance.	Workshop Technology by BS Raghuvanshi,				
5	47-56	Grinding and finishing processes:	Principles of metal removal by Grinding; Abrasives –Natural & Artificial; Bonds and binding processes: Vitrified, silicate, shellac, rubber, bakelite; Factors affecting the selection of grind wheels: size and shape of wheel, kind of abrasive, grain size, grade and strength of bond, structure of grain, spacing, kinds of bind material; Grinding machines classification: Cylindrical, Surface, Tool & Cutter grinding machines; Construction details; Principle of centerless grinding; Advantages & limitations of centerless grinding; Finishing by grinding: Honing, Lapping, Super finishing; Electroplating: Basic principles, Plating metals, applications; Hot dipping: Galvanizing, Tin coating, Parkerising, Anodizing; Metal spraying: wire process, powder process and applications; Organic coatings; Finishing specifications.	Elements of Workshop Technology by SK Chaudhary & Hajra,				


Subject Teacher

APPROVED	SIGN HOD
DATE :- 01/08/2026	

"PVC" NSSK GOVT POLYTECHNIC BILASPUR
PLANNED THEORY SYLLABUS COVERAGE

Department: Mechanical Engg.			Subject: Thermal Engineering-I				
Sem. & Branch: 3rd / Mech. Engg.			Duration: 3 Year				
Syllabus coverage		Total periods:-56					
SR. NO	Period no	Topic	Details	Instruction Reference	Additional study	Remarks	
1	1-8	Sources of Energy	Brief description of energy Sources: Classification of energy sources: Renewable, Non-Renewable; Solar Energy: Flat plate and concentrating collectors & its applications (Solar Water Heater, Photovoltaic Cell); Wind Energy; Tidal Energy; Ocean Thermal Energy; Geothermal Energy; Biogas, Biomass, Bio-diesel; Hydraulic Energy.	1. Introduction to Renewable Energy-Vaughn Nelson, CRC Press 2. Thermal Engineering-R.S.Khurmi and J.K.Gupta, 18th Edition, S.Chand & Co,New Delhi	1. Thermal Engineering- P.L. Ballaney, Khanna Publishers,2002 2. A Course in Thermal Engineering-S. Domkundwar & C.P.Kothandarama n,Dhanpat Rai 3. Thermal Engineering-R.K.R ajput, 8th Edition, Laxmi publications Pvt Ltd,NewDelhi		
2	9-18	Internal Combustion Engines	Assumptions made in air standard cycle analysis; Brief description along with derivation of efficiency of Carnot, Otto and Diesel cycles with P-V and T-S diagrams; Internal and external combustion engines; classification of I.C. engines; Function of each part and materials used for the component parts - Cylinder, crank case, crank pin, crank, crank shaft, connectingrod, wrist pin, piston, cylinder heads, exhaust valve, inlet valve; Working of four-stroke and two-stroke petrol and diesel engines; Comparison of two stroke and four stroke engines; Comparison of C.I. and S.I. engines; Valve timing and port timing diagrams for four stroke and two stroke engines				
3	19-30	I.C. Engine Systems	Fuel system of Petrol engines; Principle of operation of simple carburetor; Fuel system of Diesel engines; Plunger type fuel injection pump, fuel feed pump and fuel injector (description with line diagram); Cooling system ; Air cooling, water cooling system with thermosiphon method of circulation and water cooling system with radiator and forced circulation (description with line diagram). Comparison of air cooling and water cooling system; Ignition systems-Battery coil ignition and magneto ignition (description and working). Comparison of two systems; Types of lubricating systems used in I.C. engines with line diagram; Objective of turbocharging and supercharging				
4	31-40	Performance of I.C. Engines	Brake power; Indicated power; Frictional power; Brake and Indicated mean effective pressures; Brake and Indicated thermal efficiencies; Mechanical efficiency; Relative efficiency; Performance test; Morse test; Heat balance sheet; Methods of determination of B.P., I.P. and F.P.; Simple numerical problems on performance of I.C. engines.				
5	41-48	Air Compressors	Functions of air compressor; Uses of compressed air;Types of air compressors; Single stage reciprocating air compressor - its construction and working (with line diagram); Multistage compressors-Advantages over single stage compressors; Description of Rotary compressors, Centrifugal compressor, axial flow type compressor and vane type compressors.				
6	49-56	Refrigeration &Air-conditioning	Refrigeration; Refrigerant; COP; Air Refrigeration system: components, working & applications; Vapour Compression system: components, working & applications; Air conditioning; Classification of Air-conditioning systems; Window Air Conditioner; Summer Air-Conditioning system, Winter Air-Conditioning system, Year-round Air Conditioning system, Central air conditioning system				

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[Signature]
01/08/2026

"PVC" NSSK GOVT POLYTECHNIC BILASPUR
PLANNED THEORY SYLLABUS COVERAGE

Department: Mechanical Engg.				Subject: MEASUREMENTS & METROLOGY		
Sem. & Branch: 3RD / Mech. Engg.				Duration: 3 Year		
Syllabus coverage				Teacher: Suresh Kumar		
Total periods:-56				Practical : Yes		
SR. NO	Period no	Topic	Details	Instruction Reference	Additional study	Remarks
1	1-14	Introduction to measurements and Measuring Instruments	Introduction to measurements: Definition of measurement: Significance of measurement: Methods of measurements: Direct & Indirect: Generalized measuring system; Standards of measurements: Primary & Secondary; Factors influencing selection of measuring instruments; Terms applicable to measuring instruments: Precision and Accuracy, Sensitivity and Repeatability, Range, Threshold, Hysteresis, calibration; Errors in Measurements: Classification of errors, Systematic and Random error. (Introduction only) Measuring instruments: Introduction; Thread measurements: Thread gauge micrometer; Angle measurements: Bevel protractor, Sine Bar; Gauges: plain plug gauge, ring Gauge, snap gauge, limit gauge; Comparators: Characteristics of comparators, Types of comparators; Surface finish: Definition, Terminology of surface finish, Taly surf surface roughness tester; Coordinating measuring machine.	1. Metrology & Measurement-Anand K Bewoor, Vinay kulakarni, Tata Mc Graw Hill, NewDelhi, 2009	1. Engineering Metrology-R.K.Jain, Khanna Publishers, NewDelhi, 2005. 2. A text book of Engineering Metrology-I.C.Gu pta, Dhanpat Rai and Sons, NewDelhi, 2005	
2	15-26	Transducers and Strain gauges ; Measurement of force, torque, and pressure	Transducers and Strain gauges: Introduction; Transducers: Characteristics, classification of transducers, Strain Measurements (concept only) Strain gauge, Classification, mounting of strain gauges, (Theoretical aspects) Measurement of force, torque, and pressure (derivations omitted): Introduction; Force measurement: Spring Balance , Load cell; Torque measurement: Prony brake, Eddy current, Hydraulic dynamometer; Pressure measurement: Mcloed gauge.			
3	27-38	Applied mechanical measurements Miscellaneous measurements	Applied mechanical measurements: Speed measurement: Classification of tachometers, Revolution counters, Eddy current tachometers; Displacement measurement: Linear variable Differential transformers (LVDT); Flow measurement: Rotometer, Turbine meter; Temperature measurement: Resistance thermometers, Optical Pyrometer. Miscellaneous measurements (Problems omitted): Humidity measurement: hair hygrometer; Density measurement: hydrometer; Liquid level measurement, sight glass, Float gauge.			

SR. NO	Period no	Topic	Details	Instruction Reference	Additional study	Remarks
4	39-52	Limits, Fits & Tolerances and Angular Measurement Screw thread Measurement	Limits, Fits & Tolerances: Concept of Limits, Fits, and Tolerances, Selective Assembly; Interchangeability, Hole And Shaft Basis System; Taylor's Principle Angular Measurement: Concept; Instruments For Angular Measurements, Working and Use of Universal Bevel Protractor, Sine Bar, Spirit Level; Principle of Working of Clinometers; Angle Gauges. Screw thread Measurements: ISO grade and fits of thread; Errors in threads; Measurement of different elements such as major diameter, minor diameter, effective diameter, pitch; Two wire method; Thread gauge micrometer; Working principle of floating carriage dial micrometer.			
5	53-64	Gear Measurement and Testing Machine tool testing	Gear Measurement and Testing: Analytical and functional inspection; Rolling test; Measurement of tooth thickness; Gear tooth Vernier; Errors in gears such as backlash, run out, composite. Machine tool testing: Parallelism; Straightness; Squareness; Coaxiality; roundness; run out; alignment testing of machine tools as per IS standard procedure.			

Signature of Teacher *01/08/26*

Approved	Sign HOD/ I/O

01/08/2026

"PVC" NSSK GOVT POLYTECHNIC BILASPUR
PLANNING & COVERAGE OF PRACTICALS

Department: Mechanical Engg.				Laboratory :- MEASUREMENTS & METROLOGY		
Sem. & Branch: 3rd / Mech. Engg.				Subject: MEASUREMENTS & METROLOGY		
Syllabus coverage				Teacher: Suresh Kumar		
Total periods:-28 (L:0,P:2) /week				Practical : Yes		
SR. NO	Period no	Topic	Details	Likely dates	Actual Dates	Remarks
1	1-2	Practical 1	Measure the diameter of a wire using micrometer and compare the result with digital micrometer	G-I :- 3/8, 10/8/26 G-II :- 7/8, 14/8/26		
2	3	Practical 2	Measure the angle of the machined surface using sine bar with slip gauges.	G-I :- 17/8, 24/8/26 G-II :- 21/8, 28/8/26		
3	4	Practical 3	Measure the angle of a V-block/Taper Shank of Drill/Dove tail using universal bevel protractor.	G-I :- 7/9, 14/9/26 G-II :- 11/9, 18/9/26		
4	5	Practical 4	Measure the dimensions of ground MS flat/cylindrical bush using Vernier Caliper compare with Digital/Dial Vernier Caliper.	G-I :- 21/9, 28/9/26 G-II :- 25/9, 02/10/26		
5	6	Practical 5	Measure the geometrical dimensions of V-Thread using thread Vernier gauge.	G-I :- 5/10, 12/10/26 G-II :- 16/10, 23/10/26		
6	7	Practical 6	Measure the thickness of ground MS plates using slip gauges	G-I :- 19/10, 26/10/26 G-II :- 30/10, 06/11/26		
7	8	Practical 7	Measure the surface roughness using roughness tester.	G-I :- 9/11, 16/11/26 G-II :- 13/11, 20/11/26		
8	9	Practical 8	Measurement of geometrical parameters of components like screw, gear etc. using Tool makers microscope/ profile projector.	G-I :- 27/11, 30/11/26 G-II :- 20/11, 27/11/26		

Signature of Teacher

Approved	Sign HOD/DE

[Signature]
01/08/2026