JIT
JAWAHAR INSTITUTE OF TECHNOLOGY, NASHIK

Jawahar Education Society's
Institute of Technology,Management & Research,Nashik

Approved by AICTE and DTE,Goverment of Maharashtra, Affiliated to University of Pune

TE Mechanical 2019 Pattern

Course Outcomes

Department of Mechanical Engineering

Course Outcomes (CO)

Syllabus Pattern:-2019

Class:-TE Semester:- I

Sr. No	Subject	Course Outcomes (CO)
1	Numerical and Statistical Methods	CO1: SOLVE system of equations using direct and iterative numerical methods. CO2: ESTIMATE solutions for differential equations using numerical techniques. CO3: DEVELOP solution for engineering applications with numerical integration. CO4: DESIGN and CREATE a model using a curve fitting and regression analysis. CO5: APPLY statistical Technique for quantitative data analysis. CO6: DEMONSTRATE the data, using the concepts of probability and linear algebra.
2	Heat and Mass Transfer	CO1. ANALYZE & APPLY the modes of heat transfer equations for one dimensional thermal system. CO2. DESIGN a thermal system considering fins, thermal insulation and & Transient heat conduction. CO3. EVALUATE the heat transfer rate in natural and forced convection & validate with experimentation results. CO4. INTERPRET heat transfer by radiation between objects with simple geometries, for black and grey surfaces. CO5. ABILITY to analyze the rate of mass transfer using Fick's Law of Diffusion and understands mass diffusion in different coordinate systems. CO6. DESIGN & ANALYSIS of heat transfer equipments and investigation of its performance.
3	Design of Machine Elements	CO1. DESIGN AND ANALYZE the cotter and knuckle Joints, levers and components subjected to eccentric loading. CO2. DESIGN shafts, keys and couplings under static loading conditions. CO3. ANALYZE different stresses in power screws and APPLY those in the procedure to design screw jack. CO4. EVALUATE dimensions of machine components under fluctuating loads. CO5. EVALUATE & INTERPRET the stress developed on the different type of welded and threaded joints. CO6. APPLY the design and development procedure for different types of springs.

Sr. No	Subject	Course Outcomes (CO)
4	Mechatronics	CO1. DEFINE key elements of mechatronics, principle of sensor and its characteristics. CO2. UTILIZE concept of signal processing and MAKE use of interfacing systems such as ADC, DAC, Digital I/O. CO3. DETERMINE the transfer function by using block diagram reduction technique. CO4. EVALUATE Poles and Zero, frequency domain parameter for mathematical modeling for mechanical system. CO5. APPLY the concept of different controller modes to an industrial application. CO6. DEVELOP the ladder programming for industrial application.
5	Advanced Forming & Joining Processes	CO1. ANALYSE the effect of friction in metal forming deep drawing and IDENTIFICATION of surface defects and their remedies in deep drawing operations CO2. ASSESS the parameters for special forming operation and SELECT appropriate special forming operation for particular applications CO3. ANALYSE the effect of HAZ on microstructure and mechanical properties of materials CO4. CLASSIFY various solid state welding process and SELECT suitable welding processes for particular applications CO5. CLASSIFY various advanced welding process and SELECT suitable welding processes for particular applications. CO6. INTERPRET the principles of sustainable manufacturing and its role in manufacturing industry.
6	Machining Science &Technology	CO1. DEFINE metal cutting principles and mechanics of metal cutting and tool life. CO2. DESCRIBE features of gear and thread manufacturing processes. CO3. SELECT appropriate grinding wheel and demonstrate the various surface finishing processes. CO4. SELECT appropriate jigs/fixtures and to draw the process plan for a given component. CO5. SELECT & EVALUATE various parameters of process planning. CO6. GENERATE CNC program for Turning / Milling processes and generate tool path using CAM software.
7	Digital Manufacturing Laboratory	CO1. DEVELOP a component using conventional machines, CNC machines and Additive Manufacturing Techniques. CO2. ANALYZE cutting tool parameters for machining given job. CO3. DEMONSTRATE simulation of manufacturing process using Digital Manufacturing Tools. CO4. SELECT and DESIGN jigs and Fixtures for a given component. CO5. DEMONESTRATE different parameters for CNC retrofitting and reconditioning.
8	Skill Development	CO1. APPLY& DEMONSTRATE procedure of assembly & disassembly of various machines. CO2. DESIGN & DEVELOP a working/model of machine parts or any new product. CO3. EVALUATE fault with diagnosis on the machines, machine tools and home appliances. CO4. IDENTIFY & DEMONSTRATE the various activities performed in an industry such as maintenance, design of components, material selection.

Department of Mechanical Engineering

Course Outcomes (CO)

Syllabus Pattern:-2019

Class:-TE Semester:- II

Sr. No	Subject	Course Outcomes (CO)
1	Artificial Intelligence & Machine Learning	CO1. DEMONSTRATE fundamentals of artificial intelligence and machine learning. CO2. APPLY feature extraction and selection techniques. CO3. APPLY machine learning algorithms for classification and regression problems. CO4. DEVISE AND DEVELOP a machine learning model using various steps. CO5. EXPLAIN concepts of reinforced and deep learning. CO6. SIMULATE machine learning model in mechanical engineering problems.
2	Computer Aided Engineering	CO1: DEFINE the use of CAE tools and DESCRIBE the significance of shape functions in finite element formulations. CO2: APPLY the various meshing techniques for better evaluation of approximate results. CO3: APPLY material properties and boundary condition to SOLVE 1-D and 2-D element stiffness matrices to obtain nodal or elemental solution. CO4: ANALYZE and APPLY various numerical methods for different types of analysis. CO5: EVALUATE and SOLVE non-linear and dynamic analysis problems by analyzing the results obtained from analytical and computational method. CO6: GENERATE the results in the form of contour plot by the USE of CAE tools.
3	Design of Transmission Systems	CO1. APPLY the principle of Spur & Helical gear design for industrial application and PREPARE a manufacturing drawing with the concepts of GD&T. CO2. EXPLAIN and DESIGN Bevel & Worm gear considering design parameters as per design standards. CO3. SELECT&DESIGN Rolling and Sliding Contact Bearings from manufacturer's catalogue for a typical application considering suitable design parameters. CO4. DEFINE and DESIGN various types of Clutches, Brakes, used in automobile. CO5. APPLY various concept to DESIGN Machine Tool Gear box, for different applications CO6. ELABORATE various modes of operation, degree of hybridization and allied terms associated with hybrid electric vehicles.

Sr. No	Subject	Course Outcomes (CO)
4	Composite Materials	CO1. DEFINE & COMPARE composites with traditional materials. CO2. IDENTIFY & ESTIMATE different parameters of the Polymer Matrix Composite CO3. CATEGORISE and APPLY Metal Matrix Process from possessions landscape. CO4. DETERMINE volume/weight fraction and strength of Composites. CO5. SELECT appropriate testing and inspection method for composite materials. CO6. SELECT composites materials for various applications.
5	Surface Engineering	CO1. DEFINE the basic's principle & mechanism of surface degradation. CO2. ANALYSE & SELECT correct corrosion prevention techniques for a different service condition. CO3. DEMONSTRATE the role of surface engineering of materials to modify/improve the surface properties. CO4. SELECT the suitable surface heat treatments to improve the surface properties. CO5. APPLY the surface modification technique to modify surface properties. CO6. ANALYSE & EVALUTE various surface coating defects using various testing/characterization method.
6	Measurement Laboratory	CO1. EVALUATE causes of errors in Vernier calipers, micrometers by performing experiments in standard metrological conditions, noting deviations at actual and by plotting cause and effect diagram, to reduce uncertainty in measurement. CO2. ANALYZE strain measurement parameters by taking modulus of elasticity in consideration to acknowledge its usage in failure detection and force variations. CO3. EXAMINE surface Textures, surface finish using equipment's like Talysurf and analyze surface finish requirements of metrological equipment's like gauges, jaws of vernier calipers, micrometers, magnifying glasses of height gauge and more, to optimize surface finish accuracy requirements and cost of measurement. CO4. MEASURE the dimensional accuracy using Comparator and limit gauges and appraise their usage in actual measurement or comparison with standards set to reduce measurement lead time. CO5. PERFORM Testing of Flow rate, speed and temperature measurements and their effect on performance in machines and mechanisms like hydraulic or pneumatic trainers, lathe machine etc. to increase repeatability and reproducibility. CO6. COMPILE the information of opportunities of entrepreneurships/business in various sectors of metrology like calibrations, testing, coordinate and laser metrology etc in an industry visit report.
7	Fluid Power & Control Laboratory	CO1. DEFINE working principle of components used in hydraulic and pneumatic systems. CO2. IDENTIFY & EXPLAIN various applications of hydraulic and pneumatic systems. CO3. SELECT an appropriate component required for hydraulic and pneumatic systems using manufactures' catalogues. CO4. SIMULATE & ANALYSE various hydraulic and pneumatic systems for industrial/mobile applications. CO5. DESIGN a hydraulic and pneumatic system for the industrial applications. CO6. DESIGN & DEMONESTRATE various IoT, PLC based controlling system using hydraulics and pneumatics.

Sr. No	Subject	Course Outcomes (CO)
8	Internship/Mini project	CO1. DEMONSTRATE professional competence through industry internship. CO2. APPLY knowledge gained through internships to complete academic activities in a professional manner. CO3. CHOOSE appropriate technology and tools to solve given problem. CO4. DEMONSTRATE abilities of a responsible professional and use ethical practices in day to day life. CO5. DEVELOP network and social circle, and DEVELOPING relationships with industry people. CO6. ANALYZE various career opportunities and DECIDE career goals.