

Shree Santkrupa Institute of Engineering and Technology

Department of Mechanical Engineering

Academic Year: 2020-21

Semester: III

Sr. No.	Course Code	Course Name	Lecture	Tutorial	Practical	Credit
1	BTMEC303	Fluid Mechanics	3	1		4
2	BTMES302	Material Science and Metallurgy	3	1		4
3	BTMEC305	Thermodynamics	3	1		4
4	BTMEC304	Machine Drawing & CAD	2			2
5	BTBSC301	Engineering Mathematics -III	3	1		4
6	BTHM3401	Basic Human Rights	2			Audit
7	BTMEL307	Material Science and Metallurgy Lab			2	1
8	BTMEL308	Fluid Mechanics Lab			2	1
9	BTMEL309	Machine Drawing & CAD Lab			4	2
10	BTMEF310	Industrial Training-I				1

Semester: IV

Sr. No.	Course Code	Course Name	Lecture	Tutorial	Practical	Credit
1	BTMEC401	Manufacturing Process-I	2	1		3
2	BTMEC402	Theory of Machine-I	3	1		4
3	BTMEC403	Strength of Materials	3	1		4
4	BTMEC404	Numerical Methods in Mechanical Engineering	2	1		3
5	BTID405	Product Design Engineering	2			2
6	BTHM3402	Inter Personal Communication Skills and Self Development	3			3
7	BTMEL407	Manufacturing Process Lab-I			2	1
8	BTMEL408	Theory of Machine Lab-I			2	1
9	BTMEL409	Strength of Materials Lab			2	1
10	BTMEL410	Numerical Method Lab			2	1

Semester: V

Sr. No.	Course Code	Course Name	Lecture	Tutorial	Practical	Credit
1	BTMEC501	Heat Transfer	3	1		4
2	BTMEC503	Machine Design-I	2	1		3
3	BTMEC504	Theory of Machine-II	3	1		4
4	BTMEC502	Applied Thermodynamics-I	2	1		3
5	BTMEC505	Metrology & Quality Control	2	1		3
6	BTID506	Product Design Engineering-II	1		2	2
7	BTMEC506A	Automobile Engineering	3			Audit
8	BTMEL507	Heat Transfer Lab			2	1
9	BTMEL508	Applied Thermodynamics Lab			2	1
10	BTMEL509	Machine Design Practice-I			2	1
11	BTMEL510	Theory of Machine Lab-II			2	1
12	BTMEF511	Industrial Training-II				1

Semester: VI

Sr. No.	Course Code	Course Name	Lecture	Tutorial	Practical	Credit
1	BTMEC601	Manufacturing Process-II	2	1		3
2	BTMEC602	Machine Design-II	3	1		4
3	BTMEC603	Applied Thermodynamics-II	2	1		3
4	BTMEC604B	IC Engine	2	1		3
5	BTMEC605C	Renewable energy Sources	3			3
6	BTMEC606C	Human Resource management	3			Audit
7	BTMEL607	Metrology & Quality Control Lab			2	1
8	BTMEL608	Machine Design Practice-II			2	1
9	BTMEL609	IC Engine Lab			2	1
10	BTMEL610	Refrigeration & Air conditioning Lab			2	1
11	BTMEM611	Technical Project for community Service			4	2

Semester: VII

Sr. No.	Course Code	Course Name	Lecture	Tutorial	Practical	Credit
1	BTMEC701	Mechatronics	2	1		3
2	BTMEC702	CAD/CAM	2	1		3
3	BTMEC703	Manufacturing Process-III	2	1		3
4	BTMEC704B	Industrial Engineering and Management	2	1		3
5	BTMEC705D	Knowledge Management	3			Audit

6	BTMEL706	Manufacturing Process Lab -II			2	1
7	BTMEL707	Mechatronics Lab			2	1
8	BTMEL708	CAD/CAM Lab			2	1
9	BTMES709	Seminar			2	1
10	BTMEF710	Industrial Training-III				1
11	BTMEP711	Project Stage-I			6	3

Semester: VIII

Sr. No.	Course Code	Course Name	Lecture	Tutorial	Practical	Credit
1	BTMEC801A	Fundamental of Automotive system				3
2	BTMEC801D	Material Characterization				3
3	BTMEC801C	Explosion and safety				3
4	BTMEP803	Project Stage-II			30	15

Course Outcomes

Semster : III		
Course Name		Engineering Mathematics – III
Course Code		BTBSC301
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Explain the application of the Laplace Transform to find solutions of system of linear equations arising in many engineering problem	
CO 2	Demonstrate and apply the concept Laplace Transform	
CO 3	Interpret Computation of Fourier Transform and their applications to engineering problems	
CO 4	Identify Partial Differential Equations and Their Applications.	
CO 5	Evaluate Functions of Complex Variables.	
Semster : III		
Course Name		Material Science and Metallurgy
Course Code		BTMES302
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	identify the properties of metals with respect to crystal structure and grain size.	
CO 2	acquire the knowledge of solidification, phase & equilibrium diagram for different materials	

CO 3	describe the concept of heat treatment of steels & strengthening mechanisms.
CO 4	prepare samples of different materials for metallography
CO 5	explain the failure theory, fracture, fatigue properties and NDT testing for different materials.
Semster : III	
Course Name	Thermodynamics
Course Code	BTMEC305
Course Outcome No	Course Outcome Statement
	By the end of the course, students will be able to:
CO 1	Define the terms like system, boundary, properties, equilibrium, work, heat, ideal gas, entropy etc. used in thermodynamics
CO 2	Discuss different laws of thermodynamics and use these to simple thermal systems like balloon, piston-cylinder arrangement, compressor, pump, refrigerator, heat exchanger etc. to study energy balance.
CO 3	Interpret various types of processes like isothermal, adiabatic, etc. considering system with ideal gas and represent them on p-v and T-s planes.
CO 4	Describe phase diagram of pure substance (steam) on different thermodynamic planes like p-v, T-s, h-s, etc. & show various constant property lines on them.
Semster : III	
Course Name	Machine Drawing & CAD
Course Code	BTMEC304
Course Outcome No	Course Outcome Statement
	By the end of the course, students will be able to:
CO 1	Interpret the object with the help of given sectional and orthographic views.
CO 2	Construct the curve of intersection of two solids
CO 3	Outline the machine element using keys, cotter, knuckle, bolted and welded joint
CO 4	Organize details of any given part. i. e. valve, pump, machine tool part etc.
CO 5	Make use of tolerances and level of surface finish on production drawings
Semster : III	
Course Name	Fluid Mechanics
Course Code	BTMEC303
Course Outcome No	Course Outcome Statement
	By the end of the course, students will be able to:
CO 1	Define fluid and various properties of fluid.
CO 2	Determine hydrostatic forces on the plane and curved surfaces and explain stability of floating bodies.
CO 3	Explain several types of flow and determine the acceleration of fluid particles.
CO 4	Apply Bernoulli's equation and Navier-Stokes equation to simple problems in fluid mechanics.
CO 5	Explain and solve simple problems related to the use of dimensional analysis, boundary layer theory, and drag and lift force.
Semster : III	
Course Name	Basic Human Rights
Course Code	BTHM3401

Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Explain the history of human rights.	
CO 2	Recall responsibilities of others caste, religion, region and culture.	
CO 3	Remember the importance of groups and communities in the society.	
CO 4	Analyse the philosophical and cultural basis and historical perspectives of human	
	Aware of their responsibilities towards the nation.	
Semster : III		
Course Name		Material Science and Metallurgy Lab
Course Code		BTMEL307
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	identify the properties of metals with respect to crystal structure and grain size.	
CO 2	acquire the knowledge of solidification, phase & equilibrium diagram for different materials.	
CO 3	describe the concept of heat treatment of steels & strengthening mechanisms.	
CO 4	prepare samples of different materials for metallography.	
CO 5	explain the failure theory, fracture, fatigue properties and NDT testing for different materials.	
Semster : III		
Course Name		Fluid Mechanics Lab
Course Code		BTMEL308
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Utilize manometers for pressure measurement, Explain laminar and Turbulent flow.	
CO 2	Apply Bernoulli's theorem, determine the metacentric height of the floating body.	
CO 3	Determine pressure drop in flow through pipes, pipe fittings, and critical Reynolds number using Reynolds apparatus.	
CO 4	Interpret momentum equation using impact of jet apparatus.	
CO 5	Determine the viscosity of a given oil sample using a viscometer.	
Semster : III		
Course Name		Machine Drawing & CAD Lab
Course Code		BTMEL309
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Illustrate conventional representation of standard machine components, welds, materials etc.	
CO 2	Develop sectional view of a given machine component	
CO 3	Develop Assemble view from details of given component i.e. valve, pump, machine tool part, etc.	
CO 4	Build a assembled view by combining details of given machine component and	

CO 5	Make use of various Auto-Cad commands to draw orthographic projection and sectional view from pictorial view of given machine component.	
Semster : IV		
Course Name		Manufacturing Process-I
Course Code		BTMEC401
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	identify castings processes, working principles and applications and list various defects in metal casting.	
CO 2	acquire the knowledge the various metal forming processes, working principles and applications.	
CO 3	classify the basic joining processes and demonstrate principles of welding, brazing and soldering.	
CO 4	study center lathe and its operations including plain, taper turning, work holding devices and cutting tool.	
CO 5	describe milling machines operations, cutters ,indexing mechanism and their types and related tooling's.	
Semster : IV		
Course Name		Theory of Machine-I
Course Code		BTMEC402
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Define basic terminology of kinematics of mechanisms.	
CO 2	Classify planar mechanisms and calculate its degree of freedom.	
CO 3	Perform kinematic analysis of a given mechanism using ICR and RV methods.	
CO 4	Perform kinematic analysis of a given mechanism analytically using vector or complex algebra method.	
CO 5	Perform kinematic analysis of slider crank mechanism using Klein's construction and analytical approach.	
Semster : IV		
Course Name		Strength of Materials
Course Code		BTMEC403
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Define the fundamental terms such as axial load, eccentric load, stress, strain, E, μ , etc.	
CO 2	Compare the various stress types and determine the value of stress developed in the component in various load cases.	
CO 3	Distinguish between uniaxial and multiaxial stress situations and determine principal stresses, max. shear stress, their planes, and max. normal and shear stresses on a given plane.	
CO 4	Analyze given beam for calculations of SF and BM, Explain the use of C- Programming in the strength of materials.	
CO 5	Determine slope and deflection at a point on cantilever /simply supported beam using various methods.	
Semster : IV		
Course Name		BTMEC404
Course Code		Numerical Methods in Mechanical Engineering
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:

CO 1	Discuss the concept of error.
CO 2	Illustrate the concept of various Numerical Techniques.
CO 3	Interpret the given Engineering problem using the suitable Numerical Technique.
CO 4	Develop the computer programming based on the Numerical Techniques.
Course Name	Product design Engineering
Course Code	BTID405
Course Outcome No	Course Outcome Statement
	By the end of the course, students will be able to:
CO 1	Create simple mechanical designs.
CO 2	Create design documents for knowledge sharing.
CO 3	Illustrate own work to meet design requirements.
CO 4	Discuss various ways for effective work with colleagues.
Semster : IV	
Course Name	Inter Personal Communication Skills and Self Development
Course Code	BTHM3402
Course Outcome No	Course Outcome Statement
	By the end of the course, students will be able to:
CO 1	Demonstrates the skills to manage and express their emotions, thoughts, impulses and stress in effective ways.
CO 2	Apply various time management techniques in productive manner.
CO 3	Build performance, enhanced wellbeing, personal growth, or a sense of purpose
CO 4	Develop interpersonal communication skills to establish and enhance personal and work-based relationships.
CO 5	Design an effective Presentation and speak with greater control in front of others.
Semster : IV	
Course Name	Manufacturing Process-I Lab
Course Code	BTMEL407
Course Outcome No	Course Outcome Statement
	By the end of the course, students will be able to:
CO 1	identify castings processes, working principles and applications and list various defects in metal casting.
CO 2	acquire the knowledge the various metal forming processes, working principles and applications
CO 3	classify the basic joining processes and demonstrate principles of welding, brazing and soldering.
CO 4	study center lathe and its operations including plain, taper turning, work holding devices and cutting tool.
CO 5	describe milling machines operations, cutters ,indexing mechanism and their types and related tooling's.
Semster : IV	
Course Name	Theory of Machine Lab-I
Course Code	BTMEL408

Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Perform graphically kinematic analysis of any planar mechanism using ICR and RV methods.	
CO 2	Perform graphically kinematic analysis of slider crank mechanism using Klein's construction.	
CO 3	Demonstrate use of graphical differentiation method for kinematic analysis of slider crank mechanism or any other planar mechanism with a slider.	
CO 4	Sketch polar diagram for a Hooke's joint.	
Semster : IV		
Course Name		Strength of Materials Lab
Course Code		BTMEL409
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Analyze the tensile and compressive strength of a specimen for applying in apractical design based project work.	
CO 2	Determine the impact strength, fatigue strength to analyze the application of a specific material for a given design requirements for different loading conditions of structures or machines.	
CO 3	Analyze the given beam for calculations of SF and BM and Explain the use of C- Programming in the strength of materials.	
CO 4	Evaluate the capacity of a material to withstand torsional stresses for a safe and sustainable design of machine elements.	
CO5	Determine principal stresses, max. Shear stress, their planes and max. Normal and shear stresses on a given plane by analytical and Mohers circle method.	
Semster : IV		
Course Name		BTMEL410
Course Code		Numerical Method Lab
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Discuss the concept of error.	
CO 2	Illustrate the concept of various Numerical Techniques.	
CO 3	Interpret the given Engineering problem using the suitable Numerical Technique.	
CO 4	Develop the computer programming based on the Numerical Techniques.	
Semster : V		
Course Name		Heat Transfer
Course Code		BTMEC501
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Explain the laws of heat transfer and deduce the general heat conduction equation and to explain it for 1-D steady state heat transfer in regular shape bodies	
CO 2	Describe the critical radius of insulation, overall heat transfer coefficient, thermal conductivity and lumped heat transfer	
CO 3	Illustrate the boundary layer concept, dimensional analysis, forced and free convection under different conditions	
CO 4	Describe the Boiling heat transfer, mass transfer and evaluate the heat exchanger and examine the LMTD and NTU methods applied to engineering problems	
CO 5	Explain the thermal radiation black body, emissivity and reflectivity and evaluation of view factor and radiation shields	
Semster : V		

Course Name		Machine Design-I
Course Code		BTMC503
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Formulate the problem by identifying customer need and convert into design Specification	
CO 2	Understand component behavior subjected to loads and identify failure criteria	
CO 3	Design of machine component using theories of failures	
CO 4	Design of component for finite life and infinite life when subjected to fluctuating load	
CO 5	Design of components like shaft, key, coupling, screw and spring	
Semster : V		
Course Name		Theory of Machines-II
Course Code		BTMEC504
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	identify and select type of belt and rope drive for a particular application.	
CO 2	evaluate gear tooth geometry.	
CO 3	select appropriate gears & gear trains for a particular application.	
CO 4	suggest an appropriate governor and characterize flywheels as per engine requirement.	
CO 5	illustrate the gyroscopic effects in ships, aeroplanes, and road vehicles.	
Semster : V		
Course Name		Applied Thermodynamics-I
Course Code		BTMEC502
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Define the terms like calorific value of fuel, stoichiometric air-fuel ratio, excess air, equivalent evaporation, boiler efficiency, etc. Calculate minimum air required for combustion of fuel.	
CO 2	Discuss and compare gas power cycles and vapour power cycles like Otto, Diesel, dual, Joule and Rankine cycles and derive expressions for the performance ratio like thermal efficiency.	
CO 3	Classify various types of boiler, nozzle, steam turbine and condenser used in steam power plant. Classify various types of IC engines. Sketch the cut section of typical diesel engine and label its components.	
CO 4	Sketch p-v diagram for single-stage reciprocating air compressor, with and without clearance volume, and evaluate its performance. Differentiate between reciprocating and rotary air compressors.	
Semster : V		
Course Name		Metrology & Quality Control
Course Code		BTMEC505
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Identify methods and devices for measurement of length, angle, and gear and thread parameters, surface roughness and geometric features of parts	
CO 2	Choose limits for plug and ring gauges.	
CO 3	Explain methods of measurement in modern machineries	

CO 4	Select quality control techniques and its applications
CO 5	Plot quality control charts and suggest measures to improve product quality and reduce costs using Statistical tools.
Semster : V	
Course Name	Product Design Engineering-II
Course Code	BTID506
Course Outcome No	Course Outcome Statement
	By the end of the course, students will be able to:
CO 1	Create prototypes.
CO 2	Discuss various principles and technologies used for the preparation of prototype.
CO 3	Examine the prototypes.
CO 4	Summarize the product life cycle management.
CO 5	Use structural approach to concept generation, selection and testing.
Semster : V	
Course Name	Automobile Engineering
Course Code	BTMEC506A
Course Outcome No	Course Outcome Statement
	By the end of the course, students will be able to:
CO 1	Identify and Explain the working of the different parts of the automobile.
CO 2	Demonstrate various types of drive systems.
CO 3	Apply vehicle troubleshooting and maintenance procedures.
CO 4	Analyze the environmental implications of automobile emissions and suggest suitable regulatory modifications.
CO 5	Evaluate future developments in the automobile technology.
Semster : V	
Course Name	Heat Transfer Lab
Course Code	BTMEL507
Course Outcome No	Course Outcome Statement
	By the end of the course, students will be able to:
CO 1	Interpret the various heat transfer mode of heat transfer and its application and verify
CO 2	Utilize the experimental methodology
CO 3	Explain the concept of terms like least count, calibration of the instruments
Semster : V	
Course Name	Applied Thermodynamics Lab
Course Code	BTMEL508
Course Outcome No	Course Outcome Statement
	By the end of the course, students will be able to:
CO 1	Demonstrate test on Bomb calorimeter, nozzle, steam turbine, condenser, compressor etc. to study their performance.

CO 2	Sketch performance curves of these machines.
CO 3	Conclude the results of the experiments
CO 4	Sketch the layout and write the specifications of Industrial visit .
Semster : V	
Course Name	Machine Design Practice-I
Course Code	BTMEL509
Course Outcome No	Course Outcome Statement
	By the end of the course, students will be able to:
CO 1	Determine suitable material and size for structural component of machine/system.
CO 2	Apply design process to an open ended problems
CO 3	Apply iterative technique in design including making estimate of unknown values for first computation and checking or revisiting and re-computing.
CO 4	Design of components for given part/system i.e shaft, keys, coupling, links, screws, springs etc.
Semster : V	
Course Name	Theory of Machines-II Lab
Course Code	BTMEL510
Course Outcome No	Course Outcome Statement
	By the end of the course, students will be able to:
CO 1	identify and select type of belt and rope drive for a particular application.
CO 2	evaluate gear tooth geometry.
CO 3	select appropriate gears & gear trains for a particular application.
CO 4	suggest an appropriate governor and characterize flywheels as per engine requirement.
CO 5	illustrate the gyroscopic effects in ships, aeroplanes, and road vehicles.
Semster : VI	
Course Name	Manufacturing Process-II
Course Code	BTMEC601
Course Outcome No	Course Outcome Statement
	By the end of the course, students will be able to:
CO 1	illustrate the process of powder metallurgy and its applications.
CO 2	calculate the cutting forces in orthogonal and oblique cutting.
CO 3	evaluate the machinability of materials.
CO 4	study various abrasive processes.
CO 5	explain the different precision machining processes.
Semster : VI	
Course Name	Machine Design-II
Course Code	BTMEC602

Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Define function of bearing and classify bearings and	Understanding failure of bearing and their influence on its selection.
CO 2	Classify the friction clutches and brakes and decide the torque capacity and friction disk parameter.	
CO 3	Discuss & use materials and configuration for machine element like gears, belts and chain.	
CO 4	Design of elements like gears, belts and chain for given power ratingalso Design thickness of pressure vessel using thick and thin criteria.	
Semster : VI		
Course Name		Applied Thermodynamics-II
Course Code		BTMEC603
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Discuss the working principles of IC Engine.	
CO 2	Intrepret the combustion process occurred in IC engine.	
CO 3	Summarize with concepts of thermodynamics Cycles used in various power plants and gas turbines.	
CO 4	Make use of knowledge on working principle of Air conditioning,refrigeration,nozzles and turbines.	
Semster : VI		
Course Name		I C Engine
Course Code		BTMEC604B
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Explain various types of I.C. Engines and Cycles of operation.	
CO 2	Explain normal and abnormal combustion phenomena in SI and CI engines.	
CO 3	Explain the Various Engine Systems like Starting, fuel supply, engine cooling, ignition system, engine lubrication systems, and governing systems.	
CO 4	Evaluate performance analysis of IC Engine and justify the suitability of IC Engine for different applications, relate the effects of emission formation of IC	
CO 5	Illustrate the traditional and non-conventional fuels for internal combustion engines, as well as the layout and vehicle dynamics of electric and hybrid vehicles.	
Semster : VI		
Course Name		Renewable energy Sources
Course Code		BTMEC605C
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Distinguish between renewable and non-renewable energy	
CO 2	Explain working of solar collectors	
CO 3	Illustrate various applications of solar energy	
CO 4	Explain working of other renewable energies such as wind, biomass	
Semster : VI		
Course Name		Human Resources & Management

Course Code		BTMEC606C
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Describe trends in the labor force composition and how they impact human resource management practice.	
CO 2	Discuss how to strategically plan for the human resources needed to meet organizational goals and objectives.	
CO 3	Compare and contrast methods used for selection and placement of human resources.	
CO 4	Summarize the activities involved in evaluating and managing employee performance.	
CO 5	Identify and explain the issues involved in establishing compensation systems.	
Semster : VI		
Course Name		Metrology & Quality Control Lab
Course Code		BTMEL607
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Identify methods and devices for measurement of length, angle, and gear and thread parameters, surface roughness and geometric features of parts	
CO 2	Explain methods of measurement in modern machineries	
CO 3	Select quality control techniques and its applications	
CO 4	Plot quality control charts and suggest measures to improve the quality of product and reduce cost using Statistical tools.	
Semster : VI		
Course Name		Machine Design Practice-II
Course Code		BTMEL608
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Use design process to an open ended problems.	
CO 2	Choose suitable material and size for structural component of machine/system.	
CO 3	Apply iterative technique in design including making estimate of unknown values for first computation and checking or revisiting and re-computing.	
CO 4	Design of components for given part/system i.e shaft, keys, coupling, links, screws, springs etc.	
Semster : VI		
Course Name		I C Engine Lab
Course Code		BTMEL609
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Illustrate the practical operation of 2-stroke and 4-stroke I.C engines using valve timing diagram.	
CO 2	Demonstrate the performance of IC Engines, draw performance curves of these machines/systems.	
CO 3	Interpret the various engine systems like starting, fuel supply, engine cooling, ignition system etc.	
CO 4	Outline conclusions based on the results of the experiments, and Analyse the results obtained from the tests.	
CO 5	Estimate the constituents of combustion products for emission characteristics related to public safety.	

Semster : VI		
Course Name		Refrigeration & Air connditioning Lab
Course Code		BTMEL610
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Demonstrate test on Refrigeration and air conditioning test units to study their performance.	
CO 2	Sketch performance curves of these machines/systems.	
CO 3	Analyse the results obtained from the tests	
CO 4	Conclude the results of the experiments.	
Semster : VI		
Course Name		Technical Project for Community Services
Course Code		BTMEM611
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Find the problems of the community by visiting nearby places.	
CO 2	Select one of the problems for the study, state the exact title of the project and define scope of the problem & explain the motivation, objectives and scope of the project	
CO 3	Evaluate possible solutions of the problem.	
CO 4	Design, produce, test and analyze the performance of product/system/process.	
Semster : VII		
Course Name		Mechatronics
Course Code		BTMEC701
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Define sensors and transducers and their applications	
CO 2	Explain the signal conditioning and data representation techniques	
CO 3	Construct pneumatic and hydraulic circuits for a given applications	
CO4	Analyse application of microrocessor and micro controller	
CO5	Determine PI, PD and PID controllers for a given application	
semester:VII		
Course Name		CAD/CAM
Course Code		BTMEC702
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	List and describe the various input and output devices for a CAD work station.	
CO 2	Discuss the 2-D and 3-D transformation positions (Solve problems on 2-D and 3-D transformations) & Describe various CAD modeling techniques with their relative advantages and limitations.	

CO 3	Illustrate the basic Finite Element procedure & Explain various components of a typical FMS system, Robotics, and CIM.
CO 4	Define and differentiate the CAPP systems.
Semster : VII	
Course Name	Manufacturing Process-III
Course Code	BTMEC703
Course Outcome No	Course Outcome Statement
	By the end of the course, students will be able to:
CO 1	differentiate clearly between NC and CNC machines.
CO 2	prepare and execute a part program for producing a given product.
CO 3	select appropriate non-traditional machining process for a given application.
CO 4	compare different surface coating techniques.
CO 5	explain different rapid prototyping techniques & Illustrate the working principle of various micro-manufacturing processes.
Semster : VII	
Course Name	Industrial Engineering and Management
Course Code	BTMEC704B
Course Outcome No	Course Outcome Statement
	By the end of the course, students will be able to:
CO 1	Relate the fundamental knowledge and skill sets required in the Industrial Management and Engineering profession.
CO 2	Build ability to adopt a system approach to design, develop, implement and innovate integrated systems that include people, materials, information, equipment and energy.
CO 3	Interpret the interactions between engineering, businesses, technological and environmental spheres in the modern society.
CO 4	Decide their role as engineers and their impact to society at the national and global context.
Semster : VII	
Course Name	Knowledge Management
Course Code	BTMEC705D
Course Outcome No	Course Outcome Statement
	By the end of the course, students will be able to:
CO 1	Define KM, learning organizations, intellectual capital and related terminologies in clear terms and understand the role of knowledge management in organizations.
CO 2	Demonstrate concepts, and antecedents of management of knowledge and describe several successful knowledge management systems.
CO 3	Select tools and techniques of KM for the stages of creation, acquisition, transfer, and management of knowledge. also, evaluate tangible and intangible knowledge assets and understand current KM issues and initiatives.
CO 4	Evaluate the impact of technology including telecommunications, networks, and internet/intranet role in managing knowledge.
CO 5	Identify KM in specific environments: managerial and decision making communities, finance and economic sectors, legal information systems, health information systems.
Semster : VII	
Course Name	Manufacturing Process-II Lab
Course Code	BTMEL706
Course Outcome No	Course Outcome Statement
	By the end of the course, students will be able to:

CO 1	illustrate the process of powder metallurgy and its applications.
CO 2	determine the cutting forces in orthogonal and oblique cutting.
CO 3	evaluate the machinability of materials.
CO 4	study various abrasive processes.
CO 5	explain the different precision machining processes.
Semster : VII	
Course Name	Mechatronics Lab
Course Code	BTMEL707
Course Outcome No	Course Outcome Statement
	By the end of the course, students will be able to:
CO 1	Define the key elements of mechatronics system
CO 2	Explain the characteristics of temperature sensor
CO 3	Interpret the Characteristics of LVDT
CO 4	Create a logic gate using PLC.
CO5	Illustrate the working principle of Burdon tube pressure gauge
CO 6	Demonstrate the hydraulics system with its principle
Semster : VII	
Course Name	CAD/CAM Lab
Course Code	BTMEL708
Course Outcome No	Course Outcome Statement
	By the end of the course, students will be able to:
CO 1	Construct CAD part models, assembly model and drafting of machine elements using CAD software.
CO 2	Evaluate stresses in components subjected to simple structural loading using FE software
CO 3	Summarize and use NC programs for turning and milling
CO 4	discuss case study of industrial robots
Semster : VII	
Course Name	Seminar
Course Code	BTMES709
Course Outcome No	Course Outcome Statement
	By the end of the course, students will be able to:
CO 1	State the exact title of the seminar.
CO 2	Explain the motivation for selecting the seminar topic and its scope.
CO 3	Search pertinent literature and information on the topic.
CO 4	Critically review the literature and information collected.
CO 5	Demonstrate effective written and verbal communication.
Semster : VII	
Course Name	Project stage -I

Course Code		BTMEP711
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Evaluate the state of the field.	
CO 2	Analyse a problem and evaluate the potential of a solution or experiment.	
CO 3	Synthesise the progress and outputs of your project through professional engineering reports and presentations to a range of audiences including the community and industry.	
CO 4	Formulate research and technical outputs by applying appropriate techniques, resources and modern engineering tools to a complex open-ended engineering problem.	
Semster : VIII		
Course Name		Fundamental of Automotive System
Course Code		BTMEC801A
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Adapt fundamental knowledge of the various systems of an automobile.	
CO 2	Relate the functions of each system with its design and layout.	
CO 3	Demonstrate the various systems using simple schematics.	
CO 4	Apply concepts and to determine mathematical models of various automotive systems.	
Semster : VIII		
Course Name		Material Characterization
Course Code		BTMEC801D
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Explain the concept of each material characterization technique	
CO 2	decide on the characterization technique that can give the specified properties of materials	
CO 3	identify an unknown material, based on given characterization information	
CO 4	design the characterization scheme to find out the requested properties of materials.	
Semster : VIII		
Course Name		Explosion and Safety
Course Code		BTMEC801C
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Explain the physical principles governing the various kinds of explosions.	
CO 2	Explain simple modeling of blast waves derived from energy release in explosions.	
CO 3	Examine the mechanisms of energy release in gaseous, liquid, dust and solid explosives.	
CO 4	Interpret the physical explosions and explosions of pressure vessels.	
Semster : VIII		
Course Name		Project Stage-II

Course Code		BTMEP803
Course Outcome No	Course Outcome Statement	By the end of the course, students will be able to:
CO 1	Discuss the aim and objectives for this stage of the project.	
CO 2	Construct and demonstrate the tests on the system/product .	
CO 3	Analyze the results of the tests.	
CO 4	Discuss the findings, draw conclusions, and modify the system/product, if necessary.	