

Kalinga University

Technology

Bachelor Of Technology (Mechanical Engineering)

PO

S. No.	Program Outcome (PO) Description
1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions
5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. -long learning in the broadest context of technological change.
6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life

PSO

S. No.	Program Specific Outcome (PSO) Description
1	Mechanical Engineering design: Achieve optimized product design utilizing the advanced knowledge in thermal engineering, material science, manufacturing, and production.
2	Mechanical Engineering analysis: Analyze, interpret and provide solutions to real life mechanical engineering and related problems.
3	Managerial excellence: Attain excellence in using managerial tools and techniques for effective and efficient manufacturing and in developing leadership skills with ethical and environmental practices.
4	Optimized system design: Design optimized systems and process to meet desired needs within social, economic, technical, environmental, and financial constraints.
5	Attain knowledge in modern manufacturing technologies

CO

S.No.	Course Code	Course Name	Course Outcome (CO's) - Description
1	BTME101	Programming for Problem Solving	CO1: To develop simple algorithms for arithmetic and logical problems
			CO2: To translate the algorithms to programs & execution (in C language)
			CO3: To implement conditional branching, iteration and recursion.
			CO4: To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
			CO5: To use arrays, pointers and structures to develop algorithms and programs
2	BTME102	EMERGING DOMAIN IN ELECTRONICS ENGINEERING	CO1: Understand the concept of PN Junction and devices
			CO2: Understand the concept of BJT, FET and MOFET
			CO3: Understand the concept of Operational amplifier
			CO4: Understand the concept of measurement instrument
			CO5: Understand the working principle of different type of sensor and their uses.
			CO6: Understand the concept of IoT system & Understand the component of IoT system
3	BTME103	ENGINEERING CHEMISTRY	CO1: Use of different analytical instruments.
			CO2: Measure molecular/system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water.
			CO3: Measure hardness of water.
			CO4: Estimate the rate constant of reaction
4	BTME104	ENGINEERING MATHEMATICS-I	CO1: Remember the concept of matrices and apply for solving linear simultaneous equations.
			CO2: Understand the concept of limit, continuity and differentiability and apply in the study of Rolle,s , Lagrange,s and Cauchy mean value theorem and Leibnitz theorems .
			CO3: Identify the application of partial differentiation and apply for evaluating maxima, minima, series and Jacobians.
			CO4: Illustrate the working methods of multiple integral and apply for finding area, volume, centre of mass and centre of gravity.
			CO5: Remember the concept of vector and apply for directional derivatives, tangent and normal planes. Also evaluate line, surface and volume integrals.
			CO1: Students will be enabled to understand the basic objective of the course by being acquainted with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking.
			CO2: Students would be able to create substantial base by the formation of strong professional vocabulary for its application at different platforms and through numerous modes as Comprehension, reading, writing and speaking etc.

5	BTME105	ENGLISH	CO3: Students will apply it at their work place for writing purposes such as Presentation/official drafting / administrative communication and use it for document/project/report/research paper writing. CO4: Students will be made to evaluate the correct & error-free writing by being well-versed in rules of English grammar & cultivate relevant technical style of communication & presentation at their work place & also for academic uses. CO5: Students will apply it for practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics. They will apply techniques for developing inter-personal communication skills and positive attitude leading to their professional competence.
6	BTME106	Emerging Technology for Engineers	CO1: To understand the basic concepts of IoT, followed by major components, its layer CO2: architecture and how IoT is impacting the Industry in the various forms along with major applications CO3: To make students aware about basic concepts of cloud computing, its benefits and different applications along with insights of major service providers. CO4: To understand the basic concepts of Blockchain and its underlying technologies with its implementation as cryptocurrencies. CO5: To understand the concept of Additive Manufacturing, its applications in various fields and the basic concepts of drones, their assembly and government regulations involved. CO6: To introduce students to the upcoming technology and to develop the required skills for practical applications.
7	BTME201	Fundamental of Mechanical Engineering and Mechatronics	CO1: Identification of key elements of mechatronics system and its representation in terms of block diagram CO2: Understanding the concept of signal processing and use of interfacing systems such as ADC, DAC, digital I/O CO3: Interfacing of Sensors, Actuators using appropriate DAQ micro-controller CO4: Time and Frequency domain analysis of system model (for control application) CO5: PID control implementation on real time systems
8	BTME202	Basic Electrical Engineering	CO1: Apply the concepts of KVL/KCL and network theorems in solving DC circuits. CO2: Analyze the steady state behavior of single phase and three phase AC electrical circuits. CO3: Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer. CO4: Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications. CO5: Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.

9	BTME203	Engineering Physics	CO1: To solve the classical and wave mechanics problems
			CO2: To develop the understanding of laws of thermodynamics and their application in various processes
			CO3: To formulate and solve the engineering problems on Electromagnetism & Electromagnetic Field Theory
			CO4: To aware of limits of classical physics & to apply the ideas in solving the problems in their parent streams
10	BTME204	Engineering Mathematics-II	CO1: Understand the concept of differentiation and apply for solving differential equations
			CO2: Remember the concept of definite integral and apply for evaluating surface areas and volumes
			CO3: Understand the concept of convergence of sequence and series. Also evaluate Fourier series
			CO4: Illustrate the working methods of complex functions and apply for finding analytic functions
			CO5: Apply the complex functions for finding Taylor's series, Laurent's series and evaluation of definite integrals
11	BTME205	Environmental Science	CO1: Multidisciplinary nature of environmental studies
			CO2: Scope and importance; Concept of sustainability and sustainable development.
12	BTME206	Artificial Intelligence for Engineers	CO1: Understand the evolution and various approaches of AI
			CO2: Understand data storage, processing, visualization, and its use in regression, clustering etc
			CO3: Understand natural language processing and chatbots
			CO4: Understand the concepts of neural networks.
			CO5: Understand the concepts of face, object, speech recognition and robots.
13	BTME301	Mathematics-III	CO1: The idea of partial differentiation and types of partial differential equations
			CO2: The idea of classification of second partial differential equations, wave , heat equation and transmission lines
			CO3: The basic ideas of statistics including measures of central tendency, correlation, regression and their properties.
			CO4: The idea s of probability and random variables and various discrete and continuous probability distributions and their properties.
			CO5: The statistical methods of studying data samples, hypothesis testing and statistical quality control, control charts and their properties.
14	BTME302	Technical Communication	CO1: Students will be enabled to understand the nature and objective of Technical Communication relevant for the work place as Engineers.
			CO2: Students will utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions.
			CO3: Students would imbibe inputs by presentation skills to enhance confidence in face of diverse audience.

			CO4: Technical communication skills will create a vast know-how of the application of the learning to promote their technical competence. CO5: It would enable them to evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics.
15	BTME303	THERMODYNAMICS	CO1: After completing this course, the students will be able to apply energy balance to systems and control volumes, in situations involving heat and work interactions. CO2: Students can evaluate changes in thermodynamic properties of substances. CO3: The students will be able to evaluate the performance of energy conversion devices. CO4: The students will be able to differentiate between high grade and low-grade energies
16	BTME304	ENGINEERING MECHANICS	CO1: Beer, F.P and Johnston Jr. E.R., "Vector Mechanics for Engineers (In SI Units): Statics and Dynamics", 8th Edition, Tata McGraw-Hill Publishing company, New Delhi (2004). CO2: Vela Murali, "Engineering Mechanics", Oxford University Press (2010). CO3: A Textbook of Engineering Mechanics, R.K. Bansal, Laxmi Publications. CO4: Engineering Mechanics, R.S. Khurmi, S.Chand Publishing CO5: Meriam J.L. and Kraige L.G., "Engineering Mechanics- Statics - Volume 1, Dynamics- Volume 2", Third Edition, John Wiley & Sons (1993). CO6: Rajasekaran S and Sankarasubramanian G., "Engineering Mechanics Statics and Dynamics", 3rd Edition, Vikas Publishing House Pvt. Ltd., (2005). CO7: Bhavikatti, S.S and Rajashekarappa, K.G., "Engineering Mechanics", New Age International (P) Limited Publishers, (1998). CO8: Engineering mechanics by Irving H. Shames, Prentice-Hall.
17	BTME305	Materials Engineering	CO1: Student will be able to identify crystal structures for various materials and understand the defects in such structures. CO2: Understand how to tailor material properties of ferrous and non-ferrous alloys. CO3: How to quantify mechanical integrity and failure in materials.
18	BTME306	Constitution of India, Law & Engineering	CO1: Identify and explore the basic features and modalities about Indian constitution. CO2: Differentiate and relate the functioning of Indian parliamentary system at the center and state level. CO3: Differentiate different aspects of Indian Legal System and its related bodies. CO4: Discover and apply different laws and regulations related to engineering practices. CO5: Correlate role of engineers with different organizations and governance models

19	BTME401	Measurement and Metrology	CO1: Understand the fundamentals of measurement: Students should be able to understand the basic principles and concepts of measurement, including accuracy, precision, calibration, and traceability.
			CO2: Demonstrate knowledge of measurement systems: Students should be able to describe and analyze different types of measurement systems, including mechanical, electrical, and optical systems, and understand their components and operation.
			CO3: Apply measurement techniques and instruments: Students should be able to select and use appropriate measurement techniques and instruments for different types of measurements, and understand their limitations and sources of error.
			CO4: Perform measurement uncertainty analysis: Students should be able to analyze and quantify measurement uncertainty, including sources of uncertainty and their propagation, and apply appropriate statistical methods to estimate and express measurement uncertainty.
			CO5: Understand metrological standards and traceability: Students should be able to understand the importance of metrological standards and traceability in ensuring the reliability and comparability of measurements, and apply appropriate calibration procedures.
20	BTME402	Universal Human Values	CO1: Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society.
			CO2: Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body.
			CO3: Understand the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society.
			CO4: Understand the harmony in nature and existence, and work out their mutually fulfilling participation in the nature.
			CO5: Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.
21	BTME403	APPLIED THERMODYNAMICS	CO1: After completing this course, the students will get a good understanding of various practical power cycles and heat pump cycles.
			CO2: They will be able to analyze energy conversion in various thermal devices such as combustors, air coolers, nozzles, diffusers, steam turbines and reciprocating compressors.
			CO3: They will be able to understand phenomena occurring in high speed compressible flows
22	BTME404	FLUID MECHANICS AND FLUID MACHINES	CO1: Upon completion of this course, students will be able to mathematically analyze simple flow situations.
			CO2: They will be able to evaluate the performance of pumps and turbines.

23	BTME405	MANUFACTURING PROCESSES	CO1: Upon completion of this course, students will be able to understand the different conventional and unconventional manufacturing methods employed for making different products.
24	BTME406	Indian Traditions, Cultural and Society	CO1: Ability to understand, connect up and explain basics of Indian Traditional knowledge from modern scientific perspective.
25	BTME501	Heat and Mass Transfer	CO1: Understand the fundamentals of heat and mass transfer.
			CO2: Apply the concept of steady and transient heat conduction
			CO3: Apply the concept of thermal behavior of fins.
			CO4: Apply the concept of forced and free convection.
			CO5: Apply the concept of radiation for black and non-black bodies.
			CO6: Conduct thermal analysis of heat exchangers.
26	BTME502	Strength of Material	CO1: Understand the concept of stress and strain under different conditions of loading
			CO2: Determine the principal stresses and strains in structural members
			CO3: Determine the stresses and strains in the members subjected to axial, bending and torsional loads
			CO4: Apply the concepts of stresses and strain in solving problems related to springs, column and pressure vessels
			CO5: Calculate the slope, deflection and buckling of loaded members
			CO6: Analyze the stresses developed in straight and curved beams of different cross sections
27	BTME503	Industrial Engineering	CO1: Understand the concept of production system, productivity, facility and process planning in various industries
			CO2: Apply the various forecasting and project management techniques
			CO3: Apply the concept of break-even analysis, inventory control and resource utilization using queuing theory
			CO4: Apply principles of work study and ergonomics for design of work systems
			CO5: Formulate mathematical models for optimal solution of industrial problems using linear programming approach
28	BTME504A	Computer Integrated Manufacturing	CO1: Understand the basic concepts of automation, computer numeric control machining
			CO2: Understand the algorithms of line generation, circle generation, transformation, curve, surface modeling and solid modeling
			CO3: Understand group technology, computer aided process planning, flexible manufacturing, Industry 4.0, robotics
			CO4: Understand information system and material handling in CIM environment, rapid prototyping
			CO5: Apply the algorithms of line & circle generation and geometric transformations

			CO6: Develop CNC program for simple operations
29	BTME504B	Mechatronics Systems	CO1: Identify key elements of mechatronics and its representation by block diagram
			CO2: Understand the concept of sensors and use of interfacing systems.
			CO3: Understand the concept and applications of different actuators
			CO4: Illustrate various applications of mechatronic systems.
			CO5: Develop PLC ladder programming and implementation in real life problem.
30	BTME504C	Finite Element Methods	CO1: Understand the basic concepts of FEM and its applications.
			CO2: Apply the procedure involved to solve a problem using Finite Element Methods
			CO3: Develop the element stiffness matrices using different approach.
			CO4: Analyze 1D and 2D problem using different methods
			CO5: Analyze the complex geometric problems through FEM software packages.
31	BTME504D	I C Engine Fuel and Lubricants	CO1: Explain the working principle, performance parameters and testing of IC Engine.
			CO2: Understand the combustion phenomena in SI and CI engines and factors influencing combustion chamber design.
			CO3: Understand the essential systems of IC engine and latest trends and developments in IC Engines.
			CO4: Understand the effect of engine emissions on environment and human health and methods of reducing it.
			CO5: Apply the concepts of thermodynamics to air standard cycle in IC Engines
32	BTME504E	Automobile Engines & Combustion	CO6: Analyze the effect of various operating parameters on IC engine performance.
			CO1: Explain the working principle, performance parameters and testing of IC Engine.
			CO2: Understand the phenomena of combustion and its application in SI and CI engines.
			CO3: Understand the essential systems of IC engine
			CO4: Understand the effect of engine emissions on environment and human health and methods of reducing it.
33	BTME505A	Advance Welding	CO5: Apply the concepts of thermodynamics to air standard cycle in IC Engines
			CO6: Analyze the effect of various operating parameters on IC engine performance.
			CO1: Understand the physics of arc welding process and various operating characteristics of welding power source.
			CO2: Analyse various welding processes and their applications.
			CO3: Apply the knowledge of welding for repair & maintenance, along with the weldability of different materials.
			CO4: Apply the concept of quality control and testing of weldments in industrial environment.
			CO5: Evaluate heat flow in welding and physical metallurgy of weldments.

34	BTME505B	Programming, Data Structures And Algorithms Using Python	CO1: Understand the numbers, math's function, strings, list, tuples, and dictionaries in pythons
			CO2: Apply conditional statement and functions in python
			CO3: Apply file handling techniques in python
			CO4: Analyze the graphical demonstration in python
			CO5: Apply techniques of Classes and Object Concept in Python
35	BTME505C	Mechanical Vibrations	CO1: Understand fundamentals of mechanical vibrations along with their classification
			CO2: Differentiate among single, two and multiple degree of freedom (DOF) systems.
			CO3: Analyze, predict and measure the performance of systems undergoing single, two and multiple DOF.
			CO4: Design systems with optimized vibration absorption capabilities.
			CO5: Apply the fundamentals to the real life problems like whirling of shaft
			CO6: Solve complicated mathematical models using Numerical methods and software applications.
36	BTME505D	Fuels and Combustion	CO1: Understand the properties of different types of fuel with their application.
			CO2: Classify different types of fuels.
			CO3: Understand the concept of combustion.
			CO4: Understand the fundamental concept of air pollution and its control
			CO5: Calculate various properties of the fuels
37	BTME505E	Automotive chassis and suspension	CO6: Analyze the flue gases.
			CO1: Understand different types of automotive chassis and frames used in automobiles.
			CO2: Understand transmission and drive line components used in automobile.
			CO3: Understand the axles and types of steering system in automobile
			CO4: Understand the constructional features of barking, suspension system, wheels and tyres in automobile application.
			CO5: Understand the recent advancements made in chassis components of automobile.
38	BTMEOE506A	Real Time Systems	CO6: Apply the concepts of braking and steering system to design the same for automobile application.
			CO1: Describe concepts of Real-Time systems and modeling.
			CO2: Recognize the characteristics of a real-time system in context with real time scheduling
			CO3: Classify various resource sharing mechanisms and their related protocols.
			CO4: Interpret the basics of real time communication by the knowledge of real time models and protocols.
			CO5: Apply the basics of RTOS in interpretation of real time systems.
			CO1: Understand the basics of embedded system and its structural units.
			CO2: Analyze the embedded system specification and develop software programs

39	BTMEOE506B	Embedded System	CO3: Evaluate the requirements of the programming embedded systems, related software architecture. CO4: Understand the RTOS based embedded system design. CO5: Understand all the applications of the embedded system and designing issues.
40	BTMEOE506C	Introduction to Mems	CO1: Understand the Basic concept of MEMS Fabrication Technologies, Piezoresistance Effect, Piezoelectricity, Piezoresistive Sensor. CO2: Explain Mechanics of Beam and Diaphragm Structures CO3: Understand the Basic concept of Air Damping and Basic Equations for Slide-film Air Damping, Couette-flow Model, Stokes-flow Model. CO4: Know the concept of Electrostatic Actuation. CO5: Understand the applications of MEMS in RF
41	BTMEOE506D	Object Oriented Programming	CO1: Apply Java in developing Object Oriented code CO2: Apply the knowledge of Multi-threading and Streams in developing Java applications CO3: Design and implement applications using GUI and Networking in Java. CO4: Apply the knowledge of Collections and Generics for building Java applications CO5: Design and develop Java based applications for solutions to real world problems.
42	BTMEOE506E	Numerical Techniques	CO1: Understand about the basics of Ordinary Differential Equations, Separable equations, Equations made separable by change of variables CO2: Retrieve the information content of Power series method. CO3: Apply problem specific Bessel's equation, Bessel Functions to engineering applications CO4: Understand about the basics of matrix, Eigen values and eigen vectors. CO5: Analysis of Stage wise Processes by the Calculus of Finite Differences, Countercurrent Liquid-Liquid Extraction.
43	BTMEOE506F	GIS & Remote Sensing	CO1: Understand about the principles of Remote Sensing and its advantages and limitations. CO2: Retrieve the information content of remotely sensed data. CO3: Apply problem specific remote sensing data for engineering applications CO4: Analyze spatial and attribute data for solving spatial problems. CO5: Create GIS and cartographic outputs for presentation
			CO1: The methodology of this course is exploration and thus universally adaptable. It involves a systematic and rational study of the human being vis-à-vis the rest of existence CO2: It is free from any dogma or set of do's and don'ts related to values.

44	BTMEOE506G	Understanding the Human Being Comprehensively – Human Aspirations and its Fulfillment	CO3: It is a process of self-investigation and self-exploration, and not of giving sermons. Whatever is found as truth or reality is stated as a proposal and the students are facilitated and encouraged to verify it in their own right, based on their Natural Acceptance and subsequent Experiential Validation CO4: This process of self-exploration takes the form of a dialogue between the teacher and the students to begin with, and then to continue within the student leading to continuous self-evolution. CO5: This self-exploration also enables them to critically evaluate their preconditioning and present beliefs.
45	BTME601	Refrigeration & Air Conditioning	CO1: Understand the basics concepts of Refrigeration & Air-Conditioning and its future prospects. CO2: Explain the construction and working of various components in Refrigeration & Air-Conditioning systems. CO3: Understand the different types of RAC systems with their respective applications. CO4: Apply the basic laws to the thermodynamic analysis of different processes involved in Refrigeration and Air-Conditioning. CO5: Apply the basic concepts to calculate the COP and other performance parameters for different RAC systems CO6: Analyze the effects of performance parameters on COP.
46	BTME602	Machine Design	CO1: Recall the basic concepts of Solid Mechanics to understand the subject. CO2: Classify various machine elements based on their functions and applications CO3: Apply the principles of solid mechanics to machine elements subjected to static and fluctuating loads. CO4: Analyze forces, bending moments, twisting moments and failure causes in various machine elements to be designed. CO5: Design the machine elements to meet the required specification.
47	BTME603	Theory of Machines	CO1: Understand the principles of kinematics and dynamics of machines. CO2: Calculate the velocity and acceleration for 4-bar and slider crank mechanism CO3: Develop cam profile for followers executing various types of motions CO4: Apply the concept of gear, gear train and flywheel for power transmission CO5: Apply dynamic force analysis for slider crank mechanism and balance rotating & reciprocating masses in machines. CO6: Apply the concepts of gyroscope, governors in fluctuation of load and brake & dynamometer in power transmission
			CO1: Understand the concept of destructive and Non-destructive testing methods

48	BTME604A	Nondestructive Testing	CO2: Explain the working principle and application of die penetrant test and magnetic particle inspection. CO3: Understand the working principle of eddy current inspection. CO4: Apply radiographic techniques for testing CO5: Apply the principle of Ultrasonic testing and applications in medical and engineering areas.
49	BTME604B	Artificial Intelligence	CO1: Understand concepts of Artificial Intelligence CO2: Solve problem by Search-I & Search-II CO3: Understand Knowledge representation CO4: Apply concepts of Learning methods CO5: Analyse Decision Networks CO6: Build planning graphs
50	BTME604C	Tribology	CO1: Identify and explain various friction and wear mechanisms. CO2: Select proper lubricants for different applications. CO3: Select suitable lubrications methods in different bearings CO4: Study the surfaces coating techniques for reduction of wear. CO5: Analyze the impact of friction in various kinematic pairs.
51	BTME604D	Gas Dynamics and Jet Propulsion	CO1: Understand the concept of compressible fluid flow and flow through variable area ducts. CO2: Understand the basic principle and types of jet and rocket propulsion. CO3: Apply the basic laws for the investigation of flow through ducts. CO4: Apply the basic laws for the thermodynamics analysis of jet and rocket propulsion CO5: Analyze the compressible flow through variable area ducts.
52	BTME604E	Automotive Electrical and Electronics	CO1: Understand the basic concepts of electrical systems used in automobile CO2: Understand the constructional features of charge storage devices and methods to test these devices for their healthy operation CO3: Understand the principles and characteristics of charging and starting system of automobile and study the various faults occurring in system. CO4: Understand the ignition and auxiliary system- types & constructional features used in automobile. CO5: Describe the principles and architecture of electronics systems and its components present in an automobile related to data transfer, instrumentation, control, and security systems. CO6: Understand latest trends developed in electrical and electronic systems of automobile and their advantages over conventional technologies.
			CO1: Explain the various subsystems of coal power plant and calculate the efficiency of Rankine cycle. CO2: Discuss the merits & demerits of combined power plants and calculate the efficiency of gas power cycles.

53	BTME605A	Power Plant Engineering	CO3: Differentiate pressurized water reactor & boiling water reactor and explain the various waste disposal system in nuclear power plant. CO4: Explain the working principle of various renewable energy power plants. CO5: Explain the different tariff procedures for energy consumption and differentiate fixed and operating costs involved in power production
54	BTME605B	Additive Manufacturing	CO1: Describe additive manufacturing and explain its advantages and disadvantages CO2: Explain the processes used in additive manufacturing for a range of materials and applications CO3: Understand the role of additive manufacturing in the design process and the implications for design CO4: Describe the effects of surface finish and microstructural properties on behaviour for components produced using additive manufacturing CO5: Display an awareness of residual stresses that may occur during additive manufacturing and their effects.
55	BTME605C	Vehicle Body Engineering and Safety	CO1: Classify the vehicles and define basic terms. CO2: Select appropriate body material. CO3: Calculate various aerodynamic forces and moments acting on vehicle CO4: Calculate load distribution in vehicle body. CO5: Explain the ergonomics, stability the vehicle. CO6: Identify the various safety aspects in a given vehicle. CO7: Identify various sources of noise and methods of noise separation
56	BTMEOE606A	Digital and Social Media Marketing	CO1: Understand what social media is, the various channels through which it operates, and its role in marketing strategy CO2: Use principles of consumer and social psychology to develop social media content and campaigns that engage consumers CO3: Draw on knowledge about word-of-mouth marketing to develop effective approaches for propagating ideas, messages, products, and behaviors across social networks CO4: Measure the impact of a social media campaign in terms of a specific marketing objective
57	BTMEOE606B	Idea to Business Model	CO1: Examine the challenges associated with defining the concepts of entrepreneur and entrepreneurship CO2: Discuss how the evolution of entrepreneurship thought has influenced how we view the concept of entrepreneurship today CO3: Discuss how the list of basic questions in entrepreneurship research can be expanded to include research inquiries that are important in today's world CO4: Discuss how the concepts of entrepreneurial uniqueness, entrepreneurial personality traits, and entrepreneurial cognitions can help society improve its support for entrepreneurship

			CO5: Apply the general venturing script to the study of entrepreneurship
58	BTMEOE606C	Machine Learning	CO1: Gain knowledge about basic concepts of Machine Learning
			CO2: Identify machine learning techniques suitable for a given problem
			CO3: Solve the problems using various machine learning techniques
			CO4: Apply Dimensionality reduction techniques
			CO5: Design application using machine learning techniques
59	BTMEOE606D	Renewable Energy Resources	CO1: Describe the environmental aspects of non-conventional energy resources. In Comparison with various conventional energy systems, their prospects and limitations.
			CO2: Know the need of renewable energy resources, historical and latest developments.
			CO3: Describe the use of solar energy and the various components used in the energy production with respect to applications like - heating, cooling, desalination, power generation, drying, cooking etc.
			CO4: Appreciate the need of Wind Energy and the various components used in energy generation and know the classifications.
			CO5: Understand the concept of Biomass energy resources and their classification, types of biogas Plants- applications
60	BTMEOE606E	Operations Research	CO6: Compare Solar, Wind and bio energy systems, their prospects, Advantages and limitations
			CO7: Acquire the knowledge of fuel cells, wave power, tidal power and geothermal principles and applications.
			CO1: Identify and develop operational research models from the verbal description of the real system
			CO2: Understand the mathematical tools that are needed to solve optimization problems.
61	BTMEOE606F	Value Relationship & Ethical Human Conduct –For A Happy & Harmonious Society	CO3: Use mathematical software to solve the proposed models
			CO4: Develop a report that describes the model and the solving technique, analyze the results and propose recommendations in language understandable to the decision-making processes in Management Engineering
			CO1: The methodology of this course is exploration and thus universally adaptable. It involves a systematic and rational study of the human being vis-a-vis the rest of existence.
			CO2: It is free from any dogma or set of do's and don'ts related to values.
61	BTMEOE606F	Value Relationship & Ethical Human Conduct –For A Happy & Harmonious Society	CO3: It is a process of self-investigation and self-exploration, and not of giving sermons. Whatever is found as truth or reality is stated as a proposal and the students are facilitated and encouraged to verify it in their own right, based on their Natural Acceptance and subsequent Experiential Validation
			CO4: This process of self-exploration takes the form of a dialogue between the teacher and the students to begin with, and then to continue within the student leading to continuous self-evolution

		CO5: This self-exploration also enables them to critically evaluate their preconditioning and present beliefs. Introduction to the course: Basic aspiration of a Human Being and program for its fulfillment, Need for family and relationship for a Human Being, Humanhuman relationship and role of behavior in its fulfillment, Human-rest of Nature
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