

Meerut Institute of Engineering and Technology, Meerut

CO-wise Syllabus

1	CO-1	Statement	Apply the concept of force resolution and stress and strain to solve basic problems.
		Syllabus	Introduction to Mechanics Force moment and couple, principle of transmissibility, Varignon's theorem. Resultant of force system- concurrent and non-concurrent coplanar forces, Types of supports (Hinge, Roller) and loads (Point, UDL, UVL), free body diagram, equilibrium equations and Support Reactions. Normal and shear Stress, strain, Hookes' law, Poisson's ratio, elastic constants and their relationship, stress-strain diagram for
2	CO-2	Statement	Understand the construction and working of internal combustion engines, electric vehicle and hybrid vehicles.
		Syllabus	Introduction to IC Engines and Electric Vehicles IC Engine: Basic definition of engine and Components, Construction and Working of Two stroke and four stroke SI & CI engine, merits and demerits, scavenging process; difference between two-stroke and four stroke IC engines and SI and CI Engines. Electric vehicles and hybrid vehicles: Components of an EV, EV batteries, chargers, drives, transmission and power devices. Advantages and disadvantages of EVs. Hybrid electric vehicles, HEV drive train components, advantages of HV.
3	CO-3	Statement	Explain the construction and working of refrigerator, heat pump and air conditioner.
		Syllabus	Introduction to Refrigeration and Air-Conditioning Refrigeration: Refrigerating effect, Ton of Refrigeration; Coefficient of performance, methods of refrigeration, construction and working of domestic refrigerator, concept of heat pump. Air-Conditioning: Its meaning and application, humidity, dry bulb, wet bulb, and dew point temperatures, comfort conditions, construction and working of window air conditioner.
4	CO-4	Statement	Understand fluid properties, conservation laws and hydraulic machinery used in real life.
		Syllabus	Introduction to Fluid Mechanics and Applications Introduction to Fluid Mechanics and Applications 8 Introduction: Fluids properties, pressure, density, dynamic and kinematic viscosity, specific gravity, Newtonian and Non-Newtonian fluid, Pascal's Law and Continuity Equation. Working principles of hydraulic turbines (Pelton Wheel and Francis)& pumps (Centrifugal and Reciprocating) and their classifications and
5	CO-5	Statement	Understand the working principle of different measuring instrument and mechatronics with their advantages, scope and Industrial application
		Syllabus	Introduction to Measurement and Mechatronics Introduction to Measurement: Concept of Measurement, Error in measurements, Calibration, measurements of pressure(Bourdon Tube Pressure and U-Tube Manometer), temperature(Thermocouple and Optical Pyrometer), mass flow rate(Venturi Meter and Orifice Meter), strain(Bonded and Unbonded Strain Gauge), force (Proving Ring) and torques(Prony Brake Dynamometer); Concepts of accuracy, precision and resolution. Introduction to Mechatronic Systems: Evolution, Scope, Advantages and disadvantages of Mechatronics, Industrial applications of Mechatronics, Introduction to autotronics, bionics, and avionics and their applications. Sensors and Transducers: Types of sensors, types of transducers and their characteristics. Overview of Mechanical Actuation System – Kinematic Chains, Cam, Ratchet Mechanism, Gears and its type, Belt, Bearing. Hydraulic and Pneumatic Actuation Systems: Overview: Pressure Control Valves, Direction Control Valves, Rotary Actuators, Accumulators

B.Tech First Year: Regular Course Lecture Plan Session 2023-24

Subject Name	Fund. Of Mechanical Engg. (BME 101/201)
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CO No.	Unit Name	Syllabus Topics	Lecture No
CO-1	Introduction to mechanics of solids	Force system, moment and couple, Principle of transmissibility,	1
		Varignon's Theorem, Resultant of forces,	2
		Types of supports and loads, equilibrium equation and support reactions.	3
		Free body diagram, numericals	4
		Normal and shear Stress, strain, Hooke's law, Poisson's ratio.	5
		Various types of Elastic constants and their relationship	6
		Stress-strain diagram for ductile and brittle materials, factor of safety.	7
		Basic Numerical problems on stress, strain and elastic constant.	8
CO-2	Introduction to IC-engines and Electric Vehicles	Introduction to IC and EC engines, Classification of IC Engine and its components .	9
		IC Engine terminology, Construction and Working of four stroke SI & CI engine, Differentiate SI and CI engines.	10
		Construction and Working of two stroke SI & CI engine, Scavenging process, Differentiate 2 stroke and 4 stroke IC engine	11
		Introduction to electric vehicles, advantages and disadvantages	12
		EV Batteries and chargers	13
		EV Drives, Transmission and power device	14
		Introduction to Hybrid electric vehicles(HEV), HEV drive train, advantages and disadvantages, comparison	15
CO-3	Introduction to RAC	Refrigeration : meaning and its applications, unit of refrigeration, methods of refrigeration.	16
		VCRS method	17
		Concept of Refrigerator and Heat pump, Coefficient of performance.	18
		Construction and Working of domestic refrigerator.	19
		Formula based numerical problems on cooling load.	20
		Air-Conditioning : meaning and applications, Atmospheric air, Dry Air ,Wet air.	21
		Specific and relative humidity, Psychrometry : dry bulb, wet bulb, and dew point temperatures.	22
		Construction and working of window air conditioner, Comfort conditions	23

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Subject Name	Fund. Of Mechanical Engg. (BME 101/201)
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CO No.	Unit Name	Syllabus Topics	Lecture No
CO-4	Introduction to fluid mechanics and application	Fluids and their properties :pressure, density,specific weight, Specific gravity with basic numericals . Dynamic and kinematic viscosity	24
		Newton's law of viscosity,Types of fluids: Newtonian and Non-Newtonian fluid	25
		Pascal's Law and its applications, Continuity Equation basic numerical problems .	26
		Hydraulic machines : general layout of hydro-electric power plant,classification of turbines.	27
		Construction and working of Impulse and Reaction turbine.	28
		Working principles and classification of hydraulic pump(Centrifugal and reciprocating)	29
		Working of hydraulic lift.	30
CO-5	Introductions to Measurement & Mechatronics	Concept of Measurement, Error in measurements, Calibration, Accuracy, Precision and Resolution	31
		Measurements of pressure, Bourdon Tube Pressure Gauge	32
		Temperature Measurements	33
		Measurement of Mass flow rate, strain, Force and Torque	34
		Evolution, Scope, Advantages and disadvantages of Mechatronics, Industrial applications of Mechatronics and its scope	35
		Introduction to autotronics, bionics, and avionics and their applications.	36
		Sensors and Transducers: Types of sensors, types of transducers, various characteristics of sensors and tranducers	37
		Mechanical Actuation systems	38
		Overview: Pressure Control Valves, Cylinders, Direction Control Valves, Rotary Actuators	39
		Accumulators and their applications, Amplifiers, and Pneumatic Sequencing Problems.	40