AL AZHAR COLLEGE OF ENGINEERING & TECHNOLOGY

B TECH MECHANICAL ENGINEERING

2019 Scheme Syllabus - Course Outcomes

S1 B.Tech (2019) Syllabus

COURSE NAME	COURSE CODE	COURSE OUTCOME CODE	COURSE OUTCOME STATEMENTS
LINEAR ALGEBRA AND CALCULUS	MAT 101	CO 1	Solve system of Linear equations,diagonalize the matrices and characterise quadratic forms
		CO 2	Compute the partial and total derivatives and maxima and minima of multivariable functions
		CO 3	Compute multiple integrals and apply them to find area and volume of geometrical shapes,mass and centre of gravities of plane laminas
		CO 4	Perform various tests to determine whether a given series is convergent absolutely convergent or conditionally convergent
		CO 5	Determin the Taylor and Fourier series expansion of functions and learn their application
ENGINEERING CHEMISTRY	CYT 100	CO 1	Apply the basic concepts of Electrochemistryand corrosion to explore its possible applications in various Engineering fields
		CO 2	Understand various spectroscopic techniques like UV-VISIBLE,IR and NMR and its applications.
		CO 3	Apply the knowledge of analytical method for characterizing a chemical mixture or a compound.Understand the basic concept of SEM for srface characterisation of Nano materials.
		CO 4	Learn about the basics of stereochemistry and its application.Apply the knowledge of conducting polymers and advanced polymers in engineering.
		CO 5	Study various types of water treatment methods to develop skills for water treatments.
ENGINEERING GRAPHICS	EST 110	CO 1	Draw the projection of points and lines located in different quadrants
		CO 2	Prepare multiview orthographic projections of objects by visualizing them in different positions
		CO 3	Draw sectional views and develop surfaces of a given object

		CO 4	Prepare pictorial drawings using the principles of isometric and perspective projections to visualize objects in three dimensions.
		CO 5	Convert 3D views to orthographic views
BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	EST 130	CO 1	Apply fundamental concepts and circuit laws to solve simple DC electric and magnetic circuits
		CO 2	Develop and solve models of magnetic circuits
		CO 3	Apply the fundamental laws of electrical engineering to solve simple ac circuits in steady state
		CO 4	Describe working of a voltage amplifier
		CO 5	Outline the principle of an electronic instrumentation system
		CO 6	Explain the principle of radio and cellular communication
LIFE SKILLS	HUN 101	CO 1	To enable students to define and identify different life skills required in personal and professional life
		CO 2	To facilitate the students to develop an awareness of the self and apply well-defined techniques to cope with emotions and stress.
		CO 3	To inculcate effective communication and demonstrate these through presentations.
		CO 4	To enable students to take part in group discussions
		CO 5	To equip the students to use appropriate thinking and problem solving techniques to solve new problems
		CO 6	To create awareness on basics of teamwork and leadership.
ENGINEERING CHEMISTRY LAB	CYL 120	CO 1	Understand and practice different techniques of quantitativechemical analysis to generate experimental skills and apply this to various analyzes
		CO 2	Develop skills to synthesise Organic polymers and acquire knowledge about their applications and properties
		CO 3	Develop the ability to nderstand and explain the use of modern spectroscopic techniques for
			analysing and interpretingthe IR and NMR spectra of componds
		CO 4	Acqire the ability to understand and use pH meter to measure the acidic and basic character of solutions used for various analysis

		CO 5	Learn tobdesign and carry out scientific experiments as well as accurately record and analyze the reslts of experiments.
		CO 6	Function as a member of a team,communicate effectively and engage in furthur learning.Also understand how chemistry addresses social,economical and environmental problems and why it is an integral part of the curriculm
ELECTRICAL & ELECTRONICS WORKSHOP	ESL 130	CO 1	Demonstrate safety measures against electric shocks.
		CO 2	Identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and standard symbols
		CO 3	Develop the connection diagram, identify the suitable accessories and materials necessary for wiring simple lighting circuits for domestic buildings
		CO 4	Identify and test various electronic components
		CO 5	Draw circuit schematics with EDA tools
		CO 6	Assemble and test electronic circuits on boards
		CO 7	Work in a team with good interpersonal skill

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S2 B.Tech (2019) Syllabus

COURSE NAME	COURSE CODE	COURSE OUTCOME CODE	COURSE OUTCOME STATEMENTS
VECTOR CALCULUS, DIFFERENTIAL EQUATIONS AND TRANSFORMS	MAT 102	CO 1	Compute the derivatives and line integrals of vector functions and learn their applications
		CO 2	Evaluate surface and volume integrals and learn their inter relations and applications
		CO 3	Solve homogeneous and non homogeneous linear differential equations and their applications
		CO 4	Compute Laplace transforms and apply them to solve ODEs arising in Engineering
		CO 5	Determine Fourier Transform of functions and apply them to solve problems arising in Engineering
ENGINEERING PHYSICS B	PHT 110	CO 1	Compute the quantitative aspects of waves and oscillations in engineering systems.
		CO 2	Apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments.
		CO 3	Analyze the behaviour of matter in the atomic and subatomic level through the principles of quantum mechanics to perceive the microscopic processes in electronic devices.
		CO 4	Apply the knowledge of ultrasonics in non-destructive testing and use the principles of acoustics to explain the nature and characterization of acoustic design and to provide a safe and healthy environment
		CO 5	Apply the comprehended knowledge about laser and fibre optic communication systems in various engineering applications
ENGINEERING MECHANICS	EST 100	CO 1	Recall principles and theorems related to rigid body mechanics
		CO 2	Identify and describe the components of system of forces acting on the rigid body
		CO 3	Apply the conditions of equilibrium to various practical problems involving different force system.
		CO 4	Choose appropriate theorems, principles or

			formulae to solve problems of mechanics.
		CO 5	Solve problems involving rigid bodies, applying the properties of distributed areas and masses
BASICS OF CIVIL & MECHANICAL ENGINEERING	EST 120	CO 1	Recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering.
		CO 2	Explain different types of buildings, building components, building materials and building construction
		CO 3	Describe the importance, objectives and principles of surveying.
		CO 4	Summarise the basic infrastructure services MEP, HVAC, elevators, escalators and ramps
		CO 5	Discuss the Materials, energy systems, water management and environment for green buildings.
		CO 6	Analyse thermodynamic cycles and calculate its efficiency
		CO 7	Illustrate the working and features of IC Engines
		CO 8	Explain the basic principles of Refrigeration and Air Conditioning
		CO 9	Describe the working of hydraulic machines
		CO 10	Explain the working of power transmission elements
		CO 11	Describe the basic manufacturing, metal joining and machining processes
PROFESSIONAL COMMUNICATION	HUN 102	CO 1	Develop vocabulary and language skills relevant to engineering as a profession.
		CO 2	Analyze, interpret and effectively summarize a variety of textual content
		CO 3	Create effective technical Presentation
		CO 4	Discuss a given technical or non-technical topic in a group and arrive at generalizations/consensus
		CO 5	Identify drawbacks in listening patterns and apply techniques for specific needs
		CO 6	Create professional and technical documents that are clear and adhering to all the necessary conventions
PROGRAMMING IN	EST 102	CO 1	Compare various hardware and software

C			components of a computer system.
		CO 2	Design algorithm/flowchart for a given computational problem.
		CO 3	Develop C programs with branching and looping statements, which uses Arithmetic, Logical, Relational or Bitwise operators.
		CO 4	Develop C programs with arrays, structure or union for storing and processing the data.
		CO 5	Implement multi-function C programs for a given computational problem.
		CO 6	Build C programs which use pointers for array processing and parameter passing.
		CO 7	Develop readable C programs with files for reading input and storing output.
ENGINEERING PHYSICS LAB	PHL 120	CO 1	Develop analytical/experimental skills and impart prerequisite hands on experience for engineering laboratories.
		CO 2	Understand the need for precise measurement practices for data recording
		CO 3	Understand the principle, concept, working and applications of relevant technologies and comparison of results with theoretical calculations
		CO 4	Analyze the techniques and skills associated with modern scientific tools such as lasers and fiber optics
		CO 5	Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results
CIVIL & MECHANICAL WORKSHOP	ESL 120	CO 1	Name different devices and tools used for civil engineering measurements
		CO 2	Explain the use of various tools and devices for various field measurements
		CO 3	Demonstrate the steps involved in basic civil engineering activities like plot measurement, setting out operation, evaluating the natural profile of land, plumbing and undertaking simple construction work.
		CO 4	Choose materials and methods required for basic civil engineering activities like field measurements, masonry work and plumbing.
		CO 5	Compare different techniques and devices used in civil engineering measurements

		CO 6	Identify Basic Mechanical workshop operations in accordance with the material and objects
		CO 7	Apply appropriate Tools and Instruments with respect to the mechanical workshop trades
		CO 8	Apply appropriate safety measures with respect to the mechanical workshop trades

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S3 B.Tech (2019) Syllabus

COURSE NAME	COURSE CODE	COURSE OUTCOME CODE	COURSE OUTCOME STATEMENTS
PARTIAL DIFFERENTIAL EQUATION AND COMPLEX ANALYSIS	MAT201	CO 1	Understand the concept and solutions of PDE
		CO 2	Analyse and solve 1 D wave equation and heat equation
		CO 3	Understand the complex function ,its continuity,differentiability with use of CR equation
		CO 4	Evaluate complex integrals using Cauchy's theorem and Cauchy's integral formula,understand series expansion of Analytic functions
		CO 5	Understand series expansion of Complex functions about a sigularity and apply Residue theorem to compare several kinds of real integrals
MECHANICS OF SOLIDS	MET201	CO 1	Determine the stresses, strains and displacements of structures by tensorial and graphical (Mohr's circle) approaches
		CO 2	Analyse the strength of materials using stress-strain relationships for structural and thermal loading
		CO 3	Perform basic design of shafts subjected to torsional loading and analyse beams subjected to bending moments
		CO 4	Determine the deformation of structures subjected to various loading conditions using strain energy methods
		CO 5	Estimate the strength of thin cylinders, spherical vessels and columns, and appreciate the theories of failures and its relevance in mechanical design
MECHANICS OF FLUIDS	MET203	CO 1	Explain the physical properties of a fluid and the consequences of such properties on fluid flow
		CO 2	Compute the kinematical properties of a fluid element.
		CO 3	Apply the conservation principles of mass, energy and linear momentum to fluid flow systems

		CO 4	Calculate the energy losses in flow through pipes.
		CO 5	Use dimensional analysis for design and for conducting model tests.
METALLURGY & MATERIAL SCIENCE	MET205	CO 1	Understand the various nonconventional and net-shape manufacturing techniques and optimally select the appropriate process to realise a part.
		CO 2	Analyze the microstructure of metallic materials using phase diagrams and modify the microstructure and properties using different heat treatments
		CO 3	How to quantify mechanical integrity and failure in materials.
		CO 4	Apply the basic principles of ferrous and non-Ferrous metallurgy for selecting materials for specific applications
		CO 5	Define and differentiate engineering materials on the basis of structure and properties for engineering applications.
PROFESSIONAL ETHICS	HUT200	CO 1	Understand the core values that shape the ethical behaviour of a professional
		CO 2	Adopt a good character and follow an ethical life
		CO 3	Explain the role and responsibility in technological development by keeping personal ethics and legal ethics
		CO4	Solve moral and ethical problems through exploration and assessment by established experiments.
		CO5	Apply the knowledge of human values and social values to contemporary ethical values and global issues.
SUSTAINABLE ENGINEERING	MCN201	CO 1	Understand the relevance and the concept of sustainability and the global initiatives in this direction
		CO 2	Explain the different types of environmental pollution problems and their sustainable solutions
		CO 3	Discuss the environmental regulations and standards
		CO 4	Outline the concepts related to conventional and non-conventional energy
		CO 5	Demonstrate the broad perspective of sustainable practices by utilizing engineering

			knowledge and principles
COMPUTER AIDED MACHINE DRAWING	MEL201	CO 1	Apply the knowledge of engineering drawings and standards to prepare standard dimensioned drawings of machine parts and other engineering components.
		CO 2	Prepare standard assembly drawings of machine components and valves using part drawings and bill of materials.
		CO 3	Apply limits and tolerances to components and choose appropriate fits for given assemblies.
		CO 4	Interpret the symbols of welded, machining and surface roughness on the component drawings.
		CO 5	Prepare part and assembly drawings and Bill of Materials of machine components and valves using CAD software.
MATERIALS TESTING LAB	MEL203	CO 1	To understand the basic concepts of analysis of circular shafts subjected to torsion.
		CO 2	To understand the behaviour of engineering component subjected to cyclic loading and failure concepts
		CO 3	Evaluate the strength of ductile and brittle materials subjected to compressive, Tensile shear and bending forces
		CO 4	Evaluate the microstructural morphology of ductile or brittle materials and its fracture modes (ductile /brittle fracture) during tension test
		CO 5	To specify suitable material for applications in the field of design and manufacturing.

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2019 Scheme Syllabus - Course Outcomes
S4 B.Tech (2019) Syllabus

COURSE NAME	COURSE CODE	COURSE OUTCOME CODE	COURSE OUTCOME STATEMENTS
PROBABILITY, STATISTICS AND NUMERICAL METHODS	MAT202	CO 1	Understand the concept ,properties and important models of discrete random variables and ,using them,analyse suitable random phenomena
		CO 2	Understand the concept ,properties and important models of continuous random variables and ,using them,analyse suitable random phenomena
		CO 3	Perform statistical inferences concerning characteristics of a population based on attributes of samples drawn from the population
		CO 4	Compute roots of equations ,evaluate definite integrals and perform interpolation on given numerical data using standard numerical techniques
		CO 5	Apply standard numerical techniques for solving systems of equations, fitting curves on given numerical data and solving ordinary differential equations.
ENGINEERING THERMODYNAMICS	MET202	CO 1	Discuss the basic tenets of thermodynamics
		CO 2	Apply I Law of Thermodynamics to non-flow and steady flow processes
		CO 3	Examine the irreversibilities of processes using II law of Thermodynamics
		CO 4	Use equations of state and property charts to calculate change of property values during processes
		CO 5	Discuss important thermodynamic relations
MANUFACTURING PROCESS	MET204	CO 1	Illustrate the basic principles of foundry practices and special casting processes, their advantages, limitations and applications.
		CO 2	Categorize welding processes according to welding principle and material.
		CO 3	Understand requirements to achieve sound welded joint while welding different similar and dissimilar engineering materials.
		CO 4	Student will estimate the working loads for

			pressing, forging, wire drawing etc. processes
		CO 5	Recommend appropriate part manufacturing processes when provided a set of functional requirements and product development constraints.
FLUID MACHINERY	MET206	CO 1	Calculate forces and work done by a jet on fixed or moving flat plates and curved plates
		CO 2	Explain the working of turbines and Select a turbine for specific application.
		CO 3	Explain the characteristics of centrifugal and reciprocating pumps
		CO 4	Analyse the working of air compressors and Select the suitable one based on application.
		CO 5	Analyse gas turbines and Identify the improvements in basic gas turbine cycles.
DESIGN AND ENGINEERING	EST200	CO 1	Explain the different concepts and principles involved in design engineering.
		CO 2	Apply designthinkingwhilelearning and practicing engineering.
		CO 3	Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering.
CONSTITUTION OF INDIA	MCN202	CO 1	Explain the background of the present constitution of India and features.
		CO 2	Utilize the fundamental rights and duties.
		CO 3	Understand the working of the union executive, parliament and judiciary.
		CO 4	Understand the working of the state executive, legislature and judiciary.
		CO 5	Utilize the special provisions and statutory institutions.
		CO 6	Show national and patriotic spirit as responsible citizens of the country
FM & HM LAB	MEL202	CO 1	Determine the coefficient of discharge of flow measuring devices (notches, orifice meter and Venturi meter)
		CO 2	Calibrate flow measuring devices (notches, orifice meter and Venturi meter)
		CO 3	Evaluate the losses in pipes
		CO 4	Determine the metacentric height and stability of floating bodies
		CO 5	Determine the efficiency and plot the characteristic curves of different types of

			pumps and turbines
MACHINE TOOLS LAB-I	MEL204	CO 1	The students can operate different machine tools with understanding of work holders and operating principles to produce different part features to the desired quality.
		CO 2	Apply cutting mechanics to metal machining based on cutting force and power consumption.
		CO 3	Select appropriate machining processes and process parameters for different metals.
		CO4	Fabricate and assemble various metal components by welding and students will be able to visually examine their work and that of others for discontinuities and defects.
		CO5	Infer the changes in properties of steel on annealing, normalizing, hardening and tempering.

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S5 B.Tech (2019) Syllabus

COURSE NAME	COURSE CODE	COURSE OUTCOME CODE	COURSE OUTCOME STATEMENTS
MECHANICS OF MACHINERY	MET301	CO 1	Explain the fundamentals of kinematics, various planar mechanisms and interpret the basic principles of mechanisms and machines.
		CO 2	Students will be able to summarize how velocity & acceleration analysis can be done analytically as well as graphically and classify cams and followers
		CO 3	Students will be able to build a knowledge of synthesis of mechanisms and modern gear system design and able to distinguish between types of gears and gear parameters
		CO 4	Students will be able to analyze static force problems and gyroscopic effect on machines
		CO 5	Students will be ble to build knowledge on balancing of masses and machines
THERMAL ENGINEERING	MET303	CO 1	Explain the working of steam power cycle and related components economic analysis for decision making
		CO 2	Discuss the working of steam turbines and methods for evaluating the performance
		CO 3	Illustrate the performance testing and evaluation of IC engines
		CO 4	Explain the combustion phenomenon and pollution in IC engines
		CO 5	Discuss the principles of refrigeration and air-conditioning and basic design considerations
INDUSTRIAL & SYSTEMS ENGINEERING	MET305	CO 1	Implement various tools and techniques in industrial engineering
		CO 2	Calculate the inventory system for a given requirement
		CO 3	Explain the importance of industrial relations
		CO 4	Select the lean manufacturing tools to find and eliminate wastes
		CO 5	Identify the framework of agile manufacturing
		CO 6	Identify core and extended modules of

			enterprise resource planning
MACHINE TOOLS AND METROLOGY	MET307	CO 1	Analyze various machining process and calculate relevant quantities such us velocities, forces and powers.
		CO 2	Analyze of the tool nomenclature with surface roughness obtainable in each machining processes.
		CO 3	Understand the limitations of various machining process with regard to shape formation and surface texture.
		CO 4	Demonstrate knowledge of the underlying principles of measurement, as they relate to mechanical measurement, electronic instrumentation, and thermal effects.
		CO 5	Get an exposure to advanced measuring devices and machine tool metrology.
INDUSTRIAL ECONOMICS AND FOREIGN TRADE	HUT300	CO 1	Understand the problem of scarcity of resources and consumer behaviour, and to evaluate the impact of government policies on the general economic welfare.
		CO 2	Take appropriate decisions regarding volume of output and to evaluate the social cost of production.
		CO 3	Analyse the functional requirement of a firm under various competitive conditions.
		CO 4	Analyse the overall performance of the economy, and the regulation of economic fluctuations and its impact on various sections in the society.
		CO 5	Determine the impact of changes in global economic policies on the business opportunities of a firm.
DISASTER MANAGEMENT	MCN301	CO 1	Define and use various terminologies in use in disaster management parlance and organise each of these terms in relation to the disaster management cycle
		CO 2	Distinguish between different hazard types and vulnerability types and do vulnerability assessment
		CO 3	Identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk
		CO 4	Explain the core elements and phases of Disaster Risk Management and develop possible measures to reduce disaster risks across sector and community

		CO 5	Identify factors that determine the nature of disaster response and discuss the various disaster response actions
		CO 6	Explain the various legislations and best practices for disaster management and risk reduction at national and international level
MACHINE TOOLS LAB-II	MEL331	CO 1	Apply the procedures to measure length, angles, width, depth, bore diameters, internal and external tapers, tool angles, and surface roughness by using different instruments and by different indirect methods.
		CO 2	Determine limits and fits and allocate tolerances for machine components
		CO 3	CNC programming and to use coordinate measuring machine to record measurements of complex profiles with high sensitivity.
		CO 4	Use effective methods of measuring straightness, Squareness, flatness, roundness, profile, screw threads and gear teeth.
		CO 5	Securing knowledge of manufacturing components within the tolerance limit and surface roughness according to given drawings using various machine tools.
THERMAL ENGINEERING LAB-I	MEL333	CO 1	Measure thermo-physical properties of solid, liquid and gaseous fuels
		CO 2	Identify various systems and subsystems of Diesel and petrol engines
		CO 3	Analyse the performance characteristics of internal combustion engines
		CO 4	Investigate the emission characteristics of exhaust gases from IC Engines
		CO 5	Interpret the performance characteristics of air compressors / blowers

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2019 Scheme Syllabus - Course Outcomes
S6 B.Tech (2019) Syllabus

COURSE NAME	COURSE CODE	COURSE OUTCOME CODE	COURSE OUTCOME STATEMENTS
HEAT & MASS TRANSFER	MET302	CO 1	Apply principles of heat and mass transfer to engineering problems
		CO 2	Analyse and obtain solutions to problems involving various modes of heat transfer
		CO 3	Design heat transfer systems such as heat exchangers, fins, radiation shields etc.
		CO 4	Define laminar and turbulent boundary layers and ability to formulate energy equation in flow systems.
DYNAMICS OF MACHINERY & MACHINE DESIGN	MET304	CO 1	Do engine force analysis and to draw turning moment diagrams
		CO 2	Analyse free and forced vibrations of single degree of freedom systems
		CO 3	Determine the natural frequencies of a two degree of freedom vibrating system and to calculate the stresses in a structural member due to combined loading
		CO 4	Design machine elements subjected to fatigue loading and riveted joints
		CO 5	Design welded joint and close coiled helical compression spring
ADVANCED MANUFACTURING ENGINEERING	MET306	CO 1	To be conversant with the advanced machining process and to appreciate the effect of process parameters on the surface integrity aspects during the advanced machining process.
		CO 2	CNC programming, select appropriate tooling and fixtures.
		CO 3	To categorize the various nontraditional material removal process based on energy sources and mechanism employed
		CO 4	Analyze the processes and evaluate the role of each process parameter during micro-machining of various advanced material removal processes.
		CO 5	Explain the processes used in additive manufacturing for a range of materials and applications.

NON DESTRUCTIVE TESTING (Programme Elective I)	MET 312	CO 1	Have a basic knowledge of surface NDT which enables to carry out various inspections in accordance with the established procedures.
		CO 2	The students will be able to differentiate various defect types and select the appropriate NDT methods for the specimen.
		CO 3	Calibrate the instrument and evaluate the component for imperfections.
		CO4	Have a basic knowledge of ultrasonic testing which enables them to perform inspection of samples.
		CO 5	Have a complete theoretical and practical understanding of the radiographic testing, interpretation and evaluation.
MANAGEMENT FOR ENGINEERS	HUT310	CO 1	Explain the characteristics of management in the contemporary context
		CO 2	Describe the functions of management
		CO 3	Demonstrate ability in decision making process and productivity analysis
		CO 4	Illustrate project management technique and develop a project schedule
		CO 5	Summarize the functional areas of management
COMPREHENSIVE COURSE WORK	MET308	CO 1	Learn to prepare for a competitive examination
		CO 2	Comprehend the questions in Mechanical Engineering field and answer them with confidence
		CO 3	Communicate effectively with faculty in scholarly environments
		CO 4	Analyze the comprehensive knowledge gained in basic courses in the field of Mechanical Engineering
COMPUTER AIDED DESIGN & ANALYSIS LAB	MEL332	CO 1	Gain working knowledge in Computer Aided Design and modeling procedures.
		CO 2	Gain knowledge in creating solid machinery parts.
		CO 3	Gain knowledge in assembling machine elements.
		CO 4	Gain working knowledge in Finite Element Analysis.
		CO 5	Solve simple structural, heat, and fluid flow problems using standard software

THERMAL ENGINEERING LAB-II	MEL334	CO 1	Evaluate thermal properties of materials in conduction, convection and radiation
		CO 2	Analyse the performance of heat exchangers
		CO 3	Illustrate the operational performances of refrigeration and air conditioning systems Applying (K3)
		CO 4	Perform calibration of thermocouples and pressure gauges

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2019 Scheme Syllabus - Course Outcomes

S7 B.Tech (2019) Syllabus

COURSE NAME	COURSE CODE	COURSE OUTCOME CODE	COURSE OUTCOME STATEMENTS
DESIGN OF MACHINE ELEMENTS	MET413	CO 1	Understand the theoretical and practical knowledge in methods of non-destructive testing processes
		CO 2	Understand the knowledge of advanced methods in ultrasonic testing which enables them to perform inspection of samples.
		CO 3	Illustrate complete theoretical and practical understanding of the radiographic testing, interpretation and evaluation.
		CO 4	Understand the recent advances in the field of non-destructive testing
		CO 5	Outline the recent and advanced developments in radiography testing
ADVANCED METHODS IN NON DESTRUCTIVE TESTING(Programme Elective II)	MET463	CO 1	Understand operations, production system and perform facility location analysis.
		CO 2	Impart knowledge of facility layout, layout planning and perform line balancing.
		CO 3	Compute demand forecast and forecast accuracy.
		CO 4	Perform aggregate planning and materials requirement planning.
		CO 5	Apply various algorithms for production scheduling.
ENVIRONMENTAL IMPACT ASSESSMENT	CET415	CO 1	Explain the need for minimizing the environmental impacts of developmental activities
		CO 2	Outline environmental legislation & clearance procedure in the country

		CO 3	Apply various methodologies for assessing the environmental impacts of any developmental activity
		CO 4	Prepare an environmental impact assessment report
		CO 5	Conduct an environmental audit
INDUSTRIAL SAFETY ENGINEERING	MCN401	CO 1	Describe the theories of accident causation and preventive measures of industrial accidents
		CO 2	Explain about personal protective equipment, its selection, safety performance & indicators and importance of housekeeping.
		CO 3	Explain different issues in construction industries.
		CO 4	Describe various hazards associated with different machines and mechanical material handling.
		CO 5	Utilize different hazard identification tools in different industries with the knowledge of different types of chemical hazards.
MECHANICAL ENGINEERING LAB	MEL411	CO 1	Get practical knowledge on design and analysis of mechanisms in the machines.
		CO 2	Measure the cutting forces associated with milling machining operations.
		CO 3	Apply the basic concepts of hydraulic and pneumatic actuators and their applications in product and processes
		CO 4	Use appropriate systems for data acquisition and control of product and processes
SEMINAR	MEQ413	CO 1	Identify academic documents from the
			literature which are related to her/his areas of interest
		CO 2	Read and apprehend an academic document from the literature which is related to her/ his areas of interest
		CO 3	Prepare a presentation about an academic document
		CO 4	Give a presentation about an academic document
		CO 5	Prepare a technical report
PROJECT PHASE I	MED415	CO 1	Model and solve real world problems by applying knowledge across domains
		CO 2	Develop products, processes or technologies for sustainable and socially relevant applications

		CO 3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks
		CO 4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms
		CO 5	Identify technology/research gaps and propose innovative/creative solutions
		CO 6	Organize and communicate technical and scientific findings effectively in written and oral forms

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2019 Scheme Syllabus - Course Outcomes
S8 B.Tech (2019) Syllabus

COURSE NAME	COURSE CODE	COURSE OUTCOME CODE	COURSE OUTCOME STATEMENTS
MECHATRONICS	MET402	CO 1	Explain the sensors and actuators used in mechatronics
		CO 2	Design hydraulic and pneumatic circuits for automation.
		CO 3	Explain the manufacturing processes used in MEMS
		CO 4	Demonstrate the various components of a CNC machine
		CO 5	Create a PLC program
		CO 6	Explain the robotic sensors and vision system
QUALITY MANAGEMENT (Programme Elective III)	MET414	CO 1	To be conversant with important terms for quality management in organisations
		CO 2	Have a complete theoretical and practical understanding of the contributions of Quality Gurus
		CO 3	Demonstrate knowledge of the underlying principles of strategic quality management
		CO 4	Identify various human dimensions of TQM
		CO 5	Implement different tools and techniques in TQM
		CO 6	Identify core and extended modules of ISO 9000 family of standards
COMPOSITE MATERIALS (Programme Elective IV)	MET466	CO 1	To understand history about composites, various matrices and reinforcements used in composites
		CO 2	To understand types of fibers/ whiskers used in composites, structure, properties and applications, manufacturing process characteristics and applications, manufacturing methods, micromechanics of composites
		CO 3	To know about polymer matrix composites, classification, properties, characteristics and applications, manufacturing methods.
		CO 4	To know about metal matrix composites, classification, properties, characteristics and applications, manufacturing methods. Alloys and their potential role as matrices in composites. To understand about

			intermetallics.
		CO 5	To know about ceramic matrix composites, classification, properties,
ADDITIVE MANUFACTURING (Programme Elective V)	MET468	CO 1	Discuss various additive manufacturing processes
		CO 2	Explain slicing operations in additive manufacturing
		CO 3	Use liquid and solid based additive manufacturing system
		CO 4	Select powder based and use of pre requirement of AM
		CO 5	Apply rapid prototyping techniques for obtaining solutions 3
PROJECT PHASE II	MED416	CO 1	Model and solve real world problems by applying knowledge across domains
		CO 2	Develop products, processes or technologies for sustainable and socially relevant applications
		CO 3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks
		CO 4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms
		CO 5	Identify technology/research gaps and propose innovative/creative solutions
		CO 6	Organize and communicate technical and scientific findings effectively in written and oral forms