

**SYLLABUS  
DIPLOMA IN MECHANICAL ENGINEERING  
SEMESTER – III**

**ENGINEERING MECHANICS**

**Sub. Code: DME 301**

**Credits: 02**

**Total Marks: 100**

**Minimum Pass Marks: 40%**

**Internal Assessment: 40 Marks**

**University Examination: 60 Marks**

**Unit 1**

Concept of Engineering Mechanics; Definition of Mechanics; Statics; Dynamics; Application of Engineering Mechanics in Practical Fields; Definition of Applied Mechanics; Definition, Basic Quantities and Derived Quantities of Basic Units and Derived Units.

**Unit 2:** Definition of Force; Measurement of Force in SI Units; Its Representation; Types of Force: Point Force/Concentrated Force & Uniformly Distributed Force. Resolution of Forces

**Unit 3:**

Concept of Moment; Moment of a Force and Units of Moment; Varignon's Theorem (Definition only); Principle of Moment and its Applications; Levers: Simple and Compound, Steel Yard, Safety Valve; Position of Resultant Force by Moment.

**Unit 4:**

Definition and Concept of Friction; Types of Friction; Force of Friction; Laws of Static Friction; Coefficient of Friction; Angle of Friction; Angle of Repose; Cone of Friction.

**Unit 5:**

Center of Gravity: Concept; Definition of Centroid of Plain Figures and Centre of Gravity of Symmetrical Solid Bodies; Determination of Centroid of Plain and Composite Lamina using Moment Method only.

**Unit 6:**

Definition of Effort; Velocity Ratio, Mechanical Advantage and Efficiency of a Machine and their Relationship; Law of Machines; Simple and Compound Machine; Definition of Ideal Machine; Reversible and Self Locking Machine; Effort Lost in Friction; Load Lost in Friction.

**Unit 7:** Concept of Moment of Inertia and Second Moment of Area and Radius of Gyration; Theorems of Parallel and Perpendicular Axis.

**Suggested Readings:**

1. A Text Book of Applied Mechanics, S Ramamurtham, Dhanpat Rai Publishing Co. Ltd.
2. Applied Mechanics, Col. Harbhajan Singh, TL Singha and Parmod Kumar Singla, Abhishek Publication, Chandigarh

**Note:**

1. Eight questions are to be set. Students will have to attempt five questions in all.
2. Use of non-programmable scientific calculator is allowed in Examination Hall.

**SYLLABUS  
DIPLOMA IN MECHANICAL ENGINEERING  
SEMESTER – III**

**INTERNAL COMBUSTION ENGINES**

**Sub. Code: DME 302**

**Credits: 02**

**Total Marks: 100**

**Minimum Pass Marks: 40%**

**Internal Assessment: 40 Marks**

**University Examination: 60 Marks**

**Unit 1:**

Introduction and Classification of I.C. Engines; Working Principle of Four Stroke and Two Stroke Cycles; Petrol and Diesel Engines, their Comparison and Applications; Location and Functions of Various Parts of I.C. Engines and Materials used for them; Concept of IC Engine

**Unit 2:**

Concept of Carburetion; Air-fuel Ratio; Simple Carburetor and its Limitations; Various Circuits of Solex and Carburetor; Description of a Battery Coil and Magneto Ignition System.

**Unit 3:**

Components of Fuel System; Description and Working of Fuel Feed Pump; Fuel Injection Pump Injector.

**Unit 4:**

Necessity of Engine Cooling; Cooling Systems: their Main Features; Thermostat; Defects in Cooling Systems and their Rectification.

**Unit 5:**

Engine Power-indicated and Brake Power; Efficiency: Mechanical, Thermal, Relative and Volumetric; Morse Test; Heat Balance Sheet.

**Unit 6:**

Industrial Uses of Compressed Air; Classification and Description of Reciprocating and Rotary Air Compressors; Fans, Blowers and Supercharger; Working Principle of Reciprocating Single and Two Stage Compressors.

**Unit 7:**

Energy Equation as Applied to a Nozzle; Description of Various Types of Turbines; Methods of Reducing Rotor Speed in Impulse Turbines; Governing of Steam Turbines.

**Suggested Readings:**

1. Internal Combustion Engines, V. Ganesan, Tata McGraw Hill
2. Internal Combustion Engines, RK Singhal, S. K. Kataria and Sons.

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**SYLLABUS  
DIPLOMA IN MECHANICAL ENGINEERING  
SEMESTER – III**

**ELECTRICAL MACHINES**

**Sub. Code: DME 303**

**Credits: 02**

**Total Marks: 100**

**Minimum Pass Marks: 40%**

**Internal Assessment: 40 Marks**

**University Examination: 60 Marks**

**Unit 1:**

Advantage of Three-Phase System over Single-Phase System; Star Delta Connections.

**Unit 2:**

Principle of Operation and Constructional Details of Single Phase and Three-Phase Transformer, Core Type and Shell Type Transformers, Current Transformer and Potential Transformer.

**Unit 3:**

Introduction to Rotating Electrical Machines; E.M.F Induced in a Coil Rotating in a Magnetic Field; Common Features of Rotating Electrical Machines.

**Unit 4:**

Principle of Working of D.C Motors and D.C Generator; their Constructional Details Characteristics of Different Types of DC Machines; Application of DC Machines.

**Unit 5:**

Revolving Magnetic Field Produced by Poly Phase Supply; Brief Introduction about Three Phase Induction Motors, its Principle of Operation. Principle and Working of Synchronous Machines; Application of Synchronous Machines.

**Unit 6:**

Introduction; Principle of Operation of Single Phase Motors; Single Phase Synchronous Motors: Reluctance Motor, Hysteresis Motor.; Motors and Stepper Motors; Concept of Micro-Motors.

**Suggested Readings:**

1. Electrical Machine, SK Bhattacharya, Tata McGraw Hills.
2. Electrical Machines, Nagrath and Kothari, Tata McGraw Hills.
3. Experiments in Basic Electrical Engineering, S.K. Bhattacharya, KM Rastogi: New Age International (P) Ltd. Publishers.

**Note:**

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**SYLLABUS  
DIPLOMA IN MECHANICAL ENGINEERING  
SEMESTER – III**

**MATERIAL SCIENCE**

**Sub. Code: DME 304**

**Credits: 02**

**Total Marks: 100**

**Minimum Pass Marks: 40%**

**Internal Assessment: 40 Marks**

**University Examination: 60 Marks**

**Unit 1:**

Classification of Materials; Thermal, Chemical, Electrical and Mechanical Properties of Various Materials; Selection Criteria for Use in Industry.

**Unit 2:**

Metal Structure; Relation of Metal Structure to its Properties; Arrangement of Atoms in Metals (Basic Idea); Crystalline Structure of Metals.

**Unit 3:**

Classification of Iron and Steel; Sources of Iron Ore and its Availability; Manufacture of Pig Iron, Wrought Iron, Cast Iron and Steel (Flow Diagrams Only); Types of Cast Iron, White, Malleable, Grey, Mottled, Modular and Alloy and their Usage.

**Unit 4:**

Important Ores and Properties of Aluminum, Copper, Zinc, Tin and Lead; Properties and Uses of Al Alloys and Copper Alloys; Bearing Metals; Solders.

**Unit 5:**

Important Sources of Plastics; Classification; Thermoplastic and Thermo-set; Various Trade; Names of Engineering. Plastics; Plastic Coating; Fibers and their Classification.

**Unit 6:**

Various Heat Insulating Material and their Usage: Asbestos, Glass Wool, Thermocole, Cork, Puf and China Clay; Various Electrical Insulating Material and their Usage.

**Unit 7:**

Identification Tests: Appearance, Sound, Spark, Weight, Magnetic, Band Microstructure and Filling.

**Unit 8:**

Purpose of Heat Treatment; Theory of Solid Solution; Iron-carbon Diagram; TTT Curve in Steels and its Importance.

**Suggested Readings:**

1. Text book of Material Science, R.K. Rajput, Kaston Pubs.
2. Text book of Material Science, Varinder Kumar, Eagle Publisher.

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**SYLLABUS  
DIPLOMA IN MECHANICAL ENGINEERING  
SEMESTER – III**

**MACHINE DRAWING**

**Sub. Code: DME 305**

**Credits: 02**

**Total Marks: 100**

**Minimum Pass Marks: 40%**

**Internal Assessment: 40 Marks**

**University Examination: 60 Marks**

**Unit 1:**

Introduction to BIS Specification SP: 46 – 1988 Code of Engineering Drawing: Limits, Fits and Tolerance: Dimensional and Geometrical Tolerance; Surface Finish Representation.

**Unit 2:**

Gear Terminology; I.S. Convention Representation of Assembly of Spur Gears; Helical Gears; Bevel Gears; Worm and Worm Wheel.

**Unit 3:**

Orthographic Views from Isometric Views of Machine Parts/Components: Dimensioning, Sectioning. Exercises on Coupling, Crankshaft, Pulley, Piston and Connecting Rod, Cotter and Knuckle Joint. Riveted Joint and Welded Joint.

**Unit 4:**

Assembly Drawing with Sectioning and Bill of Materials from given Detailed Drawings of Assemblies: Lathe Tail Stock, Machine Vice, Pedestal Bearing.

**Suggested Readings:**

1. Machine Drawing, N D Bhatt and V M Panchal, Charotar Publishing House.
2. A Text Book of Machine Drawing, P S Gill, S K Kataria & Sons.
3. Engineering Graphics with Auto CAD 2002, James D. Bethune, Pearson Education.

**Note:**

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