

## B.Tech. Mechanical Engineering: 1st Year

S.No	Course Code	Course Outcome
1	<b>BAST-102</b>	<ol style="list-style-type: none"> <li>1. Evaluate mean value theorems and justify problems based on these theorems, calculate and use of maxima and minima related to daily life problems</li> <li>2. Apply the concept of definite integral as limit of a sum, utilizing Beta and Gamma functions and evaluate the surface and volume integral</li> <li>3. Develop effective mathematical tools and geometric meaning of gradient, divergence and curl; justify the Gauss divergence, stokes and Green theorems</li> <li>4. Evaluate vector space and linear transformations</li> <li>5. Calculate the rank of matrix, evaluate the linear equations by elementary transformation and calculate Eigen values and corresponding Eigen vectors</li> </ol>
2	<b>BAST-105</b>	<ol style="list-style-type: none"> <li>1. To evaluate ordinary differential equation of first order first degree, first order higher degree and higher order differential equations with constant coefficients</li> <li>2. To evaluate second order linear differential equations with variable coefficients and find power series solutions of differential equation</li> <li>3. To formulate partial differential equation and evaluate linear and non-linear partial differential equation and homogeneous linear equation with constant coefficients</li> <li>4. To justify convergence of sequence and series using tests for convergence and develop tools for of Fourier series</li> <li>5. To analyze functions of complex variable, their analyticity and evaluate their differentiation and integration using Cauchy's Integral Formula and Residue theorem and its applications</li> </ol>
3	<b>BAST 103</b>	<ol style="list-style-type: none"> <li>1. Justification of a variety of accurate sentence structures</li> <li>2. Ability to infer new strategies for vocabulary expansion as well as retention and see your vocabulary grow</li> <li>3. Students will develop knowledge, skills, and judgment around human communication that facilitate their ability to</li> </ol>

		<p>work collaboratively with others</p> <ol style="list-style-type: none"> <li>To compose technical and academic article's comprehension</li> <li>Express the capacity to use various writing forms, to achieve the specific purposes of the course</li> </ol>
4	<b>BCST 101</b>	<ol style="list-style-type: none"> <li>The student will learn about basics computer, different type of data type and to formulate simple algorithms for arithmetic and logical problems</li> <li>To translate the algorithms to programs (in C language), learn and apply the concept of different types of control structure and linear data structure</li> <li>Ability to learn and apply the concept of searching, sorting and functions and analyze complexity of algorithm</li> <li>To apply and test the concept of recursion and structure To decompose a problem into functions and synthesize a complete program using divide and conquer approach</li> <li>To learn and apply the concept of pointer, linear data structure and operations on file</li> </ol>
5	<b>BAST 104</b>	<ol style="list-style-type: none"> <li>Examine the principles of quantum mechanics in engineering discipline and explain the reasons for physical happenings</li> <li>Understand the basic knowledge about wave optics and its application in optical instruments</li> <li>Examine physical and structural concept of electronic materials Develop the basic understanding about the new superconducting materials to save and less consumption of energy</li> <li>Analyze applied physics in engineering domain Make a vision to use laser light in various fields of science, engineering, medical science, industries and defense</li> <li>Basic understanding about the electrostatics and its application in Evaluation of electric field and electrostatic potential for charge distributions</li> </ol>
6	<b>BAST-101</b>	<ol style="list-style-type: none"> <li>Analyze and choose appropriate metals and non-metals on the basis of periodic properties such as ionization potential, electron affinity, oxidation states and electronegativity for broader industrial applications</li> <li>Rationalize bulk properties and processes using thermodynamic considerations</li> <li>Design and build some economical technologies for conservation, purification and effective utilization of water in future</li> </ol>

		<ol style="list-style-type: none"> <li>4. Synthesize conservation and use some of the important materials in the field of engineering</li> <li>5. Differentiate the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques</li> </ol>
7	<b>BMET 102</b>	<ol style="list-style-type: none"> <li>1. Student will be able to speculate Fundamental knowledge of thermodynamics as properties, system, process, cycle etc</li> <li>2. Student will be able to analyze principle of law of motion in thermodynamics</li> <li>3. Categorize the different types of Engines, steam properties</li> <li>4. Student will be able to evaluate Fundamental knowledge of Forces, laws of motion, beams, trusses</li> <li>5. Student will be able to calculate and analyze stress, strain, torsion, bending analysis etc</li> </ol>
8	<b>BECT 101</b>	<ol style="list-style-type: none"> <li>1. Analyze materials in terms of energy band gap and Group 4 materials as intrinsic and extrinsic depending on donors and acceptor impurities also evaluate Junction diode in terms of V-I Characteristics, resistance &amp; capacitance</li> <li>2. Illustrate applications of Junction Diode as rectifier, clipper, clamper, voltage multiplier circuit &amp; analyze break down diodes (Zener &amp; Avalanche) in terms of characteristics, resistance, ratings and application as shunt regulator</li> <li>3. Analyze BJT, its configurations as CB, CE &amp; CC and biasing also illustrate its role as amplifier</li> <li>4. Evaluate JFET and MOSFET in terms of their construction, operation and characteristics</li> <li>5. Analyze operational amplifiers in terms of ideal, inverting, non-inverting, summer, integrator &amp; differentiator and its applications as instrumentation circuits, active filters, controlled sources, logarithmic amplifiers, waveform generators, Schmitt triggers, comparators</li> </ol>

**Mechanical Engineering : III Semester**

S.No.	Course Code	Course Outcome
1.	BAST 301	Remember the concept of Laplace transform and apply in solving real life problems.
		Understand the concept of Fourier transform to evaluate engineering problems
		Understand to evaluate roots of algebraic and transcendental equations.
		Understand interpolation, differentiation, integration and the solution of differential equations.
		Understand the concept of correlation, regression, moments, skewness and kurtosis and curve fitting.
2.	BMET 302	Knowledge of heat and work transfer and their effect, application of first law of thermodynamics to different machines as well as second law of thermodynamics.
		Knowledge of quality of energy and its balance
		Knowledge of steady flow energy equation and its use in compressor, turbines, nozzles, evaporators etc
		Knowledge of basic power output cycles
		Knowledge of heat and work transfer and their effect, application of first law of thermodynamics to different machines as well as second law of thermodynamics.
3.	BMET 303	Discriminate different types Of Materials based on their mechanical properties
		Categorize various ferrous materials and their production process and Properties based on methodology and their applications.
		Distinguish and examine the Non Ferrous metals and Testing of Materials
		Compare and analyze magnetic and electric properties of materials and their applications material science
		Compare and analyze various Non-Metallic Materials and their methodologies and their application in industries.
4.	BMET 304	Analyze structural members using the concept of stress and strain
		Understand the shear force and bending moment diagram
		Determine the deflection of beam
		Analyze structural members using the concept of stress and strain
		Analyze the stress and strain in thick cylinders
5.	BMET 305	To make acquaintance foundry processes like pattern design and making and manufacturing of casting
		To study metal forming processes such as forging, rolling,

		extrusion and wire drawing
		To study die design set and sheet metal working process
		To study and design principles of jigs and fixture
<b>Mechanical Engineering : IV Semester</b>		
6.	BMET 401	Ability to apply various thermodynamics laws to real system.
		Understanding of steam properties and different types of Boilers
		An understanding of the interrelationship between thermodynamic cycles
		Ability to understand steam turbine.
		An understanding of principles of gas turbine and Brayton cycle
7.	BCET-402	Apply advanced level knowledge, techniques, skills and modern tools in the field of Energy and Environmental Engineering
		Distinguish the different energy generation systems and their environmental impacts
		Respond to global policy initiatives and meet the emerging challenges with sustainable technological solutions in the field of energy and environment.
		Formulate and solve energy and energy-related environmental problems
		Apply mathematical or experimental tools and techniques relevant to the energy and energy related environmental disciplines
8.	BMET 403	Identify mechanisms in real life applications. analyse velocity and acceleration of mechanisms by vector and graphical methods
		Identifying the types of cams and gears and their usage
		Studying the static and dynamic analysis of force in mechanisms
		Learning balancing and about governors
		Studying the types of brakes and dynamometers and their application in automobiles
8.	BMET 404	To introduce and explain fundamentals of Fluid Mechanics, which is used in the applications of Aerodynamics, Hydraulics, Marine Engineering, Gas dynamics etc
		Evaluate fundamental knowledge of fluid, its properties and behavior under various conditions of internal and

		external flows
		To develop understanding about hydrostatic law, principle of buoyancy and stability of a floating body and application of mass, momentum and energy equation in fluid flow
		To illustrate basic laws and equations used for analysis of static and dynamic fluids. 5. To inculcate the importance of fluid flow measurement and its applications in Industries
		To evaluate the losses in a flow system, flow through pipes, boundary layer flow and flow past immersed bodies
9.	BMET 405	Select appropriate Manufacturing Processing to manufacture any component
		Demonstrate operation such as Turning, Facing, Threading, Knurling and Grooving on Centre Lathe.
		Select appropriate Process to finish any component
		Select appropriate Joining Processes to join Work piece
		Design & manufacturing different products by cutting processes
<b>Mechanical Engineering : V Semester</b>		
10.	BMET 501	Ability to understand productivity and work study
		Ability to apply plant layouts and understanding the application of material handling equipments
		An understanding of managerial economics
		Ability to apply the concept of Inventory and supply chain management
		An understanding of job evaluation and merit rating.
11.	BMET 502	Illustrate the fundamentals of stress analysis, theories of failure and material science in the design of machine components
		Analyze the principle of solid mechanics to design machine members, under variable loading.
		Analyze the shaft design based on strength, rigidity and design various types of coupling based on application
		Compare and analyze design parameters of Springs & joints on various loading applications.
		Illustrate the different types of Product design & development
12.	BMET 503	Mathematically formulate and analyze heat transfer system by conduction mode
		Apply the conduction heat transfer knowledge on fins which are used in various applications

		Apply the knowledge of fluid flow and convection heat transfer to analyze the thermal system
		Analyze radiative heat transfer system
		Perform thermal design of various heat exchangers
13.	BMET 504	Analyse engine classification Cycle analysis
		Estimate Combustion in SI engine, abnormal combustion and it's control, combustion.
		Categorize different Fuel injection in CI engines and Fuel injectors.
		Analyse cooling systems, Cooling Towers & Radiators.
		Analyse Performance parameters and Testing of SI and CI engines.
14.	BMET 505	Developed the attitudes, values, characteristics, behaviour, and processes associated with possessing an entrepreneurial mindset and engaging in successful appropriate entrepreneurial behaviour
		Justify the ways in which entrepreneurs perceive opportunity, manage risk, organize resources and add value
		Developed advanced knowledge about key processes necessary to bring new products and services to market and key challenges facing the entrepreneur at different stages of the entrepreneurial voyage
		Will utilize interpersonal and leadership skills to be highly effective business managers and leaders; demonstrating self-awareness, emotional intelligence, curiosity, visionary and strategic thinking, teamwork, reflection and knowledge transfer skills
<b>Mechanical Engineering : VI Semester</b>		
15.	BMET 601	Determine the velocity triangles in turbomachinery stages operating at design and offdesign conditions
		Apply the affinity laws to pumps such as to determine their off-design behavior
		Perform the preliminary design of turbomachines (pumps, compressors, turbines) on a 1- D basis
		Recognize relations between choices made early in the turbomachinery design process and the final components and operability
		Recognize and discuss today's and tomorrow's use of turbomachines for enabling a sustainable society
16.	BMET 602	Enable students to attain the basic knowledge required understanding, analyzing,

		designing and select machine elements required in transmission systems
		To develop the ability of the selection of gear types, sizing, analysis and material selection of gear systems
		To develop the ability of the selection of bearings, analysis and material selection of bearings
		To develop an ability to design I.C. Engine parts, component, or process to meet desired needs.
		To analyze, identify, formulate, and solve engineering problems.
17.	BMET 603	Interpret the working principles and applications of refrigeration systems.
		Interpret the vapour compression refrigeration system and identify methods for Performance improvement.
		Demonstrate the working principles of air, vapour absorption, thermoelectric and estimate the condition of steam and performance of vapour power cycle and vapour compression cycle
		Analyze air-conditioning processes using the principles of psychrometry and estimate various essential properties related to Psychrometry and processes.
		Evaluate cooling and heating loads in an air-conditioning system.
18	BMET 604	Apply the concept of Product Design and Development Process, as a means to manage the development of an idea from concept through to production
		Apply creative process techniques in synthesizing information, problem-solving and critical thinking
		Demonstrate and employ hand drawing and drafting principles to convey concepts
		Analyze the basic fabrication methods to build prototype models for hard-goods and soft-goods and packaging.
		Demonstrate, apply, explain, and recognize basic engineering, mechanical, and technical principles.
19.	BMET 605	Apply matrix algebra and Lie algebra for computing the kinematics of robots
		Calculate the forward kinematics and inverse kinematics of serial and parallel robots
		Calculate the jacobian for serial and parallel robots
		Develop the path planning for a robotic system



		Develop the simulation of robots using Maple or Matlab
<b>Mechanical Engineering : VII Semester</b>		
20.	BMET 703 A	Analyze failure data, maintainability, availability and reliability.
		Evaluate different Maintenance Strategies
		Interpret different Replacement techniques and planning
		Compare various handling techniques in engineering industries.
		Use different concepts of Maintenance Management and spare parts planning and control.
21.	BMET 701	Explain the effort of quantum confinement on the electronic structure and corresponding physical and chemical properties of material at nanoscale
		Choose appropriate chemical method to synthesize quantum nanostructure of desired size, shape and surface properties
		Choose appropriate physical method to synthesize quantum nanostructure of desired size, shape and surface properties
		Correlate properties of nanostructure with their size shape and surface characteristics
		Appreciate enhanced sensitivity of nanomaterial based sensors and their novel applications in industry.
22	BMET-704 (A)	Categorize, interpret and understand the essential properties of fuels for IC engines
		Identify the need for alternate fuels and characterize prospective alternate fuels
		Evaluate the vehicle fuel storage and dispensing facility requirements.
		Analyze the implement limitations with regard to performance, emission and materials compatibility.
		Develop strategies for control of emissions as per the legislation standards.
<b>Mechanical Engineering : VIII Semester</b>		
23	BMET 802	Predict sources of energy and types of power plants.
		Analyse different types of steam cycles and estimate efficiencies in a steam power plant.
		Discriminate basic working principles of gas turbine and diesel engine power plants.
		Explain principal components and types of nuclear reactors.
		Evaluate cycle efficiency and performance of a gas cooled

		reactor power plant.
24	BMET- 803(B)	Evaluate Earth sun angles and potential of energy from sun
		Do analysis of solar radiation and solar thermal system for their utilization
		Differentiate between methods of solar thermal energy storage system
		Analyze different solar photovoltaic system for specific application
		Compare and analyze different economic aspects associated with different solar thermal system
25	BMET-804B	Development of understanding about the types of energy resources
		Explain the basics of Ecosystem
		Develop the understanding of Biodiversity
		Analyse the pollution and its causes