Kashi Institute of Technology, Varanasi

(An Autonomous Institute Approved by AICTE)

Evaluation Scheme & Syllabus

For

Diploma 2nd Year

(Mechanical Engineering)

(Effective from Session: 2025-26)

MS 23KM, Varanasi – Prayagraj(Allahabad) Highway, Mirzamurad, Varanasi

Uttar Pradesh - 221307

Diploma Second Year, Semester-III

Mechanical Engineering

S.N.	Course Category	Course Code	Course Title	Evaluation Scheme							
				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 Engineering

SN	Course Category	Course Code	Course Title	Evaluation Scheme							
				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 Engineering 3rd Semester**

(Effective from Session: 2025-26)

Diploma in Mechanical 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	***At the end of this course, the students will be able to:***					**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**
1.1 Algebra of Matrices, InverseAddition, Multiplication of matrices, Null matrix and a unit matrix, Squarematrix,Symmetric, Skew symmetric, Hermitian, Skew hermition, Orthagonal, Unitary,diagonal and Triangular matrix, Determinant of a matrix.Definition and Computation of inverse of a matrix. 1.2 Elementry Row/Column Transformation .Meaning and use in computing inverse and rank of a matrix. 1.3 Linear Dependence, Rank of a Matrix. Linear dependence/independence of vectors, Definition and computation of rankof matrix. Computing rank through determinants, Elementary row transformationan through the concept of a set of independent vectors. 1.4 Eigen Pairs, Cayley-Hamilton Theorem .Definition and evaluation of eign values and eign vectors of a matrix of order twoand three, Cayley-Hamilton theorem (without Proof)and its verification.						**CO1**
UNIT – II	**Differential Calculus**					**Contact Hours :12**
2.1 Function of two variables, identification of surfaces in space, conicoids 2.2 Partial DifferentiationDirectional derivative, Gradient, Use of gradient f, Partial derivatives, Chainrule, Higher order derivatives, Euler's theorem for homogeneous functions,Jacobeans.						**CO2**
UNIT – III	**Differential Equation**					**Contact Hours :12**
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. 3.2 First Order Equations Variable Separable, equations reducible to separable forms, Homogeneousequtions, equations reducible to homogeneous forms, Linear and Bernoulliform exact equation and their solutions. 3.3 Higher Order Linear Equation :Property of solution, Linear differential equation with constant coefficients(PI for X= e^{ax},Sinax, Cosax)						**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. *Applied Mathematics-III by Ajay Kumar ,Jai Prakash Nath Publication Merrut.*
5. *Applied Mathematics-III by H.R. Luthera, Bharat Bharati Publication Merrut*
6. *Applied Mathematics-III by Kailash Sinha , BBP Publication,Merrut*

Diploma in Mechanical Engineering						
Semester: **III**			Course Category: **PC**			
Course Code	Course		Period / Week			Credit
			L	T	P	C
DMEPC205	**MATERIAL SCIENCE**		**3**	**0**	**0**	**3**
Prerequisite	***At the end of this course, the students will be able to:***					**Bloom's Level**
Course Outcome	**CO1**	*Distinguish between metals and non metals and ferrous and non ferrous materials.*				K_2,K_4
	CO2	*Analyze microstructure and changes in microstructure due to heat treatment.*				K_2,K_4
	CO3	*Explain properties and applications of composites, ceramics and smart materials.*				K_2,K_3,K_5
	CO4	*Select suitable material to be used for various engineering applications.*				K_2,K_3
	CO5	*Perform destructive and non-destructive testing of materials.*				K_3,K_4,K_5
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. 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.						**CO2**
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. 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						**CO3**
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:

1. *Text book of Material Science by R.K. Rajput; Katson Pubs, Ludhiana*
2. *Text book of Material Science by V.K. Manchanda; India Publishing House, Jalandhar.*
3. *Introduction to Material Science by A.R. Gupta, Satya Prakashan, New Delhi.*
4. *Material Science by Hazra, Chaudhary*
5. *Material Science and Engineering Raghuan by Raghvaan PHI*
6. *E-books/e-tools/relevant software to be used as recommended byAICTE/UBTE/NITTTR, Chandigarh*

Diploma in Mechanical 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	***At the end of this course, the students will be able to:***					**Bloom's Level**
Course Outcome	**CO1**	*Interpret various concepts and terms related to strength of materials. Calculate stresses in bars of various cross-sections.*				K_2,K_5
	CO2	*Calculate energy stored by materials subjected to axial loads. Calculate moment of inertia of different sections.*				K_2,K_5
	CO3	*Draw and calculate shear force and bending moment diagrams of beam under given loading*				K_3,K_5
	CO4	*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.*				K_2,K_4
	CO5	*Calculation of deflection and slope on beams for different types of loading conditions.*				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:

1. *SOM by Birinder Singh; Katson Publishing House, New Delhi.*
2. *SOM by RS Khurmi; S.Chand& Co; New Delhi*

Text Book:

3. *Mechanics of Solids by Karmveer Saini, Krishna Publication House, Meerut.*
4. *E-books/e-tools/relevant software to be used as recommended by AICTE/UBTE/NITTTR, Chandigarh..*

Diploma in Mechanical Engineering						
Semester: III			**Course Category: PC**			
Course Code	**Course**		**Period / Week**			**Credit**
			L	**T**	**P**	**C**
DMEPC209	**Thermodynamics**		**2**	**1**	**0**	**3**
Prerequisite	***At the end of this course, the students will be able to:***					**Bloom's Level**
Course Outcome	**CO1**	*Study of different types thermodynamics properties.*				K_2,K_4
	CO2	*Solve basic problems of gas equation using perfect gas laws and compute the work done, enthalpy, internal*				K_2,K_4
	CO3	*Application of steady flow energy to equation and law of thermodynamics*				K_2,K_3,K_5
	CO4	*To understand the methods of computing various properties of steam.*				K_2,K_3
	CO5	*Explain the working, construction and applications of steam generators*				K_2,K_4,K_5
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, polytrophic 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:

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 Engineering						
Semester :**III**			Course Category: **PC**			
Course Code	**Course**		Period / Week			Credit
			L	T	P	C
DMEPC211	**MANUFACTURING PROCESS**		**2**	**0**	**0**	**2**
Prerequisite	***At the end of this course, the students will be able to:***					**Bloom's Level**
Course Outcome	**CO1**	*Study of welding and Fabricate welding joints using gas welding*				K_2,K_3
	CO2	*Fabricate welding joints using gas welding arc welding, TIG and MIG welding of mild steel and stainless steel materials.*				K_2,K_3
	CO3	*Prepare pattern for given job, Select material and type of patterns, cores, Prepare sand moulds manually and on machine.*				K_3,K_4
	CO4	*Select type of moulding sand, adhesives, compact, strength and parameters of sand for given job, Cast a mould.*				K_2,K_4
	CO5	*Study of different types of metal forming processes.*				K_3,K_4
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 weldingAtomic hydrogen welding, , Thermit welding , Electron beam welding, Ultrasonic welding, Laser beam welding, Robotic welding						**CO2**
UNIT – III	**Pattern &Moulding**					**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 moulding 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 Risering 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:

1. *Workshop Technology by BS Raghuvanshi :Dhanpat Rai and Sons Delhi*
2. *Elements of Workshop Technology by SK Choudhry and Hajra : Asia Publishing House*
3. *Welding Engineering by RL Aggarwal and T Manghnani; Khanna Publishers, Delhi*

Text Book:

4. *Foundry Technology by KP Sinha and DB Goel; Roorkee Publishng House, Roorkee.*
5. *A Text Book of Manufacturing Science and Technology by A Manna, Prentice Hall of India, Delhi.*

Diploma in Mechanical 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	***At the end of this course, the students will be able to:***					
Course Outcome	**CO1**	*Carryout various heat treatment processes.*				
	CO2	*Analyze microstructure and changes in microstructure due to heat treatment.*				
	CO3	*Explain properties and applications of composites, ceramics and smart materials*				
	CO4	*Distinguish between metals and non metals and ferrous and non ferrous materials.*				
	CO5	*Select suitable material to be used for various engineering applications.*				

LIST OF PRACTICALS

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	***At the end of this course, the students will be able to:***					
Course Outcome	**CO1**	*Identify modes of heat transfer.*				
	CO2	*Study of Joule's experiment.*				
	CO3	*Distinguish between water tube and fire-tube boilers and explain the function all the mountings and accessories.*				
	CO4	*Explain the working, construction and applications of steam boilers and steam generators.*				
	CO5	*Calculate dryness fraction.*				

LIST OF PRACTICALS

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 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	***At the end of this course, the students will be able to:***					**Bloom's Level**
Course Outcome	**CO1**	*To help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings.*				K_2,K_3
	CO2	*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.*				K_2,K_3
	CO3	*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*				K_3,K_4
	CO4	*Intended to provide a much needed orientation input in value education to the young enquiring minds.*				K_2,K_4
	CO5	*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.*				K_3,K_4
UNIT – I	**Course Introduction - Need, Basic Guidelines, Content and Process for Value**					**Contact Hours : 06**
Education 1. Understanding the need, basic guidelines, content and process for Value Education 2. Self-Exploration–what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration 3. Continuous Happiness and Prosperity- A look at basic Human Aspirations 4. Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority 5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario 6. Method to fulfill the above human aspirations: understanding and living in harmony at various levels						**CO1**
UNIT – II	**Understanding Harmony in the Human Being - Harmony in Myself!**					**Contact Hours : 06**
1. Understanding human being as a co-existence of the sentient 'I' and the material the Body' 2. Understanding the needs of Self ('I') and 'Body' - *Sukh* and *Suvidha*						**CO2**

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: *Sanyam* and *Swasthya*; correct appraisal of Physical needs, meaning of Prosperity in detail *6.* Programs to ensure *Sanyam* and *Swasthya*		
UNIT – III	**Understanding Harmony in the Family and Society- Harmony in Human- Human Relationship**	**Contact Hours : 06**
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; 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**
1. Understanding the harmony in the Nature. 2. Interconnectedness and mutual fulfillment among the four orders of nature-recyclability and self-regulationin 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**
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: 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**

5. Case studies of typical holistic technologies, management models and production systems 6. Strategy for transition from the present state to Universal Human Order: a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers b) At the level of society: as mutually enriching institutions and organizations 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.		
Lecture Hours :30	**Tutorial Hour: 00**	**Total :30**

Reference Books:

a. *The text book (Latest Edition)*
R.R Gaur, R Asthana, G P Bagaria, A foundation course in Human Values and professional Ethics, Excel books, New Delhi.

b. *The teacher's manual (Latest Edition)*
R.R Gaur, R Asthana, G P Bagaria, A foundation course in Human Values and professional Ethics – Teachers Manual, Excel books, New Delhi.

Text Book:

1. *PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Purblishers.*

Diploma in Mechanical 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	***At the end of this course, the students will be able to:***					
Course Outcome	**CO1**	*Study and application of gas welding.*				
	CO2	*Study and application of arc welding.*				
	CO3	*Study and application of pattern making.*				
	CO4	*Study and application of Foundry Shop*				
	CO5	*Study and application of sheet metal shop.*				

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 Engineering 4th Semester**

(Effective from Session: 2025-26)

Diploma in Mechanical 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	***At the end of this course, the students will be able to:***					**Bloom's Level**
Course Outcome	**CO1**	*Frame Correct sentences with language*				K1
	CO2	*Comprehend the language correctly.*				K2
	CO3	*Mastering writing skills.*				K3
	CO4	*Learning classified knowledge on speaking etiquettes*				K1, K3
	CO5	*Identifying and evaluating the entire concepts of Presentation Skills*				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 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	***At the end of this course, the students will be able to:***					**Bloom's Level**
Course Outcome	**CO1**	*Explain the working and construction features of refrigeration and air conditioning systems&draw and interpret various refrigeration cycles.*				K_2,K_3
	CO2	*Make basic calculation of psychometric properties and processes. Calculate heating and cooling load requirements of a room.*				K_2,K_3
	CO3	*Explain latest developments in the field of refrigeration and air conditioning.*				K_3,K_4
	CO4	*Calculate the properties of air by using psychometric chart.*				K_2,K_4
	CO5	*Detect faults in an air-conditioner/refrigerator.*				K_3,K_4
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:		
1. *Refrigeration and Air Conditioning by Domkundwar; Dhanpat Rai and Sons, Delhi.* 2. *Refrigeration and Air Conditioning by CP Arora; Tata McGraw Hill, New Delhi*		
Text Book:		
3. *Refrigeration and Air Conditioning by Dr. R.K Rajput; S.K. Kataria and Sons, Ludhiana.* 4. *e-books/e-tools/relevant software to be used as recommended by AICTE/UBTE/NITTTR, Chandigarh.*		

Diploma in Mechanical Engineering						
Semester: **IV**			Course Category: **PC**			
Course Code	Course		Period / Week			Credit
			L	T	P	C
DMEPC204	**FLUID MECHANICS**		**3**	**1**	**0**	**4**
Prerequisite	***At the end of this course, the students will be able to:***					**Bloom's Level**
Course Outcome	**CO1**	*Explain fluid properties, their units and conversion.*				K_2,K_4
	CO2	*Measure different types of pressures.Maintain different types of pressure gauges.*				K_2,K_4
	CO3	*Calculate flow and discharge of various liquids.Apply Bernoulli's theorem for calculating pipe diameter and height of pipe from ground.*				K_2,K_3,K_5
	CO4	*Calculate pipe friction and losses in pipelines.Specify hydraulic machines for different applications.*				K_2,K_3
	CO5	*Apply Pascal's law in practical applications. Explain the functions of various components used in hydraulic and pneumatic system.Maintain hydraulic and pneumatic system.*				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 dynamicviscosity 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 andturbulent; rate of flow and their units; continuity equation of flow; potential energy of aflowing 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, tanden 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**

Reference Books:

7. *Fluid Mechanics by KL Kumar; S Chand and Co Ltd., Ram Nagar, New Delhi.*
8. *Hydraulics and Fluid Mechanics Machine by RS Khurmi ;S.Chand& Co. Ltd., NewDelhi.*
9. *Fluid Mechanics through Problems by RJ Garde; Wiley Eastern Ltd., New Delhi.*
10. *Fluid Mechanics by Dr AK Jain, Khanna Publishers, New Delhi.*
11. *Hydraulic and Pneumatic Control by K Shammuga Sundaram, S. Chand & Co. Ltd., NewDelhi*
12. *Hydraulics and Hydraulic Machinery by Dr. Jagadish Lal; Metropolitan Book CompanyLtd., Delhi.*
13. *Hydraulic and Pneumatic Power and Control Design, Performance and ApplicationbyYeaple, McGraw Hill, New York..*
14. *Pneumatic Controls by Festo Didactic; Bangalore.*
15. *Pneumatics Control: An Introduction to the Principles by Werner Deppert and Kurt Stoll;Vogel - Verlag.*

Diploma in Mechanical Engineering						
Semester: **IV**			Course Category: PC			
Course Code	Course		Period / Week			Credit
			L	T	P	C
DMEPC206	**BASIC OF AUTOCAD (2D AND 3D)**		**4**	**0**	**0**	**4**
Prerequisite	***At the end of this course, the students will be able to:***					**Bloom's Level**
Course Outcome	**CO1**	*Know about Computer aided design and manufacturing.*				K_2,K_4
	CO2	*Know the process of 2D & 3D transformations*				K_2,K_4
	CO3	*Know the method of viewing objects in 3D space.*				K_2,K_3,K_5
	CO4	*Know about flexible manufacturing system.*				K_2,K_3
	CO5	*Know about robotics.*				K_2,K_4,K_5
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 handlingsystem, 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**

Reference Books:

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, NewDelhi.
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 Engineering						
Semester: **IV**			Course Category :**AU**			
Course Code	Course		Period / Week			Credit
			L	T	P	C
DAU202	**ENVIRONMENT SCIENCE**		**3**	**0**	**0**	**0**
Prerequisite	***At the end of this course, the students will be able to:***					**Bloom's Level**
Course Outcome	**CO1**	*Understanding of ecology and ecosystem, sustainable development, renewable and nonrenewable resource.*				K_2,K_4
	CO2	*Understanding of Air pollution and water pollution.*				K_2,K_4
	CO3	*Understanding of soil pollution and noise pollution.*				K_2,K_3,K_5
	CO4	*Understanding the environmental law*				K_2,K_3
	CO5	*Understanding the effect of pollution on environment.*				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. Impurities in water Cause of water pollution, Source of water pollution. Effect of water pollution on human health, Concept of dissolved O2, BOD, COD. Prevention of water pollution- Water treatment processes, Sewage treatment. Water quality standard.						CO2
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. Source of noise pollution, Unit of noise, Effect of noise pollution, Acceptable noise level, Different method of minimize noise pollution.						CO3
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**
Reference Books:	
1. *Environmental Pollution by Dr. RK Khitoliya; S Chand Publishing, New Delhi* 2. *Environmental and Pollution Awareness by Sharma BR; Satya Prakashan, New Delhi.* 3. *Environmental Engineering and Management by Suresh K Dhamija; S K Katariaand Sons, New Delhi.*	

Diploma in Mechanical 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	***At the end of this course, the students will be able to:***					
Course Outcome	**CO1**	*Study of refrigerating tools.*				
	CO2	*Study of air conditioning parts.*				
	CO3	*Evaluating the COP of refrigeration system.*				
	CO4	*Demonstration of charging of refrigeration.*				
	CO5	*Identifying the parts of refrigeration and air conditioning system.*				

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 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	***At the end of this course, the students will be able to:***					
Course Outcome	**CO1**	*Identify fluid properties, their units and conversion.*				
	CO2	*Measure different types of pressures. Maintain different types of pressure gauges.*				
	CO3	*Apply Bernoulli's theorem for calculating pipe diameter and height of pipe from ground.*				
	CO4	*Calculate flow and discharge of various liquids.*				
	CO5	*Apply Pascal's law in practical applications.*				

LIST OF PRACTICALS

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.	

Diploma in Mechanical 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	***At the end of this course, the students will be able to:***					
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.				

LIST OF PRACTICALS

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.	**CO1**
3. CNC Programming for turning operation	**CO1**
4. CNC Programming for pocket milling	**CO2**
5. CNC Programming for profile milling	**CO2**
6. CNC Programming for facing and drilling	**CO3**
7. Performing operation on trainer Lathe	**CO4**
8. Designing of Simple machine components	**CO4**
9. Designing of Crank shaft (Connecting Rod)	**CO5**
10. Performing simple assembly operations like- nut, bolt, coupling etc.	**CO5**