PEOPLE'S UNIVERSITY, BHOPAL

(Applicable for Admitted from Academic Session 2019-20 onwards)

Programme: **Diploma in Engineering** **Semester –III**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External	Internal	Total
DME1301	Material Science	3	1	-			Min: 40 (D Grade)	Nil	Nil	Nil

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 15	Assignment/Quiz/Attendance Max. Marks: 15
Practical Internal Max Marks: Nil	Lab work & Sectional – Max Marks: Nil	Assignment / Quiz/Attendance Max. Marks: Nil

Pre-Requisite	Nil
Course Outcome	1. Classify the materials and suggest testing methodologies for the characterization of different categories of materials.
	2. Understand the basic properties that characterize the behavior of materials.
	3. Select appropriate type of material for specific applications and engineering practice.

Unit	Contents (Theory)	Marks Weightage
I	**Engineering Material Testing:** Properties of Materials, Destructive including Tensile test, compression test, hardness test, impact test fatigue test, endurance limit, bending test, shear test and non- destructive testing methods.	**14**
II	**Equilibrium Phase Diagrams and Phase Transformation:** Equilibrium of phase Diagrams: Plotting of equilibrium diagrams, interpretation, phase rule and lever rule and its application Phase transformations – Eutectic Eutectoid, Peritectic and Peritectoid, Iron carbon equilibrium Diagram.	**14**
III	**Heat Treatment of Steels**: Objective of heat treatment, thermal processes- annealing, normalizing, hardening and tempering. Hardening process : Surface hardening, flame hardening, case hardening methods, their scope, limitations and advantages, quenching mediums and their effect on hardness, Hardening defects due to improper quenching, hardenability, T.T.T. curves interpretation and use.	**14**
IV	**Non- Metallic Materials:** Introduction to Ceramic Refractory, Rubbers Insulators and Lubricants; their properties and applications. **Plastics**: characteristics, classification, commonly used thermo-setting and thermoplastic - their properties and uses. Ingredients for processing plastics. Plastic processing methods different methods.	**14**
V	**Powder Metallurgy:** Introduction and application. Description of process, manufacture and blending of metal powder compacting and sintering. **Metal Preservation**: Corrosion meaning various mechanism effect of corrosion, methods of minimizing corrosion	**14**

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Text Book/References Books/ Websites:

1. R K Jain; Production Technology; Khanna Publishers
2. S.P. Nayak ;Metallurgy for engineering; New Age Publication
3. Dr. Abdul mubeen, S Agrawal, Metallurgical Testing; Dhanpat Rai Prakashan
4. Material Science by William D. Callistre
5. O. P. Khanna ,Material Science , Dhanpat rai publications

Suggested List of Laboratory Experiments :- (Expandable): Nil

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total (100)			Total (50)
DME1302	Machine Drawing and CAD	3	1	1	External (70)	Internal (30)	Min: 40 (D Grade)	External (35)	Internal (15)	Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 15	Assignment/Quiz/Attendance Max. Marks: 15
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks: 10	Assignment / Quiz/Attendance Max. Marks: 05

Pre-Requisite	Engineering Drawing
Course Outcome	1. Student should be able to Use IS convention of representing various machine components
	2. Interpret drawings and the assembly of a given set of details of machine components.
	3. Know the significance & use of tolerances of size, forms & positions.

Unit	Contents (Theory)	Marks Weightage
I	**Drawing, Dimensioning, Tolerance, Machining and Welding Symbols:** Types of Drawing, Types of Lines, Types of dimensions (size and location) dimensioning terms and notations. (Use of I.S. Code 696 &2709) general rules for dimensioning and practical hints on dimensioning systems of dimensioning. Representation of welded joints, welding symbols, tolerance, tolerance symbols and its positions, Application of tolerances, Surface finishing symbols, Procedure of drawing fits, limits, size, clearance, hole basis and shaft basis system.	**14**
II	**Projection and Multi View Representation:** Orthographic projection. First and third angle projection, auxiliary views- views -full and partial, conversion of pictorial views in to orthographic views, conventional representation of metals and machine parts as per IS: 696. **Sectional Views:** Full section, half section, partial or broken section, revolved section, removed section, offset section. Sectioning conventions, section lines. Hatching procedure, Sectional views of assembled parts. Choosing from IC engine parts, couplings, clutches, brackets, bearing etc.	**14**
III	**Production Drawing:** Types of assembly drawing, scale, finish tolerances, notes etc. Title block, Bill of Materials, Preparation of detailed drawing from assembly drawings and assembled pictorial views, Interpretation of production drawing, Assembly drawing of cotter joint, Knuckle joint, Foot-step bearing, drawing of nut and bolt, Plummer block, Universal coupling.	**14**
IV	**Gear Drawing:** Gear terminology, construction of involutes teeth profile. **Pipe Drafting :** Selection criteria for pipe fitting materials, flanged joint, socket and spigot joint, gland and stuffing box, expansion joint, C.I. and PVC pipe fitting pipe fitting and pipe layouts. Applications.	**14**
V	**Auto CAD:** Introduction, Advantages and limitations, use of commands i.e. Draw, Modify, Dimensioning, Layers, and Properties.	**14**

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Text Book/References Books/ Websites

1. N.D.Bhatt; Mechanical Drawing By Dhanpat Prakashan.
2. P.S.Gill; Mechanical Drawing By P.S.Gill S.K. Kataria & Sons.
3. K.L. Narayana, P. Kannaiah,k.V. Reddy ; Machine Drawing by New Age Publications.
4. R.K.Dhawan ; Mechanical Drawing By S. Chand Publication.

Suggested List of Laboratory Experiments (Expandable):-

Prepare drawing sheets on following topics.

1. Types of line, and Dimensioning System.
2. Sheet of Tolerance Symbols, Positioning, Surface Finishing and Welding Symbols.
3. Use first angle method of projection, Orthographic projects (One Sheet containing atleast two problems and atleast four problems for home assignment).
4. Sectioning views: projects (One Sheet containing atleast two problems and atleast four problems for home assignment).
5. Conventional Representation as per SP – 46 (1988) - one sheet.
6. Details to Assembly: Draw sheets covering assembly drawing and its details for given machine parts.
7. One sheet of Gear terminology and construction of involutes gear profile.
8. Pipe fitting and pipe layout: C.I. and PVC.
9. Two problems on assembly drawings using any CAD Package.

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total (100)			Total (50)
DME1303	Strength of Materials	3	1	1	External (70)	Internal (30)	Min: 40 (D Grade)	External (35)	Internal (15)	Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 15	Assignment/Quiz/Attendance- Max. Marks: 15
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks: 10	Assignment / Quiz/ Attendance Max. Marks: 05

Pre-Requisite	General study of stress and strain
Course Outcome	1. Apply knowledge of stress distributions to calculate stresses in structures under combined loading.
	2. Develop an understanding of normal and shear stress and strain.
	3. Ability to calculate stress and angular deflection of Torsionally-loaded structures.

Unit	Contents (Theory)	Marks Weightage
I	**Stress and Strains:** Introduction types of loads and deformation, types of stresses and strain. Hooke's law, stress strain diagram for ferrous and non ferrous materials modulus of elasticity. Rigidity and bulk modules of materials Stress in bars of varying cross sections, composite sections and compound sections Thermal stresses and strains, Poisson's ratio, volumetric strain, relation between different modulus, resilience.	**14**
II	**Stresses in Frames:** Definition of frame, perfect, deficient and redundant frame. Assumptions made in finding stress in method of sections and graphical method Bows notation, solution of problems using three methods.	**14**
III	**S.F. and B.M. Diagrams:** S.F. and B.M. diagrams for cantilever simply supported and overhanging beams with point or concentrated loads uniformly distributed loads and combination of point and U.D.L. Point of contra flexure, numerical problems.	**14**
IV	**Spring:** Definition types and use of springs, leaf spring, helical and spiral springs, Stiffness of a spring and maximum shear stress, defection of spring. Spring Classification based on size shape and load. Concept of column, modes of failures, Types of column, Buckling load, crushing load, Factor Effecting Strength of column end, restraints, Strength of column by Euler Formula without derivation. Rankine Gourdan formula (without derivation).	**14**
V	**Thin Cylinders and Spheres :** Hoop stress longitudinal stress on inclined plane subject subjected to direct, shell, volume strain change in value, cylindrical vessels subjected to internal pressure, simple numerical problems	**14**

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Text Book/References Books/ Websites

1. Andrew Pytel ,Fedrinand L.Singer ,Strength of Material,Addison-Wesley An imprint of Addison Wesley Longman Inc. Forth edition.
2. G.H.Ruder ,Strength of Material, ELBS with Macmillan third edition.
3. B.K.Sarkar, Strength of Material ,Tata McGraw hill New Delhi.
4. Dr. R. K.Bansal, A Text Book strength of Material, Laxmi Publication New Delhi.

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5. S Ramamrutham, Strength of Material, Dhanpat Rai & Publication New Delhi.
6. R.S.Khurmi, Strength of Material, S.Chand Company Ltd. Delhi.

Suggested List of Laboratory Experiments (Expandable):-

1. Study and demonstration of Universal Testing Machine & its attachments.
2. Drawing sheet on shear force & bending Moment diagrams for a given loading (At least four problems.).
3. Tension Test on mild steel, Aluminium & compression test on cast iron on UTM.
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.

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total (100)			Total (50)
DME1304	Electrical Engineering	3	1	1	External (70)	Internal (30)	Min: 40 (D Grade)	External (35)	Internal (15)	Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 15	Assignment/Quiz/Attendance- Max. Marks: 15
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks: 10	Assignment / Quiz/Attendance Max. Marks: 05

Pre-Requisite	General study of Electricals tools
Course Outcome	1. Ability to general's study of electrical tools.
	2. An ability to impart a basic knowledge of electrical quantities such as current, voltage, power, energy and frequency.
	3. Able to analyze basic DC and AC circuits used in electrical and electronic devices.

Unit	Contents (Theory)	Marks Weightage
I	**Introduction:** Electrical power Generation, Transmission, Distribution & Utilization. AC supply & DC supply **AC Fundamentals**: cycle, frequency, phase, period, max, average, r.m.s.value. R, L, & C circuits. **Three phase supply:** Star & Delta circuit, Line & Phase relationship, power equation	**14**
II	**Measuring Instruments**: Introduction to construction, operation and use of AC & DC ammeter, voltmeter, Electrodynamic Wattmeter, energy meter & digital multimeter, Clip on meter.	**14**
III	**A.C.Machines:** Transformer: Construction and principle of operation. EMF equation and transformation ratio. Efficiency and regulation. 3 phase transformer concept, Applications of transformers.	**14**
IV	**DC Motor:** Construction and principle of operation. Speed torque Characteristics. Types, ratings and applications. Types of Insulation used. **AC motor:** Construction and principle of operation of 3 phase induction Motor. Speed torque characteristics, slip, Single phase motor, universal motor, stepper motor & servo motor. Motor specification & ratings. Applications of these motors in various fields. Alternator: Construction, principle of operation & applications. Synchronous Motor-Construction, principle of operation, starting & applications	**14**
V	**Utilization of Electrical Energy:** Industrial applications: Electrical drives, factors for selection of motor for different drives, Enclosures & Mountings Electric heating & welding: Working principle & types.	**14**

Text Book/References Books/ Websites

1. Dr.P.S.Bimbhra ,Electrical Machines by Khanna Publication.
2. Ashfaq Hussain ,Electrical Machines Dhanpat Rai.
3. H. Partab, Art & Science of Utilisation of Electrical Energy, Dhanpat Rai & Sons.

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4. G. K Dubey, Power Semiconductor Controlled Drives, Prentice-Hall, Englewood Cliffs! .
5. A.K. Sawhney, Electrical and Electronic measurements and Instrumentation, Dhanpat Rai and Co.
6. J. B. Gupta ,Power Systems, Dhanpat Rai Publications.

List of Experiments:

1. Measurement of current, voltage and power drawn by a given resistive & inductive series & parallel circuit by using an ammeter, voltmeter & wattmeter.
2. To draw the speed-torque characteristics of given DC series/Shunt motor by using suitable meters.
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.
7. Observe Electric wiring of main building in your campus list the accessories used and draw a general layout
8. Observe earthling of your laboratory, measure its resistance & list its significance

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (35)	Internal (15)	Total (50)
DME1305	Manufacturing Process	3	1	1			Min: 40 (D Grade)			Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 15	Assignment/Quiz/Attendance Max. Marks: 15
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks: 10	Assignment / Quiz/Attendance Max. Marks: 05

Pre-Requisite	General study of Manufacturing processes.
Course Outcome	1. Understanding of the behavior and properties of materials as they are altered and influenced by manufacturing processes.
	2. Ability to perform engineering analysis by designing and conducting appropriate experiments and analyzing and interpreting results.
	3. Ability to design products, equipment, tooling and environment for manufacturing systems.

Unit	Content (Theory)	Marks Weightage
I	**Forging , Rolling and Extrusion:** Forging Processes – Drop Forging, Upset forging, Die forging or press forging. 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.	**14**
II	**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.	**14**
III	**Casting:** Patterns - Material used, types, Patterns allowances, Cores, Core allowances , Moulds - Mould Materials, Types of sand, Mounding Processes Sand Molding, Pit Molding, Machine Molding. Shell Molding , Melting Practice. Types of furnaces with Specific Application Cupola Furnace, Special Casting Processes. Viz Die Casting, Centrifugal Casting, Investment Casting , Casting Defects	**14**
IV	**Welding:** Classification , Gas Welding Techniques , Types of Welding Flames , Arc Welding – Principle, Equipment, Applications , Shielded Metal Arc Welding , Submerged Arc Welding , TIG / MIG welding , Resistance Welding - Spot Welding, Seam Welding, Projection Welding , Welding Defects , Brazing and Soldering: Types, Principles, Applications.	**14**
V	**Lathe, Drilling and Milling Machine:** Types of lathes – light duty, Medium duty and Heavy Duty Geared Lathe, Specifications. Basic Parts and their functions, Operations and tools – Facing, Boring, Drilling, Threading, Taper Turning , Radial Drilling Machine, Types of operations, Specifications of Drilling machine. Column and knee type Milling Machine, Types of Operations, Types of Milling Cutters.	14

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Text Book/References Books/ Websites

1. Dr.K.Radhakrishna , Manufacturing Process-I, Sapna Book House, 5th Revised Edition .
2. Roy A Lindberg , Process and Materials of Manufacturing , 4th Ed.Pearson Edu. .
3. S. K. Hajra Chaudary, Bose, Roy Elements of workshop Technology – Volume I & II
4. O. P. Khanna and Lal ,Production Technology –Dhanpat rai publication, Volume I & II

Suggested List of Laboratory Experiments :- (Expandable):

1. To study on cutting tool nomenclature and tool signature of single point cutting tool.
2. To study on lathe containing the operations like plain turning, threading, boring, taper turning.
3. One job on CNC lathes containing the operations like plain turning, taper turning and curvature.
4. One job containing drilling, milling, reaming, gear cutting (spur gear) per job max. two students.
5. One job containing surface grinding / cylindrical grinding for tolerances ± 30 micron,(For the job already made on milling machine /lathe).
6. To study the accessories & attachment, work holding & tool holding devises used on milling machine.
7. One job containing on shaper Machine
8. To study tool nomenclature & geometry of milling cutters.

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total			Total (50)
DME1306	Auto CAD	-	-	1	External Nil	Internal Nil	Nil	External (35)	Internal (15)	Min: 20 (D Grade)

Duration of Theory (Externals): Nil

Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test – Max Marks: Nil	Assignment/Quiz/Attendance Max. Marks: Nil
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks: 10	Assignment / Quiz/Attendance- Max. Marks: 05

Pre-Requisite	To get the basic knowledge of Software.
Course Outcome	1. Increase ability to communicate with people.
	2. Learn to sketch and take field dimensions.
	3. Learn to take data and transform it into graphic drawings.

Unit	Contents (Theory)	Marks Weightage
	Introduction to CAD Introduction to Computer Aided Drafting software for 2D and 3D Modeling, benefit, software's basic commands of drafting entities like line, circle, polygon, polyhedron, cylinders; transformations and editing commands like move, rotate, mirror, array. • Practicing commands under Draw and Dimension Menu • Practicing commands under Modify Menu. • Practicing commands under Tool Menu. • Practicing commands under Format Menu. • Practicing commands under Express Menu.	**50**

Text Book/References Books/ Websites: Nil

Suggested List of Laboratory Experiments :- (Expandable):

Students should draw at least ten work sheets of machines parts by using AutoCAD command.

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External	Internal	Total	External	Internal	Total (50)
DPE1307	Professional Skill	-	-	1	(Nil)	(Nil)	Nil	(Nil)	(50)	Min: 20 (D Grade)

Duration of Theory (Externals): Nil

Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test – Max Marks: Nil	Assignment/Quiz/Attendance Max. Marks: Nil
Practical Internal Max Marks: 50	Lab work & Sessional – Max Marks: Nil	Assignment / Quiz/ Attendance Max. Marks: 50

Pre-Requisite	**Nil**
Course Outcome	1. To develop the knowledge to face to competitive Exams. 2. To develop the personal abilities and skills.

Unit	Contents (Theory)	Marks Weightage
I	**Quantitative Aptitude:** Percentages/Profit & Loss, Time and Work, Simple and Compound Interest, Series and Progression.	**50**
II	**Reasoning :** Puzzles and Seating Arrangement, Data Sufficiency, Coding-decoding, Blood Relation, Order and Ranking, Alpha Numeric Symbol Series, Logical Reasoning:	
III	English: free quizzes related to Synonyms, Antonyms, One Word Substitution, Idioms and Phrases, Spelling Correction; Fill in the Blanks and Common Errors in English.	

Text Book/References Books/ Websites:

1. R.S. Aggarwal; Quantitative Aptitude for Competitive Examinations.
2. Arihant Publications; Fast Track Objective Arithmetic.
3. R S Aggarwal; Verbal and Nonverbal Reasoning.
4. M K Pandey; Analytical Reasoning.
5. B S Sijwali, Indu Sijwal; A New Approach to Reasoning Verbal and Non-Verbal (English) 1st Edition.
6. SP Bakshi; Objective General English.
7. Wren and martin; English grammar book.
8. Neetu singh; Plinth to paramount English.
9. Norman Lewis; Word power made easy (Mainly for development of vocab)
10. https://www.playquiz2win.com/engquizmenu.html
11. https://www.sawaal.com

Suggested List of Laboratory Experiments :- (Expandable):

Students should solve various problems and quiz on the above mention topics, and prepare a assignment.