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A.G.M RURALCOLLEGEOFENGINEERINGANDTECHNOLOGY, VARUR
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DEPARTMENT OF MECHANICAL ENGINEERING
CO STATEMENT FOR THE SCHEME 2022 (BATCH 2022-2026)

SL.NO	SUB NAME	COs	CO Statement
		I SEM	
1	Mathematics-I for Mechanical Engineering stream	BMATM101.1	Apply the knowledge of calculus to solve problems related to polar curves
		BMATM101.2	Learn the notion of partial differentiation to compute rate of change of multivariate functions.
		BMATM101.3	Analyze the solution of linear and non-linear ordinary differential equations.
		BMATM101.4	make use of matrix theory for solving the system of linear equations and compute eigenvalues and eigenvectors.
		BMATM101.5	familiarize with modern mathematical tools namely mathematical/ mat lab/ python/sci lab
2	Applied Physics for ME Stream	BPHYM102/202 2.1	Elucidate the concepts in oscillations, waves, elasticity and material failures
		BPHYM102/202 2.2	Discuss the fundamentals of Thermoelectric materials and their application
		BPHYM102/202 2.3	Summarize the low temperature phenomena and generation of low temperature
		BPHYM102/202 2.4	Explain the various material characterization techniques
		BPHYM102/202 2.5	Practice working in groups to conduct experiments in physics and perform precise and honest measurements
3	Elements of Mechanical Engineering	BEMEM103/203 3.1	Acquire a basic understanding about scope of mechanical engineering, fundamentals about steam and nonconventional energy sources.
		BEMEM103/203 3.2	Acquire a basic knowledge about conventional and advanced manufacturing processes.

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		BEMEM103/203 3.3	. Acquiring a basic understanding about IC engines, propulsive devices and air-conditioner.
		BEMEM103/203 3.4	Acquiring a basic knowledge about power transmission and joining processes.
		BEMEM103/203 3.5	Acquiring a basic insight into future mobility and mechatronics and robotics.
		II SEM	
8	Mathematics-II for Mechanical Engineering stream	BMATM201.1	Apply the knowledge of multiple integrals to compute area and volume
		BMATM201.2	Understand the applications of vector calculus refer to solenoidal, irrotational vectors, line integral and surface integral.
		BMATM201.3	Demonstrate partial differential equations and their solutions for physical interpretations.
		BMATM201.4	Apply the knowledge of numerical methods in solving physical and engineering phenomena.
		BMATM201.5	Get familiarize with modern mathematical tools namely Mathematica/MatLab/Python/Scilab
9	Applied Chemistry for Mechanical Engineering stream	BCHEM202/202.1	Identify the terms and applications processes involved in scientific and engineering
		BCHEM202/202.2	Explain the phenomena of chemistry to describe the methods of engineering processes
		BCHEM202/202.3	Solve the problems in chemistry that a repertinentin engineering applications
		BCHEM202/202.4	Apply the basic concepts of chemistry to explain the chemical properties and processes.

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		BCHEM202/202.5	Analyze properties and multi disciplinary situations processes associated with chemical substances in
10	Computer Aided Engineering Drawing	BCEDK203/203.1	Draw and communicate the objects with definite shape and dimensions
		BCEDK203/203.2	Recognize and Draw the shape and size of objects through different views
		BCEDK203/203.3	Develop the lateral surfaces of the object
		BCEDK203/203.4	Create a Drawing views using CAD software.
		BCEDK203/203.5	Identify the interdisciplinary engineering components or systems through its graphical representation.
11	INTRODUCTION TO MECHANICAL ENGINEERING	BESCK104D/204D.1	Explain the concepts of Role of Mechanical Engineering and Energy sources.
		BESCK104D/204D.2	Describe the Machine Tool Operations and advanced Manufacturing process.
		BESCK104D/204D.3	Explain the Working Principle of IC engines and EV vehicles.
		BESCK104D/204D.4	Discuss the Properties of Common Engineering Materials and various Metal Joining Processes.
		BESCK104D/204D.5	Explain the Concepts of Mechatronics, Robotics and Automation in IoT
III SEM			
15	MECHANICS OF MATERIALS	BME301.1	Understand the concepts of stress and strain in simple and compound bars.
		BME301.2	Explain the importance of principal stresses and principal planes & Analyze cylindrical pressure vessels under various loadings

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		BME301.3	Apply the knowledge to understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment.
		BME301.4	Evaluate stresses induced in different cross-sectional members subjected to shear loads.
		BME301.5	Apply basic equation of simple torsion in designing of circular shafts & Columns
16	MANUFACTURING PROCESS	BME302.1	Describe the casting process and prepare different types of cast products. Acquire knowledge on Pattern, Core, Gating, Riser system and to use Jolt, Squeeze, and Sand Slinger Moulding machines.
		BME302.2	Compare the Gas fired pit, Resistance, Coreless, Electrical and Cupola Metal Furnaces. Compare the Gravity, Pressure die, Centrifugal, Squeeze, slush and Continuous Metal mold castings.
		BME302.3	Understand the Solidification process and Casting of Non-Ferrous Metals.
		BME302.4	Describe the Metal Arc, TIG, MIG, Submerged and Atomic Hydrogen Welding processes etc. used in manufacturing.
		BME302.5	Describe the methods of different joining processes and thermal effects in joining process
17	MATERIAL SCIENCE AND ENGINEERING	BME303.1	Understand the atomic arrangement in crystalline materials and describe the periodic arrangement of atoms in terms of unit cell parameters.
		BME303.2	Understand the importance of phase diagrams and the phase transformations.
		BME303.3	Explain various heat treatment methods for controlling the microstructure..
		BME303.4.	Correlate between material properties with component design and identify various kinds of

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			defects.
		BME303.5	Apply the method of materials selection, material data and knowledge sources for computeraided selection of materials.
18	BASIC THERMODYNAMICS	BME304.1	Explain fundamentals of thermodynamics and evaluate energy interactions across the boundary of thermodynamic systems.
		BME304.2	Apply 1st law of thermodynamics to closed and open systems and determine quantity of energy transfers.
		BME304.3	Evaluate the feasibility of cyclic and non-cyclic processes using 2nd law of thermodynamics
		BME304.4	Apply the knowledge of entropy, reversibility and irreversibility to solve numerical problems and Interpret the behaviour of pure substances and its application in practical problems.
		BME304.5	Recognize differences between ideal and real gases and evaluate thermodynamic properties of ideal and real gas mixtures using various relations
19	INTRODUCTION TO MODELING AND DESIGN FOR MANUFACTURING	BMEL305.1	Crete and modify form based design
		BMEL305.2	Use design tools for molded designs
		BMEL305.3	Demonstrate proficiency in the setup and creation in a design
		BMEL305.4	Simulate the assembly of machine components in 3D environment.
20	INTERNET OF THINGS (IOT)	BME306C.1	Explain the definition and usage of the term "Internet of Things" in different contexts
		BME306C.2	Understand the key components that make up an IoT system

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		BME306C.3	Differentiate between the levels of the IoT stack and be familiar with the key technologies and protocols employed at each layer of the stack
		BME306C.4	Apply the knowledge and skills acquired during the course to build and test a complete, working IoT system involving prototyping, programming and data analysis
		BME306C.5	Understand where the IoT concept fits within the broader ICT industry and possible future trends and Appreciate the role of big data, cloud computing and data analytics in a typical IoT system
21	SOCIAL CONNECT AND RESPONSIBILITY	BSCK307	Communicate and connect to the surrounding
		BSCK307	Create a responsible connection with the society
		BSCK307	Involve in the community in general in which they work
		BSCK307	Notice the needs and problems of the community and involve them in problem –solving.
		BSCK307	develop among themselves a sense of social & civic responsibility & utilize their knowledge in finding practical solutions to individual and community problems
		BSCK307	Develop competence required for group-living and sharing of responsibilities & gain skills in mobilizing community participation to acquire leadership qualities and democratic attitudes.
22	ADVANCED PYTHON PROGRAMMING	BME358A.1	Develop algorithmic solutions to simple computational problems.
		BME358A.2	Develop and execute simple Python programs
		BME358A.3	Use functions to decompose a Python program.

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		BME358A.4	Process compound data using Python data
		BME358A.5	Utilize Python packages in developing software applications.
23	PHYSICAL EDUCATION	BPEK3598.1	Understand the fundamental concepts and skills of physical education, health, nutrition and fitness.
		BPEK3598.2	Familiarization of health related excises, sports for overall growth and development.
		BPEK3598.3	Crete consciousness among the students on health, fitness and wellness in development and maintaining a health BPEK3598.1y life style.
		BPEK3598.4	Create a foundation for the professionals in physical education and sports
		BPEK3598.5	Participate in the computation at regional/state/national/international levels.
IV SEM			
23	APPLIED THERMODYNAMICS	BME401.1	Adopt different types of teaching methods to develop the outcomes through PowerPoint presentations and Video demonstrations or Simulations.
		BME401 .2	Chalk and Talk method for Problem Solving.
		BME401.3	Adopt flipped classroom teaching method.
		BME401.4	Adopt collaborative (Group Learning) learning in the class.
		BME401.5	Adopt Problem Based Learning (PBL), which fosters students' analytical skills and develops thinking skills such as evaluating, generalizing, and analysing information.

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24	MACHINING SCIENCE & METROLOGY	BME402.1	To enrich the knowledge pertaining to relative motion and mechanics required for variousmachine tools.
		BME402.2	To introduce students to different machine tools to produce components having different shapesand sizes.
		BME402.3	To develop the knowledge on mechanics of machining process and effect of various parameterson machining
		BME402.4	To understand the basic principles of measurements
		BME402.5	To enrich the knowledge pertaining to gauge , comparator and angular measurement
25	FLUID MECHANICS	BME403 .1	To have a working knowledge of the basic properties of fluids and understand the continuum approximation.
		BME403.2	To Calculate the forces exerted by a fluid at rest on submerged surfaces and understand theforce of buoyancy

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		BME403.3	To understand the flow characteristic and dynamics of flow field for various Engineeringapplications
		BME403 .4	To know how velocity changes and energy transfers in fluid flows are related to forces andtorques and to understand why designing for minimum loss of energy in fluid flows is so important
		BME403.5	To discuss the main properties of laminar and turbulent pipe flow and appreciate theirdifferences and the concept of boundary layer theory
		BME403.6	Understand the concept of dynamic similarity and how to apply it to experimental modelling.
		BME403.7	To appreciate the consequences of compressibility in gas flow and understand the effects offriction and heat transfer on compressible flows.
26	MECHANICAL MEASUREMENTS AND METROLOGY LAB	BME404 .1	To illustrate the theoretical concepts taught in Mechanical Measurements & Metrology throughexperiments
		BME404 .2	To illustrate the use of various measuring tools measuring techniques.
		BME404 .3	

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			To understand calibration techniques of various measuring devices
27	NON TRADITIONAL MACHINING	BME405A .1	To learn various concepts related to modern machining processes & their applications
		BME405A .2	To appreciate the differences between conventional and non-conventional machining processes
		BME405A .3	To acquire a functional understanding of non-traditional manufacturing equipment.
		BME405A.4	To know about various process parameters and their influence on performance and their applications.
		BME405A .5	To impart knowledge on various types of energy involved in non-traditional machining processes
28	INTRODUCTION TO AI & ML	BME456A .1	Make use of Data sets in implementing the machine learning algorithms
		BME456A.2	Implement the machine learning concepts and algorithms in any suitable language of choice.
		BME456A.3	Analyse the working of various documents like PDF, Word file
29	BIOLOGY FOR ENGINEERS	BBOK407.1	To familiarize the students with the basic biological concepts and their engineering applications.
		BBOK407.2	To enable the students with an understanding of biodesign principles to create noveldevices and structures.
		BBOK407.3	To provide the students an appreciation of how biological systems can be re-designed As

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			substitute products for natural systems.
		BBOK407.4	To motivate the students to develop interdisciplinary vision of biological engineering.
30	UNIVERSAL HUMAN VALUES (UHV)	BUHK408.1	To help the students appreciate the essential complementarity between 'VALUES' and SKILLS' to ensure sustained happiness and prosperity which are the core aspirations ofall human beings.
		BUHK408.2	To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
		BUHK408.3	To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature.
		BUHK408.4	This course is intended to provide a much-needed orientation input in value education to the young enquirinminds.
31	PHYSICAL EDUCATION	BPEK459	Understand the fundamental concepts and skills of physical education, health, nutrition and fitness.
		BPEK459	Familiarization of health related excises, sports for overall growth and development.
		BPEK459	Crete consciousness among the students on health.

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			fitness and wellness in development and maintaining a health BPEK 3598 ly life style.
		BPEK459	Create a foundation for the professionals in physical education and sports
		BPEK459	Participate in the computation at regional/state/national/international levels.
		V SEM	
31	Industrial Management & Entrepreneurship	BME501.1	Understand the basic concepts of management, planning, organizing, staffing, directing and controlling.
		BME501.2	Identify various types of supporting agencies and financing available for an entrepreneur
		BME501.3	Prepare project report and decide selection of industrial ownership.
32	TURBOMACHINES	BME502.1	Understand typical design of Turbo machine, their working principle, application and thermodynamics process involved..
		BME502.2	Study the conversion of fluid energy to mechanical energy in Turbo machine with utilization factor and degree of reaction
		BME502.3	Analyse various designs of steam turbine and their working principle
		BME502.4.	Study the various designs of hydraulic turbine based on the working principle
		BME502.5	Understand the various aspects in design of power absorbing machine
33	THEORY OF MACHINES	BME503.1	To understand the concept of machines, mechanisms and to Analyze a mechanism for displacement, velocity and acceleration at any point in a moving link..

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		BME503.2	To understand the forcemotion relationship in components subjected to external forces and analysis of standard mechanisms
		BME503.3	To understand the theory of gears and gear trains.
		BME503.4	To understand the undesirable effects of unbalances resulting from prescribed motions in mechanism
		BME503.5	To understand the principles in mechanisms used for speed control and stability control
		BME503.6	To compute the natural and damped frequencies of free 1DOF mechanical systems and to analyse the vibrational motion of 1DOF mechanical systems under harmonic excitation conditions
33	CNC PROGRAMMING AND 3-D PRINTING LAB	BME504L.1	To expose the students to the techniques of CNC programming and cutting tool path generation through CNC simulation software by using G-Codes and Mcodes.
		BME504L.2	To educate the students on the usage of CAM package
		BME504L.3	To expose the students on the usage of 3D Printing Technology
		BME504L.4	To make the students understand the importance of automation in industries through exposure to FMS
		BME504L.5	Robotics, and Hydraulics and Pneumatics
34	ENERGY ENGINEERING	BME515D.1	Adopt different types of teaching methods to develop the outcomes through PowerPoint presentations and Video demonstrations or Simulations
		BME515D.2	Arrange visits to show the live working models other than laboratory topics

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		BME515D.3	Adopt collaborative (Group Learning) Learning in the class
		BME515D.4	Adopt Problem Based Learning (PBL), which foster students' Analytical skills and develops
		BME515D.5	thinking skills such as evaluating, generalizing, and analyzing information
35	MINI PROJECT	BME586.1	Design and Implementation of system to measure the system optimally
		BME586.2	Analyzing the outcomes of experiment in hardware/software through comparison
		BME586.3	Imbibing Professional Ethics in Report Writing in systematic manner and adopting to quality presentation
36	RESEARCH METHODOLOGY & IPR	BRMK557.1	To Understand the knowledge on basics of research and its types.
		BRMK557.2	. To Learn the concept of Literature Review, Technical Reading, Attributions and Citations
		BRMK557.3	To learn Ethics in Engineering Research. C
		BRMK557.4	To Discuss the concepts of Intellectual Property Rights in engineering
37	ENVIRONMENTAL STUDIES	BESK508.1	To create environmental and sustainbility awareness among the students..
		BESK508.2	To gain knowledge on different types of pollution in the environment, waste management and Environmental legislation
38	PHYSICAL EDUCATION	BPEK559.1	Understand the fundamental concepts and skills of physical education, health, nutrition and fitness.
		BPEK559.2	Familiarization of health related excises, sports for

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			overall growth and development.
		BPEK559.3	Crete consciousness among the students on health, fitness and wellness in development and maintaining a health BPEK3598.1y life style.
		BPEK559.4	Create a foundation for the professionals in physical education and sports
		BPEK559.5	Participate in the computation at regional/state/national/international levels.
VI SEM			
39	HEAT TRANSFER	BME601.1	Principles of heat transfer. .
		BME601.2.	Steady and transient heat transfer, obtain the differential equation of heat conduction in various coordinate system
		BME601.3	Physical mechanism of convection and visualize the development of velocity and thermal boundary layers during flow over a surface.
		BME601.4	Radiation heat transfer mechanism
		BME601.5	The mechanisms of boiling and condensation and understand performance parameters of heat exchangers.
40	MACHINE DESIGN	BME602.1	To explain the principles involved in design of machine elements, subjected to different kinds of forces, from the considerations of strength, rigidity.
		BME602.2	To understand and interpret different failure modes and application of appropriate criteria for design of machine elements.
		BME602.3	Develop the capability to design elements like shafts, couplings and welded joints, screwed joints.

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		BME602.4	To learn transmission elements like gears, belts, pulleys, bearings from the manufacturers' catalogue.
		BME602.5	To produce assembly and working drawings of various mechanical systems involving machine elements like clutches and brakes.
41	TOTAL QUALITY MANAGEMENT	BME613A.1	Understand various approaches to TQM
		BME613A.2	Understand the characteristics of quality leader and his role.
		BME613A.3	Develop feedback and suggestion systems for quality management.
		BME613A.4	Enhance the knowledge in Tools and Techniques of quality management
42	WATER CONSERVATION AND RAIN WATER HARVESTING	BCV654A.1	Appreciate basic concepts of Water and its importance.
		BCV654A.2	Learn element ary knowledge of groundwater.
		BCV654A.3	Conceptually learn various the oriesrelated to Ground water Recharge and Ground water recharge
		BCV654A.4	Study about Subsurface investigation of Groundwater.
43	MAJOR PROJECT PHASE 1	BME685.1	Design and Implementation of system to measure the system optimally
		BME685.2	Analyzing the outcomes of experiment in hardware/software through comparison
		BME685.3	Imbibing Professional Ethics in Report Writing in

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			systematic manner and adopting to quality presentation
44	M/C DESIGN LAB	BME606L.1	To understand the concepts of natural frequency, logarithmic decrement, damping and damping ratio.
		BME606L.2	To understand the techniques of balancing of rotating masses and influence of gyroscopic couple
		BME606L.3	To verify the concept of the critical speed of a rotating shaft
		BME606L.4	To illustrate the concept of stress concentration using Photo elasticity.
		BME606L.5	To appreciate the equilibrium speed, sensitiveness, power and effort of a Governor
		BME606L.6	To illustrate the principles of pressure development in an oil film of a hydrodynamic journal bearing.
		BME606L.7	To visualize different mechanisms and cam motions
		BME606L.8	Modern computing techniques are preferred to be used wherever possible
45	SIMULATION AND ANALYSIS USING ANSYS WORKBENCH	BME657C.1	General understanding of the user interface, as related to geometry import, meshing, applicationof loads and supports, and post processing
		BME657C.2	Procedure for performing FEA simulations, including linear static, modal, and harmonic structuralanalyses and nonlinear steadystate thermal analyses

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		BME657C.3	Utilizing parameters for 'whatif' scenarios
		BME657C.4.	To launch the individual software components and used to transfer data between them.
		BME657C.5	To see ataglance how a model has been built, and determine which files were used for a particular simulation (pairing geometry files to solver runs)
		BME657C.6	To perform parametric analyses (without the user needing to manually launch each application in turn) and makes it easy to simulate Multiphysics scenarios like fluidstructure interaction.
46	PHYSICAL EDUCATION	BPEK658.1	Understand the fundamental concepts and skills of physical education, health, nutrition and fitness.
		BPEK658.2	Familiarization of health related excises, sports for overall growth and development.
		BPEK658.3	Crete consciousness among the students on health, fitness and wellness in development and maintaining a health BPEK3598.1y life style.
		BPEK658.4	Create a foundation for the professionals in physical education and sports
		BPEK658.5	Participate in the computation at regional/state/national/international levels.

H.O.D
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