



Program outcomes

Department: Mechanical Engineering

List of Program outcomes (POs)

Mechanical Students will able to:

PO1: Engineering Knowledge: Apply the knowledge of Mathematics, Science, Engineering fundamentals, and Engineering specialization to the solution of Complex Engineering Problems.

PO2: Problem Analysis: Identify, formulate, research literature, and analyze engineering problems to arrive at substantiated conclusions using first principles of Mathematics, Natural, and Engineering Sciences.

PO3: Design/Development of solutions: Design solutions for complex engineering problems and design system components, processes to meet the specifications with consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6: The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively with the engineering community and with society at large. Be able to comprehend and write effective reports documentation. Make effective presentations, and give and receive clear instructions.

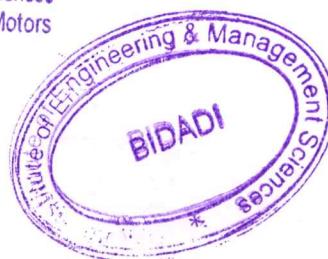
PO11: Project Management and Finance: Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team. Manage projects in multidisciplinary environments.

PO12: Lifelong learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PRINCIPAL

Amruta Institute of Engineering & Management Sciences
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Bidadi, Bangalore-562 109

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BVV Sangha, Bagalkot
AMRUTA INSTITUTE OF ENGINEERING & MANAGEMENT SCIENCES

Approved by AICTE, New Delhi
Recognized by Government of Karnataka & Affiliated to VTU, Belagavi

AIEMS
BENGALURU

Program Specific outcomes

Department: Mechanical Engineering

List of Program Specific outcomes (PSOs)

Graduates will able to:

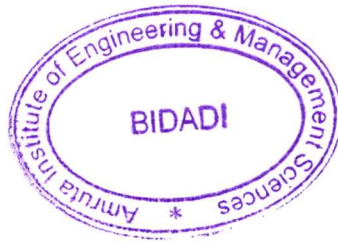
PSO 1: The Mechanical Engineering graduates will be able to modelling, analysis, optimization, and implementation of same for industries.

PSO 2: The Mechanical Engineering graduates will be able to develop effective manufacturing methods and process and also suggest optimal methods adopting latest technology.

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Course outcomes
Department of Mechanical Engineering

I Semester			
Course Name	Course Code	COs	Statement
MATHEMATICS-I	BMATM101	CO1	Apply the knowledge of calculus to solve problems related to polar curves.
		CO2	Learn the notion of partial differentiation to compute rate of change of multivariate functions.
		CO3	Analyze the solution of linear and non-linear ordinary differential equations.
		CO4	make use of matrix theory for solving the system of linear equations and compute eigen values and eigenvectors.
		CO5	familiarize with modern mathematical tools namely Mathematica/ mat lab/ python/Scilab.
APPLIED CHEMISTRY	BCHEM202	CO1	Identify the terms and applications processes involved in scientific and engineering.
		CO2	Explain the phenomena of chemistry to describe the methods of engineering processes
		CO3	Solve the problems in chemistry that are pertinent in engineering applications
		CO4	Apply the basic concept of chemistry to explain the chemical properties and processes
		CO5	Analyze properties and ary situations processes associated with chemical substances.
COMPUTER AIDED ENGINEERING DRAWING	BCEDK103	CO1	Draw and communicate the objects with definite shape and dimensions
		CO2	Recognize and Draw the shape and size of objects through different views
		CO3	Develop the lateral surfaces of the object.
		CO4	Create a Drawing views using CAD software.
INTRODUCTION TO CIVIL ENGINEERING	BESCK104A	CO1	Understand the various disciplines of civil engineering
		CO2	Understand the infrastructure requirement for sustainable development
		CO3	Compute the resultant and equilibrium of force s/m.
		CO4	Locate the centroid of plane and built-up sections
		CO5	Compute the moment of inertia of plane and built-up sections.
INTRODUCTION TO PYTHON PROGRAMMING	BPLCK105B	CO1	Demonstrate proficiency in handling loops and creation of functions.
		CO2	Identify the methods to create and manipulate lists, tuples and dictionaries
		CO3	Develop programs for string processing and file organization
		CO4	Interpret the concepts of Object-Oriented Programming as used in Python.

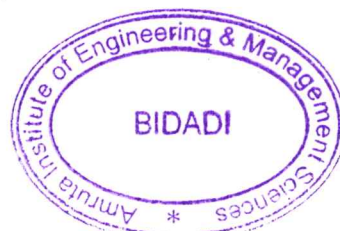


COMMUNICATIVE ENGLISH	BENGK106	CO1	Understand and apply the Fundamentals of Communication Skills in their communication skills.
		CO2	Identify the nuances of phonetics, intonation and enhance pronunciation skills.
		CO3	To impart basic English grammar and essentials of language skills as per present requirement.
		CO4	Understand and use all types of English vocabulary and language proficiency
		CO5	Adopt the Techniques of Information Transfer through presentation.
INDIAN CONSTITUTION	BICOK107	CO1	Analyse the basic structure of Indian Constitution.
		CO2	Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution.
		CO3	know about our Union Government, political structure & codes, procedures.
		CO4	Understand our State Executive & Elections system of India.
		CO5	Remember the Amendments and Emergency Provisions, other important provisions given by the constitution.
SCIENTIFIC FOUNDATIONS OF HEALTH	BSFHK108	CO1	To understand and analyse about Health and wellness (and its Beliefs) & It's balance for positive mindset
		CO2	Develop the healthy lifestyles for good health for their better future.
		CO3	Build a Healthy and caring relationships to meet the requirements of good/social/positive life.
		CO4	To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future.
		CO5	Prevent and fight against harmful diseases for good health through positive mindset.

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Course outcomes
Department of Mechanical Engineering

II Semester

Course Name	Course Code	COs	Statement
MATHEMATICS-II	BMATM201	CO1	Apply the knowledge of multiple integrals to compute area and volume.
		CO2	Understand the applications of vector calculus refer to solenoidal, irrotational vectors etc.
		CO3	Demonstrate partial differential equations and their solutions for physical interpretations.
		CO4	Apply the knowledge of numerical methods in solving physical and engineering phenomena.
		CO5	Get familiarize with modern mathematical tools namely Mathematica/MatLab/Python/Scilab
APPLIED PHYSICS	BPHYM202	CO1	Elucidate the concepts in oscillations, waves, elasticity and material failures
		CO2	Discuss the fundamentals of Thermoelectric materials and their application
		CO3	Summarize the low temperature phenomena and generation of low temperature
		CO4	Explain the various material characterization techniques.
		CO5	Practice working in groups to conduct experiments in physics and perform precise and honest measurements.
EME	BEMEM203	CO1	Explain the role of mechanical engineering in industry and society, fundamentals of steam and non-conventional energy sources.
		CO2	Describe different conventional and advanced machining processes, IC engines, propulsive devices, air-conditioning, refrigeration.
		CO3	Explain different gear drives, gear trains, aspects of future mobility and fundamentals of robotics
		CO4	Determine the condition of steam and its energy, performance parameters of IC engines.
		CO5	Acquiring a basic insight into future mobility and mechatronics and robotics.
INTRODUCTION TO C PROGRAMMING	BESCK204E	CO1	Elucidate the basic architecture and functionalities of a computer and also recognize the hardware parts.
		CO2	Apply programming constructs of C language to solve the real world problem.
		CO3	Explore user-defined data structures like arrays in implementing solutions to problems like searching and sorting.
		CO4	Explore user-defined data structures like structures, unions and pointers.

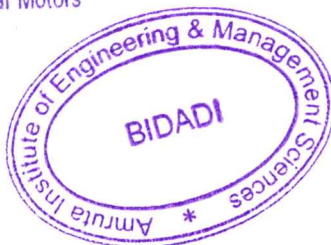


INTRODUCTION TO INTERNET OF THINGS (IOT)	BETCK205H	C01	Describe the evolution of IoT, IoT networking components, and addressing strategies in IoT.
		C02	Classify various sensing devices and actuator types.
		C03	Demonstrate the processing in IoT.
		C04	Explain Associated IOT Technologies.
		C05	Illustrate architecture of IOT Applications.
PROFESSIONAL WRITING SKILLS IN ENGLISH	BPWSK206	C01	To understand and identify the Common Errors in Writing and Speaking.
		C02	To Achieve better Technical writing and Presentation skills.
		C03	To read Technical proposals properly and make them to Write good technical reports.
		C04	Acquire Employment and Workplace communication skills.
		C05	To learn about Techniques of Information Transfer through presentation in different level.
BALAKE KANNAD	BKBKK207	C01	To understand the necessity of learning of local language for comfortable life.
		C02	To speak, read and write Kannada language as per requirement.
		C03	To Listen and understand the Kannada language properly.
		C04	To speak in polite conversation.
INNOVATION AND DESIGN THINKING	BIDTK258	C01	Appreciate various design process procedure.
		C02	Generate and develop design ideas through different technique.
		C03	Identify the significance of reverse Engineering to Understand products.
		C04	Draw technical drawing for design ideas.

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III Semester

Course Name	Course Code	COs	Statement
MECHANICS OF MATERIALS	BME301	CO1	Understand the concepts of stress and strain in simple and compound bars.
		CO2	Explain the importance of principal stresses and principal planes & Analyse cylindrical pressure vessels under various loadings.
		CO3	Apply the knowledge to understand the load transferring mechanism in beams and stress distribution
		CO4	Evaluate stresses induced in different cross-sectional members subjected to shear loads.
		CO5	Apply basic equation of simple torsion in designing of circular shafts & Columns.
MANUFACTURING PROCESS	BME302	CO1	Describe the casting process and prepare different types of cast products. Acquire knowledge on Pattern, Core, Gating, Riser system.
		CO2	Compare the Gas fired pit, Resistance, Coreless, Electrical and Cupola Metal Furnaces. Compare the Gravity, Pressure die, Centrifugal, Squeeze.
		CO3	Understand the Solidification process and Casting of Non-Ferrous Metals.
		CO4	Describe the Metal Arc, TIG, MIG, Submerged and Atomic Hydrogen Welding processes etc. used in manufacturing.
		CO5	Describe the methods of different joining processes and thermal effects in joining process.
MATERIAL SCIENCE AND ENGINEERING	BME303	CO1	Understand the atomic arrangement in crystalline materials and describe the periodic arrangement of atoms in terms of unit cell parameters.
		CO2	Understand the importance of phase diagrams and the phase transformations.
		CO3	Explain various heat treatment methods for controlling the microstructure..
		CO4	Correlate between material properties with component design and identify various kinds of defects.

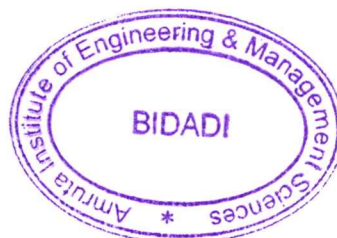


BASIC THERMODYNAMICS	BME304	CO1	Explain fundamentals of thermodynamics and evaluate energy interactions across the boundary of thermodynamic systems.
		CO2	: Apply 1st law of thermodynamics to closed and open systems and determine quantity of energy transfers.
		CO3	Evaluate the feasibility of cyclic and non-cyclic processes using 2nd law of thermodynamics
		CO4	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.
		CO5	Recognize differences between ideal and real gases and evaluate thermodynamic properties of ideal and real gas mixtures using various relations.
SMART MATERIALS & SYSTEMS	BME306B	CO1	Apply the knowledge for materials characterisation.
		CO2	Evaluate the materials based on actuation.
		CO3	Select and justify appropriate materials for specific application.
SPREADSHEET FOR ENGINEERS	BME358C	CO1	Create different plots and charts.
		CO2	Compute different functions, conditional functions and make regression analysis .
		CO3	Carryout iterative solutions for roots, multiple roots, optimization and non-linear regression analysis.
		CO4	Carryout matrix operations.
		CO5	Carryout numerical integration and solving differential equations using different methods

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IV Semester			
Course Name	Course Code	COs	Statement
APPLIED THERMODYNAMICS	BME401	CO1	Analyse air standard cycle to evaluate the performance of I C engines.
		CO2	Analyze the gas power cycles to evaluate the overall efficiency of gas turbine plant.
		CO3	Apply thermodynamic concepts to analyze the performance of vapour power cycles
		CO4	Analyze the vapour compression and vapour absorption systems to improve refrigeration
		CO5	Determination of various parameters of air compressors and steam nozzles
MACHINING SCIENCE & METROLOGY	BME402	CO1	Analyze various cutting parameters in metal cutting.
		CO2	Understand the construction of machines & machine tools and compute the machining time of various operations.
		CO3	Understand the concept of Temperature in Metal Cutting, forms of wear in metal cutting and Cutting fluids
		CO4	Understand the objectives of metrology, methods of measurement, standards of measurement & various measurement parameters. Explain tolerance, limits of size, fits, geometric and position tolerances, gauges and their design
		CO5	Understand the working principle of different types of comparators, gauges, angular Measurements
FLUID MECHANICS	BME403	CO1	Identify and calculate the key fluid properties used in the analysis of fluid behaviour.
		CO2	Understand and apply the principles of pressure, buoyancy and floatation
		CO3	Apply the knowledge of fluid dynamics while addressing problems of mechanical and chemical engineering.
		CO4	Understand the concept of boundary layer in fluid flow and apply dimensional analysis to form dimensionless numbers in terms of input output variables.
		CO5	Understand the basic concept of compressible flow and CFD.



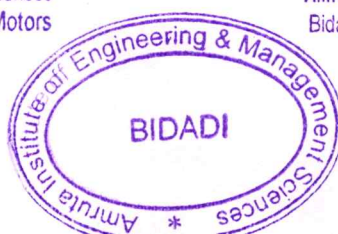
MECHANICAL MEASUREMENTS AND METROLOGY LAB	BME404	CO1	To calibrate pressure gauge, thermocouple, LVDT, load cell, micrometer.
		CO2	To measure angle using Sine Center/ Sine Bar/ Bevel Protractor, alignment using Autocollimator/ Roller set.
		CO3	To demonstrate measurements using Optical Projector/Tool maker microscope, Optical flats.
		CO4	To measure cutting tool forces using Lathe/Drill tool dynamometer.
		CO5	To measure Screw thread parameters using 2-Wire or 3-Wire method, gear tooth profile using gear tooth vernier/Gear tooth micrometer.
		CO6	To measure surface roughness using Tally Surf/ Mechanical Comparator.
NON TRADITIONAL MACHINING	BME405A	CO1	Describe non-traditional machining process and compare with Traditional machining process. Recognize the need for Non-traditional machining process.
		CO2	Describe the constructional features, performance parameters, process characteristics, applications, advantages, and limitations of USM, AJM and WJM.
		CO3	Characterize the need of Chemical and electro-chemical machining process along with the constructional features, process parameters, process characteristics, applications, advantages, and limitations.
		CO4	Illustrate the constructional feature of the equipment, process parameters, process characteristics, applications, advantages and limitations EDM & PAM.
DIGITAL MARKETING	BME456B	CO1	To focuses on the importance of digital marketing and its applications.
		CO2	To introduce current and core practices of Digital and Social Media Marketing that will allow learners to analyse, plan, execute and evaluate a digital marketing strategy

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Department of Mechanical Engineering

V Semester			
Course Name	Course Code	COs	Statement
THEORY OF MACHINES	21ME51	CO1	Knowledge of mechanisms and their motion and the inversions of mechanisms Analyse the velocity, acceleration of links and joints of mechanisms.
		CO2	Analyse the mechanisms for static and dynamic equilibrium.
		CO3	Carry out the balancing of rotating and reciprocating masses.
		CO4	Analyse different types of governors used in real life situation.
		CO5	Analyze the free and forced vibration phenomenon.
THERMO-FLUIDS ENGINEERING	21ME52	CO1	Apply the concepts of testing of I. C. Engines and evaluate their performance, and evaluate the performance of Reciprocating compressor.
		CO2	Apply and analyse the concepts related to Refrigeration and Air conditioning, and get conversant with Psychrometric Charts, Psychrometric processes, human comfort conditions.
		CO3	Explain the construction, classification and working principle of the Turbo machines and apply of Euler's turbine equation to evaluate the energy transfer and other related parameters.
		CO4	Compare and evaluate the performance of positive displacement pumps. Classify, explain and analyse the various types of hydraulic turbines and centrifugal pumps.
		CO5	Classify, explain and analyse various types of steam turbines and centrifugal compressor.
FINITE ELEMENT ANALYSIS	21ME53	CO1	Identify the application and characteristics of FEA elements such as bars, beams, plane and isoparametric elements.
		CO2	Develop element characteristic equation and generation of global equation.
		CO3	Formulate and solve Axi-symmetric and heat transfer problems.
		CO4	Apply suitable boundary conditions to a global equation for bars, trusses, beams, circular shafts, heat transfer, fluid flow, axi-symmetric and dynamic problems.

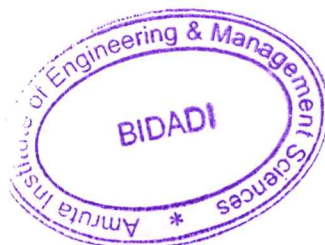


MODERN MOBILITY & AUTOMOTIVE MECHANICS	21ME54	CO1	Understand the working of different systems employed in automobile
		CO2	Analyse the limitation of present day automobiles
		CO3	Evaluate the energy sources suitability
		CO4	Apply the knowledge for selection of automobiles based on their suitability.
DESIGN LAB	21MEL55	CO1	Compute the natural frequency of the free and forced vibration of single degree freedom systems, critical speed of shafts.
		CO2	Carry out balancing of rotating masses and gyroscope phenomenon.
		CO3	Analyse the governor characteristics
		CO4	Determine stresses in disk, beams and plates using photo elastic bench.
		CO5	Determination of Pressure distribution in Journal bearing.
		CO6	Analyse the stress and strains using strain gauges in compression and bending test.
DIGITAL MARKETING	21ME582	CO1	To identify the importance of the digital marketing for marketing success.
		CO2	To manage customer relationships across all digital channels and build better customer relationships.
		CO3	To create a digital marketing plan, starting from the SWOT analysis and defining a target group, then identifying digital channels, their advantages and limitations.
		CO4	To perceive ways of the integration taking into consideration the available budget.

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VI Semester			
Course Name	Course Code	COs	Statement
PRODUCTION AND OPERATIONS MANAGEMENT	21ME61	CO1	Apply the necessary tools for decision making in operations management.
		CO2	Examine various approaches for forecasting the sales demand for an organization.
		CO3	List various capacity and location plans to determine the suitable capacity required for meeting the forecast demand of an organization.
		CO4	Analyse the aggregate plan and master production schedule for an organization, given its periodic demand.
		CO5	Apply MRP, purchasing and SCM techniques into practice.
HEAT TRANSFER	21ME62	CO1	Solve steady state heat transfer problems in conduction.
		CO2	Solve transient heat transfer problems.
		CO3	solve convection heat transfer problems using correlations
		CO4	Solve radiation heat transfer problems.
		CO5	Explain the mechanisms of boiling and condensation. And Determine performance parameters of heat exchangers.
MACHINE DESIGN	21ME63	CO1	Apply codes and standards in the design of machine elements and select an element based on the Manufacturer's catalogue.
		CO2	Analyse the performance and failure modes of mechanical components subjected to combined loading and fatigue loading using the concepts of theories of failure.
		CO3	Demonstrate the application of engineering design tools to the design of machine components like shafts, springs, couplings, fasteners, welded and riveted joints, brakes and clutches.
		CO4	Design different types of gears and simple gear boxes for relevant applications.
		CO5	Apply design concepts of hydrodynamic bearings for different applications and select Anti friction bearings for different applications using the manufacturers, catalogue.

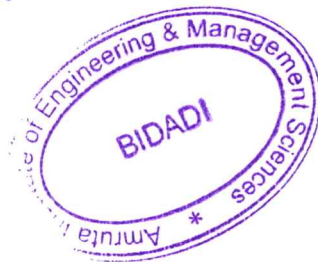


SUPPLY CHAIN MANAGEMENT & INTRODUCTION TO SAP	21ME641	CO1	Understand the framework and scope of supply chain management.
		CO2	Build and manage a competitive supply chain using strategies, models, techniques and information technology.
		CO3	Plan the demand, inventory and supply and optimize supply chain network.
		CO4	Understand the emerging trends and impact of IT on Supply chain.
		CO5	Understand the basics of SAP material management system.
CNC PROGRAMMING AND 3-D PRINTING LAB	21MEL66	CO1	Students will have knowledge of G-code and M-code for machining operations.
		CO2	Students will able to perform CNC programming for turning, drilling, milling and threading operation.
		CO3	Students will able to visualize the 3D models using CAD software's
		CO4	Students will able to use 3D printing technology.
		CO5	Students are able to understand robotic programming and FMS.

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VII Semester			
Course Name	Course Code	COs	Statement
CONTROL ENGINEERING	18ME71	CO1	Identify the type of control and control actions.
		CO2	Develop the mathematical model of the physical systems.
		CO3	Estimate the response and error in response of first and second order systems subjected standard input signals.
		CO4	Represent the complex physical system using block diagram and signal flow graph and obtain transfer function.
		CO5	Analyse a linear feedback control system for stability using Hurwitz criterion, Routh's criterion and root Locus technique in complex domain.
		CO6	Analyse the stability of linear feedback control systems in frequency domain using polar plots, Nyquist and Bode plots.
COMPUTER AIDED DESIGN AND MANUFACTURING	18ME72	CO1	Define Automation, CIM, CAD, CAM and explain the differences between these concepts. Solve simple problems of transformations of entities on computer screen.
		CO2	Explain the basics of automated manufacturing industries through mathematical models and analyze different types of automated flow lines.
		CO3	Analyse the automated flow line storeduce time and enhance productivity.
		CO4	Explain the use of different computer applications in manufacturing, and able to prepare part programs
		CO5	Visualize and appreciate the modern trends in Manufacturing like additive manufacturing, Industry 4.0 and applications of Internet of Things leading to Smart Manufacturing.
TOTAL QUALITY MANAGEMENT	18ME734	CO1	Explain the various approaches of TQM.
		CO2	Infer the customer perception of quality.
		CO3	Analyse customer needs and perceptions to design feedback systems.
		CO4	Apply statistical tools for continuous improvement of systems.

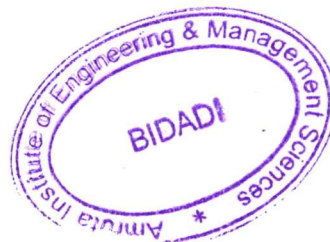


MECHATRONICS	18ME744	CO1	Illustrate various components of Mechatronics systems.
		CO2	Assess various control systems used in automation.
		CO3	Design and conduct experiments to evaluate the performance of a mechatronics system.
		CO4	Apply the principles of Mechatronics design to product design.
		CO5	Function effectively as members of multidisciplinary teams.
COMPUTRE AIDED MANUFACTURING LAB	18MEL76	CO1	To expose the students to the techniques of CNC programming and cutting tool path generation through CNC simulation software by using G-Codes and M-codes.
		CO2	To educate the students on the usage of CAM packages.
		CO3	To make the students understand the importance of automation in industries through exposure to FMS, Robotics, and Hydraulics and Pneumatics.
DESIGN LAB	18MEL77	CO1	Compute the natural frequency of the free and forced vibration of single degree freedom systems, critical speed of shafts.
		CO2	Carry out balancing of rotating masses.
		CO3	Analyse the governor characteristics.
		CO4	Determine stresses in disk, beams, plates and hook using photo elastic bench.
		CO5	Determination of Pressure distribution in Journal bearing.

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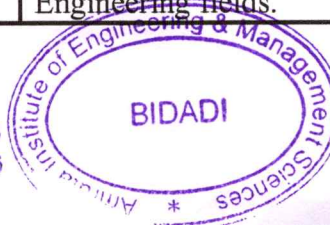
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VIII Semester			
Course Name	Course Code	COs	Statement
ENERGY ENGINEERING	18ME81	CO1	Understand the construction and working of steam generators and their accessories.
		CO2	Identify renewable energy sources and their utilization.
		CO3	Understand principles of energy conversion from alternate sources including wind, geothermal, ocean, biomass, nuclear, hydel and tidal.
AUTOMOBILE ENGINEERING	18ME824	CO1	To identify the different parts of an automobile and it's working
		CO2	To understand the working of transmission and braking systems
		CO3	To comprehend the working of steering and suspension systems
		CO4	To learn various types of fuels and injection systems
		CO5	To know the cause of automobile emissions, its effects on environment and methods to reduce the emissions
PROJECT WORK PHASE – 2	18MEP83	CO1	Identify various tools, techniques and technologies used in mechanical engineering.
		CO2	Understand the process to make reports and presentations.
		CO3	Applying ethical practices and engineering knowledge to solve industrial problems.
		CO4	Analyze complex engineering problems and tools used in different technologies.
TECHNICAL SEMINAR	18MEI85	CO1	Identify various technologies and recent trends in engineering.
		CO2	Understand problem identification, formulation and solution
		CO3	Demonstrate a sound technical knowledge of their selected seminar topic.
INTERNSHIP	18MEI85	CO1	Enhance the existing engineering knowledge and gain practical experience.
		CO2	Integrate and demonstrate existing and new technical knowledge for industrial application
		CO3	Recognize the need for lifelong learning processes with Management skills through critical reflection of internship experiences.
		CO4	Effectively present and write technical reports with professional ethics as an individual /Team on contemporary areas/trends/developments in Engineering fields.



PRINCIPAL

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BIDADI

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