DME 501: THEORY OF MACHINES

Credits: 4 Semester V

Module No.	Contents	Teaching Hours
Unit – I	**SIMPLE MECHANISMS** Definition of statics, kinetics, kinematics and dynamics , Rigid body and resistant body ,Links ,Kinematics pairs and their types , Degree of freedom ,Kinematics chain and their types ,Constrained motion and mechanisms ,Classification of mechanisms , Equivalent mechanism , Laws of inversion of mechanisms , Single slider crank chain and its inversions , Quick return mechanism, Indicator mechanism, pantograph. **Friction & Clutches** Frictional torque in screws for both square and V-threads , Screw jack , Calculation of power required for raising a load. CLUTCHES Introduction of clutches and its working principle, single plate, multi-plate clutch and cone clutches construction and working only.(without numerical).	12
Unit – II	**Cams** Definition of cam , Classification of cams , Followers and their classification ,Brief description of different types of cams and followers with simple line diagram , **Power Transmission Devices (Belt, Rope and Chain Drive)** Introduction ,Belt and rope drives, open and crossed belt drives, actions of belt on pulleys, velocity ratio , Slip in belts & ropes ,Types of V Belt and Flat belt , Laws of belting and length of belt (open & cross belt) , Ratio of tensions , Power transmitted and max power transmitted by belt , lifted **Gear Drive** Functions of gear , Classification of gears , Gear nomenclature , Forms of teeth, cycloid profile and involute profile teeth , Simple problems on gear trains	12
Unit - III	**Balancing** Need of balancing Concept of static and dynamic balancing Balancing of rotating mass by another mass in the same plane **Fly Wheel** Functions of fly wheel& Types, Kinetic Energy of rotating masses, turning moment diagram, Co-efficient of energy & speed, Simple problems. **Governor** Functions of governor; comparison between a fly wheel and governor. Types of governor – Principle, construction and working of Watt governor Simple problems on watt Governor, Terminology used in Governors: Height, equilibrium speed, Hunting, isochronism, stability, sensitiveness (numerical problem). **Vibration** Introduction Types of vibration – longitudinal, transverse and torsional vibration Causes, remedial measures & harmful effects of viberations	12

Reference Books:

1. JS Rao and Dukkipati; Mechanism and Machine Theory; Wiley Eastern, New Delhi
2. A Ghosh and AK Malik: Theory of Mechanism and Machine; East West Press (Pvt) Ltd., New Delhi
3. MF Spotts: Design of Machine Elements; Prentice Hall of India Ltd., New Delhi
4. R.C Jindal; Theory of Machines & Mechanisms; Ishan Publications, Ambala City
5. S.S Rattan: Theory of Machines; Tata McGrawHill , New Delhi

DME 502: REFRIGERATION AND AIR CONDITIONING

Credits: 4 Semester V

Module No.	Contents	Teaching Hours
Unit – I	**Introduction** Fundamentals of Refrigeration and Air Refrigeration Introduction, methods of refrigeration, Unit of refrigeration, COP, Carnot refrigeration cycle, Air refrigeration cycle, Refrigeration principles, COP, power calculations, refrigerants, Refrigeration Systems, VCRS(VAPOR COMPRESSION REFRIGERATION SYSTEM), VARS (VAPOR ABSORPTION REFRIGERATION SYSTEM)	12
Unit – II	**Refrigerants, Refrigeration Equipment and applications** Refrigeration devices- Compressors, Evaporators, Condenser, Cooling towers- function, types & capacity; Domestic refrigerators – ice plant, Water cooler, cold storages freezer. Non conventional Refrigeration system, low temperature Refrigeration	12
Unit - III	**PSYCHROMETRY & Air Conditioning** Effective temperature, comfort condition, psychrometry, psychrometer, psychrometric process. Air Conditioning cycles-Design-Duct design and selection of fan or blower, Fluidized bed drying system, working & usages of freezers and cold storages, Filters & Dust collectors, Types of Air Conditioners: window, split, central, A.C. plant- Installation practice & servicing, Requirement of power	12

Reference Books:

1. Refrigeration & Air Conditioning by R .S. Khurmi, S Chand Publication
2. Refrigeration and Air Conditioning – by Arora
3. Refrigeration and Air Conditioning – by Domakundavar
4. Heat Transfer, by R. Yadav, Central Publishing House, Allahabad.

DME 503: ENVIRONMENTAL ENGINEERING

Credits: 4 **Semester V**

Module No.	Contents	Teaching Hours
Unit – I	**Introduction:** Basics of ecology: flora & fauna, Ecosystem, Biodiversity Human activities and its effect on ecology and eco system, different development i.e. irrigation, urbanization, engineering activities and their effects on ecology and eco system **Mining and deforestation and their effects:** Lowering of water level, Urbanization. -Biodegradation and Biodegradability, composting, bio remediation, Microbes .Use of bio-pesticides and bio-fungicides - Global warning concerns, Ozone layer depletion, Greenhouse effect, Acid rain, etc.	12
Unit – II	**Pollution:** Sources of pollution, natural and manmade, their effects on living Environments and related legislation. **Water Pollution:** Factors contributing water pollution and their effect – Domestic waste Water and industrial waste water. Heavy metals, microbes and leaching metal-Physical, Chemical and Biological Characteristics of waste water - Indian Standards for quality of drinking water - Indian Standards for quality of treated waste water. – Treatment methods of effluent (domestic waste water and industrial/ mining waste water), its reuse/safe disposal.	12
Unit - III	**Air Pollution:** Definition of Air pollution, types of air pollutants i.e. SPM, NOX,SOX, CO, CO2, NH3, F, CL, causes and its effects on the environment - Monitoring and control of air pollutants, Control measures techniques. Introductory Idea of control equipment in industries i.e. A. Settling chambers B. Cyclone separator C. Scrubbers (Dry and Wet) D. Multi Clones E. Electro Static Precipitations F. Bog Fillers a) Ambient air quality measurement and their standards. b) Process and domestic emission control c) Vehicular Pollution and Its control with special emphasis of Euro-I, Euro-II, Euro-III and Euro IV.	12

Reference Books:

1. Garg S. K., Environmental Engineering Vol I, Khanna Publishers.
2. Birdie G.S & Birdie J.S, Water Supply and Sanitary Engineering, Dhanpat Rai & Sons.
3. Duggal K N, Elements of Environmental Engineering, S Chand & Co Ltd.
4. Manoj Tiwari, Kapil Khulbe, Environmental Studies, I.K. International Publishing Pvt. Ltd.

DME 504: COMPUTER AIDED MANUFACTURING

Credits: 4 **Semester V**

Module No.	Contents	Teaching Hours
Unit – I	Introduction to CAM,Automation and it's types Features of NC Machine-Fundamental of NC Machine,Element if NC Machine tools,Classification of NC Machine toos,advantages, suitability & limitations of NC Machine tools, application of NC System, method for improving accuracy considering the factors such as tool deflection and chatter and productivity.	12
Unit – II	Computer Control in NC- Problems with conventional NC, Computer numerical control (CNC), Direct numerical control (DNC), Combined DNC/CNC system.ADAPTIVE CONTROL SYSTEM – their types, advantages, adaptive control for proper cutting speed, feed in turning operation. Introduction to CIM- Layout , application, advantages, limitations. Introduction to FMS and their types with advantages and disadvantages.	12
Unit - III	Introduction to computer Aided process planning (CAPP), Detailed introduction to group technology, types of formats. (i) Introduction to NC Part programmimg- Manual (word address format), GM Codes. (ii) Programmimg on lathe- turnning, facing, drillig. Canned cycle. Milling.	12

Reference Books:

1. Internal Combustion Engines –V. Ganesan, Pub.-Tata McGraw-Hill.
2. Engineering fundamental of the I. C. Engine – Willard W. Pulkrabek Pub.-PHI, India

DME 505: WORKSHOP TECHNOLOGY III

Credits: 4 Semester V

Module No.	Contents	Teaching Hours
Unit – I	**Modern Machining Processes** Mechanical Process: Ultrasonic machining (USM): Introduction, principle process, advantages and limitations, applications, Electro chemical machining (ECM), Fundamental principle, process, applications, Electrical Discharge Machining (EDM): Introduction, principle parts of EDM machine, EDM terminology. Principal, metal removing rate, dielectric fluid and properties of electric fluid, applications, Wire cut EDM, Extrusion process & Plasma Acr Machining	12
Unit – II	**Metallic Coating Process** Metal Spraying, Wire process, powder process, applications, Electro plating, anodizing and galvanizing, Organic Coatings, oil base paint, rubber base coating **Finishing Processes** Purpose of finishing surfaces, Surface roughness, definition & units, Honing process and its applications, Description of hones, Brief idea of honing machines, Lapping process, its applications, Description of lapping compounds & tools, Brief idea of lapping machines, Super finishing process and its applications, Use of super finishing attachment on center lathe, Polishing, Buffing	12
Unit - III	**Gear Manufacturing and Finishing Processes** Gear hobbing, Gear shaping, Gear shaving, Gear burnishing **Jigs & Fixtures** Importance and use of jigs & fixtures, Principle of location, Locating devices, Clamping devices, Types of jigs, Drilling jigs, bushes, template jigs, plate jigs, channel jig, leaf jig, Fixture of milling, Advantages of jigs & fixtures. **CNC** Basic components of CNC and DNC, Advantages and Disadvantages of CNC machine, Application of CNC machine, difference between Conventional and CNC machine, profitable application of CNC Machine	12

Reference Books:

1. A text Book of Production Engineering by P.C. Sharma; S. Chand and Company Ltd., New Delhi
2. Manufacturing Technology by Rao; Tata McGraw Hill Pulishers, New Delhi
3. CNC Machines by Bharaj Satya Pyblication, New Delhi
4. Computer Numerical Control & Automation by M.S. Sehrawat and J.S. Narang, Dhanpat Rai & Co.

DME 551: THEORY OF MACHINE LAB.

Credits: 2 **Semester V**

LIST OF PRACTICALS

Module No.	Contents
1	To study various types of kinematics links, pairs, chains & Mechanisms.
2	To plot slider displacement, velocity & acceleration against crank rotation for single slider crank mechanisms.
3	To study various types of gears
4	To study various types of gear trains – Simple, Compound, reverted, Epicyclic
5	and Differential.
6	To perform gyroscopic couple on Motorized Gyroscope.
	To study gyroscopic effects through models.
7	To perform the experiment for static balancing on static balancing
8	machine.
9	To study various types of dynamometer.
10	To find co-efficient of friction between belt and pulley.
	To study the working of screw jack and determine its efficiency