

TILAK MAHARASHTRA VIDYAPEETH, PUNE																
TEACHING AND EXAMINATION SCHEME FOR DIPLOMA COURSE																
COURSE NAME : DIPLOMA IN MECHANICAL ENGINEERING																
COURSE CODE : ME																
DURATION OF COURSE : 6 SEMESTERS																
SEMESTER : THIRD													DURATION :- 16 WEEKS			
FULL TIME																
SR. NO.	SUBJECT TITLE	SUBJECT CODE	TEACHING SCHEME		EXAMINATION SCHEME											
			TH	PR	PAPER HRS	TH		INT	TOTAL		PR		OR		TW	
						Max	Min		Max	Min	Max	Min	Max	Min		
1	Mathematics-III	ME3001	04	--	03	80	32	20	100	40	--	--	--	--	--	--
2	Machine Drawing	ME3002	02	04	04	80	32	20	100	40	--	--	25**	10	25*	--
3	Strength of Materials	ME3003	04	02	03	80	32	20	100	40	25*	10	--	--	--	--
4	Engineering Materials	ME3004	04	--	03	80	32	20	100	40	--	--	--	--	--	--
5	Electrical Technology	ME3005	04	02	03	80	32	20	100	40	--	--	25*	10	--	--
6	Manufacturing Processes	ME3006	04	02	03	80	32	20	100	40	25*	10	--	--	--	--
7	Professional Practices-II	ME3007	--	02***	--	--	--	--	--	--	--	--	--	--	50*	20
8	Communication Skills	ME3011	03	02***	03	80	32	20	100	40	--	--	--	--	--	10
TOTAL			25	14	--	560	--	140	700	--	50	--	50	--	75	--

STUDENT CONTACT HOURS PER WEEK(FORMAL TEACHING) : **39 HRS; Theory and Practical periods of 60 minutes each**
* - INTERNAL ASSESSMENT , ** - EXTERNAL ASSESSMENT,***- TUTORIAL
TOTAL MARKS – 875
ABBREVIATIONS : TH – THEORY , INT-INTERNAL , PR – PRACTICALS , OR –ORAL, TW – TERMWORK
All Practical, orals and Term Work assessments are to be done as per the prevailing norms for implementation and assessment

COURSE NAME : DIPLOMA IN MECHANICAL ENGINEERING

COURSE CODE : ME

SEMESTER : THIRD

SUBJECT TITLE : MATHEMATICS-III

SUBJECT CODE : ME3001

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	INT	PR	OR	TW	TOTAL
04	--	03	80	20	--	--	--	100

Pre-requisites: The student must know the following concepts:

1. Factorization of polynomials.
2. Limits, Derivatives.
3. Formulae of factorization & expansion.
4. Factorization and de-factorization formulae of trigonometry.
5. Concept of probability.
6. Numerical Integration.

Objectives: The student will be able to

1. Apply Mathematical terms, concepts, principles and different methods.
2. Apply Mathematical methods to solve technical problems.
3. Use Mathematical techniques necessary for daily and practical problems.

Contents: Theory

Unit	Name of the Topic	Hours	Marks
01	<p>INTEGRATION</p> <p>Definition of integration as anti-derivative. Integration of standard function.</p> <p>Rules of integration (Integrals of sum, difference, scalar multiplication)</p> <p>Methods of Integration.</p> <ul style="list-style-type: none"> • Integration by substitution • Integration of rational functions. • Integration by partial fractions. • Integration by trigonometric transformation. • Integration by parts. <p>Definite Integration.</p> <ul style="list-style-type: none"> • Definition of definite integral. • Properties of definite integral with simple problems. <p>Applications of definite integrals.</p> <ul style="list-style-type: none"> • Area under the curve. Area bounded by two curves, • Volume of revolution. • Centre of gravity of a rod, plane lamina. • Moment of Inertia of uniform rod, rectangular lamina • Theorems of parallel and perpendicular axes. 	14	24
02	<p>NUMERICAL METHODS</p> <p>Solution of algebraic equations</p> <ul style="list-style-type: none"> • Bisection method, Regula-falsi method and Newton - Raphson method. <p>Solution of simultaneous equations containing 2 and 3 unknowns</p> <ul style="list-style-type: none"> • Gauss elimination method. • Iterative methods- Gauss Seidal and Jacobi's methods. 	10	18
03	<p>PROBABILITY DISTRIBUTION</p> <ul style="list-style-type: none"> • Binomial distribution. • Poisson's distribution. • Normal distribution • Simple examples corresponding to production process 	12	20

Unit	Name of the Topic	Hours	Marks
04	<p>DIFFERENTIAL EQUATION</p> <p>Definition of differential equation, order and degree of differential equation. Formation of differential equation for functions containing single constant.</p> <p>Solution of differential equations of first order and first degree such as variable separable type, reducible to variable separable, Homogeneous, Non-homogeneous, Exact, Linear and Bernoulli equations.</p> <p>Applications of Differential equations.</p> <p>Rectilinear motion (motion under constant and variable acceleration) Simple Harmonic Motion.</p>	12	18
	TOTAL	48	80

Recommended Books:

Sr. No.	Title	Author	Publisher
01	Mathematics for Polytechnic	S. P. Deshpande	Pune Vidyarthi Griha Prakashan, Pune
02	Calculus: single variable	Robert T. Smith	Tata McGraw Hill
03	Advanced Mathematics for Engineers and Scientist	Murray R Spiegel	Schaum Outline series, McGraw Hill
04	Higher Engineering Mathematics	B. S. Grewal	Khanna Publication, New Delhi
05	Introductory Methods of Numerical analysis	S. S. Sastry	Prentice Hall Of India, New Delhi
06	Numerical methods for Engg. 4 th ed.	Chopra	Tata McGraw Hill
07	Numerical methods for scientific & engineering computations	M. K. Jain & others	Wiley Eastern Publication.

COURSE NAME : DIPLOMA IN MECHANICAL ENGINEERING

COURSE CODE : ME

SEMESTER : THIRD

SUBJECT TITLE : MACHINE DRAWING

SUBJECT CODE : ME3002

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	INT	PR	OR	TW	TOTAL
02	04	04	80	20	--	25**	25*	125

Pre-requisites: The student must know the following concepts:

1. Machine components.
2. Assembly.

Objectives: The student will be able to

1. Interpret industrial drawings.
2. Interpret instructions related to manufacturing of components.
3. Use IS convention of representing various machine components.
4. Visualize the assembly of a given set of details of machine components.
5. Know the significance & use of tolerances of size, forms & positions.
6. Understand basic concepts of limit, fit and tolerances.

Contents: Theory

Unit	Name of the Topic	Hours	Marks
01	DEVELOPMENTS OF SURFACES. Developments of lateral surfaces of cube, prisms, cylinder, pyramids, cone and their applications such as tray, funnel, chimney, pipe bends etc.	08	12
02	INTERSECTION OF SOLIDS Curves of intersection of the surfaces of the solids in the following cases (a) Prism with prism, cylinder with cylinder, prism with cylinder when (i) the axes are at 90^0 and intersecting (ii) The axes are at 90^0 and offset (b) Cylinder with cone when axis of cylinder is parallel to both the reference planes and cone resting on base on HP and with axis intersecting and offset from axis of cylinder	08	12
03	AUXILIARY VIEWS Study of auxiliary planes, projection of objects on auxiliary planes. Completing the regular views with the help of given auxiliary views (Use first angle method of projection)	08	12
04	CONVENTIONAL REPRESENTATION Standard convention using SP - 46 (1988) <ul style="list-style-type: none"> • Materials C.I., M.S, Brass, Bronze, Aluminum, wood, Glass, Concrete and Rubber • Long and short break in pipe, rod and shaft. • Ball and Roller bearing, pipe joints, cocks, valves, internal / external threads. • Various sections- Half, removed, revolved, offset, partial and aligned sections. • Knurling, serrated shafts, splined shafts, and chain wheels. • Springs with square and flat ends, gears, sprocket wheel • Countersunk & counter-bore. • Tapers 	04	10

05	LIMITS, FITS AND TOLERANCES Characteristics of surface roughness - Indication of machining symbol showing direction of lay, roughness grades, machining allowances, manufacturing methods. Introduction to ISO system of tolerancing, dimensional tolerances, and elements of interchangeable system, hole & shaft based system, limits, fits & allowances. Selection of fit Geometrical tolerances, tolerances of form and position and its geometric representation. General welding symbols, sectional representation and symbols used in Engineering practices	04	08
06	DETAILS TO ASSEMBLY <ul style="list-style-type: none"> • Introduction • Couplings - Universal couplings & Oldham's Coupling • Bearing - Foot Step Bearing & Pedestal Bearing • Lathe tool Post • Machine vice & Pipe Vice • Screw Jack • Steam Stop Valve 	08	14
07	ASSEMBLY TO DETAILS <ul style="list-style-type: none"> • Introduction • Pedestal Bearing • Lathe Tail Stock • Drilling Jig • Piston & connecting rod • Gland and Stuffing box Assembly • Valve - Not more than eight parts • Fast & loose pulley 	08	12
TOTAL		48	80

Practical:

Skills to be developed:

Intellectual Skills:

1. Understand interpenetration of solid.
2. Interpret limits, fits and tolerances on a given drawing.
3. Visualize assembly of components from given details.
4. Interpret Conventional symbols as per IS code SP46.
5. Identify different materials and their properties.

Motor Skills:

1. Draw front view and top view of solids penetrating one with other.
2. Conventionally represent limit, fits and tolerances on a given drawing as per the manufacturing processes.
3. Give surface roughness values and symbols on a part drawing.
4. Setting and use of different drawing equipments.
5. Record bill of materials in assembly drawing.
6. Use computer aided drafting package.

List of Practical:

Using first angle method of projection

1. Intersection of Solids
 - (i) One Sheet containing at least two problems.
 - (ii) At least four problems for home assignment in sketch book.
2. Development of surfaces
Any two problems on development of surfaces of different objects. (One sheet)
3. Auxiliary views: One sheet containing two problems
At least two problems as home assignment in sketch book
4. Conventional Representation as per SP - 46 (1988) - one sheet
5. Limit, Fit, Tolerances and Machining Symbols - one sheet
6. Assembly to detailed drawings of components including conventional representation of tolerances and surface finish symbols:
One sheet covering any one assembly and its details
At least two problems as home assignment in sketch book
7. Details to Assembly
Draw one sheet covering any one assembly and its details.
Solve at least two problems as home assignment in sketchbook.
8. Two problems on assembly drawings using any CAD Package
(Assembly containing maximum 6 to 7 components-minimum 12 hours)

Recommended Books:

Sr.No.	Title	Author	Publisher
01	Machine Drawing	N.D. Bhatt	Charotar Publication, Anand
02	Code of practice for general Engineering drawing.	IS Code SP 46 (1988) L.K. Narayanan,	Engineering Drawing Practice for School and colleges
03	Production Drawing	P. Kannaich, K.Venkat Reddy	New Age International Publication
04	Machine Drawing	P.S. Gill	S. K. Kataria and Sons
05	Engineering Graphics (For Topic on Auxiliary Views)	M.L.Dabhade	-----
06	Machine Drawing	N Sidheswar, P Kannaiah, V.V.S. Sastry	Tata McGraw Hill

COURSE NAME : DIPLOMA IN MECHANICAL ENGINEERING

COURSE CODE : ME

SEMESTER : THIRD

SUBJECT TITLE : STRENGTH OF MATERIALS

SUBJECT CODE : ME3003

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	INT	PR	OR	TW	TOTAL
04	02	03	80	20	25*	--	--	125

Pre-requisites: The students must know the following concepts:

1. Properties of materials
2. Periodic table.
3. Different types of simple machines.

Objectives: The Student will be able to

1. Understand the fundamentals of solid mechanics.
2. Acquire elementary knowledge of stresses, strains & material properties.
3. Understand & analyze the basic principles involved in the behavior of machine parts under load in the context of designing it.
4. Understand & analyze the mechanical properties of the various materials.

Contents: Theory

Unit	Name of the Topic	Hours	Marks
01	<p>MECHANICAL PROPERTIES OF MATERIALS, SIMPLE STRESSES & STRAINS</p> <p>Simple stresses & strains viz. tensile, compressive, Shear, Crushing, Thermal stresses, Hoop stresses & corresponding strains, Volumetric Strain, Bulk modulus, Hook's law, Young's modulus, Modulus of Rigidity, stress-strain curves for ductile & brittle materials, Poisson's ratio.</p> <p>Concept of stresses & strains in thin cylindrical & spherical shells subjected to internal pressure.</p> <p>Concepts of Buckling - Rankine's & Euler's formulae for buckling load for columns / shafts under compression,</p> <p>Concepts of equivalent length for various end conditions.</p> <p>Concepts of Deflection & slope of beams – relation between bending moment & slope. Deflection of simply supported beams and cantilever beams subjected to point load. (No derivation)</p> <p>(Problems on compressive & tensile stresses, thermal stresses, butt & lap riveted joints, simple cases of buckling).</p>	10	12
02	<p>STRAIN ENERGY</p> <p>Concept, derivation & use of expression for deformation of axially loaded members under gradual, sudden & impact load.</p> <p>Strain energy due to self-weight.</p>	03	10
03	<p>BENDING MOMENT & SHEAR FORCE</p> <p>Shear force, bending moment & relation between them.</p> <p>Shear force & bending moment diagrams for simply supported beam & cantilevers subjected to point loads & Uniformly distribution load, concept of uniformly varying load & couples acting on beam</p>	08	12
04	<p>MOMENT OF INERTIA</p> <p>Definition of Moment of inertia, Moment of inertia of different laminae, radius of gyration.</p> <p>Parallel & perpendicular axis theorem.</p> <p>Moment of inertia of rectangular, circular, semicircular.</p> <p>Triangular, Hollow Rectangular, symmetrical I- Section, Channel section, Tee- section, angle section about centroidal axis. Polar moment of inertia.</p>	03	03

05	BENDING & SHEAR STRESSES Theory of simple bending, equation of bending. Assumptions in the theory of bending, moment of resistance, section modulus & neutral axis. Shear stresses - concepts of direct & transverse shear stress.	06	08
06	COMBINATION OF BENDING & DIRECT STRESSES Axial load, eccentric load, direct stresses, bending stresses maximum & minimum stresses. Application of the above concepts for machine parts such as offset links, C-clamp, Bench vice, Drilling machine frame, stresses at base of a short column, condition for no tension at extreme fibers, total stress variation diagrams. (Simple problems on above applications)	08	15
07	PRINCIPAL PLANES & PRINCIPAL STRESSES Definition of principle plane & principal stresses. Expression for normal and tangential stress, maximum shear stress. Stresses on inclined planes. Position of principal planes & planes of maximum shear. Graphical solution using Mohr's circle of Stresses.	04	10
08	TORSION Concept of Pure Torsion, Torsion equation for solid and hollow circular shafts. Assumptions in theory of pure torsion. Comparison between solid and hollow shafts subjected to pure torsion (one problem on composite and non homogeneous shaft)	06	10
	TOTAL	48	80

Practical:

Skills to be developed:

Intellectual Skill:

1. Identification of different parts of machine and their function.
2. Interpretation failure patterns of different metal under different action.
3. Extrapolating test result or observation during test.
4. Testing different metals and comparison of experimental result.

Motor Skill:

1. Sketch of standard specimen, arrangement for test on respective machines.
2. Measurement of different parameters.
3. Handling Instrument.
4. Observing behavior of different metal during test.

List of Practical:

1. Study and demonstration of Universal Testing Machine & its attachments.
2. Study & demonstration of extensometer.
3. Tension Test on mild steel, aluminium & compression test on cast iron on Universal Testing Machine.
4. Direct Shear Test of mild steel on Universal Testing Machine.
5. Brinell hardness test on mild steel.
6. Rockwell hardness Test on Hardened Steel.
7. Izod & Charpy - Impact tests of a standard specimen.
8. Torsion Test on Mild steel bar.
9. Assignments: Drawing sheet on shear force & bending Moment diagrams for a given loading (At least four problems)
10. Estimation of principal stresses and maximum shear strain for a given combined loading by analytical & Mohr's circle method (At least two problems)

Recommended Books:

Sr.No.	Title	Author	Publisher
01	Strength of Material	Andrew Patel Ferdinand L. Singer	Addison-Wesley An imprint of Addison Wesley Longman, Inc. Forth edition
02	Strength of Material	G.H. Ruder	ELBS with Macmillan third edition
03	Strength of Material	B.K. Sarkar	Tata McGraw hill New Delhi
04	A Text Book strength of Material	Dr. R. K. Bansal	Laxmi Publication New Delhi
05	Strength of Material	S Ramamrutham	Dhanpat Rai Publications, New Delhi
06	Strength of Material	R.S. Khurmi	S. Chand Company Ltd. Delhi
07	Materials Science	G. K. Narula, K. S. Narula, V. K. Gupta	Tata McGraw Hill New Delhi

COURSE NAME : DIPLOMA IN MECHANICAL ENGINEERING

COURSE CODE : ME

SEMESTER : THIRD

SUBJECT TITLE : ENGINEERING MATERIALS

SUBJECT CODE : ME3004

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	INT	PR	OR	TW	TOTAL
04	--	03	80	20	--	--	--	100

Pre-requisites: The student must know the following concepts:

1. Physical properties.
2. Atomic theory.
3. Periodic table.

Objectives: The student will be able to

1. Know the properties of engineering materials like metals, non-metals, ferrous metals and non-ferrous metals
2. Interpret Iron – Iron Carbide phase equilibrium diagram to find temperatures for heat treatment processes.
3. Select the proper materials for different applications like cutting tools, dies, gears & other applications.
4. Understand various heat treatment processes & their applications for various components to improve mechanical properties.
5. Understand powder metallurgy process and its applications.
6. Understand Non Destructive testing methods & their applications.

Contents: Theory

Unit	Name of the Topic	Hours	Marks
01	INTRODUCTION TO ENGINEERING MATERIALS AND THEIR PROPERTIES Introduction, classification and application of engineering materials, I.S specification of materials like plain carbon steel, grey cast iron, low alloy steels & bearing materials. Properties of metals Physical Properties - Structure, Density, Melting point. Mechanical Properties - Strength, elasticity, ductility, malleability, plasticity, toughness, hardness, hardenability, brittleness, fatigue strength, thermal conductivity, electrical conductivity, thermal coefficient of linear expansion Introduction to corrosion, types of corrosion, corrosion resisting materials	05	08
02	FERROUS METALS AND ALLOYS Characteristics and application of ferrous metals Phase equilibrium diagram for Iron and Iron Carbide. Flow diagram for production of Iron and Steel, Classification, composition and uses of cast iron, effect of sulphur, silicon and phosphorous. Classification, composition and application of low carbon steel, medium carbon steel and high carbon steel with their chemical composition.	10	12
03	ALLOYS OF FERROUS METALS Alloy Steels: Low alloy steel, high alloy steel, tools steel & stainless steel. Effect of various alloying elements such as - Chromium, nickel, manganese, molybdenum, tungsten, vanadium Tool Steels: High Speed Steels (HSS), Hot & cold working die steels, shear, punches etc., properties & applications. Magnetic materials: Properties & applications of commonly used magnetic materials (Permanent magnets and temporary magnets). Special Cutting Tool Materials - Diamond, Stellites & Tungsten Carbide	11	12
04	NON FERROUS METALS AND ALLOYS Properties, applications & chemical compositions of copper alloys (naval brass, Muntz metal, gun metal & bronzes), Aluminium alloys (Y-alloy & duralumin) & bearing materials like white metals, leaded bronzes & copper lead alloys. Desired properties of bearing materials.	05	10

05	HEAT TREATMENT OF STEELS Introduction to heat treatment processes such as annealing, subcritical annealing, normalizing, hardening, tempering (Austempering & Martempering) - Principle, advantages, limitations and applications Surface Hardening - Methods of surface hardening, i) case hardening ii) Flame Hardening, iii) Induction Hardening, iv) Nitriding, v) Carburizing - Principle, advantages, limitations and applications	05	10
06	NON-METALLIC MATERIALS Polymeric Materials - Introduction to Polymers - types, characteristics, properties and uses of thermoplastics, thermosetting plastics & rubbers. Thermoplastic Resins - characteristics and uses of ABS, Acrylics, Nylons and Vinyls Thermosetting Plastics - Characteristics and uses of polyesters, Epoxies, Melamines & Bakelites. Rubbers - Neoprene, Butadiene, Buna & Silicones - Properties & applications. Properties and applications of following Engineering Materials - Ceramics, Abrasive, Adhesive and Insulating as Cork, Asbestos, Thermocole and Glass Wool, materials such as cork, asbestos, thermocole & glass wool Introduction to Composite Materials - Laminated & fibre reinforced materials - Structure, Properties & Applications.	06	10
07	POWDER METALLURGY Advantages, limitations and applications of Powder Metallurgy for engineering products. Brief description of process of Powder Metallurgy Powder making, blending, compacting, sintering, infiltration & impregnation. Applications of Powder metallurgy for tungsten carbide tip tools & porous bearing.	02	06
08	NON-DESTRUCTIVE TESTING Importance of Non-destructive testing, difference between Destructive and Nondestructive testing. Nondestructive testing methods – Radiography (X-Ray & Gamma Ray), Ultrasonic crack detection, Dye penetrant test, Magnaflux test - Comparison & applications.	03	08
09	COMPOSITE MATERIALS Concept properties Utilization ;Brief introduction	02	04
	TOTAL	49	80

Recommended Books:

Sr.No.	Title	Author	Publisher
01	A Text Book of Material Science and Metallurgy	O.P. Khanna	Dhanpat Rai and Sons [1999]
02	Material Science and Metallurgy	Dr.V.D. Kodgire	Everest Publishing House [1990]
03	Material Science and Engineering	R.K. Rajput	S.K.Katari and Sons [2002 reprint 2003]
04	Material Science and Processes	S.K. Hazra and Choudhari	Indian Book Distribution Co. [1982]
05	Engineering Materials Properties and Selection	Kenneth G. Budinski and Michael K. Budinski	Pearson Education, New Delhi
06	ASME Material Manuals	ASME	-----
07	Introduction to Physical metallurgy	Sidney H. Avner	Tata Mc Graw Hill edition (2 nd)

COURSE NAME : DIPLOMA IN MECHANICAL ENGINEERING

COURSE CODE : ME

SEMESTER : THIRD

SUBJECT TITLE : ELECTRICAL TECHNOLOGY

SUBJECT CODE : ME3005

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	INT	PR	OR	TW	TOTAL
04	02	03	80	20	--	25*	--	125

Pre-requisites: The student must know the following concepts:

1. Magnetism.
2. Basics of mathematics, especially trigonometric function.
3. Safety precautions

Objectives: The student will be able to

1. Identify the type of electric supply system.
2. Use the tariff system & calculate energy requirements and cost of energy.
3. Identify different types of motors, transformers and drives.
4. Select suitable drive as per the requirements.
5. Apply knowledge of electric heating & welding for various operations in manufacturing processes.
6. Supervise routine maintenance of electrical machines and supply systems.

Contents: Theory

Unit	Name of the Topic	Hours	Marks
01	FUNDAMENTALS Introduction to electrical power supply systems: Generation, Transmission, Distribution & Utilization. AC supply & DC supply AC Fundamentals: cycle, frequency, phase, period, max, average, R.M.S. (Root mean square) value. Concept of current, voltage, power & energy in R, L, & C circuits. Three phase supply: Star & Delta circuit, Line & Phase relationship, power equation.	09	14
02	MEASURING INSTRUMENTS Introduction to construction, operation and use of AC & DC ammeter, voltmeter, Electrodynamic Wattmeter, energy meter & digital multimeter, Clip-on meter.	04	08
03	DC MOTORS Construction and principle of operation. Speed torque characteristics. Types, specifications & ratings and applications. Types of insulation used.	06	10
04	A. C .MACHINES Transformer: Construction and principle of operation. EMF equation and transformation ratio. Load test, efficiency and regulation. Specifications & rating. Auto transformer & 3 phase transformer concept only. Applications of transformers. AC motor: Construction and principle of operation of 3 phase induction motor. Speed torque characteristics, slip, speed control (VFD) (Variable Frequency drive), reversal of rotation, starters. Single phase motor, universal motor, stepper motor & servo motor. Motor specification & ratings. Applications of these motors in various fields. Testing of motors. Alternator: Construction, principle of operation & applications. Self and separate excitation. Synchronous Motor- Construction, principle of operation, methods of starting & applications	15	22

05	APPLICATIONS OF ELECTRICAL ENERGY Industrial applications: Classification of drives, factors for selection of motor for different drives, enclosures & mountings Electric heating & welding: Working principle & types selection of system, specifications & rating Electrometallurgical & Electro Agro Systems: Concept & principle used in electroplating, Electrical machines used in electro-agro systems (irrigation pumps)	06	14
06	ELECTRIC WIRING & ILLUMINATION Simple Electric Installations with 2 sockets, 2 fans, 2 lamps, fuses. Introduction to different accessories like MCCB (Molded Case Circuit Breaker), ELCB (Earth Leakage Circuit Breaker), wires & cables. Different types of lamps their specifications,	04	08
07	ELECTRIC SAFETY AND COST Tariff & power conservation, necessity of earthing, safety tools, first aid measures, types of tariff, P.F.(Power Factor) improvement only methods, energy conservation & audit, fire extinguishing methods adopted in electrical engineering.	04	04
	TOTAL	48	80

Practical:

Skills to be developed:

Intellectual skills:

1. Identify and select suitable electrical instruments for measurement.
2. Identify and give specifications of electrical motors and transformers.
3. Interpret wiring diagrams for various applications.
4. Identify safety equipments required.
5. Decide the procedure for setting experiments.

Motor skills:

1. Draw wiring diagram
2. Make wiring connections to connect electrical equipments and instruments.
3. Measure electrical power, earthing resistance and other electrical quantities.
4. Calibrate electrical instruments.
5. Use of safety devices while working.
6. Prepare energy consumption bill with present tariff structure.

A) List of Practical:

1. For a given resistive & inductive series & parallel circuit, select ammeter, voltmeter & wattmeter. Make the connections and measure current, voltage and power drawn by the circuit. Measure it by clip-on meter & compare it.
2. For a given DC Shunt/Series motor, select suitable meters, make connections as per diagram, check the connections and run the motor. Take the meter readings to draw speed torque characteristics, make suitable changes in the connections to reverse the direction of rotation.
3. For the above given motor prepare a circuit to control its speed above & below normal, plot its graph.
4. List specifications of given single phase transformer. Perform no load test on the transformer to find transformation ratio.
5. Connect an electronic energy meter to a load, take reading & prepare energy consumption bill with present tariff structure
6. Prepare actual wiring on a board to study and operate one lamp controlled by one switch, staircase wiring, go down wiring using casing capping.

B) Field work:

1. Observe Electric wiring of main building in your campus list the accessories used and draw a general layout
2. Observe earthing of your laboratory, measure its resistance & list its significance

C) Mini project:

1. Prepare a simple electric wiring circuit comprising of 2 lamps, 2 sockets, and 1 fan with a fuse & check it.
2. Prepare trouble-shooting chart of above motors and identify the faults of a motor or a transformer

Recommended Books:

Sr.No.	Title	Author	Publisher
01	Electrical Technology	E. Hughes	ELBS
02	Electrical Technology	H. Cotton	Pitman
03	Electrical Technology Vol. I To IV	B. L. Theraja	S. Chand

COURSE NAME : DIPLOMA IN MECHANICAL ENGINEERING

COURSE CODE : ME

SEMESTER : THIRD

SUBJECT TITLE : MANUFACTURING PROCESSES

SUBJECT CODE : ME3006

TEACHING & EXAMINATION SCHEME:

Teaching Scheme		Examination Scheme						
TH	PR	PAPER HRS	TH	INT	PR	OR	TW	TOTAL
04	02	03	80	20	25	--	--	125

Pre-requisites: The student must know the following concepts:

1. Material properties.
2. Machines tools.

Objectives: The student will able to

1. Know and identify basic manufacturing processes for manufacturing different components.
2. Operate & control different machines and equipments.
3. Inspect the job for specified dimensions.
4. Produce jobs as per specified dimensions.
5. Select the specific manufacturing process for getting the desired type of output.
6. Adopt safety practices while working on various machines.

Contents: Theory

Unit	Name of the Topic	Hours	Marks
01	FORGING Forging Processes - Drop forging, Upset forging, Die forging or press forging. Types of dies - Open Die, Closed Die (Single Impression and Multi-impession) Closed die Forging operations - Fullering, Edging, Bending, Blocking, Finishing Forgeable material and forgeability, forging temperature, grain flow in forged parts, types of presses and hammers.	06	10
02	ROLLING AND EXTRUSION Principles of rolling and extrusion. Hot and cold rolling. Types of rolling mills. Different sections of rolled parts. Methods of extrusion - Direct, indirect, backward & impact extrusion, hot extrusion, cold extrusion, advantages, disadvantages and applications.	05	05
03	PRESS WORKING Types of presses and Specifications. Press working operations - Cutting, bending, drawing, punching, blanking, notching, lancing. Die set components - punch and die shoe, guide pin, bolster plate, stripper, stock guide, feed stock, pilot. Punch and die clearances for blanking and piercing, effect of clearance.	08	15
04	LATHE OPERATIONS Types of lathes - light duty, medium duty and heavy duty geared lathe, CNC lathe. Specifications. Basic parts and their functions. Operations and tools - Turning, parting off, knurling, facing, boring, drilling, threading, step turning, taper turning, chamfering	08	15

05	DRILLING Classification. Basic parts and their functions - Radial drilling machine. Types of operations. Specifications of drilling machine. Types of drills and reamers	03	05
06	MILLING Classification. Basic parts and their functions - column and knee type. Types of operations Types of milling cutters.	04	05
07	CASTING Patterns - Materials used, types, patterns allowances, cores, core allowances. Moulds - Mould materials, types of sand, moulding processes: Sand molding, Pit molding, Machine molding. Shell molding. Melting practices, types of furnaces with specific applications. Cupola furnace, Electric arc furnace. Casting principle and operation Special casting processes, viz. die casting, centrifugal casting, investment casting. Casting defects	08	15
08	WELDING Classification. Gas welding techniques. Types of welding flames. Arc Welding - Principle, Equipment, Applications Shielded metal arc welding submerged arc welding. TIG (Tungsten Inert Gas) / MIG (Metal Inert Gas) welding. Resistance welding, Spot welding, Seam welding, Projection welding Welding defects. Brazing and soldering: Types, Principles, Applications	06	10
	TOTAL	48	80

Notes:

1. The workshop instructors should prepare specimen job in each shop as demonstration practice before the student (as per the drawing given by subject teacher/ workshop superintendent)
2. Theory behind practical is to be covered by the concerned subject teacher/ workshop superintendent.
3. Workshop diary should be maintained by each student duly signed by respective shop instructors

Practical:**Skills to be developed:****Intellectual Skills:**

1. Identify basic manufacturing processes.
2. Understand need of pattern allowances.
3. Identify joining methods for fabrication.
4. Specify press tool dies for given cutting/forming operations.
5. Understand various sand casting processes.
6. Understand types of pattern, materials of construction and identify casting defects.

Motor Skills:

1. Operate lathes, drilling, milling machines
2. Use welding machines and equipment
3. Set the tools, jobs and decide cutting parameters of machines
4. Make simple pattern out of wood/thermocole
5. Inspect dimensions of jobs using measuring instruments

List of Practical:

1. Assignment on forging die nomenclature.
2. One turning job on lathe containing the operations like plain turning, step turning, grooving, knurling, chamfering.
3. One composite welding job having two different joints. (Batch of four students per job)
4. One simple job on TIG / MIG welding setup or visit to TIG / MIG welding setup and write report.

5. One composite job containing the operations like face milling, side and face milling (slotting), drilling / tapping (drilled hole should be perpendicular to slotting operation).
6. Making of one simple wooden pattern (max. 4 students per group, each group should make different type of pattern).
7. Making of one Thermo-Cole Pattern (max. 4 students per group, each group should make different type of pattern).

Recommended Books:

Sr.No.	Title	Author	Publisher
01	Elements of workshop Technology - Volume I & II	S. K. Hajra Chaudary, Bose, Roy	Media Promoters and Publishers limited
02	Processes and design for manufacturing	D. L. Wakyl	Prentice Hall
03	Production Technology - Volume I & II	O. P. Khanna and Lal	--
04	Workshop Technology - Volume I, II & III	W.A.J. Chapman	--
05	Introduction to Manufacturing Processes	John A Schey	McGraw Hills International
06	Manufacturing Technology	M. Aduthan and A. B. Gupta	New Age International

COURSE NAME : DIPLOMA IN MECHANICAL ENGINEERING

COURSE CODE : ME

SEMESTER : THIRD

SUBJECT TITLE : PROFESSIONAL PRACTICES-II

SUBJECT CODE : ME3007

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme		Examination Scheme						
TH	TUT	PAPER HRS	TH	INT	PR	OR	TW	TOTAL
--	02***	--	--	--	--	--	50*	50

Pre-requisites: The student must know the following concepts:

1. Basic English

Objectives: The student will be able to

1. Acquire information from different sources.
2. Prepare notes for given topic.
3. Present given topic in a seminar.
4. Interact with peers to share thoughts.
5. Prepare a report on industrial visit, expert lecture.

Contents:

Sr.No.	Activity	Hours
01	<p>INDUSTRIAL VISITS</p> <p>Structured industrial visits be arranged and report of the same should be submitted by the individual student, to form a part of the Term Work.</p> <p>TWO industrial visits may be arranged in the following areas / industries :</p> <ul style="list-style-type: none"> i) Manufacturing organizations for observing various manufacturing processes such as machining press work, heat treatment, casting, forging. ii) Material testing laboratories in industries or reputed organizations iii) Auto workshop / Garage iv) Plastic material processing unit v) State Transport workshop / City Transport workshop 	06
02	<p>GUEST LECTURES</p> <p>Lectures by Professional / Industrial Expert be organized from ANY THREE of the following areas :</p> <ul style="list-style-type: none"> i) Use of plastics in automobiles. ii) Nonferrous Metals and alloys for engineering applications iii) Surface Treatment Processes like electroplating, powder coating etc. iv) Selection of electric motors. v) Computer aided drafting. vi) Industrial hygiene. vii) Composite Materials. viii) Heat treatment processes. ix) Ceramics x) Safety Engineering and Waste elimination 	06

03	INDIVIDUAL ASSIGNMENTS	06
	<p>Any two from the list suggested</p> <ol style="list-style-type: none"> a) Process sequence of any two machine components. b) Write material specifications for any two composite jobs. c) Collection of samples of different plastic material or cutting tools with properties, specifications and applications. d) Preparing models using development of surfaces. e) Assignments on bending moment, sheer forces, deflection of beams and torsion chapters of strength of material. f) Select different materials with specifications for at least 10 different machine components and list the important material properties desirable. g) Select 5 different carbon steels and alloy steels used in mechanical engineering applications and specify heat treatment processes employed for improving the properties. Also give brief description of the heat treatment processes. h) List the various properties and applications of following materials – <ol style="list-style-type: none"> a. Ceramics b. fiber reinforcement plastics c. thermo plastic materials d. thermo setting materials e. rubbers. <p style="text-align: center;">OR</p> <p>Conduct ANY ONE of the following activities through active participation of students and write report</p> <ol style="list-style-type: none"> i) Rally for energy conservation / tree plantation. ii) Survey for local social problems such as mal nutrition, unemployment, iii) Cleanliness, illiteracy etc. iv) Conduct aptitude , general knowledge test , IQ test v) Arrange any one training in the following areas: <ol style="list-style-type: none"> a) Yoga b) Use of Firefighting Equipment and First aid c) Maintenance of Domestic appliances. 	

04	<p>MODULAR COURSES (OPTIONAL)</p> <p>A course module should be designed in the following areas for max. 12 hrs.</p> <p>Batch size - min. 15 students.</p> <p>Course may be organized internally or with the help of external organizations.</p> <p>a) Forging Technology. b) CAD-CAM related software. c) Welding techniques. d) Personality development. e) Entrepreneurship development.</p>	06
05	<p>3-D DESIGN USING SOFTWARE</p> <p>Computer screen, coordinate system and planes, definition of HP, VP, reference planes How to create them in 2nd / 3rd environment. Selection of drawing site & scale. Commands of creation of Line, coordinate points, Axis, Poly lines, square, rectangle, polygon, spline, circles, ellipse, text, move, copy, offset, Mirror, Rotate, Torsion, Extend, Break, Chamfer, Fillet, Curves, Constraints fit, tangency, perpendicularity, dimensioning, line conventions, material conventions and lettering.</p> <p>The Student should draw - different orthographic views (including sections), auxiliary views according to First/ Third angle method of projection. (Minimum two sheets, each containing two problems) after learning the contents as above.</p>	12
	TOTAL	36

COURSE NAME : ALL BRANCHES OF DIPLOMA IN ENGINEERING

COURSE CODE : ET/ME/CO

SEMESTER : THIRD

SUBJECT TITLE : COMMUNICATION SKILLS

SUBJECT CODE : ME3011

TEACHING AND EXAMINATION SCHEME:

Teaching Scheme		Examination Scheme					
TH	TUT	PAPER HRS	TH	INT	OR	TW	TOTAL
03	02***	03	80	20	--	25*	125

Pre-requisites: The student must know the following concepts:

1. The orientation in English I and II.

Objectives: The student will be able to

1. Understand and use the basic concepts of communication and principles of effective communication in an organized set up and social context.
2. Give a positive feedback in various situations, to use appropriate body language & to avoid barriers for effective communication.
3. Write various types of letters, reports and office memos in appropriate format.
4. Know the role of exercise& diet.

Contents: Theory

Unit	Name of the Topic	Hours	Marks
01	ASPECTS TO COMMUNICATION Definition, communication cycle/ process, The elements of communication: sender- message – channel- Receiver –Feedback & Context. Definition of communication process. Stages in the process: defining the context, knowing the audience, designing the message, encoding, selecting proper channels, transmitting, and receiving, decoding and giving feedback.	04	18
02	TYPES OF COMMUNICATION Formal-Informal, Verbal-Nonverbal, Vertical-Horizontal-diagonal	04	10
03	COMPONENTS OF EFFECTIVE COMMUNICATION Definition of effective communication, Communication barriers & how to overcome them. Developing effective messages: Thinking about purpose, knowing the audience, structuring the message, selecting proper channels, minimizing barriers & facilitating feedback.	04	20
04	NON VERBAL- GRAPHIC COMMUNICATION Non- verbal codes: A- Kinesics , B- Proxemics , C – Haptics D-Vocalics , E- Physical appearance. F -Chronemics , G –Artifacts Aspects of body language Interpreting visuals & illustrating with visuals like tables, charts & graphs. Role of Exercise & Diet: Physical Exercise, Yoga & Mental Exercise, Role of Diet, Balanced Diet, Precautions.	08	16
05	FORMAL WRITTEN SKILLS Office Drafting: Circular, Notice, and Memo. Job Application with resume. Business Etiquettes. Business correspondence: Enquiry, Order letter, Complaint letter, and Adjustment letter. Report writing: Accident report, fall in production, Progress / Investigative. Defining & describing objects & giving Instructions. Forms and important functions of the following: noun,adjective,verb,adverb,article,pronoun,preposition,conjunction and interjection	12	16
	TOTAL	32	80

Recommended Books:

Sr. No.	Title	Author	Publisher
01	Developing Communication Skills	Krushna Mohan, Meera Banerji	Macmillan
02	Communication Skills	Joyeeta Bhattacharya	Reliable Series
03	Every ones guide to effective writing	Jayakaran	Apple publishing