

ASIAN SCHOOL OF TECHNOLOGY, KHORDHA
ACADEMIC LESSON PLAN (WINTER 2026)
TH-1 MANUFACTURING PROCESS (COURSE CODE: MEPC201)

Discipline: Mechanical Engineering	Semester: 3 RD	No. of periods available: 45	Name of the Teaching Faculty : RAJENDRA SETHY
Subject: Manufacturing process	No. of days/per week class allotted: 3p/week		Semester From: 02 ND JULY 2026 to 05 TH NOV 2026 No. of Weeks: 15 weeks
Week	Class Day		Theory Topics
1st	1 st	1	Unit-I: Cutting Fluids & Lubricants: Introduction; Types of cutting fluids
	2 nd	1	Fluids and coolants required in turning, drilling, shaping, sawing & broaching
	3 rd	1	Selection of cutting fluids; Methods of application of cutting fluid
2nd	4 th	1	Classification of lubricants (solid, liquid, gaseous); Properties and applications of lubricants
	5 th	1	Lathe Operations: Types of lathes – light duty, medium duty and heavy duty geared lathe
	6 th	1	CNC lathe; Specifications; Basic parts and their functions
3rd	7 th	1	Operations and tools – Turning, Parting off, Knurling, Facing, Boring
	8 th	1	Drilling, Threading, Step turning, Taper turning
	9 th	1	Nomenclature of single point cutting tool of lathe Unit-II: Broaching Machines: Introduction to broaching; Types of broaching machines – Horizontal type (Single ram & Duplex ram)
4th	10 th	1	Vertical type, Pull up, Pull down, and Push down; Elements of broach tool Broach teeth details; Nomenclature; Tool materials
	11 th	1	Drilling: Classification; Basic parts and their functions
	12 th	1	Radial drilling machine; Types of operations
5th	13 th	1	Specifications of drilling machine; Types of drills and reamers
	14 th	1	Specifications of drilling machine; Types of drills and reamers
	15 th	1	PROGRESSIVE ASSESSMENT – 1 (Units I & II)
6th	16 th	1	Unit-III: Welding: Classification; Gas welding techniques; Types of welding flames
	17 th	1	Arc Welding – Principle, Equipment, Applications
	18 th	1	Shielded metal arc welding; Submerged arc welding
7th	19 th	1	TIG / MIG welding; Resistance welding - Spot welding, Seam welding, Projection welding
	20 th	1	Welding defects; Brazing and soldering; Types, Principles, Applications
	21 st	1	Milling: Introduction; Types of milling machines: plain, Universal, vertical; Constructional details – specifications
8th	22 nd	1	Milling operations: simple, compound and differential indexing
	23 rd	1	Milling cutters – types; Nomenclature of teeth; Teeth materials Tool signature of milling cutter; Tool & work holding devices
	24 th	1	Revision / Doubt Clearing Session (Unit III)

9 th	25 th	1	Unit-IV: Gear Making: Manufacture of gears – by Casting, Moulding, Stamping, Coining, Extruding, Rolling, Machining
	26 th	1	Gear generating methods: Gear Shaping with pinion cutter & rack cutter
	27 th	1	Gear hobbing; Description of gear hob; Operation of gear hobbing machine
10 th	28 th	1	Gear finishing processes; Gear materials and specification; Heat treatment processes applied to gears
	29 th	1	Press working: Types of presses and Specifications
	30 th	1	Press working operations - Cutting, bending, Drawing, punching, blanking, notching, lancing
11 th	31 st	1	Die set components- punch and die shoe
	32 nd	1	Punch and die clearances for blanking and piercing, effect of clearance
	33 rd	1	guide pin, bolster plate, stripper, stock guide, feed stock, pilo
12 th	34 th	1	Punch and die clearances for blanking and piercing, effect of clearance
	35 th	1	PROGRESSIVE ASSESSMENT – 2 (Units III & IV)
	36 th	1	Unit-V: Grinding and finishing processes
13 th	37 th	1	Principles of metal removal by Grinding; Abrasives – Natural & Artificial
	38 th	1	Bonds and binding processes: Vitrified, silicate, shellac, rubber, Bakelite; Factors affecting the selection of grind wheels
	39 th	1	Standard marking systems: Meaning of letters & numbers sequence of marking, Grades of letters
14 th	40 th	1	Principle of centerless grinding; Advantages & limitations of centerless grinding
	41 st	1	Finishing by grinding: Honing, Lapping, Super finishing
	42 nd	1	Electroplating: Basic principles, Plating metals, applications; Hot dipping; Galvanizing, Tin coating, Parkering, Anodizing
15 th	43 rd	1	Metal spraying: wire process, powder process and applications
	44 th	1	Organic coatings: Oil base Paint, Lacquer base, Enamels, Bituminous paints, rubber base coating; Finishing specifications
	45 th	1	Overall Revision / Doubt Clearing / Model Question Discussion


 Signature of Teaching Faculty

ASIAN SCHOOL OF TECHNOLOGY, KHORDHA
ACADEMIC LESSON PLAN (WINTER 2026)
TH-2 STRENGTH OF MATERIALS (COURSE CODE: MEPC203)

Discipline: Mechanical Engineering	Semester: 3 RD	No. of periods available: 45	Name of the Teaching Faculty: SUIDHIR KUMAR MAHAPATRA
Subject: Strength of materials	No. of days/per week class allotted: 3p/week		Semester From: 02 ND JULY 2026 to 05 TH NOV 2026 No. of Weeks: 15-weeks
Week	Class Day		Theory Topics
1	1 st	1	Unit-I Simple Stresses and Strains: Types of forces: Stress. Strain and their nature
	2 nd	1	Properties of Engineering materials
	3 rd	1	Stress – Strain Diagram for M.S Specimen
2	4 th	1	Significance Of factor of safety
	5 th	1	Stress -Strain value for Composite section
	6 th	1	Thermal stress for uniform sections and composite sections
3	7 th	1	Proof resilience and modulus of Resilience
	8 th	1	Problems on Simple Stress and Strain
	9 th	1	Summary of Unit -I
4	10 th	1	Unit-II Shear force and Bending Moment Diagram
	11 th	1	Types of Beams
	12 th	1	Problems on Cantilever Beam
5	13 th	1	Problems on Simple supported Beam
	14 th	1	Problems on Over Hanging and Continuous Beam
	15 th	1	Types of Loads
6	16 th	1	Problems on UDL
	17 th	1	Numerical Problems related to point load for simple supported Beam
	18 th	1	Summary of Unit-II
7	19 th	1	Unit-III Theory or Simple Bending and Deflection of Beams:
	20 th	1	Explanation of terms: Neutral layer. Neutral Axis,
	21 st	1	Modulus of Section. Moment of Resistance. Bending stress. Radius of curvature
8	22 nd	1	Assumptions in theory of simple bending; Bending Equation $M/I = \sigma/Y = E/R$ with derivation:
	23 rd	1	Related Problems
	24 th	1	Problems involving calculations of bending stress. modulus of section and moment of resistance: Calculation of safe loads and safe span and dimensions of cross section
9	25 th	1	Definition and explanation of deflection as applied to beams
	26 th	1	Derivation Part of Deflection of Beam
	27 th	1	Related numerical problems
10	28 th	1	Unit-IV Torsion in Shafts and Springs:
	29 th	1	Calculation of polar M.L for solid and hollow shafts

	30 th	1	Derivation of the equation $T/J = \tau s/R = G\theta/L$
11	31 st	1	Related Problems
	32 nd	1	Problems related to comparison of strength and weight of solid and hollow shafts
	33 rd	1	Classification of springs
12	34 th	1	Deflection formula for closed coil helical spring (without derivation)
	35 th	1	Stiffness of spring: Numerical problems on closed coil helical spring to find safe load, deflection, size of coil and number of coils.
	36 th	1	Related Problems
13	37 th	1	Unit-V Thin Cylindrical Shell
	38 th	1	Explanation of longitudinal and hoop stress
	39 th	1	Stress on longitudinal and circumferential failure of shell
14	40 th	1	Derivation of expressions for the longitudinal and hoop stress for seamless and seam shell.
	41 st	1	Related numerical Problems
	42 nd	1	Summery for Unit-V
15	43 rd	1	Revision On Shear Force and Bending moment.
	44 th	1	Revision on UDL
	45 th	1	Overall Revision / Doubt Clearing / Model Question Discussion

Sudhakar Mahapatra
Signature of Teaching Faculty

ASIAN SCHOOL OF TECHNOLOGY, KHORDHA
ACADEMIC LESSON PLAN (WINTER 2026)
TH-3 MATERIAL SCIENCE & ENGINEERING (COURSE CODE: MEPC205)

Discipline: Mechanical Engineering	Semester: 3 RD	No. of periods available: 45	Name of the Teaching Faculty : RAJENDRA SETHY
Subject: Material Science & Engineering	No. of days/per week class allotted: 3p/week		Semester From: 02 ND JULY 2026 to 05 TH NOV 2026 No. of Weeks: 15 weeks
Week	Class Day		Theory Topics
1	1 st	1	Unit-I: Crystal structures and Bonds: Introduction; Unit cell and space lattice; Crystal system: The seven basic crystal systems
	2 nd	1	Crystal structure for metallic elements: BCC, FCC and HCP
	3 rd	1	Coordination number for Simple Cubic, BCC and FCC; Atomic radius: definition, atomic radius for Simple Cubic, BCC and FCC
2	4 th	1	Atomic Packing Factor for Simple Cubic, BCC, FCC and HCP
	5 th	1	Simple problems on finding number of atoms for a unit cell; Numerical practice
	6 th	1	Bonds in solids: Classification - primary or chemical bond, secondary or molecular bond
3	7 th	1	Types of primary bonds: Ionic, Covalent and Metallic Bonds
	8 th	1	Types of secondary bonds: Dispersion bond, Dipole bond and Hydrogen bond
	9 th	1	Unit-II: Phase diagrams, Ferrous metals and its Alloys: Isomorphs, Eutectic and Eutectoid systems
4	10 th	1	Iron-Carbon binary diagram
	11 th	1	Iron and Carbon Steels; Flow sheet for production of iron and steel
	12 th	1	Iron ores – Pig iron; classification, composition and effects of impurities on iron
5	13 th	1	Cast Iron: classification, composition, properties and uses
	14 th	1	Wrought Iron: properties, uses/applications of wrought Iron
	15 th	1	Comparison of cast iron, wrought iron and mild steel and high carbon steel; Standard commercial grades of steel as per BIS and AISI
6	16 th	1	Alloy Steels – purpose of alloying; Effects of alloying elements
	17 th	1	Important alloy steels: Silicon steel, High Speed Steel (HSS), heat resisting steel, spring steel
	18 th	1	Stainless Steel (SS): types of SS, applications of SS – Magnet steel – composition, properties and uses
7	19 th	1	PROGRESSIVE ASSESSMENT – 1 (Units I & II)
	20 th	1	Revision / Doubt Clearing Session (Unit I & II)
	21 st	1	Unit-III: Non-ferrous metals and its Alloys: Properties and uses of aluminum, copper, tin, lead, zinc, magnesium and nickel
8	22 nd	1	Copper alloys: Brass, Bronzes — composition, properties and uses
	23 rd	1	Aluminum alloys: Duralumin, Hindalium, Magnalium — composition, properties and uses
	24 th	1	Nickel alloys: Inconel, Monel, Nichrome — composition, properties and uses

9	25 th	1	Anti-friction/Bearing alloys: Various types of bearing bronzes - Standard commercial grades as per BIS/ASME
	26 th	1	Unit-IV: Failure analysis & Testing of Materials: Introduction to failure analysis; Fracture: ductile fracture, brittle fracture; Cleavage; Notch sensitivity
	27 th	1	Fatigue; Endurance limit; Characteristics of fatigue fracture; Variables affecting fatigue life
10	28 th	1	Creep; Creep curve; Creep fracture
	29 th	1	Destructive testing: Tensile testing; Compression testing; Hardness testing: Brinell, Rockwell
	30 th	1	Bend test; Torsion test; Fatigue test; Creep test
11	31 st	1	Non-destructive testing: Visual Inspection; Magnetic particle inspection; Liquid penetrant test
	32 nd	1	Ultrasonic inspection; Radiography
	33 rd	1	Unit-V: Corrosion & Surface Engineering: Nature of corrosion and its causes; Electro chemical reactions; Electrolytes
12	34 th	1	Factors affecting corrosion: Environment, Material properties and physical conditions; Types of corrosion
	35 th	1	Corrosion control: Material selection, environment control and design
	36 th	1	Surface engineering processes: Coatings and surface treatments; Cleaning and mechanical finishing of surfaces
13	37 th	1	Organic coatings; Electroplating and Special metallic plating
	38 th	1	Electro polishing and photo-etching; Conversion coatings: Oxide, phosphate and chromate coatings
	39 th	1	Thin film coatings: PVD and CVD; Surface analysis
14	40 th	1	Hard-facing, thermal spraying and high-energy processes; Process/material selection
	41 st	1	Pollution norms for treating effluents as per standards
	42 nd	1	PROGRESSIVE ASSESSMENT – 2 (Units III, IV & V)
15	43 rd	1	Overall Revision / Doubt Clearing / Model Question Discussion
	44 th	1	Full Syllabus Revision: Important topics & Numerical problems
	45 th	1	Model questions discussion; Final summary and last-minute tips

Rayendra Setty

Signature of Teaching Faculty

ASIAN SCHOOL OF TECHNOLOGY, KHORDHA
ACADEMIC LESSON PLAN (WINTER 2026)
TH-4 Fluid Mechanics & Fluid Power (COURSE CODE: MEPC207)

Discipline: Mechanical Engineering	Semester: 3 RD	No. of periods available: 45	Name of the Teaching Faculty : PRIYARANJAN PATTANAIK
Subject: Fluid Mechanics & Fluid Power	No. of days/per week class allotted: 3p/week		Semester From: 02 ND JULY 2026 to 05 TH NOV 2026 No. of Weeks: 15 weeks
Week	Class Day		Theory Topics
1	1 st	1	UNIT –I Definition of a fluid, classification of fluids
	2 nd	1	Fluid properties: density, specific weight, specific gravity – definitions and units
	3 rd	1	Viscosity and surface tension – definition, units, and engineering significance
2	4 th	1	Fluid pressure, total pressure (hydrostatic force) on plane surfaces
	5 th	1	Location of center of pressure on vertical and horizontal surfaces
	6 th	1	Location of center of pressure on inclined and curved surfaces
3	7 th	1	Pressure measuring devices – principle of simple, differential, and inverted manometers
	8 th	1	Principle of buoyancy and floatation; Simple numerical on manometers
	9 th	1	UNIT-II Kinematics: Types of flow, circulation and vorticity
4	10 th	1	Stream-line, path line and streak-line
	11 th	1	Various energies of fluid; Law of conservation of mass
	12 th	1	Energy equation – Bernoulli's theorem, its limitations, and applications
5	13 th	1	Working of venturimeter, pitot tube, and current meter – flow rate & velocity equations
	14 th	1	Simple numericals on venturimeter, pitot tube, and Bernoulli's equation
	15 th	1	PROGRESSIVE ASSESSMENT – 1 (Units I & II)
6	16 th	1	UNIT-III Flow through orifices: Definition, orifice coefficients (C_c , C_v , C_d)
	17 th	1	Relationship between orifice coefficients; Simple numericals
	18 th	1	Weir and notch – definition; Discharge over rectangular notch and weir
7	19 th	1	Discharge over triangular notch; Simple numericals
	20 th	1	Flow through pipes: Definition, Laws of fluid friction
	21 st	1	Darcy's formula and Chezy's formula for loss of head due to friction
8	22 nd	1	Hydraulic gradient and total energy line
	23 rd	1	Nozzle applications; Power transmission through nozzle; Condition for max power; Diameter for max power; Simple numericals
	24 th	1	Revision / Doubt Clearing Session (Unit III)
9	25 th	1	UNIT- IV Turbines: Classification of hydraulic turbines; Selection based on head and discharge
	26 th	1	Pelton wheel – construction and working principle
	27 th	1	Francis turbine – construction and working principle
10	28 th	1	Kaplan turbine – construction and working principle
	29 th	1	Draft tubes – types and construction; Concept of cavitation in turbines
	30 th	1	Work done, power and efficiency of turbines – Simple numericals

11	31 st	1	Centrifugal Pumps: Principle, working, applications; Types of casings and impellers
	32 nd	1	Concept of multistage; Priming and its methods
	33 rd	1	Manometric head, work done, manometric efficiency, overall efficiency – Simple numericals
12	34 th	1	Reciprocating Pumps: Construction, working of single and double acting pumps
	35 th	1	Slip, Negative slip, Cavitation and separation – Simple numericals
	36 th	1	PROGRESSIVE ASSESSMENT – 2 (Units III & IV)
13	37 th	1	UNIT -V Fluid Power: Definition, classification – hydraulic and pneumatic systems
	38 th	1	Basic principle of enclosed hydraulic system – Pascal's law; Components: reservoir, filter, pressure limiting valves
	39 th	1	Direction control valves, flow control valves
14	40 th	1	Actuators (linear and rotary), accumulator, pipes and fittings
	41 st	1	Positive displacement pumps – gear, vane, and piston pumps
	42 nd	1	Drawing hydraulic circuits – extension and retraction of linear actuator
15	43 rd	1	Motion of rotary actuator; Holding a job
	44 th	1	Hydraulic press; Simple circuit examples
	45 th	1	Overall Revision / Doubt Clearing / Model Question Discussion

Pradyuman Bhatnagar

Signature of Teaching Faculty

ASIAN SCHOOL OF TECHNOLOGY, KHORDHA

ACADEMIC LESSON PLAN (WINTER 2026)

TH-5 Thermal Engineering-I (COURSE CODE: MEPC209)

Discipline: Mechanical Engineering	Semester: 3 RD	No. of periods available: 45	Name of the Teaching Faculty : PRIYARANJAN PATTANAİK
Subject: Thermal Engineering-I	No. of days/per week class allotted:3p/week		SemesterFrom:02 ND JULY 2026 to 05 TH NOV 2026 No. of Weeks:15 weeks
Week	Class Day		Theory Topics
1	1 st	1	UNIT:1 INTRODUCTION TO THERMODYNAMICS / Thermodynamic Systems – closed, open, isolated
	2 nd	1	Thermodynamic properties – pressure, volume, temperature, entropy, enthalpy, internal energy (units)
	3 rd	1	Intensive and extensive properties; Thermodynamic processes, path, cycle, state, path function, point function
2	4 th	1	Thermodynamic Equilibrium; Quasi-static Process
	5 th	1	Laws of thermodynamics (statements only – Zeroth, First and Second Law)
	6 th	1	SOURCES OF ENERGY / Classification – Renewable and Non-Renewable; Fossil fuels (CNG & LPG)
3	7 th	1	Solar Energy – Flat plate and concentrating collectors; Solar Water Heater, Photovoltaic Cell, Solar Distillation (working principles)
	8 th	1	Wind Energy; Tidal Energy; Ocean Thermal Energy; Geothermal Energy
	9 th	1	Biogas, Biomass, Bio-diesel; Hydraulic Energy; Nuclear Energy; Fuel Cell
4	10 th	1	UNIT:2 INTERNAL COMBUSTION ENGINES / Assumptions in air standard cycle analysis; Carnot cycle with P-V and T-S diagrams
	11 th	1	Otto cycle with P-V and T-S diagrams
	12 th	1	Diesel cycle with P-V and T-S diagrams
5	13 th	1	Internal and external combustion engines; Advantages of I.C. engines over E.C. engines
	14 th	1	Classification of I.C. engines; Heat sketch of I.C. engine indicating component parts
	15 th	1	Function and materials of each part – Cylinder, crank case, crank pin, crank, crank shaft, connecting rod, wrist pin, piston, cooling fins, cylinder head, valves
6	16 th	1	Working of four-stroke petrol engine
	17 th	1	Working of four-stroke diesel engine
	18 th	1	Working of two-stroke petrol and diesel engines (combined)
7	19 th	1	Comparison of two-stroke and four-stroke engines; Comparison of C.I. and S.I. engines
	20 th	1	Valve timing diagram for four-stroke engines; Port timing diagram for two-stroke engines
	21 st	1	PROGRESSIVE ASSESSMENT – 1 (Units: I & II)
8	22 nd	1	UNIT:3 I.C. ENGINE SYSTEMS / Fuel system of Petrol engines; Principle of operation of simple carburetor
	23 rd	1	Zenith carburetor – construction and working
	24 th	1	Fuel system of Diesel engines; Types of injectors and fuel pumps
9	25 th	1	Cooling system – Air cooling system
	26 th	1	Water cooling system – Thermo-siphon method of circulation

	27 th	1	Water cooling system with radiator and forced circulation (with line diagram); Comparison of air and water cooling
10	28 th	1	Ignition systems – Battery coil ignition (description and working)
	29 th	1	Magneto ignition (description and working); Comparison of both systems
	30 th	1	Types of lubricating systems used in I.C. engines (with line diagram)
11	31 st	1	Types of governing – Hit and miss, Quantitative, Qualitative, Combination methods (applications); Objective of super charging
	32 nd	1	UNIT:4 PERFORMANCE OF I.C. ENGINES / Brake power, Indicated power, Frictional power
	33 rd	1	Brake and Indicated mean effective pressures; Mechanical efficiency
12	34 th	1	Brake and Indicated thermal efficiencies; Relative efficiency
	35 th	1	Performance test; Morse test; Heat balance sheet
	36 th	1	Methods of determination of B.P., I.P. and F.P.; Simple numerical problems (Part - 1)
13	37 th	1	Simple numerical problems on performance of I.C. engines (Part - 2)
	38 th	1	PROGRESSIVE ASSESSMENT – 2 (Units: III & IV)
	39 th	1	UNIT:5 AIR COMPRESSORS / Functions and uses of compressed air; Types of air compressors
14	40 th	1	Single stage reciprocating air compressor – construction and working (with line diagram and P-V diagram)
	41 st	1	Multi-stage compressors – Advantages over single stage compressors
	42 nd	1	Rotary compressors – Centrifugal, Axial flow and Vane type compressors
15	43 rd	1	REFRIGERATION & AIR-CONDITIONING / Refrigeration; Refrigerant; COP
	44 th	1	Air Refrigeration system – components, working and applications; Vapour Compression system – components, working and applications
	45 th	1	Air conditioning – Definition; Classification of systems; Comfort and Industrial AC; Window Air-Conditioner; Summer, Winter and Year-round Air-Conditioning systems

P. Jayaraman Patkar

Signature of Teaching Faculty