GOVT.MILLENNIUM POLYTECHNIC CHAMBA

LESSON PLAN FOR : BASIC OF MECHANICAL ENGINEERING

(SESSION: AUGUST-DEC. 2025)

MECHATRONICS ENGINEERING (SEMESTER - 3RD)

S.NO.	MONTH	WEEK	DATE	CONTENT (THEORY)	REMARKS
1	AUGUST	1st	5,7	**UNIT-I:** 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	
		2nd	11,12,14		
		3rd	18,19,21,23		
		4th	25,26,28,30		
2	SEPT.	1st	1,2,4,6	**Unit-II:** 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	
		2nd	8,9,11		
		3rd	15,16,18,20		
		4th	21,23,25,27		
		5th	29,30		
3	OCT.	1st	4	**Unit-III:** Steam Turbines: Impulse and Reaction Turbines; Condensers: Jet & Surface Condensers, Cooling Towers; Internal Combustion Engines: 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.	
		2nd	6,9		
		3rd	13,14,16,18		
		4th	21,23,25		
		5th	27,28,30		
4	NOV.	1st	1	**Unit-IV:** Materials and Manufacturing Processes (derivations and Problems omitted): 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. **Unit-V:** 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.	
		2nd	3,4,6		
		3rd	10,11,13,15		
		4th	17,18,20,22		
		5th	24,25		

Mithun Thakur
(Lect. Mech. Engg.)

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GOVT. MILLENNIUM POLYTECHNIC CHAMBA

LESSON PLAN FOR : MANUFACTURING ENGINEERING

(SESSION: AUGUST-DEC. 2025)

MECHATRONICS ENGINEERING (SEMESTER - 3RD)

S.NO.	MONTH	WEEK	DATE	CONTENT (THEORY)	REMARKS
1	AUGUST	1st	6,6,7,8	**UNIT-I: 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.	
		2nd	13,13,14		
		3rd	20,20,21,22		
		4th	27,27,28,29		
2	SEPT.	1st	3,3,4,5	**Unit-II: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.	
		2nd	10,10,11,12		
		3rd	17,17,18,19		
		4th	24,24,25,26		
3	OCT.	1st	1,1,3	**Unit-III:Welding:** Classification; Gas welding techniques; Types of welding flames; Arc Welding –Principle, Equipment, Applications; Shielded metal arcwelding; 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 **Unit-IV: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;	
		2nd	8,8,9,10		
		3rd	15,15		
		4th	22,22,23,24		
		5th	29,29,30,31		
4	NOV.	1st	6,7	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 dieshoe, guide pin, bolster plate, stripper, stock guide, feed stock, pilot; Punch and die clearances for blanking and piercing, effect of clearance.	
		2nd	12,12,13,14	**Unit-V : 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;	
		3rd	19,19,20,21		
		4th	26,26	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.	

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Government Millennium Polytechnic Chamba Distt Chamba (H.P) -176310
Department of Mechatronics

Lesson Plan
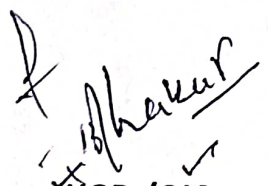
Subject: Digital Electronics   **Semester-** 3rd   **Session:** (Aug – Dec, 2025)

Total Planned Periods: 56   **Start From:** 01/08/2025

Sr. No	Month	Week	Chapter	Contents	Remarks
1	August	1st	Number Systems & Boolean Algebra	• Introduction to different number systems • Conversion from one number system to another	
2		2nd		• Boolean variables – Rules • Laws of Boolean algebra • De-Morgan's Theorem	
3		3rd		• Karnaugh Maps • Their use for simplification of Boolean expressions	
4		4th	Logic Gates	• AND, OR, NOT, NAND, NOR, XOR, XNOR: Symbolic representation and truth table	
4	September	1st		• Implementation of Boolean expressions • Logic Functions using gates • Simplification of expressions	
		2nd	Combinational Logic Circuits	• Arithmetic Circuits – Addition, Subtraction • 1's & 2's Complement Half Adder, Full Adder	
8		3rd		• Half Subtractor, Full Subtractor • Parallel and Series Adders	Class Test-1
9		4th		• Encoder, Decoder • Multiplexer – 2 to 1 MUX, 4 to 1 MUX, 8 to 1 MUX and their Applications	

Sr. No	Month	Week	Chapter	Contents	Remarks
1	October	1st	Sequential Logic Circuits	• Demultiplexer – 1-2 DEMUX, 1-4 DEMUX, 1- 8 DEMUX • Flip Flops – SR, JK, T, D	
2		2nd		• JK-MS, Triggering • Counters – 4bit Up – Down Counters, Asynchronous/ Ripple Counter	
3		3rd		• Decade Counter- Mod 3, Mod 7 Counter, Johnson Counter, Ring Counter	Class Test-2
4		4th		• Registers – 4bit Shift Register: Serial In Serial Out, Serial In Parallel Out, Parallel In Serial Out, Parallel In Parallel Out	
4	November	1st	Memory Devices	• Classification of Memories – RAM Organization, Address Lines and Memory Size, Static RAM, Bipolar RAM, Cell Dynamic RAM, D RAM, DDR RAM	
		2nd		• House Test	
8		3rd		• Read only memory – ROM organization, Expanding memory, PROM, EPROM, EEPROM, Flash memory	
9		4th		• Data Converters – Digital to Analog converters, Analog to Digital Converters	

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Mechatronics

Teacher's Signature

Discipline : Mechatronics Engg
Name of Faculty : Mr. Bhupinder Singh
Semester : 3rd
Subject : EDC
Duration : 16 weeks

Work load per week (in hours): Lectures—03, DCS (Th)-01, Practical—02, DCS (Pr)-00

Week	Theory			Practical	
	Lecture Day	Topics		Practical day	Topic
1st	1	Definition, Extrinsic/Intrinsic , N-type & P-type		1st	Construct the circuit and plot the VI characteristics of the PN Junction Diode, find the cut in voltage
	2	PN Junction Diode			
	3	Forward and Reverse Bias Characteristics			
	4	DCS			
2nd	5	Zener Diode – Principle		2nd	Revision
	6	Zener Diode – characteristics			
	7	Zener Diode – construction , working.			
	8	DCS			
3rd	9	Diode Rectifiers – Half Wave		3rd	Construct the circuit and plot the characteristics of a Zener Diode. Find the breakdown voltage
	10	Diode Rectifiers – Full Wave			
	11	Filters – C, LC, and PI Filters.			
	12	DCS			
4th	13	NPN Transistor – Operation and characteristics		4th	Revision
	14	Same Topic			
	15	PNP Transistor – Operation and characteristics			
	16	DCS			
5th	17	Common Base Configuration – characteristics and working		5th	Construct a Half Wave Rectifier and obtain regulation characteristics – Without Filters and with Filters Compare the results
	18	Same Topic			
	19	Common Emitter Configuration– characteristics and working			
	20	DCS			
6th	21	Common Collector Configuration– characteristics and working		6th	Construct a Full Wave center tap rectifier and obtain regulation characteristics – Without Filters and with Filters Compare the results
	22	Same Topic			
	23	High frequency model of BJT			
	24	DCS			
7th	25	Classification of amplifiers		7th	Revision
	26	negative feedback			
	27	FET – Working Principle, Classification			
	28	DCS			
8th	29	MOSFET Small Signal model		8th	Construct a Bridge Rectifier and obtain regulation characteristics – Without Filters and with Filters
	30	N-Channel MOSFETs – characteristics			
	31	P- Channel MOSFETs – characteristics			
	32	DCS			
9th	33	enhancement ,depletion mode, MOS-FET		9th	Obtain the characteristics of DIAC and TRIAC
	34	MOS-FET as a Switch			
	35	Common Source Amplifiers			
	36	DCS			

10th	37	Uni-Junction Transistor – equivalent circuit and operation.	10th	Revision
	38	Same Topic		
	39	SCR – Construction, operation		
	40	DCS		
11th	41	SCR – working, characteristics	11th	Simulate half wave, full wave and bridge rectifier using simulation tool like PSpice/ ORCAD/Multisim
	42	Same Topic		
	43	DIAC - Construction, operation		
	44	DCS		
12th	45	DIAC - working, characteristics	12th	Revision
	46	Same Topic		
	47	TRIAC - Construction, operation		
	48	DCS		
13th	49	TRIAC -working, characteristics	13th	Develop a simulation model for Voltage Series and Voltage Shunt Feedback Amplifiers
	50	SCR and MOSFET as a Switch, DIAC as bidirectional switch		
	51	Comparison of SCR, DIAC, TRIAC, MOSFET		
	52	DCS		
14th	53	Feedback Amplifiers – Properties of negative Feedback	14th	Develop a simulation model for Current Series and Current Shunt Feedback Amplifiers
	54	Same Topic		
	55	impact of feedback on different parameters		
	56	DCS		
15th	57	Basic Feedback Amplifier Topologies	15th	Develop circuits for Current Series and Current Shunt Feedback Amplifiers and obtain output plots. Compare the results with the simulation model
	58	Voltage Series, Voltage Shunt		
	59	DCS		
	60	Current Series, Current Shunt		
16th	61	Same Topic	16th	Revision
	62	Oscillator – Basic Principles , Crystal Oscillator		
	63	Non-linear/ Pulse Oscillator		
	64	DCS		

Faculty Signature

Government Millennium Polytechnic Chamba Distt Chamba (H.P) -176310

Department of Mechatronics

Lesson Plan

Subject: Electric Circuits and Network   **Semester-** 3rd   **Session**: (Aug – Dec, 2025)

Total Planned Periods: 56   **Start From**: 01/08/2025

Sr. No	Month	Week	Chapter	Contents	Remarks
1	August	1st	Basics of Network and Network Theorem	• Nodal and Mesh analysis • Superposition Theorem • Thevenin Theorem	
2		2nd		• Norton Theorem • Maximum Power transfer Theorem	
3		3rd		• Reciprocity Theorem • Revision	
4	September	1st	Graph Theory	• Concept of Graph • Node Tree of Network • Incidence matrix	
5		2nd		• Analysis of network using cut-set and tie set • Duality Theorem	
6		3rd		• Application of duality theorem • Numericals	**Class Test - I**
7		4th		• Revision of 1st and 2nd Chapter	
8	October	1st	Time Domain and Frequency Domain Analysis	• Solution of first and second order differential equations for series circuits • Solution of first and second order differential equations for parallel circuits	
9		2nd		• Initial and final conditions in network elements • Forced and free responses time constants • Steady state and transient state response	

				• Analysis of electrical circuits using Laplace Transform for standard inputs (Ramp, unit, step)	
10		3rd	**Trigonometric and exponential Fourier series**	Discrete spectra and symmetry of waveform Steady state response of a network to non-sinusoidal periodic inputs	**Class Test- II**
11		4th		Revision	**Diwali Vacation**
12	November	1st		• Power factor • Fourier transform and continuous spectra	
13		2nd	**Two Port Network**	**House Test**	
14		3rd		• Introduction of the two port network and the various network parameters • Short circuit admittance parameters	
15		4th		• Transmission parameters • Hybrid Parameters • Revision	

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