

Kashi Institute of Technology, Varanasi

(An Autonomous Institute Approved by AICTE)



Evaluation Scheme & Syllabus

For

Diploma 2nd Year

(Mechanical Production Engineering)

(Effective from Session: 2025-26)

Diploma Second Year, Semester-III

Mechanical Production Engineering

				Evaluation Scheme							
S.N.	Course Category	Course Code	Course Title	Type	Periods			FA	SA	Total	Credit
					L	T	P				
1.	BS	DBS211	APPLIED MATHEMATICS-III	T	3	1	0	70	30	100	4
2.	PC	DMEPC205	MATERIAL SCIENCE	T	3	0	0	70	30	100	3
3.	PC	DMEPC207	STRENGTH OF MATERIALS	T	2	1	0	70	30	100	3
4.	PC	DMEPC209	THERMODYNAMICS	T	2	1	0	70	30	100	3
5.	PC	DMEPC211	MANUFACTURING PROCESS	T	2	0	0	70	30	100	2
6.	PC	DMEPC213	MATERIAL SCIENCE LAB	P	0	0	2	70	30	100	1
7.	PC	DMEPC217	THERMODYNAMICS LAB	P	0	0	2	70	30	100	1
8.	AU	DAU201	UNIVERSAL HUMAN VALUE	P	2	0	0	70	30	--	NC
9.	PC	DMEPC219	MANUFACTURING PROCESS LAB	P	0	0	2	70	30	100	1
10.	SI	DSI203	INTERNSHIP	-	-	-	-	--	-	100	2
11.	CCA	DCCA203	CO-CURRICULAR ACTIVITIES	-	-	-	-	--	-	100	0.5
12.	GP	DGP203	GENERAL PROFICIENCY	-	-	-	-	---	-	100	0.5
Total				-	14	3	6	630	270	1100	21

Diploma Second Year, Semester-IV

Mechanical Production Engineering

				Evaluation Scheme							
SN	Course Category	Course Code	Course Title	Type	Period			FA	SA	Total	Credit
					L	T	P				
1.	HS	DHS202	COMMUNIKCATION SKILLS-II	T	2	0	0	70	30	100	2
2.	PC	DMEPC202	REFRIGERATION AND AIR CONDITIONING	T	2	1	0	70	30	100	3
3.	PC	DMEPC204	FLUID MECHANICS	T	3	1	0	70	30	100	4
4.	PC	DMEPC206	BASIC OF AUTOCAD (2D AND 3D)	T	4	0	0	70	30	100	4
5.	PC	DMEPC208	REFRIGERATION AND AIR CONDITIONING LAB	P	0	0	2	70	30	100	1
6.	PC	DMEPC210	FLUID MECHANICS LAB	P	0	0	2	70	30	100	1
7.	PC	DMEPC212	BASIC OF AUTOCAD (2D AND 3D) LAB	P	0	0	2	70	30	100	1
8.	SI	DSI202	INDUSTRIAL TRAINING	-	-	-	-	100	-	100	1
9.	PR	DMEPR202	MINOR PROJECT	P	0	0	6	--	--	100	3
10.	AU	DAU202	ENVIRONMENTAL SCIENCE	T	3	0	0	70	30	--	NC
11.	CCA	DCCA204	CO-CURRICULAR ACTIVITIES	-	-	-	-	--	-	100	0.5
12.	GP	DGP204	GENERAL PROFICIENCY	-	-	-	-	--	-	100	0.5
Total				-	14	2	12	560	240	1100	21

**DETAILED SYLLABUS
DIPLOMA 2nd Year**

- **Mechanical (Production) Engineering 3rd Semester**

(Effective from Session: 2025-26)

Diploma in Mechanical (Production) Engineering						
Semester: III			Course Category: BS			
Course Code	Course		Period / Week			Credit
			L	T	P	C
DBS211	APPLIED MATHEMATICS-III		3	1	0	4
Prerequisite	<i>At the end of this course, the students will be able to:</i>					Bloom's Level
Course Outcome	CO1	Understand matrix operations and uses of matrix in different problems. Apply elementary row and column operations in finding inverse of a matrix. Find Eigen values, Eigen vectors of a matrix and their different properties.			K ₁ ,K ₂ ,K ₃	
	CO2	Apply to mathematically formulate, and thus aid the solution of, physical and other problems involving functions of several variables.			K ₂ ,K ₃	
	CO3	Understand degree/order of differential equations and their solution techniques.			K ₁ ,K ₂ ,K ₃	
	CO4	Apply Laplace transform and their applications in solving engineering problems.			K ₂ ,K ₃	
	CO5	Understand concept of probability distribution and their applications.			K ₁ ,K ₂ ,K ₃	
UNIT – I	Matrices					Contact Hours :12
<p>1.1 Algebra of Matrices, Inverse Addition, Multiplication of matrices, Null matrix and a unit matrix, Square matrix, Symmetric, Skew symmetric, Hermitian , Skew hermition, Orthogonal, Unitary, diagonal and Triangular matrix, Determinant of a matrix. Definition and Computation of inverse of a matrix.</p> <p>1.2 Elementary Row/Column Transformation .Meaning and use in computing inverse and rank of a matrix.</p> <p>1.3 Linear Dependence, Rank of a Matrix. Linear dependence/independence of vectors, Definition and computation of rank of matrix. Computing rank through determinants, Elementary row transformation through the concept of a set of independent vectors.</p> <p>1.4 Eigen Pairs, Cayley-Hamilton Theorem .Definition and evaluation of eign values and eign vectors of a matrix of order two and three, Cayley-Hamilton theorem (without Proof)and its verification.</p>						CO1
UNIT – II	Differential Calculus					Contact Hours :12
<p>2.1 Function of two variables, identification of surfaces in space, conchoids</p> <p>2.2 Partial Differentiation Directional derivative, Gradient, Use of gradient f, Partial derivatives, Chain rule, Higher order derivatives, Euler's theorem for homogeneous functions, Jacobians.</p>						CO2
UNIT – III	Differential Equation					Contact Hours :12
<p>3.1 Formation, Order, Degree, Types, Solution. Formation of differential equations through physical, geometrical, mechanical and electrical considerations, Order, Degree of a differential equation, Linear, nonlinear equation.</p> <p>3.2 First Order Equations Variable Separable, equations reducible to separable forms, Homogeneous equations, equations reducible to homogeneous forms, Linear and Bernoulli form exact equation and their solutions.</p> <p>3.3 Higher Order Linear Equation :Property of solution, Linear differential equation with constant coefficients(PI for $X = e^{ax}, \sin ax, \cos ax$)</p>						CO3

UNIT – IV	Integral Calculus-II	Contact Hours :12
4.1 Beta and Gamma Functions Definition, Use, Relation between the two, their use in evaluating integrals. 4.2 Laplace Transform ---Definition, Basic theorem and properties, inverse Laplace transform,		CO4
UNIT – V	Probability and Statistics	Contact Hours :12
5.1 Probability Introduction, Addition and Multiplication theorem and simple problem. 5.2 Distribution, Binomial Distribution, Poisson distribution, Normal Distribution		CO5
Lecture Hours :45	Tutorials Hours :15	Total :60
Reference Books:		
4. <i>Applied Mathematics-III by Ajay Kumar ,Jai Prakash Nath Publication Merrut.</i> 5. <i>Applied Mathematics-III by H.R. Luthera, Bharat Bharati Publication Merrut</i> 6. <i>Applied Mathematics-III by Kailash Sinha , BBP Publication, Merrut</i>		

Diploma in Mechanical (Production) Engineering						
Semester: III			Course Category: PC			
Course Code	Course		Period / Week			Credit
			L	T	P	C
DMEPC205	MATERIAL SCIENCE		3	0	0	3
Prerequisite	<i>At the end of this course, the students will be able to:</i>				Bloom's Level	
Course Outcome	CO1	<i>Distinguish between metals and non metals and ferrous and non ferrous materials.</i>			K₂,K₄	
	CO2	<i>Analyze microstructure and changes in microstructure due to heat treatment.</i>			K₂,K₄	
	CO3	<i>Explain properties and applications of composites, ceramics and smart materials.</i>			K₂,K₃,K₅	
	CO4	<i>Select suitable material to be used for various engineering applications.</i>			K₂,K₃	
	CO5	<i>Perform destructive and non-destructive testing of materials.</i>			K₃,K₄,K₅	
UNIT – I	Introduction				Contact Hours :8	
Material, History of Material Origin, Scope of Material Science, Overview of different engineering materials and applications, Classification of materials, Thermal, Chemical, Electrical, Mechanical properties of various materials, Present and future needs of materials.					CO1	
UNIT – II	Crystallography				Contact Hours :8	
Fundamentals: Crystal, Unit Cell, Space Lattice, Arrangement of atoms in Simple Cubic Crystals, BCC, FCC and HCP Crystals, Number of atoms per unit Cell, Atomic Packing Factor.					CO2	
Deformation: Overview of deformation behavior and its mechanism, behavior of material under load control and strain control.						
Failure Mechanisms: Overview of failure modes, fracture, fatigue and creep.						
UNIT – III	Metals And Alloys				Contact Hours :8	
Ferrous Materials: Different iron ores, Raw materials in production of iron and steel, Basic process of iron-making and steel-making, Classification of iron and steel.					CO3	
Cast Iron: Different types of Cast Iron, manufacture and their use. Classification of Grey cast iron and S.G. iron Steels: Steels and alloy steel, Classification of plain carbon steels, Properties and usage of different types of Plain Carbon Steels, Effect of various alloys on properties of steel, Uses of alloy steels (high speed steel, stainless steel, spring steel, silicon steel)						
Non Ferrous Materials: Properties and uses of Aluminum, Copper and Zinc and their alloys						
UNIT – IV	Heat Treatment				Contact Hours :8	

Purpose of heat treatment, Solid solutions and its types, Formation and decomposition of Austenite, Martensitic Transformation -Simplified Transformation Cooling Curves. Various heat treatment processes- hardening, tempering, annealing, normalizing, Case hardening and surface hardening, Hardenability of steels, Selection of case carburizing and induction hardening steels. Types of heat treatment furnaces (only basic idea)		CO4
UNIT – V	Identification and Testing of Materials (Destructive and NDT)	Contact Hours :8
Identification of metal by giving mini projects. Destructive testing: Stress testing, Harness testing. Non-destructive testing: Eddy-current, Magnetic-particle, Liquid penetration, radiographic, Ultrasonic and visual testing		
Lecture Hours : 40	Tutorials Hours :00	Total : 40
Reference Books:		
<ol style="list-style-type: none"> 1. <i>Text book of Material Science by R.K. Rajput; Katson Pubs, Ludhiana</i> 2. <i>Text book of Material Science by V.K. Manchanda; India Publishing House, Jalandhar.</i> 3. <i>Introduction to Material Science by A.R. Gupta, Satya Prakashan, New Delhi.</i> 4. <i>Material Science by Hazra, Chaudhary</i> 5. <i>Material Science and Engineering Raghuan by Raghvaan PHI</i> 6. <i>E-books/e-tools/relevant software to be used as recommended by AICTE/UBTE/NITTTR, Chandigarh</i> 		

Diploma in Mechanical (Production) Engineering						
Semester : III			Course Category: PC			
Course Code	Course		Period / Week			Credit
			L	T	P	C
DMEPC207	Strength of Materials		2	1	0	3
Prerequisite	<i>At the end of this course, the students will be able to:</i>				Bloom's Level	
Course Outcome	CO1	<i>Interpret various concepts and terms related to strength of materials. Calculate stresses in bars of various cross-sections.</i>			K ₂ ,K ₅	
	CO2	<i>Calculate energy stored by materials subjected to axial loads. Calculate moment of inertia of different sections.</i>			K ₂ ,K ₅	
	CO3	<i>Draw and calculate shear force and bending moment diagrams of beam under given loading</i>			K ₃ ,K ₅	
	CO4	<i>Interpret the concept of bending and torsion and calculate stresses on different section of materials. Determine the diameter of a shaft under combined bending and torsion.</i>			K ₂ ,K ₄	
	CO5	<i>Calculation of deflection and slope on beams for different types of loading conditions.</i>			K ₃ ,K ₄ ,K ₅	
UNIT – I	Stresses and Strains				Contact Hours : 08	
Basic assumptions; Concept of load, Stress: Tensile, Compressive and Shear stresses Strains: Longitudinal, Lateral, Shear and Volumetric strain, Concept of Elasticity, Elastic limit and limit of proportionality. Hook's Law, Modulus of elasticity & its types Relationship between Young, Shear and Bulk Modulus of Elasticity, Stress-strain diagrams for ductile and brittle materials, Nominal stress & Yield point, plastic stage Ultimate strength and breaking stress, Percentage elongation, Proof stress and working stress, Factor of safety, Poisson's Ratio, Simple numerical					CO1	
UNIT – II	Resilience & Moment of Inertia				Contact Hours : 08	
Resilience, proof resilience and modulus of resilience, Strain energy due to direct stresses, Concept of moment of inertia and second moment of area, Radius of gyration Theorem of perpendicular axis and parallel axis (without derivation), Second moment of area of common geometrical sections :Rectangle, Triangle, Circle (without derivation); Second moment of area for L,T,C and I section, Section modulus					CO2	
UNIT – III	Shear Force and Bending Moment				Contact Hours : 08	
Concept of beam and form of loading, Concept of end supports-Roller, hinged and fixed Concept of bending moment and shearing force, S.F. and B.M. Diagram for cantilever and simply supported beams without overhang subjected to concentrated load and U.D.L.					CO3	
UNIT – IV	Bending Stresses & Torsion				Contact Hours : 08	
Concept of Bending stresses, Theory of simple bending, Derivation of pure bending equation $\sigma/y = M/I = E/R$, Concept of moment of resistance, Concept of torsion- difference between torque and torsion. Use of torque equation for circular shaft, Comparison between solid and hollow shaft with regard to their strength and weight. Power transmitted by shaft Concept of mean and maximum torque					CO4	

UNIT – V	Slope and Deflections of Beams	Contact Hours : 08
Definition of slope and deflection, sign convention. Calculation of maximum slope and deflection for the following standard cases by double integration or moment area method. Cantilever having point load at the free end, Cantilever having point load at any point of the span, Cantilever with uniformly distributed load over the entire span Cantilever having U.D.L. over part of the span from free end, Cantilever having U.D.L. over a part of span from fixed end, Simply supported beam with point load at centre of the span. Simply supported beam with U.D. L. over entire span.		CO5
Lecture Hours : 30	Tutorial Hours :10	Total : 40
Reference Books:		
<ol style="list-style-type: none"> 1. <i>SOM by Birinder Singh; Katson Publishing House, New Delhi.</i> 2. <i>SOM by RS Khurmi; S.Chand& Co; New Delhi</i> 		
Text Book:		
<ol style="list-style-type: none"> 3. <i>Mechanics of Solids by Karmveer Saini, Krishna Publication House, Meerut.</i> 4. <i>E-books/e-tools/relevant software to be used as recommended by AICTE/UBTE/NITTTR, Chandigarh..</i> 		

Diploma in Mechanical (Production) Engineering						
Semester: III			Course Category: PC			
Course Code	Course		Period / Week			Credit
			L	T	P	C
DMEPC209	Thermodynamics		2	1	0	3
Prerequisite	<i>At the end of this course, the students will be able to:</i>				Bloom's Level	
Course Outcome	CO1	<i>Study of different types thermodynamics properties.</i>			K₂,K₄	
	CO2	<i>Solve basic problems of gas equation using perfect gas laws and compute the work done, enthalpy, internal</i>			K₂,K₄	
	CO3	<i>Application of steady flow energy to equation and law of thermodynamics</i>			K₂,K₃,K₅	
	CO4	<i>To understand the methods of computing various properties of steam.</i>			K₂,K₃	
	CO5	<i>Explain the working, construction and applications of steam generators</i>			K₂,K₄,K₅	
UNIT – I	Fundamental Concepts				06 Periods	
Thermodynamic state and system, boundary, surrounding, universe, thermodynamic systems – closed, open, isolated, adiabatic, homogeneous and heterogeneous, macroscopic and microscopic, properties of system – intensive and extensive, thermodynamic equilibrium, quasi – static process ,reversible and irreversible processes, Zeroth law of thermodynamics, definition of properties like pressure, volume, temperature, enthalpy, internal energy. Modes of heat transfer,					CO1	
UNIT – II	Laws of Perfect Gases and Work in different Thermodynamic Processes				12 Periods	
Definition of gases, explanation of perfect gas laws – Boyle's law, Charle's law, Avagadro's law, Renault's law, Universal gas constant, , Specific heat at constant pressure, specific heat at constant volume of gas, Types of thermodynamic processes– isochoric, isobaric, isothermal, hyperbolic, isentropic, polytropic and throttling processes, equations representing the processes Derivation of work done, change in internal energy, rate of heat transfer for the above. Simple problems.					CO2	
UNIT – III	Laws of Thermodynamics				08 Periods	
Laws of conservation of energy, first law of thermodynamics (Joule's experiment), Steady flow energy equation, Application of steady flow energy to equation, turbines, pump, boilers, nozzles. Heat source and heat sinks, statement of second laws of thermodynamics: Kelvin Planck's statement, Clasius statement, Introduction of third law of thermodynamics, entropy, Description of Carnot cycle, Otto cycle, Diesel cycle					CO3	
UNIT – IV	Properties of Steam				08 Periods	
Formation of steam and related terms, thermodynamics properties of steam, steam tables, internal latent heat, internal energy of steam, Mollier diagram (H – S Chart), Expansion of steam, Hyperbolic, reversible adiabatic and throttling processes Quality of steam.					CO4	

UNIT – V	Steam Generators	06 Periods
Uses of steam, classification of boilers, comparison of fire tube and water tube boilers. Construction features of Lancashire boiler, Nestler boiler, Babcock & Wilcox Boiler. Introduction to modern boilers		CO5
Lecture Hours : 40	Tutorials Hours :12	Total :52
Reference Books:		
<ol style="list-style-type: none"> 1. Engineering Thermodynamics by PK Nag; Tata McGraw Hill, Delhi. 2. Basic Engineering Thermodynamics by Roy Chaudhary; Tata McGraw Hill, Delhi. 3. Engineering Thermodynamics by CP Arora; Tata McGraw Hill, Delhi. 4. A Treatise on Heat Engineering by VP Vasandani and DS Kumar; Metropolitan BookCompany. 5. Internal Commercial Engine by V. Ganeshan; Tata McGraw Hill, Education 6. E-books/e-tools/relevant software to be used as recommended by 		

Diploma in Mechanical (Production) Engineering					
Semester :III			Course Category: PC		
Course Code	Course	Period / Week			Credit
		L	T	P	C
DMEPC211	MANUFACTURING PROCESS	2	0	0	2
Prerequisite	<i>At the end of this course, the students will be able to:</i>				Bloom's Level
Course Outcome	CO1	<i>Study of welding and Fabricate welding joints using gas welding</i>			K₂,K₃
	CO2	<i>Fabricate welding joints using gas welding arc welding, TIG and MIG welding of mild steel and stainless steel materials.</i>			K₂,K₃
	CO3	<i>Prepare pattern for given job, Select material and type of patterns, cores, Prepare sand moulds manually and on machine.</i>			K₃,K₄
	CO4	<i>Select type of molding sand, adhesives, compact, strength and parameters of sand for given job, Cast a mould.</i>			K₂,K₄
	CO5	<i>Study of different types of metal forming processes.</i>			K₃,K₄
UNIT – I	Welding				Contact Hours : 06
Welding Process Principle of welding, Classification of welding processes, Advantages and limitations of welding, Industrial applications of welding, Welding positions and techniques, symbols. Safety precautions in welding. Gas Welding Principle of operation, Types of gas welding flames and their applications.					CO1
UNIT – II	Arc Welding				Contact Hours : 06
Arc Welding: Principle of operation, Shielded metal arc welding, submerged arc, Electro slag welding, welding, Tungsten inert gas (TIG) welding, other welding process, Metal inert gas (MIG) welding, Resistance welding Atomic hydrogen welding, , Thermit welding , Electron beam welding, Ultrasonic welding, Laser beam welding, Robotic welding					CO2
UNIT – III	Pattern & Molding				Contact Hours : 06
Types of pattern, Pattern material, Pattern allowances, Introduction to cores, core boxes and core materials, Core prints, positioning of cores. Properties of molding sand, their impact and control of properties viz. permeability, refractoriness, adhesiveness, cohesiveness, strength, flow ability, collapsibility, Various types of molding sand, Mould Making Types of moulds, Step involved in making a mould, Molding boxes, hand tools used for mould making, Molding processes: Bench molding, floor molding, pit molding and machine molding.					CO3
UNIT – IV	Casting				Contact Hours : 06
Introduction of casting processes. Principle, working and applications of Die casting: hot chamber and cold chamber, Investment and lost wax process, centrifugal casting. Gating and Riser System Elements of gating system, Pouring basin, sprue, runner, gates, Types of risers, location of risers, Casting Defects Different types of casting defects,					CO4
UNIT – V	Metal Forming Process				Contact Hours : 06

Press Working- Types of presses, type of dies. Press Operations-Shearing, piercing trimming, punching, notching, shaving, gearing, embossing, stamping. Forging- Open die forging, closed die gorging, Press forging, upset forging, swaging, up setters, roll forging, Cold and hot forging. Rolling- Elementary theory of rolling, Types of rolling mills, Thread rolling, Rolling defects and remedies. Extrusion and Drawing- Type of extrusion- Hot and Cold, Direct and indirect, pipe drawing, tube drawing, wire drawing.		CO5
Lecture Hours: 30	Tutorial Hour: 00	Total :30
Reference Books:		
<ol style="list-style-type: none"> 1. <i>Workshop Technology</i> by BS Raghuvanshi :Dhanpat Rai and Sons Delhi 2. <i>Elements of Workshop Technology</i> by SK Choudhry and Hajra : Asia Publishing House 3. <i>Welding Engineering</i> by RL Aggarwal and T Manghnani; Khanna Publishers, Delhi 		
Text Book:		
<ol style="list-style-type: none"> 4. <i>Foundry Technology</i> by KP Sinha and DB Goel; Roorkee Publishng House, Roorkee. 5. <i>A Text Book of Manufacturing Science and Technology</i> by A Manna, Prentice Hall of India, Delhi. 		

Diploma in Mechanical (Production) Engineering					
Semester: III			Course Category: PC		
Course Code	Course	Period/Week			Credit
		L	T	P	C
DMEPC213	MATERIAL SCIENCE LAB	0	0	2	1
Prerequisite	<i>At the end of this course, the students will be able to:</i>				
Course Outcome	CO1	<i>Carryout various heat treatment processes.</i>			
	CO2	<i>Analyze microstructure and changes in microstructure due to heat treatment.</i>			
	CO3	<i>Explain properties and applications of composites, ceramics and smart materials</i>			
	CO4	<i>Distinguish between metals and non metals and ferrous and non ferrous materials.</i>			
	CO5	<i>Select suitable material to be used for various engineering applications.</i>			
<u>LIST OF PRACTICALS</u>					
Any 7 of the following experiment					
1. Use of diamond polishing apparatus.					CO1
2. To perform following heat treatment process on materials of known carbon percentage and checking the change in the properties. a) Annealing b) Normalising c) Care hardening					CO2
3. Preparation of specimens and study of micro structure of given metals and alloys on metallurgical microscope a) Brass b) Bronze c) Grey Cast Iron d) Low Carbon Steel e) High Carbon Steel f) High Speed Steel					CO3
4. To prepare specimen for microscope examination for polishing 5. To determine composition of alloy steel by steeloscope. 6. Study and sketch Universal Testing Machine. 7. Study and sketch of Rockwell hardness testing machine.					CO4
8. To study the impact toughness or energy absorbed by various materials (like mild steel, brass, copper, etc.) under sudden load using the Izod impact test. 9. To study the impact toughness (energy absorbed) of materials using the Charpy impact test 10. To find angle of twist for given torque and to draw torque – angle of twist graph.					CO5

Diploma in Mechanical Engineering					
Semester :III			Course Category: PC		
Course Code	Course	Period/Week			Credit
		L	T	P	C
DMEPC217	THERMODYNAMICS LAB	0	0	2	1
Prerequisite	<i>At the end of this course, the students will be able to:</i>				
Course Outcome	CO1	<i>Identify modes of heat transfer.</i>			
	CO2	<i>Study of Joule 's experiment.</i>			
	CO3	<i>Distinguish between water tube and fire-tube boilers and explain the function all the mountings and accessories.</i>			
	CO4	<i>Explain the working, construction and applications of steam boilers and steam generators.</i>			
	CO5	<i>Calculate dryness fraction.</i>			
<u>LIST OF PRACTICALS</u>					
Any 7 of the following experiment					
1. Demonstration of mountings and accessories on a boiler.					CO1
2. Demonstrate the working of air compressor.					CO1
3. Demonstration of heat transfer through conduction, convection and Radiation					CO2
4. Study of working of high-pressure boiler					CO2
5. Study the working of Lancashire boiler and Nestler boiler					CO3
6. Determination of BHP by dynamometer.					CO4
7. Study of Morse test on multi-cylinder petrol engine.					CO4
8. Study and Sketch of cut section of 2-stroke and 4-stroke engines.					CO5
9. To determine dry fraction of steam by throttling and separating calorimeter.					CO5

Diploma in Mechanical (Production) Engineering					
Semester: III			Course Category: PC		
Course Code	Course	Period / Week			Credit
		L	T	P	C
DAU201	UNIVERSAL HUMAN VALUES	2	0	0	0
Prerequisite	<i>At the end of this course, the students will be able to:</i>				Bloom's Level
Course Outcome	CO1	<i>To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings.</i>			K₂,K₃
	CO2	<i>To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value based living in a natural way.</i>			K₂,K₃
	CO3	<i>To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature</i>			K₃,K₄
	CO4	<i>Intended to provide a much needed orientation input in value education to the young enquiring minds.</i>			K₂,K₄
	CO5	<i>Process of self-investigation and self-exploration, and not of giving sermons. Whatever is found as truth or reality is stated as a proposal and the students are facilitated to verify it in their own right, based on their Natural Acceptance and subsequent Experiential Validation.</i>			K₃,K₄
UNIT – I	Course Introduction - Need, Basic Guidelines, Content and Process for Value				Contact Hours : 06
Education					CO1
<ol style="list-style-type: none"> Understanding the need, basic guidelines, content and process for Value Education Self-Exploration–what is it? - its content and process: ‘Natural Acceptance’ and Experiential Validation- as the mechanism for self-exploration Continuous Happiness and Prosperity- A look at basic Human Aspirations Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario Method to fulfill the above human aspirations: understanding and living in harmony at various levels 					
UNIT – II	Understanding Harmony in the Human Being - Harmony in Myself!				Contact Hours : 06
<ol style="list-style-type: none"> Understanding human being as a co-existence of the sentient ‘I’ and the material the Body’ Understanding the needs of Self (‘I’) and ‘Body’ - <i>Sukh</i> and <i>Suvidha</i> 					CO2

	<ul style="list-style-type: none"> 3. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer) 4. Understanding the characteristics and activities of 'I' and harmony in 'I' 5. Understanding the harmony of I with the Body: <i>Sanyam</i> and <i>Swasthya</i>; correct appraisal of Physical needs, meaning of Prosperity in detail 6. Programs to ensure <i>Sanyam</i> and <i>Swasthya</i> 	
UNIT – III	Understanding Harmony in the Family and Society- Harmony in Human- Human Relationship	Contact Hours : 06
	<ul style="list-style-type: none"> 1. Understanding Harmony in the family – the basic unit of human interaction 2. Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; <ul style="list-style-type: none"> a. Trust (Vishwas) and Respect (Samman) as the foundational values of relationship 3. Understanding the meaning of Vishwas; Difference between intention and competence 4. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship 5. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitvaas comprehensive Human Goals 6. Visualizing a universal harmonious order in society- Undivided Society (AkhandSamaj), Universal Order(SarvabhaumVyawastha)- from family to world family! -Practice Exercises and Case Studies will be taken up in Practice Sessions. 	CO3
UNIT – IV	Understanding Harmony in the Nature and Existence - Whole existence as Coexistence	Contact Hours : 06
	<ul style="list-style-type: none"> 1. Understanding the harmony in the Nature. 2. Interconnectedness and mutual fulfillment among the four orders of nature-recyclability and self-regulation in nature. 3. Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space 4. Holistic perception of harmony at all levels of existence. -Practice Exercises and Case Studies will be taken up in Practice Sessions. 	CO4
UNIT – V	Implications of the above Holistic Understanding of Harmony on Professional Ethics	Contact Hours : 06
	<ul style="list-style-type: none"> 1. Natural acceptance of human values 2. Definitiveness of Ethical Human Conduct 3. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order 4. Competence in professional ethics: <ul style="list-style-type: none"> a) Ability to utilize the professional competence for augmenting universal human order b) Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, c) Ability to identify and develop appropriate technologies and management patterns for above production systems. 	CO5

<p>5. Case studies of typical holistic technologies, management models and production systems</p> <p>6. Strategy for transition from the present state to Universal Human Order:</p> <p>a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers</p> <p>b) At the level of society: as mutually enriching institutions and organizations</p> <p>7. To inculcate Human Values among Students: The Role of self ,Parents and Teachers -Practice Exercises and Case Studies will be taken up in Practice Sessions.</p>	
<p>Lecture Hours :30</p>	<p>Tutorial Hour: 00</p>
<p>Total :30</p>	
<p>Reference Books:</p>	
<p>a. <i>The text book (Latest Edition)</i> R.R Gaur, R Asthana, G P Bagaria, <i>A foundation course in Human Values and professional Ethics</i>, Excel books, New Delhi.</p> <p>b. <i>The teacher's manual (Latest Edition)</i> R.R Gaur, R Asthana, G P Bagaria, <i>A foundation course in Human Values and professional Ethics – Teachers Manual</i>, Excel books, New Delhi.</p>	
<p>Text Book:</p>	
<p>1. PL Dhar, RR Gaur, 1990, <i>Science and Humanism</i>, Commonwealth Purblishers.</p>	

Diploma in Mechanical (Production) Engineering					
Semester: III			Course Category: PC		
Course Code	Course	Period/Week			Credit
		L	T	P	C
DMEPC219	MANUFACTURING PROCESS LAB	0	0	2	1
Prerequisite	<i>At the end of this course, the students will be able to:</i>				
Course Outcome	CO1	<i>Study and application of gas welding.</i>			
	CO2	<i>Study and application of arc welding.</i>			
	CO3	<i>Study and application of pattern making.</i>			
	CO4	<i>Study and application of Foundry Shop</i>			
	CO5	<i>Study and application of sheet metal shop.</i>			
List of practical:					
1. WELDING SHOP a. Preparing gas welding joint in vertical position joining M.S. Plates Job. b. Preparing gas welding joint in Horizontal position joining M.S. Plates Job. c. Welding practice-Gas and electric welding.					CO1
2. ARC WELDING a. T Joint welding after preparation of edge. b. To study spot/seam welding machine. c. Exercise on MIG/TIG welding.					CO2
3. PATTERN MAKING a. Preparation of solid/single piece pattern. b. Preparation of two piece/split pattern c. Preparation of a pattern on wooden lathe Preparation of a self cored pattern d. Preparation of self cored pattern.					CO3
4. FOUNDRY SHOP a. Preparation of mould with solid pattern on floor. b. Preparation of floor mould of split pattern in cope and drag of molding box.					CO4
5. SHEAT METAL SHOP a. Preparation of single ended spanner by hand/machine forging. b. Preparation of utility item out of G.I. sheet.					CO5

DETAILED SYLLABUS

DIPLOMA 2nd Year

- **Mechanical (Production) Engineering 4th Semester**

(Effective from Session: 2025-26)

Diploma in Mechanical (Production) Engineering						
Semester: IV			Course Category: HS			
Course Code	Course		Period / Week			Credit
			L	T	P	C
DHS202	COMMUNICATION SKILLS-II		2	0	0	2
Prerequisite	<i>At the end of this course, the students will be able to:</i>				Bloom's Level	
Course Outcome	CO1	<i>Frame Correct sentences with language</i>			K1	
	CO2	<i>Comprehend the language correctly.</i>			K2	
	CO3	<i>Mastering writing skills.</i>			K3	
	CO4	<i>Learning classified knowledge on speaking etiquettes</i>			K1, K3	
	CO5	<i>Identifying and evaluating the entire concepts of Presentation Skills</i>			K2, K3	
UNIT – I	DESCRIPTIVE GRAMMAR				Contact Hours: 06	
Tense, Preposition, Conjunction, Comparison of Adverbs, Simple, Compound & Complex Sentences Adverb					CO1	
UNIT – II	READING SKILLS				Contact Hours: 06	
Unseen Passages for comprehension, Vocabulary enhancement:- Prefix, Suffix, Synonyms, Antonyms					CO2	
UNIT – III	PROFESSIONAL WRITING SKILLS				Contact Hours: 06	
Business Letters & its types, Memorandum, Circulars, Office orders, Professional Email, Resume & CV writing					CO3	
UNIT – IV	EFFECTIVE LEARNING PATTERNS FOR INTERVIEW ROUNDS				Contact Hours: 06	
Professional Interview Practices, Types of Interview (Placement, Govt. job, academics, research, internships & training), Do's and don'ts of Interview session					CO4	
UNIT – V	BUSINESS WRITING AND LITERARY WORK				Contact Hours: 06	
Business Letters & its types, Memorandum, Circulars, Office orders, Glossary of Literary term					CO5	
Lecture Hours: 30			Tutorials Hours :00		Total: 30	
Reference Books:						
1 Business Communication by M. Raman, Oxford University Press,2006						
i. Word Power Made by Easy by Norman Lewis, Goyal Publishers & Distributors Pvt. Ltd.1949						
ii. 30 days to Better English by Norman Lewis, Pocket Books,1965						

Diploma in Mechanical (Production) Engineering					
Semester: IV			Course Category: PC		
Course Code	Course	Period / Week			Credit
		L	T	P	C
DMEPC202	REFRIGERATION AND AIR CONDITIONING	2	1	0	3
Prerequisite	<i>At the end of this course, the students will be able to:</i>				Bloom's Level
Course Outcome	CO1	<i>Explain the working and construction features of refrigeration and air conditioning systems & draw and interpret various refrigeration cycles.</i>			K₂, K₃
	CO2	<i>Make basic calculation of psychometric properties and processes. Calculate heating and cooling load requirements of a room.</i>			K₂, K₃
	CO3	<i>Explain latest developments in the field of refrigeration and air conditioning.</i>			K₃, K₄
	CO4	<i>Calculate the properties of air by using psychometric chart.</i>			K₂, K₄
	CO5	<i>Detect faults in an air-conditioner/refrigerator.</i>			K₃, K₄
UNIT – I	Basics of Refrigeration				Contact Hours : 08
Introduction to refrigeration, air conditioning, necessity of refrigeration meaning of refrigerating effect, units of refrigeration, COP, difference between COP and efficiency, methods of refrigeration, Reversed Carnot cycle and its representation on P-V and T-S diagram. Major application areas of refrigeration and air conditioning.					CO1
UNIT – II	Vapour Compression System & Refrigerants				Contact Hours : 08
Introduction, principle, function, parts and necessity of vapour compression system, T- S and p-h charts, dry, wet and superheated compression. Effect of sub cooling, super heating, mass flow rate, entropy, enthalpy, work done, Refrigerating effect and COP. Functions, classification of refrigerants, Nomenclature of refrigerant, Desirable properties of refrigerant, selection of refrigerant.					CO2
UNIT – III	Air Refrigeration System				Contact Hours : 08
Introduction, advantages and disadvantages of air-refrigeration system over vapour compression system, bell – Collemann cycle, Boot strap system, calculation of mass flow rate, work done and COP.					CO3
UNIT – IV	Vapour Absorption System				Contact Hours : 08
Introduction, principle and working of simple absorption system and domestic electrolux refrigeration systems. Solar power refrigeration system, advantages and disadvantages of solar power refrigeration system over vapour compression system.					CO4
UNIT – V	Psychrometry & Applied Psychrometry				Contact Hours : 08
Definition, importance, specific humidity, relative humidity, degree of saturation, DBT, WBT, DPT, sensible heat,. Psychrometric chart, sensible heating and cooling, Adiabatic cooling, Humidification and dehumidification, cooling and humidification, cooling and dehumidification, heating and humidification, heating and dehumidification					CO5

Lecture Hours :30	Tutorial Hours :10	Total :40
Reference Books:		
<ol style="list-style-type: none">1. <i>Refrigeration and Air Conditioning</i> by Domkundwar; Dhanpat Rai and Sons, Delhi.2. <i>Refrigeration and Air Conditioning</i> by CP Arora; Tata McGraw Hill, New Delhi		
Text Book:		
<ol style="list-style-type: none">3. <i>Refrigeration and Air Conditioning</i> by Dr. R.K Rajput; S.K. Kataria and Sons, Ludhiana.4. <i>e-books/e-tools/relevant software to be used as recommended by AICTE/UBTE/NITTTR, Chandigarh.</i>		

Diploma in Mechanical (Production) Engineering					
Semester: IV			Course Category: PC		
Course Code	Course	Period / Week			Credit
		L	T	P	C
DMEPC204	FLUID MECHANICS	3	1	0	4
Prerequisite	<i>At the end of this course, the students will be able to:</i>				Bloom's Level
Course Outcome	CO1	<i>Explain fluid properties, their units and conversion.</i>			K ₂ ,K ₄
	CO2	<i>Measure different types of pressures.Maintain different types of pressure gauges.</i>			K ₂ ,K ₄
	CO3	<i>Calculate flow and discharge of various liquids.Apply Bernoulli's theorem for calculating pipe diameter and height of pipe from ground.</i>			K ₂ ,K ₃ ,K ₅
	CO4	<i>Calculate pipe friction and losses in pipelines.Specify hydraulic machines for different applications.</i>			K ₂ ,K ₃
	CO5	<i>Apply Pascal's law in practical applications. Explain the functions of various components used in hydraulic and pneumatic system.Maintain hydraulic and pneumatic system.</i>			K ₃ ,K ₄ ,K ₅
UNIT – I	Introduction				Contact Hours :12
Fluid, types of fluid; properties of fluid viz mass density, weight density (specific weight), specific volume, capillarity, specific gravity, viscosity, compressibility, surface tension, kinematic viscosity and dynamic viscosity and their units.					CO1
UNIT – II	Pressure and its Measurement				Contact Hours :12
1. Concept of pressure (Atmospheric Pressure, gauge pressure, absolute pressure). 2. Pressure measuring devices: peizometer tube manometers - simple U-tube, differential single column, inverted U-tube, micromanometer including simple problems					CO2
UNIT – III	Flow of Fluids				Contact Hours :12
Types of fluid flow - steady and unsteady, uniform and non-uniform, laminar and turbulent; rate of flow and their units; continuity equation of flow; potential energy of a flowing fluid; total head; Bernoulli's theorem (statement and proof) and its applications. Discharge measurement with the help of venturi-meter, orifice meter, pitot-tube, limitations of Bernoulli's theorem simple problems.					CO3
UNIT – IV	Hydraulic System				Contact Hours :12
Description, operation and application of hydraulic systems - hydraulic ram, hydraulic jack, hydraulic brake, hydraulic accumulator, hydraulic door closer, hydraulic press.					CO4
UNIT – V	Components of Pneumatic Systems				Contact Hours :12
1. Basic components - function of each component 2. Air compressors - Introduction 3. Air cylinder - types, function, single acting, double acting, rotating, non-rotating, 4. piston type, diaphragm type, tandem cylinder, double ended cylinder, duplex cylinder.					CO5

5. Air filter, regulator and lubricator - their necessity in pneumatic circuit.		
6. Installation, maintenance and application of air cylinders.		
Lecture Hours :45	Tutorials Hours :15	Total :60
<i>Reference Books:</i>		
7. <i>Fluid Mechanics by KL Kumar; S Chand and Co Ltd., Ram Nagar, New Delhi.</i> 8. <i>Hydraulics and Fluid Mechanics Machine by RS Khurmi ;S.Chand& Co. Ltd., NewDelhi.</i> 9. <i>Fluid Mechanics through Problems by RJ Garde; Wiley Eastern Ltd., New Delhi.</i> 10. <i>Fluid Mechanics by Dr AK Jain, Khanna Publishers, New Delhi.</i> 11. <i>Hydraulic and Pneumatic Control by K Shammuga Sundaram, S. Chand & Co. Ltd., NewDelhi</i> 12. <i>Hydraulics and Hydraulic Machinery by Dr. Jagadish Lal; Metropolitan Book CompanyLtd., Delhi.</i> 13. <i>Hydraulic and Pneumatic Power and Control Design, Performance and ApplicationbyYeaple, McGraw Hill, New York..</i> 14. <i>Pneumatic Controls by Festo Didactic; Bangalore.</i> 15. <i>Pneumatics Control: An Introduction to the Principles by Werner Deppert and Kurt Stoll; Vogel -Verlag.</i>		

Diploma in Mechanical (Production) Engineering						
Semester: IV			Course Category: PC			
Course Code	Course		Period / Week			Credit
			L	T	P	
DMEPC206	BASIC OF AUTOCAD (2D AND 3D)		4	0	0	4
Prerequisite	<i>At the end of this course, the students will be able to:</i>				Bloom's Level	
Course Outcome	C01	<i>Know about Computer aided design and manufacturing.</i>			K₂,K₄	
	C02	<i>Know the process of 2D & 3D transformations</i>			K₂,K₄	
	C03	<i>Know the method of viewing objects in 3D space.</i>			K₂,K₃,K₅	
	C04	<i>Know about flexible manufacturing system.</i>			K₂,K₃	
	C05	<i>Know about robotics.</i>			K₂,K₄,K₅	
UNIT – I	Introduction				Contact Hours :12	
Introduction to CAD/CAM/CIM Advantages of CAD/CAM Product Cycle and CAD/CAM Automation and CAD/CAM Reasons for implementation of CAD/CAM Steps involved in CAM operation					CO1	
UNIT – II	Surface / Solid Modeling Using CAD/CAM				Contact Hours : 12	
Introduction to parametric and non-parametric surfaces, Creation of simple surfaces using revolved surface, ruled surface and 3D surfaces Commands Designing Software used in creation of solid models Concept of solid models Solid Primitives- Box, cylinder, Cone, Sphere, Wedge and torus Construction of solid using Region, Extrude and Revolved feature Creation of Composite solid using Boolean function e.g. Union, Subtraction and Intersection. Sectioning of Solids and modification of solid Edges and faces using solid editing commands. Shell, Separate commands. Performing 3Doperations like 3D array, mirror and rotate Creation of fillets and chamfers Dimensioning of solids 2D and 3D transformation: Translation, Scaling, rotation, mirror, zooming,panning and clipping. Viewing the objects in different views. Concept of SW, SE, NE and Isometric Views.					CO2	
UNIT – III	CAM (Computer Aided Manufacturing)				Contact Hours :12	
Setting up the jobs, defining the operation, creating geometry Specifying the tools, machining parameters and type of machining Back plotting and verification of operation Post processing - Converting the generated tool path in NC code depending on the system ,Setting up the parameter relating to communication like transfer of programs to CNC machine					CO3	
UNIT – IV	Flexible Manufacturing System				Contact Hours :12	
Introduction to FMS.Principles of flexibility, changes in manufacturing system - external changes and internal changes job flexibility, machine flexibility. Features of FMS -					CO4	

production equipment, support system, material handling system, computer control system. Advantages & limitations of FMS.		
UNIT – V	Robotics	Contact Hours :12
Introduction to robot ,Robot configuration, Robot motions Robot programming languages, Work cell, control and interlock, robot sensors, Robot applications		CO5
Lecture Hours : 45	Tutorials Hours :15	Total :60
<i>Reference Books:</i>		
<ol style="list-style-type: none"> 1. CAD/CAM by Mikell Groover and Zimmers; Prentice Hall of India Pvt. Ltd., Delhi. 2. Computer Aided Manufacturing by Rao, Kundra and Tiwari; Tata McGraw Hill, New Delhi. 3. Introduction to Robotics by John J. Craig; Pearson Education Asia, Singapore. 4. Industrial Robot by Groover; Prentice Hall of India Pvt. Ltd., Delhi. 5. Robotics by YoremKorem; McGraw Hill International. Book Co., New Delhi. 6. CAD/CAM – Theory and Practice by Zeid; Tata McGraw Hill Publishers, New Delhi. 7. CAD/CAM/CIM by S. Radha Krishan. 8. CNC Machines by Dr. B.S. Pabla – New Age Publications. 9. e-books/e-tools/relevant software to be used as recommended by AICTE/UBTE/NITTTR, Chandigarh. 		

Diploma in Mechanical (Production) Engineering					
Semester: IV			Course Category :AU		
Course Code	Course	Period / Week			Credit
		L	T	P	C
DAU202	ENVIRONMENT SCIENCE	3	0	0	0
Prerequisite	<i>At the end of this course, the students will be able to:</i>				Bloom's Level
Course Outcome	CO1	<i>Understanding of ecology and ecosystem, sustainable development, renewable and nonrenewable resource.</i>			K ₂ ,K ₄
	CO2	<i>Understanding of Air pollution and water pollution.</i>			K ₂ ,K ₄
	CO3	<i>Understanding of soil pollution and noise pollution.</i>			K ₂ ,K ₃ ,K ₅
	CO4	<i>Understanding the environmental law</i>			K ₂ ,K ₃
	CO5	<i>Understanding the effect of pollution on environment.</i>			K ₂ ,K ₄ ,K ₅
UNIT – I	Introduction				Contact Hours :08
Basics of ecology, ecosystem- concept, and sustainable development, Resources renewable and non renewable					CO1
UNIT – II	Air Pollution and Water Pollution				Contact Hours : 08
Source of air pollution. Effect of air pollution on human health, economy, plant, animals. Air pollution control methods.					CO2
Impurities in water Cause of water pollution, Source of water pollution. Effect of water pollution on human health, Concept of dissolved O ₂ , BOD, COD. Prevention of water pollution- Water treatment processes, Sewage treatment. Water quality standard.					
UNIT – III	Soil Pollution and Noise pollution				Contact Hours :08
Sources of soil pollution. Types of Solid waste- House hold, Hospital, From Agriculture, Biomedical, Animal and human, excreta, sediments and E-waste . Effect of Solid waste. Disposal of Solid Waste- Solid Waste Management.					CO3
Source of noise pollution, Unit of noise, Effect of noise pollution, Acceptable noise level, Different method of minimize noise pollution.					
UNIT – IV	Environmental Legislation				Contact Hours :08
Introduction to Water (Prevention and Control of Pollution) Act 1974, Introduction to Air (Prevention and Control of Pollution) Act 1981 and Environmental Protection Act 1986, Role and Function of State Pollution Control Board and National Green Tribunal (NGT), Environmental Impact Assessment (EIA).					CO4
UNIT – V	Impact of Energy Usage on Environment				Contact Hours :08

Global Warming, Green House Effect, Depletion of Ozone Layer, Acid Rain. Ecofriendly Material, Recycling of Material.	CO5
Lecture Hours : 40 Tutorial Hour: 00	Total :40
<i>Reference Books:</i>	
<ol style="list-style-type: none"> 1. <i>Environmental Pollution by Dr. RK Khitoliya; S Chand Publishing, New Delhi</i> 2. <i>Environmental and Pollution Awareness by Sharma BR; Satya Prakashan, New Delhi.</i> 3. <i>Environmental Engineering and Management by Suresh K Dhamija; S K Katariaand Sons, New Delhi.</i> 	

Diploma in Mechanical (Production) Engineering

Semester: IV		Course Category: PC			
Course Code	Course	Period/Week			Credit
		L	T	P	C
DMEPC208	REFRIGERATION AND AIR CONDITIONING LAB	0	0	2	1
Prerequisite	<i>At the end of this course, the students will be able to:</i>				
Course Outcome	CO1	<i>Study of refrigerating tools.</i>			
	CO2	<i>Study of air conditioning parts.</i>			
	CO3	<i>Evaluating the COP of refrigeration system.</i>			
	CO4	<i>Demonstration of charging of refrigeration.</i>			
	CO5	<i>Identifying the parts of refrigeration and air conditioning system.</i>			
List of practical					
Any 7 of the following experiments					
1. Demonstration of various refrigeration tools and equipment.					CO1
2. Practice in cutting, bending, flaring, swaging and brazing of tubes.					CO2
3. Study of thermostatic switch, LP/HP cut out overload protector filters, strainers and filter driers.					CO3
4. Identify various parts of a refrigerator and window air conditioner.					CO4
5. Study of charging a refrigerator/ air conditioner.					
6. To detect faults in a refrigerator/ air conditioner					
7. To find COP of Refrigeration system					CO5
8. Visit to an ice plant or cold storage plant. or central air conditioning plant.					
9. Demonstration and working of window type air-conditioner.					
10. Demonstration and working of split type air-conditioner.					

Diploma in Mechanical (Production) Engineering					
Semester :IV			Course Category :PC		
Course Code	Course	Period/Week			Credit
		L	T	P	C
DMEPC210	FLUID MECHANICS LAB	0	0	2	1
Prerequisite	<i>At the end of this course, the students will be able to:</i>				
Course Outcome	CO1	<i>Identify fluid properties, their units and conversion.</i>			
	CO2	<i>Measure different types of pressures. Maintain different types of pressure gauges.</i>			
	CO3	<i>Apply Bernoulli's theorem for calculating pipe diameter and height of pipe from ground.</i>			
	CO4	<i>Calculate flow and discharge of various liquids.</i>			
	CO5	<i>Apply Pascal's law in practical applications.</i>			
<u>LIST OF PRACTICALS</u>					
Any 7 of the following experiments					
1. Measurement of pressure head by employing. i) Piezometer tube ii) Single and double column manometer					CO1
2. To find out the value of coefficient of discharge for a venturimeter.					
3. Measurement of flow by using venturimeter.					CO2
4. Verification of Bernoulli's theorem.					CO3
5. To find coefficient of friction for a pipe (Darcy's friction).					
6. To study hydraulic circuit of an automobile brake and hydraulic ram.					CO4
7. Study the working of a Pelton wheel and Francis turbine					
8. To study a single stage centrifugal pump for constructional details and its operation to find out its normal head and discharge.					CO5

9. To study operation of double acting cylinder with quick exhaust wall.	
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Diploma in Mechanical (Production) Engineering					
Semester : IV			Course Category: PC		
Course Code	Course	Period/Week			Credit
		L	T	P	C
DMEPC212	BASIC OF AUTOCAD (2D AND 3D) LAB	0	0	2	1
Prerequisite	<i>At the end of this course, the students will be able to:</i>				
Course Outcome	CO1	Know about Computer aided design and manufacturing.			
	CO2	Know the process of 2D & 3D transformations			
	CO3	Designing of Simple machine components			
	CO4	Designing of Crank shaft (Connecting Rod)			
	CO5	Performing simple assembly operations like- nut, bolt, coupling etc.			
<u>LIST OF PRACTICALS</u>					
Any 7 of the following experiments					
1. Performing 3D operations like Array, mirror, rotation, translation using solid works.					CO1
2. Performing 3D operation- panning, zooming, clipping etc.					
3. CNC Programming for turning operation					
4. CNC Programming for pocket milling					CO2
5. CNC Programming for profile milling					
6. CNC Programming for facing and drilling					CO3
7. Performing operation on trainer Lathe					CO4
8. Designing of Simple machine components					
9. Designing of Crank shaft (Connecting Rod)					CO5
10. Performing simple assembly operations like- nut, bolt, coupling etc.					