Lokmanya Tilak Jankalyan Shikshan Sanstha's
PRIYADARSHINI BHAGWATI COLLEGE OF ENGINEERING
Harpur Nagar, Umred Road (Near Bada Tajbagh), Nagpur-24
(Approved by AICTE, New Delhi, Govt. of Maharashtra
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Department of Mechanical Engineering

Course Outcomes

B. Tech. Seventh Semester (CBCS)

Course Name: Elective – III: Computer Aided Design	
Code: BTME701T	
At the end of the course student will be able to :	
CO1	To design graphic system by selecting appropriate input output devices for any graphical applications. Also, develop a logic for various geometrical entities used in modeling software by giving appropriate mathematical treatment, put it into an algorithm and convert an algorithm into a computer program.
CO2	To develop a logic for various transformations on any 2D & 3D geometric objects giving appropriate mathematical treatment, put it into an algorithm and convert an algorithm intoa computer program
CO3	To Explain the different geometric modeling techniques, synthetic curves & methods ofassembly modeling. Also understand parametric representation of space curves and surfaces.
CO4	To understand numerical analysis technique called finite element method and apply it onone dimensional problem to determine various field variances.
CO5	Apply finite element method on truss and beams to determine various fields variancessuch as nodal displacement, reaction force, element stress etc.

Course Name: Elective – III: Computer Aided Design	
Code: BTME701P	
At the end of the course student will be able to :	
CO1	Write logic in the form of an algorithm to construct geometric entities and generate acomputer program for the same.
CO2	Develop finite element model of an engineering problem, apply loading conditions and boundary conditions, and solve it for analysis of its performance in simulated conditionusing Analysis software
CO3	Write computer program for 2D and 3D Transformation on any object.
CO4	Generate 2-D and 3-D geometric model of Engineering object using construction andmodifying commands using CAD software.
CO1	Write logic in the form of an algorithm to construct geometric entities and generate acomputer program for the same.

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Course Name: Elective – III: Advancements in Automobile Engineering	
Code: BTME701T	
At the end of the course student will be able to :	
CO1	Classify and identify the main components of automobile. Explain the construction and working of I. C.Engine, fuel supply systems, cooling systems and lubrication systems used in automobile.
CO2	Illustrate the functions of different types of automobile clutches and gear boxes and their applications.Explain the working of transmission system, its components such as propeller shaft, drives, differential and axles.
CO3	Describe the working of different steering systems, steering gear boxes and suspension systems. Identify the different components of steering, suspension and brake systems with their comparisons andapplications.
CO4	Demonstrate the importance of safety considerations in automobiles and outline the recent technologicaldevelopment in automotive safety. Describe the automobile maintenance, Trouble shooting, service procedures, Overhauling and Engine tune up.
CO5	Explain the working of Electric Car, Hybrid Electric vehicles and Fuel cell vehicles. Describe the importance of Alternative energy sources,Vehicle Pollution norms and different methods of pollutioncontrol

Course Name: Elective – III: Advancements in Automobile Engineering Lab	
Code: BTME701P	
At the end of the course student will be able to :	
CO1	Make students understand the basic concepts, requirement and working of various components of automobile.
CO2	Make students understand the assembling and disassembling procedure of Engine.clutch,brakes and the process of wheel alignment, balancing and battery testing.
CO3	Enable students to understand and identify components of transmission system, brakes, steering and suspension systems.
CO4	Aware students about automotive electronics and recent technologiesused in automobiles.
CO5	Aware students about the importance of safety considerations in automobiles, automobile maintenance and overhauling.

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Course Name: Energy Conversion-III	
Code: BTME702T	
At the end of the course student will be able to :	
CO1	Students will be able to analyze the gas turbine and jet propulsion system on varied operating conditions.
CO2	Students will be able to recognize the hydraulic pumps and valves and can able to logically design thehydraulic circuit.
CO3	Students will be able to recognize the air compressors and pneumatic control valves and can able to logicallydesign the pneumatic circuit.
CO4	Students will be able to understand solar power and future opportunities in solar power systems.
CO5	Students will learn the basics of various non-conventional energy sources and their applications.

Course Name: Open Elective – II: Waste management	
Code: BTME703T	
At the end of the course student will be able to :	
CO1	Understand different aspects of solid waste, its sources and effects on man and material etc.
CO2	Understand problems arriving in handling large amount of solid waste generated ,its collection andtransportation, processing and will able able to design safe collection and disposal methods
CO3	Design methods and equipments for solid waste management to reduce its impact on environment.
CO4	Evaluate and Analyze hazardous waste.
CO5	Design the appropriate disposal systems for hazardous wastes management.

Course Name: Design of TransmissionSystems	
Code:BTME704T	
At the end of the course student will be able to :	
CO1	Design journal and thrust bearings and selection of standard rolling contact bearings.
CO2	Design flexible transmission drives like belts, chains and rope
CO3	Design the positive transmission drives like gears as spur and Helical Gear.
CO4	Design the positive transmission drives like gears as worm and Bevel Gears
CO5	Design the energy storing components like Flywheels for various applications.

Department of Mechanical Engineering

Course Name: Project Phase I	
Code: BTME706P	
At the end of the course student will be able to :	
CO1	Convert their conceptual ideas into working projects .
CO2	Explore the possibility of publishing papers in journal.
CO3	Enhance their knowledge through an on-line collection of evidence, work and other information.
CO4	Ultimately promotes for inter-personal communication, punctuality, demonstration of appropriatewritten and oral communication skills with overall Work-Integrated-Learning.
CO5	Develop an understanding of social, cultural, professional, ethical, global and environmentalresponsibilities of the professional Engineer.

B. Tech. Eighth Semester (CBCS)

Course Name: Industrial Engineering	
Code: BTME801T	
At the end of the course student will be able to :	
CO1	Understanding the concept of productivity and method study.
CO2	Ability to measure work time and design ergonomic system.
CO3	To understand the concept of forecasting and breakeven analysis.
CO4	To analysis maintenance and reliability of equipments.
CO5	To understand various quality control tools and techniques.

Course Name: Elective – IV: Finite Element Method	
Code: BTME802T	
At the end of the course student will be able to :	
CO1	Understand the application of fundamentals of solid mechanics for evaluation of structural problems for evaluation of Point load, body force, traction and torsional loads.
CO2	Analyze the application and formulation of the basic finite elements for static and truss.
CO3	Analyze the beam subjected to transverse loading condition.
CO4	Apply the mathematical models for the solution of common engineering problems using finite element methods i.e., formulation of simple & complex problems using finite elements and to develop the ability to generate the governing finite element equations for systems regulated by partial differential equations.
CO5	Remember the significance and difference between the formulation and application ofthermal engineering problems using 1D & 2D finite elements.

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Course Name: Elective – IV: Finite Element Method	
Code: BTME802P	
At the end of the course student will be able to :	
CO1	Analyze the finite element problems using commercial software and understand thefundamental use of finite element preprocessor, solver and post-processor.
CO2	Demonstrate the ability to evaluate and interpret Finite Element Analysis results for thedesign and evaluation of 1D and 2D finite element formulations.
CO3	Understand the Finite Element Modeling aspects of the Frequency response problem forsolving engineering design problems.

Course Name: Elective – IV: Computer Integrated Manufacturing

Code: BTME802T	
At the end of the course student will be able to :	
CO1	To understand integration of business function with manufacturing planning and control.
CO2	To apply fundamentals of robotics or industrial applications.
CO3	To develop CNC programs for manufacturing applications.
CO4	To understand the process of Group technology for Flexible manufacturing system.
CO5	Get Acquainted With Automated Inspection (CAPP, CAQC, CMM) And Group Technology.

Course Name: Elective – IV: Computer Integrated Manufacturing	
Code: BTME802P	
At the end of the course student will be able to :	
CO1	Ability to Recognize automation and CIM ,CIM wheel, hardware, software, components of CIM
CO2	The student will have ability to apply fundamentals of G.T and FMS
CO3	The student will have ability to apply fundamentals of CAPP and CAQC
CO4	The student will have ability to develop CNC programs for manufacturing applications.
CO1	Ability to Recognize automation and CIM ,CIM wheel, hardware, software, components of CIM

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Course Name: Elective – IV: Refrigeration & Air-conditioning	
Code: BTME802T	
At the end of the course student will be able to :	
CO1	Understand the basics concepts of refrigeration, and Analyze refrigeration cycle and refrigerants.
CO2	Understand the concept of vapour absorption refrigeration, air refrigeration system andcryogenics.
CO3	Understand the concept of psychrometry and analyze heat load calculations.
CO4	Understand the concept of air- distribution and air handling units
CO5	Understand the design and selection of AC System. Control devices for air-conditioning systems.

Course Name: Elective – IV: Refrigeration & Air-conditioning	
Code: BTME802P	
At the end of the course student will be able to :	
CO1	Evaluate the performance of vapour compression refrigeration systems.
CO2	Analyse the components of refrigeration system and Absorption Refrigeration System.
CO3	Synthesize the concept of compound refrigeration system.
CO4	Understand the maintenance and analysis of refrigeration system.
CO5	Indentify the concept of Psychometry and comfort air conditioning.

Course Name: Elective – IV: CNC & Robotics	
Code: BTME802T	
At the end of the course student will be able to :	
CO1	Apply basic concepts of NC, CNC and DNC
CO2	Apply programme using manual part programming technique and APT for CNC lathe and machine.
CO3	Identify the basic fundamentals of industrial robots
CO4	Design kinematics of 2 DOF and 3 DOF of 2D manipulators
CO5	Select of appropriate robot for particular application

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Course Name: Elective – IV: CNC & Robotics	
Code: BTME802P	
At the end of the course student will be able to :	
CO1	Understand the programming of CNC and Robotic system.
CO2	understand advanced material handling system
CO3	Recognize automation, sensors and controller technology

Course Name: Elective – V: Heating Ventilation and Air-conditioning	
Code: BTME803T	
At the end of the course student will be able to :	
CO1	Explain the most important concepts about HVACR and operation of HVAC systems.
CO2	Estimate the heating and cooling load of a building.
CO3	Analyse and design different air and water distribution systems related to HVAC systems
CO4	Evaluate the performance of an HVAC system and the energy use of a building.
CO5	Estimate Building Energy and Modeling Methods

Course Name: Elective – V: Electric & Hybrid Vehicles	
Code: BTME803T	
At the end of the course student will be able to :	
CO1	Explain the basics of electric and hybrid electric vehicles, their architecture, technologies andvehicle dynamics fundamentals.
CO2	Analyze the use of different power electronics converters in hybrid electric vehicles.
CO3	Interpret the working of different electrical equipment in electric vehicles and hybrid vehicleconfigurations
CO4	Explain the use of different energy storage systems used for hybrid electric vehicles, their controltechniques, and select appropriate energy balancing technology
CO5	Understand the control and configurations of HEV charging stations

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Course Name: Elective – V: Design of Material Handling System	
Code: BTME803T	
At the end of the course student will be able to :	
CO1	Constructional and operational characteristics and design of trolley.
CO2	Constructional and operational characteristics and design of ropeway.
CO3	Constructional and operational characteristics and design of cranes.
CO4	Concept of AGV bulk solid conveying system.
CO5	Concept of Gravity ,powered and vibrating conveying system.

Course Name: Elective – V: Total Quality Management	
Code: BTME803T	
At the end of the course student will be able to :	
CO1	To develop understanding of Quality concepts.
CO2	practically implement the Total Quality Principles to employees and supplier partnership.
CO3	Understanding of Statistical Process Control and Process Capability for enhancement ofquality.
CO4	practically implement the tools for Total Quality Principles .
CO5	Develop Understanding of Quality System , Quality Audits, Leadership & quality council& overview of software used for TQM.

Course Name: Elective – VI: Industrial Internet of Things (IOT)	
Code: BTME804T	
At the end of the course student will be able to :	
CO1	To select sensors as per the industry based IoT applications including in-sensor processing, dataconditioning, mounting methods etc.
CO2	To design communication technologies on the basis of data transfer rate, power/energy requirementsand throughput requirements.
CO3	To implement the key enablers of industrial IoT systems such as AR, VR, cloud computing,application softwares in the field of industrial IoT.
CO4	To design predictive maintenance strategy for the critical processes of the industry by using IoTconcept to reduce the production loss of the industry.
CO5	To apply the IoT concepts in building solutions to industrial problems.

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Course Name: Elective – VI: Additive Manufacturing	
Code: BTME804T	
At the end of the course student will be able to :	
CO1	Explain the evolution of additive manufacturing (AM) and its importance in digital manufacturing. Also, create AM process chain for product.
CO2	Create and pre-process a model for additive manufacturing.
CO3	Explain liquid based and solid based additive manufacturing processes
CO4	Explain powder based additive manufacturing process
CO5	Post process the additive manufactured parts.

Course Name: Elective – VI: Energy Conservation & Management	
Code: BTME804T	
At the end of the course student will be able to :	
CO1	Identify and classify areas of energy conservation in industries.
CO2	Know the duties and responsibilities of an energy manager and energy auditor.
CO3	Analyze and modify existing working of the energy utilizing and generating machines.
CO4	Know how to use instruments in energy audit process.
CO5	Implement proper energy saving techniques in boiler, furnaces etc.

Course Name: Elective – VI: Green & Sustainable Manufacturing	
Code: BTME804T	
At the end of the course student will be able to :	
CO1	Get acquainted with the current global and Indian manufacturing scenario and challenges with respect to environment
CO2	Get acquainted with the green manufacturing concept and its need in global and Indian context
CO3	Get conversant with the various Key GM Operational Technologies, approaches, strategies, and Elements
CO4	Get acquainted with International and National Green regulations,. International Treaties supporting GM
CO5	Get conversant with the Conceptual GM model. Performance measurement tools & Green economics for GM, Analytical Tools for Sustainability Assessment, Life Cycle Assessment

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Course Name: Project Phase II	
Code: BTME805P	
At the end of the course student will be able to :	
CO1	Convert their conceptual ideas into working projects .
CO2	Explore the possibility of publishing papers in journal.
CO3	Enhance their knowledge through an on-line collection of evidence, work and otherinformation.
CO4	Ultimately promotes for inter-personal communication, punctuality, demonstration of appropriate written and oral communication skills with overall Work-Integrated-Learning.
CO5	Develop an understanding of social, cultural, professional, ethical, global, and environmental responsibilities of the professional Engineer.