



Pradnya Niketan Education Society, Pune's
**N. K. ORCHID COLLEGE OF ENGINEERING
 & TECHNOLOGY, SOLAPUR**

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 E-mail : office@orchidengg.ac.in, Website : www.orchidengg.ac.in, Phone No. 9423084363
 Post Box No. 154, Gut No. 16, Solapur-Tuljapur Road, Tale Hipparaga, Solapur- 413 002.

Department of Mechanical Engineering

Course outcomes of all courses (A.Y. 2022-23)		
SE-I (DBATU) Theory Courses		
Course no.	Course code	Course name
C301	BTBSC301	Engineering Mathematics - II
COs	After the successful completion of this course student will be able to:	
1	Use different properties of Laplace transforms and find the laplace transform of given function	
2	Apply theory of Laplace transforms to solve Linear differential equations and simultaneous linear differential equations	
3	Interprete given function into Fourier integral and also calculate Fourier transformation of given function	
4	Formulate Partial differential equations by eliminating constants and functions. Use the knowledge of P.D.E to solve heat equation	
5	Identify analytic functions and use them for different purposes, also solve the integrals involving complex functions	
Course no.	Course code	Course name
C302	BTBSC302	Fluid Mechanics
COs	After the successful completion of this course student will be able to:	
1	Define fluid, define and calculate various properties of fluid	
2	Calculate hydrostatic forces on the plane and curved surfaces and explain stability of floating bodies	
3	Explain various types of flow. Calculate acceleration of fluid particles	
4	Apply Bernouli's equation for simple problems in fluid mechanics.	
5	Explain laminar and turbulent flows on flat plates and through pipes	
6	Explain and use dimensional analysis to simple problems in fluid mechanics	



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Course no.	Course code	Course name
C303	BTBSC303	Thermodynamics
COs	After the successful completion of this course student will be able to:	
1	Define the terms like system, boundary, properties, equilibrium, work, heat, ideal gas, entropy etc. used in thermodynamics	
2	Studied different laws of thermodynamics and apply these to simple thermal systems to study energy balance	
3	Studied Entropy, application and disorder.	
4	Studied various types of processes like isothermal, adiabatic, etc. considering system with ideal gas and represent them on p-v and T-s planes.	
5	Represent 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.	
Course no.	Course code	Course name
C304	BTBSC304	Materials Science and Metallurgy
COs	After the successful completion of this course student will be able to:	
1	Study various crystal structures of materials	
2	Understand mechanical properties of materials and calculations of same using appropriate equations	
3	Evaluate phase diagrams of various materials	
4	Suggest appropriate heat treatment process for a given application	
5	Prepare samples of different materials for metallography	
6	Recommend appropriate NDT technique for a given application	
SE-I (DBATU) Laboratory Courses		
Course no.	Course code	Course name
C305	BTMCL305	Machine Drawing and CAD Lab
COs	After the successful completion of this course student will be able to:	
1	Interpret the object with the help of given sectional and orthographic views.	
2	Construct the curve of intersection of two solids	



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3	Draw machine element using keys, cotter, knuckle, bolted and welded joint		
4	Assemble details of any given part. i. e. valve, pump , machine tool part etc.		
5	Represent tolerances and level of surface finish on production drawings		
6	Understand various creating and editing commands in Auto Cad		
Course no.		Course code	Course name
C306-1		BTMCL306-1	Mechanical Engineering Lab – I (Fluid Mechanics)
COs	After the successful completion of this course student will be able to:		
1	Demonstrate the concept of stability of floating bodies.		
2	Demonstrate the laminar and turbulent flow.		
3	Evaluate the pressure, velocity and datum heads and demonstrate the concept of Bournoulli's equation		
4	Evaluate the Reynold's number for flow through pipe and distinguish the laminar, transient and turbulent flow.		
Course no.		Course code	Course name
C306-2		BTMCL306-2	Mechanical Engineering Lab – I (Material Science and Metallurgy)
COs	After the successful completion of this course student will be able to:		
1	Specimen Preparation for Microscopy		
2	Spark Test		
3	Study and drawing of microstructures of plain carbon steels of varying carbon percentage		
4	Study and drawing of microstructures of heat treated steels		
5	Study and drawing of microstructures of cast irons		
Course no.		Course code	Course name



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C209		BTES209P	IT – 1 Evaluation
COs	After the successful completion of this course student will be able to:		
1	To make the students aware of industrial culture and organizational setup		
2	To create awareness about technical report writing among the student.		
SE-II (DBATU) Theory Courses			
Course no.		Course code	Course name
C401		BTMC401	Manufacturing Processes – I
COs	After the successful completion of this course student will be able to:		
1	Identify castings processes, working principles and applications and list various defects in metal casting		
2	Understand the various metal forming processes, working principles and applications		
3	Classify the basic joining processes and demonstrate principles of welding, brazing and soldering.		
4	Study center lathe and its operations including plain, taper turning, work holding devices and cutting tool.		
5	Understand milling machines and operations, cutters and indexing for gear cutting		
6	Study shaping, planing and drilling, their types and related tooling's		
Course no.		Course code	Course name
C402		BTMC402	Theory of Machines-I
COs	After the successful completion of this course student will be able to:		
1	Differentiate mechanism and machine and calculate degree of freedom of planar mechanism		
2	Perform kinematic analysis of a given mechanism using various methods (ICR, RVM, Analytical & Kleins).		
3	Determine the frictional torque in screw threads and pivot bearing		



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4	Determine the frictional torque in clutch, brakes and dynamometer.		
5	Draw cam profile for different followers and their motions.		
6	Determine and locate balancing mass in rotating machine element		
Course no.		Course code	Course name
C403		BTMC403	Basic Human Rights
COs	After the successful completion of this course student will be able to:		
1	Understand the history of human rights		
2	Learn to respect others caste, religion, region and culture		
3	Be aware of their rights as Indian citizen.		
4	Understand the importance of groups and communities in the society		
5	Realize the philosophical and cultural basis and historical perspectives of human rights		
6	Make them aware of their responsibilities towards the nation.		
Course no.		Course code	Course name
C404		BTMC404	Strength of Materials
COs	After the successful completion of this course student will be able to:		
1	State the basic definitions of fundamental terms such as axial load, eccentric load, stress, strain, E, μ , etc.		
2	Recognize the stress state (tension, compression, bending, shear, etc.) and calculate the value of stress developed in the component in axial/eccentric static and impact load cases.		
3	Distinguish between uniaxial and multiaxial stress situation and calculate principal stresses, max. Shear stress, their planes and max. Normal and shear stresses on a given plane.		
4	Analyze given beam for calculations of SF and BM		



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5	Calculate slope and deflection at a point on cantilever /simply supported beam using double integration, Macaulay's , Area-moment and superposition methods		
Course no.		Course code	Course name
C405A		BTMPE405A	Elective-I, Numerical Methods in Engineering
COs	After the successful completion of this course student will be able to:		
1	Describe the concept of error		
2	Illustrate the concept of various Numerical Techniques		
3	Evaluate the given Engineering problem using the suitable Numerical Technique		
4	Develop the computer programming based on the Numerical Techniques		
Course no.		Course code	Course name
C405C		BTMPE405C	Elective-I, Fluid Machinery
COs	After the successful completion of this course student will be able to:		
1	Understand and apply momentum equation		
2	Understand and explain Hydrodynamic Machines		
3	Explain difference between impulse and reaction turbines		
4	Find efficiencies, draw velocity triangles		
5	Explain governing mechanisms for hydraulic turbines		
6	Explain working of various types of pumps, draw velocity diagrams, do simple calculations		
SE-II (DBATU) Laboratory Courses			
Course no.		Course code	Course name



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C405A-1	BTMPE405A-1	Mechanical Engineering Lab-II (Manufacturing Processes Lab I)
COs	After the successful completion of this course student will be able to:	
1	Making a job with a process plan involving plain, step and taper turning as well thread cutting as operations on a Centre lathe.	
2	Preparation of process planning sheet for a job including operations such as milling, drilling and shaping.	
3	Making a spur gear using universal dividing head on milling machine	
4	Making a simple component by sand casting using a split pattern.	
5	Cutting of a steel plate using oxyacetylene flame cutting /plasma cutting	
6	Making a butt joint on two stainless steel plates using TIG/MIG Welding.	
Course no.	Course code	Course name
C405A-2	BTMPE405A-2	Mechanical Engineering Lab-II (Theory of Machines Lab - I)
COs	After the successful completion of this course student will be able to:	
1	The student will be able to estimate the velocity and acceleration of a given mechanism and draw its velocity and acceleration diagram using relative velocity method.	
2	The student will be able to estimate the velocity and acceleration of a given mechanism and draw its velocity and acceleration diagram using Instantaneous center method.	
3	The student will be able to estimate the velocity and acceleration of a given mechanism and draw its velocity and acceleration diagram using Klein's Construction methods.	
4	The student will be able to estimate the velocity and acceleration of a Hooks joint using the experimental setup.	
5	The student will be able to estimate the displacement of slider crank mechanism using experimental setup and draw its velocity and acceleration diagram using relative velocity methods.	



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6	The student will be able to develop a computer program for a given mechanism to estimate the velocity and acceleration		
Course no.		Course code	Course name
C405A-3		BTMPE405A-3	Mechanical Engineering Lab-II (Strength of Materials Lab)
COs	After the successful completion of this course student will be able to:		
1	To provide students with practical knowledge of various materials testing techniques and equipment, and how to operate them safely.		
2	To enable students to understand the behavior of materials under different loading conditions and how to determine the mechanical properties of materials, such as tensile strength, yield strength, modulus of elasticity, and hardness.		
3	To provide students with hands-on experience in working with a variety of materials, including metals, plastics, and composites, and to help them appreciate the strengths and limitations of different materials in engineering applications.		
4	To encourage students to think critically and creatively when developing experimental designs and interpreting results, and to communicate their findings effectively in oral and written formats.		
Course no.	Course code	Course name	
C218	BTMPE405C	Field Training /Industrial Training	
COs	After the successful completion of this course student will be able to:		
1	To make the students aware of industrial culture and organizational setup		
2	To create awareness about technical report writing among the student.		
TE-I (DBATU) Theory Courses			
Course no.		Course code	Course name
C501		BTMEC501	Heat Transfer
COs	After the successful completion of this course student will be able to:		



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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		
2	Describe the critical radius of insulation, overall heat transfer coefficient, thermalconductivity and lumped heat transfer		
3	Interpret the extended surfaces		
4	Illustrate the boundary layer concept, dimensional analysis, forced and free convection under different conditions		
5	Describe the Boiling heat transfer, Evaluate the heat exchanger and examine the LMTD and NTU methods applied to engineering problems		
6	Explain the thermal radiation black body, emissivity and reflectivity and evaluation of view factor and radiation shields		
Course no.		Course code	Course name
C502		BTMEC502	Machine design - I
COs	After the successful completion of this course student will be able to:		
1	Formulate the problem by identifying customer need and convert into design specification		
2	Understand component behavior subjected to loads and identify failure criteria		
3	Analyze the stresses and strain induced in the component		
4	Design of machine component using theories of failures		
5	Design of component for finite life and infinite life when subjected to fluctuating load		
6	Design of components like shaft, key, coupling, screw and spring		
Course no.		Course code	Course name
C503		BTMEC503	Theory of Machine - II
COs	After the successful completion of this course student will be able to:		
1	Identify and select type of belt and rope drive for a particular application		



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2	Evaluate gear tooth geometry and select appropriate gears, gear trains		
3	Define governor and select/suggest an appropriate governor		
4	Characterize flywheels as per engine requirement		
5	Understand gyroscopic effects in ships, aeroplanes, and road vehicles.		
6	Understand free and forced vibrations of single degree freedom systems		
Course no.		Course code	Course name
C504		BTMEC504A	Refrigeration and Air conditioning
COs	After the successful completion of this course student will be able to:		
1	Explain basic refrigeration processes & calculate performance of refrigeration systems		
2	Select proper refrigerant for specific application		
3	Define and calculate Psychometric properties of air using chart and tables		
4	Decide and analyze Psychometric process for obtaining required air conditions		
5	Explain basic refrigeration cycles		
Course no.		Course code	Course name
C505		BTMEC505B	Renewable Energy Sources
COs	After the successful completion of this course student will be able to:		
1	Explain the difference between renewable and non-renewable energy		
2	Describe working of solar collectors		
3	Explain various applications of solar energy		



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4	Describe working of other renewable energies such as wind, biomass , nuclear		
Course no.		Course code	Course name
C506		BTMEC506	Applied Thermodynamics
COs	After the successful completion of this course student will be able to:		
1	Knowledge:Identify:-- Describe methodologies available for refrigeration, air conditioning and power plant. understand these from fundamental thermodynamics point of view		
2	Comprehension:Explain:-- Explain the working principles, performance evaluation and design methodologies of different components in refrigeration and air conditioning systems and also power plant engineering		
3	Analysis:Examine:-- Explore refrigeration and air conditioning processes in thermodynamic planes to understand the basic cycle of the systems and discuss about recent developments for performance enhancement.		
4	Evaluation:Assess:-- Assess the overall performances of power plant (Refrigeration or Thermal) system to evaluate the measures for increase in efficiency by cycle modifications or component design changes.		
Course no.		Course code	Course name
C507		BTMEC506A	Automobile Engineering
COs	After the successful completion of this course student will be able to:		
1	Identify the different parts of the automobile.		
2	Explain the working of various parts like engine, transmission, clutch, brakes etc.,		
3	Demonstrate various types of drive systems; front and rear wheels, two and four wheel		
4	Apply vehicle troubleshooting and maintenance procedures.		
5	Analyze the environmental implications of automobile emissions. And suggest suitable regulatory modifications		
TE-I (DBATU) Laboratory Courses			



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Course no.	Course code	Course name
C507	BTMEL507	Heat transfer lab
COs	After the successful completion of this course student will be able to:	
1	Perform steady state conduction experiments to estimate thermal conductivity of different materials for plane wall.	
2	Determination of thermal conductivity of composite wall or lagged pipe.	
3	Perform radiation experiments:determine surface emissivity of a test plane and stefan-Boltzmann's constant and compare with theritical values	
4	Perform the experiment to determine thermal conductivity with variation of temperature	
5	Determination of critical heat flux.	
Course no.	Course code	Course name
C508	BTMEL508	Applied Thermodynamics Lab
COs	After the successful completion of this course student will be able to:	
1	Conduct test on Bomb calorimeter, nozzle, steam turbine, condenser, compressor etc. to study their performance.	
2	Draw performance curves of these machines.	
3	Analyze the results obtained from the tests.	
4	Draw conclusions based on the results of the experiments	
5	Based on your visit to Industry, sketch its layout and write specifications	
Course no.	Course code	Course name
C509	BTMEL509	Machine design Practice - I



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COs	After the successful completion of this course student will be able to:	
1	Apply design process to an open ended problem	
2	Determine suitable material and size for structural component of machine/system	
3	Apply iterative technique in design including making estimate of unknown values for first computation and checking or revisiting and re-computing	
4	Choose logically and defend selection of design factors	
5	Design of components for given part/system i.e. shaft, keys, coupling, links, screws,	
6	Work effectively as a part of design group/team	
Course no.		Course code
C510		BTMEL510
		Course name
		Theory of Machine - II
COs	After the successful completion of this course student will be able to:	
1	Identify and select type of belt and rope drive for a particular application	
2	Evaluate gear tooth geometry and select appropriate gears, gear trains	
3	Define governor and select/suggest an appropriate governor	
4	Characterize flywheels as per engine requirement	
5	Understand gyroscopic effects in ships, aero planes, and road vehicles	
6	Understand free and forced vibrations of single degree freedom systems	
Course no.		Course code
C511		BTMEL511
		Course name
		Field Training /Internship/Industrial Training II



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TE-II (DBATU) Theory Courses		
Course no.	Course code	Course name
C601	BTMEC601	Manufacturing Processes- II
COs	After the successful completion of this course student will be able to:	
1	Understand the process of powder metallurgy and its applications	
2	Calculate the cutting forces in orthogonal and oblique cutting	
3	Evaluate the machinability of materials	
4	Understand the abrasive processes	
5	Explain the different precision machining processes	
6	Design jigs and fixtures for given application	
Course no.	Course code	Course name
C602	BTMEC602	Machine Design-II
COs	After the successful completion of this course student will be able to:	
1	Define function of bearing and classify bearings.	
2	Understanding failure of bearing and their influence on its selection.	
3	Classify the friction clutches and brakes and decide the torque capacity and friction disk parameter	
4	Select materials and configuration for machine element like gears, belts and chain	
5	Design of elements like gears, belts and chain for given power rating	
6	Design thickness of pressure vessel using thick and thin criteria	



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Course no.	Course code	Course name
C603	BTMEC603	IC Engines
COs	After the successful completion of this course student will be able to:	
1	Analyze the effect of various operating variables on engine performance	
2	Identify fuel metering and fuel supply systems for different types of engines	
3	Identify fuel metering and fuel supply systems for different types of engines	
4	Evaluate performance Analysis of IC Engine and Justify the suitability of IC Engine for different application	
5	Understand the conventional and non-conventional fuels for IC engines and effects of emission formation of IC engines, its effects and the legislation standards	
Course no.	Course code	Course name
C604	BTMEC604	Robotics
COs	After the successful completion of this course student will be able to:	
1	Understand various types of I.C. Engines and Cycles of operation	
2	Calculate the word to joint and joint to word coordinates using forward and reverse transformations	
3	Calculate the gripper forces, drive sizes, etc.	
4	Develop simple robot program for tasks such as pick and place, arc welding, etc. using some robotic language such as VAL-II, AL, AML, RAIL, RPL, VAL	
5	Evaluate the application of robots in applications such as Material Handling, process operations and Assembly and inspection	
6	Discuss the implementation issues and social aspects of robotics	
Course no.	Course code	Course name
C605	BTMEC605	Quantitative Techniques in Project Management
COs	After the successful completion of this course student will be able to:	
1	Define and formulate research models to solve real life problems for allocating limited resources by linear programming.	
2	Apply transportation and assignment models to real life situations	



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3	Apply queuing theory for performance evaluation of engineering and management systems.		
4	Apply the mathematical tool for decision making regarding replacement of items in real life.		
5	Determine the EOQ, ROP and safety stock for different inventory models		
6	Construct a project network and apply CPM and PERT method.		
Course no.		Course code	Course name
C606		BTMEC606	Finite Element Method
COs	After the successful completion of this course student will be able to:		
1	Understand the basic principle of Finite element methods and its applications		
2	Use matrix algebra and mathematical techniques in FEA		
3	Identify mathematical model for solution of common engineering problem		
4	Solve structural , thermal problems using FEA		
5	Derive the element stiffness matrix using different methods by applying basic mechanics laws		
6	Understand formulation for two and three dimensional problems		
TE-II (DBATU) Laboratory Courses			
Course no.		Course code	Course name
C607		BTMEL607	Metrology and Quality Control Lab
COs	After the successful completion of this course student will be able to:		
1	Measure linear, angular circular features, dimensional and geometric features		
2	Measure surface roughness of components		
3	Calibration of metrological equipment		



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Course no.	Course code	Course name
C608	BTMEL608	Machine Design Practice-II
COs	After the successful completion of this course student will be able to:	
1	Apply design process to an open ended problems	
2	Determine suitable material and size for structural component of machine/system	
3	Apply iterative technique in design including making estimate of unknown values for first computation and checking or revisiting and re-computing	
4	Choose logically and defend selection of design factors	
5	Design of components for given part/system i.e shaft, keys, coupling, links, screws, springs etc.	
6	Work effectively as a part of design group/team	
Course no.	Course code	Course name
C609	BTMEL609	IC Engine Lab
COs	After the successful completion of this course student will be able to:	
1	Analyze the effect of various operating variables on engine performance	
2	identify fuel metering and fuel supply systems for different types of engines	
3	valuate performance Analysis of IC Engine	
4	Evaluate performance of IC Engine	
5	To get practical exposers of various engine parts	
Course no.	Course code	Course name
C610	BTMEL610	Refrigeration and Air Conditioning Lab
COs	After the successful completion of this course student will be able to:	
1	Conduct test on Refrigeration and air conditioning test units to study their performance.	



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2	Draw performance curves of these machines/systems		
3	Analyse the results obtained from the tests.		
4	Draw conclusions based on the results of the experiments		
Course no.		Course code	Course name
C611		BTMEL611	Technical Project for Community Services
COs	After the successful completion of this course student will be able to:		
1	Visit nearby places to understand the problems of the community		
2	Select one of the problems for the study, state the exact title of the project and define scope of the problem		
3	Explain the motivation, objectives and scope of the project		
4	Evaluate possible solutions of the problem		
5	Design, produce, test and analyze the performance of product/system/process		
6	Modify, improve the product/system/process		
BE-I (DBATU) Theory Courses			
Course no.		Course code	Course name
C701		BTMEC701	Mechatronics
COs	After the successful completion of this course student will be able to:		
1	Define sensor, transducer and understand the applications of different sensors and transducers		
2	Explain the signal conditioning and data representation techniques		
3	Design pneumatic and hydraulic circuits for a given application		
4	Write a PLC program using Ladder logic for a given application		
5	Understand applications of microprocessor and micro controller		
Course no.		Course code	Course name



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C702	BTMEC702	CAD/CAM
COs	After the successful completion of this course student will be able to:	
1	List and describe the various input and output devices for a CAD work station	
2	Carry out/calculate the 2-D and 3-D transformation positions (Solve problems on 2-D and 3-D transformations)	
3	Describe various CAD modeling techniques with their relative advantages and limitations	
4	Describe various CAM modeling techniques with their relative advantages and limitations	
5	Develop NC part program for the given component, and robotic tasks	
6	Describe the basic Finite Element procedure	
Course no.	Course code	Course name
C703	BTMEC703	Manufacturing Processes - III
COs	After the successful completion of this course student will be able to:	
1	Differentiate clearly between NC and CNC machines	
2	Prepare and execute a part program for producing a given product	
3	Select appropriate non-traditional machining process for a given application	
4	Compare different surface coating techniques	
5	Explain different rapid prototyping techniques	
6	Illustrate the working principle of various micro-manufacturing processes	
Course no.	Course code	Course name
C704	BTMEC704A	Fluid Machinery
COs	After the successful completion of this course student will be able to:	
1	Understand and apply momentum equation	



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2	Understand and explain Hydrodynamic Machines		
3	Explain difference between impulse and reaction turbines		
4	Find efficiencies, draw velocity triangles		
5	Explain governing mechanisms for hydraulic turbines		
6	Explain working of various types of pumps, draw velocity diagrams, do simple calculations		
Course no.		Course code	Course name
C704		BTMEC704B	Industrial Engineering and Management
COs	After the successful completion of this course student will be able to:		
1	Impart fundamental knowledge and skill sets required in the Industrial Management and Engineering profession, which include the ability to apply basic knowledge of mathematics, probability and statistics, and the domain knowledge of Industrial Management and Engineering		
2	Produce ability to adopt a system approach to design, develop, implement and innovate integrated systems that include people, materials, information, equipment and energy.		
3	Understand the interactions between engineering, businesses, technological and environmental spheres in the modern society.		
4	Understand their role as engineers and their impact to society at the national and global context.		
Course no.		Course code	Course name
C704		BTMEC704C	Finite Element Method
COs	After the successful completion of this course student will be able to:		
1	Understand the basic principle of Finite element methods and its applications		
2	Use matrix algebra and mathematical techniques in FEA		
3	Identify mathematical model for solution of common engineering problem		
4	Solve structural , thermal problems using FEA		



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5	Derive the element stiffness matrix using different methods by applying basic mechanics laws		
6	Understand formulation for two and three dimensional problems		
Course no.		Course code	Course name
C705		BTMEC705A	Engineering Economics
COs	After the successful completion of this course student will be able to:		
1	Apply the appropriate engineering economics analysis method(s) for problem solving: present worth, annual cost, rate-of-return, payback, break-even, Benefit-cost ratio.		
2	Evaluate the cost effectiveness of individual engineering projects using the methods learned and draw inferences for the investment decisions.		
3	Compare the life cycle cost of multiple projects using the methods learned, and make a quantitative decision between alternate facilities and/or systems.		
4	Compute the depreciation of an asset using standard Depreciation techniques to assess its impact on present or future value.		
5	Apply all mathematical approach models covered in solving engineering economics problems: mathematical formulas, interest factors from tables, Excel functions and graphs. Estimate reasonableness of the results.		
6	Examine and evaluate probabilistic risk assessment methods.		
Course no.		Course code	Course name
C705		BTMEC705C	Wind Energy
COs	After the successful completion of this course student will be able to:		
1	Student can learn historical applications of wind energy		
2	Student can Understand and explain wind measurements and wind data		
3	Student will Determine Wind Turbine Power, Energy and Torque		



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4	Student can Understand and explain Wind Turbine Connected to the Electrical Network AC and DC		
5	Student can Understand economics of wind energy		
BE-II (DBATU) Laboratory Courses			
Course no.		Course code	Course name
C706		TMEL706	Manufacturing Processes Lab - II
COs	After the successful completion of this course student will be able to:		
1	Define comprehensively the different types of cutting process, machining parameters, types of chips and cutting tools.		
2	Identify the types of wear in tools, types of cutting forces involved during machining process.		
3	Understand difference between manual and computer part programming, different types of G and M codes, Procedure for writing the manual part program.		
4	Practically aware of operating principles of CNC Lathe and Milling Machines		
5	Write and generate the program for given 3-D model like canned cycle in CNC Lathe Machine, and Pocket milling in CNC Milling Machine		
6	Understand the operating principle of Electric Discharge Machining Process and different machining parameters encountered		
Course no.		Course code	Course name
C707		TMEL707	Mechatronics Lab
COs	After the successful completion of this course student will be able to:		
1	Understand the various types of sensors and their applications		
2	Design a pneumatic circuit for a given application		
3	Design a hydraulic circuit for a given application		
4	Write a PLC program using Ladder logic		
5	Write a PLC program using Ladder logic		



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6	Demonstrate the capacitance sensor for measuring leve	
Course no.	Course code	Course name
C708	TMEL708	CAD/CAM Lab
COs	After the successful completion of this course student will be able to:	
1	Construct CAD part models, assembly model and drafting of machine elements using CAD software.	
2	Evaluate stresses in components subjected to simple structural loading using FE software	
3	Write NC programs for turning and milling	
4	Describe case study of industrial robots	
Course no.	Course code	Course name
C709	TMEL709	Seminar
COs	After the successful completion of this course student will be able to:	
1	Expose and make students aware with latest research and research publications	
2	Understand the research and research publication, references, citation	
3	Enhance the presentation skill	
4	Enhance the report writing	
5	Make the student aware about research publication sites	
Course no.	Course code	Course name
C710	TMEL710	Field Training /Internship/Industrial Training III
COs	After the successful completion of this course student will be able to:	
1	To make the students aware of industrial culture and organizational setup	
2	To create awareness about technical report writing among the student.	



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Course no.		Course code	Course name
C711		TMEL711	Project Stage-I**
COs	After the successful completion of this course student will be able to:		
1	State the exact title of the project and problem definition		
2	Explain the motivation, objectives and scope of the project		
3	Review the literature related to the selected topic of the project		
4	Design the mechanism, components of the system and prepare detailed drawings.		
5	Evaluate the cost considering different materials/manufacturing processes		
Course outcomes of all courses (A.Y. 2021-22)			
BE-II (DBATU) Theory Courses			
Course no.		Course code	Course name
C801		BTMEC801b	Non-Conventional Energy Resources
COs	After the successful completion of this course student will be able to:		
1	At the end of completion of the course students are you able to explain operating principle of a range of non-conventional energy resources, materials used, characterization, and key performance characteristics.		
2	Students are able to explain technologies of Solar energy, Wind, Batteries, Fuel cells, and Geothermal conversion and the advantages and limitations of these technologies in comparison to conventional sources of energy will also be examined		
Course no.		Course code	Course name
C803		BTMEP803	Project Stage-II or Internship and Project*
COs	After the successful completion of this course student will be able to:		
1	State the aim and objectives for this stage of the project		



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2	Construct and conduct the tests on the system/product
3	Analyze the results of the tests.
4	Discuss the findings, draw conclusions, and modify the system/product, if necessary