



Vidya Academy of Science & Technology

(A unit of Vidya International Charitable Trust)

Thalakkottukara PO, Thrissur, Kerala, India, Pin- 680 501

Phone: +91-4885-287751, 287752, Fax: 288366

COURSE OUTCOMES				
Branch: DEPARTMENT OF MECHANICAL ENGINEERING				
2019 SCHEME				
After the completion of the course the students will be able to				
Sl. No.	SEM	Subject	CO	CO statement
1	S1	MAT101 LINEAR ALGEBRA AND CALCULUS	MAT101.1	solve systems of linear equations, diagonalize matrices and characterise quadratic forms
			MAT101.2	compute the partial and total derivatives and maxima and minima of multivariable functions
			MAT101.3	compute multiple integrals and apply them to find areas and volumes of geometrical shapes, mass and centre of gravity of plane laminas
			MAT101.4	perform various tests to determine whether a given series is convergent, absolutely convergent or conditionally convergent
			MAT101.5	determine the Taylor and Fourier series expansion of functions and learn their applications.
2	S1	CYT 100 ENGINEERING (CHEMISTRY)	CYT100.1	apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields.
			CYT100.2	understand various spectroscopic techniques like UV-Visible, IR, NMR and its applications.
			CYT100.3	apply the knowledge of analytical method for characterizing a chemical mixture or a



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				compound. Understand the basic concept of SEM for surface characterisation of nanomaterials.
			CYT100.4	learn about the basics of stereochemistry and its application. Apply the knowledge of conducting polymers and advanced polymers in engineering.
			CYT100.5	study various types of water treatment methods to develop skills for treating wastewater.
3	S1	EST 110 ENGG.GRAPHICS	EST110.1	draw the projection of points and lines located in different quadrants
			EST110.2	prepare multiview orthographic projections of objects by visualizing them in different positions
			EST110.3	draw sectional views and develop surfaces of a given object
			EST110.4	prepare pictorial drawings using the principles of isometric and perspective projections to visualize objects in three dimensions.
			EST110.5	convert 3D views to orthographic views and vice versa using CAD tools
4	S1	HUN 101 LIFE SKILLS	HUN101.1	define and Identify different life skills required in personal and professional life
			HUN101.2	develop an awareness of the self and apply well-defined techniques to cope with emotions and stress.
			HUN101.3	explain the basic mechanics of effective communication and demonstrate these through presentations.
			HUN101.4	take part in group discussions
			HUN101.5	understand the basics of teamwork and leadership



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5	S1	EST 130 BASIC ELECTRONICS/EL ECTRICAL	EST130.1	apply fundamental concepts and circuit laws to solve simple DC electric circuits.
			EST130.2	develop and solve models of magnetic circuits.
			EST130.3	apply the fundamental laws of electrical engineering to solve simple ac circuits in steady state.
			EST130.4	describe the working of a voltage amplifier and to outline the principle of an electronic instrumentation system.
			EST130.5	explain the principle of radio and cellular communication.
6	S1	CYL 120 ENGINEERING CHEMISTRY LAB	CYL120.1	understand and practice different techniques of quantitative chemical analysis to generate experimental skills and apply these skills to various analyses
			CYL120.2	develop skills relevant to synthesize organic polymers and acquire the practical skill to use TLC for the identification of drugs
			CYL120.3	develop the ability to understand and explain the use of modern spectroscopic techniques for analysing and interpreting the IR spectra and NMR spectra of some organic compounds
			CYL120.4	acquire the ability to understand, explain and use instrumental techniques for chemical analysis
			CYL120.5	learn to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments
7	S1	ESL 130 ELECTRICAL &	ESL130.1	demonstrate safety measures against electric shocks.

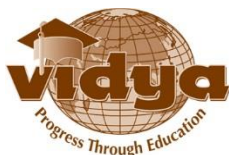


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		ELECTRONICS WORKSHOP	ESL130.2	identify the tools used for electrical wiring, electrical accessories, wires, cables, batteries and standard symbols.
			ESL130.3	develop the connection diagram, identify the suitable accessories and materials necessary for wiring simple lighting circuits for domestic buildings
			ESL130.4	identify and test various electronic components
			ESL130.5	make use of BIS/IEEE symbols to draw circuit schematics and experiment with and test electronic circuits on board
8	S2	MAT 102 VECTOR CALCULUS, DIFFERENTIAL EQUATIONS & TRANSFORMS	MAT102.1	compute the derivatives and line integrals of vector functions and learn their applications
			MAT102.2	evaluate surface and volume integrals and learn their inter-relations and applications.
			MAT102.3	solve homogeneous and non-homogeneous linear differential equation with constant coefficients
			MAT102.4	compute Laplace transform and apply them to solve ODEs arising in engineering
			MAT102.5	determine the Fourier transforms of functions and apply them to solve problems arising in engineering
9	S2	PHT 110 ENGINEERING PHYSICS	PHT110.1	compute the quantitative aspects of waves and oscillations in engineering systems.
			PHT110.2	apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural

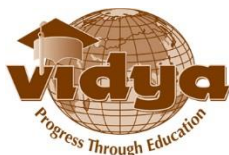


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				optical processes and optical instruments.
			PHT110.3	analyze the behaviour of matter in the atomic and subatomic level through the principles of quantum mechanics to perceive the microscopic processes in electronic devices.
			PHT110.4	classify the properties of magnetic materials and apply vector calculus to static magnetic fields and use Maxwell's equations to diverse engineering problem
			PHT110.5	analyze the principles behind various superconducting applications, explain the working of solid state lighting devices and fibre optic communication system
10	S2	EST 100 ENGINEERING MECHANICS	EST100.1	recall principles and theorems related to rigid body mechanics
			EST100.2	identify and describe the components of system of forces acting on the rigid body
			EST100.3	apply the conditions of equilibrium to various practical problems involving different force system.
			EST100.4	choose appropriate theorems, principles or formulae to solve problems of mechanics.
			EST100.5	solve problems involving rigid bodies, applying the properties of distributed areas and masses
11	S2	EST 102 BASICS OF	EST102.1	analyze a computational problem and develop an algorithm/flowchart to find its solution.

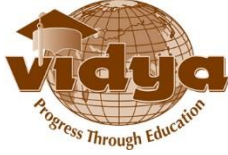


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		COMPUTER PROGRAMMING	EST102.2	develop readable C programs with branching and looping statements, which uses Arithmetic, Logical, Relational or Bitwise operators.
			EST102.3	write readable C programs with arrays, structure or union for storing the data to be processed.
			EST102.4	divide a given computational problem into a number of modules and develop a readable multi-function C program by using recursion if required, to find the solution to the computational problem.
			EST102.5	write readable C programs which use pointers for array processing and parameter passing. Develop readable C programs with files for reading input and storing output.
12	S2	EST 120 BASICS OF CIVIL AND MECHANICAL ENGINEERING	EST120.1	recall the role of civil engineer in society and to relate the various disciplines of Civil Engineering with special focus on Building construction and basics of Surveying
			EST120.2	summarize the basic infrastructure services MEP, HVAC, elevators, escalators and ramps and discuss the Materials, energy systems, water management and environment for green buildings.
			EST120.3	analyse thermodynamic cycles and their efficiency for illustrating working of IC Engines.
			EST120.4	explain the basic principles of refrigeration, air conditioning, hydraulic turbines and power transmission elements.



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			EST120.5	describe the basic manufacturing, metal joining and machining processes.
13	S2	HUN 102 PROFESSIONAL COMMUNICATION	HUN102.1	develop vocabulary and language skills relevant to engineering as a profession.
			HUN102.2	get the capability to analyze, interpret and effectively summarize a variety of textual content.
			HUN102.3	create effective technical presentations.
			HUN102.4	discuss a topic in a group setting and arrive at generalizations/ conclusions.
			HUN102.5	create professional and technical documents with required relevance and clarity.
14	S2	PHL 120 ENGINEERING PHYSICS LAB	PHL120.1	develop analytical/experimental skills and impart prerequisite hands on experience for engineering laboratories
			PHL120.2	understand the need for precise measurement practices for data recording
			PHL120.3	understand the principle, concept, working and applications of relevant technologies and comparison of results with theoretical calculations
			PHL120.4	analyze the techniques and skills associated with modern scientific tools such as lasers and fiber optics
			PHL120.5	develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results
15	S2	ESL 120 CIVIL & MECHANICAL WORKSHOP	ESL120.1	name different devices and tools used for civil engineering measurements and Explain the use of various tools and devices for various field measurements

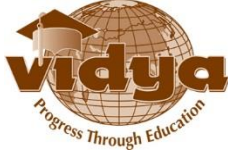


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			ESL120.2	demonstrate the steps involved in basic civil engineering activities like plot measurement, setting out operation, evaluating the natural profile of land, plumbing and undertaking simple construction work.
			ESL120.3	choose materials and methods required for basic civil engineering activities like field measurements, masonry work and plumbing and Compare different techniques and devices used in civil engineering measurements
			ESL120.4	identify Basic Mechanical workshop operations with appropriate Tools and Instruments with respect to the mechanical workshop trades in accordance with the material and Objects.
			ESL120.5	apply appropriate safety measures with respect to the mechanical workshop trades.
16	S3	MAT201 PARTIAL DIFFERENTIAL EQUATION AND COMPLEX ANALYSIS	MAT201.1	understand the concept and the solution of the partial differential equation.
			MAT201.2	analyse and solve one dimensional wave equation and heat equation.
			MAT201.3	understand complex functions, its continuity differentiability with the use of Cauchy-Riemann equations
			MAT201.4	evaluate complex integrals using Cauchy's integral theorem and Cauchy's integral formula, understand the series expansion of analytic function
			MAT201.5	understand the series expansion of complex function about a singularity and



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				Apply residue theorem to compute several kinds of real integrals
17	S3	MET201 MECHANICS OF SOLIDS	MET201.1	determine the stresses, strains and displacements of structures by tensorial and graphical (Mohr's circle) approaches
			MET201.2	analyse the strength of materials using stress-strain relationships for structural and thermal loading
			MET201.3	perform basic design of shafts subjected to torsional loading and analyse beams subjected to bending moments
			MET201.4	determine the deformation of structures subjected to various loading conditions using strain energy methods
			MET201.5	estimate the strength of thin cylinders, spherical vessels and columns, and appreciate the theories of failures and its relevance in mechanical design
18	S3	MET203 MECHANICS OF FLUIDS	MET203.1	define Properties of Fluids and Solve hydrostatic problems
			MET203.2	explain fluid kinematics and Classify fluid flows
			MET203.3	interpret Euler and Navier-Stokes equations and Solve problems using Bernoulli's equation
			MET203.4	evaluate energy loses in pipes and sketch energy gradient lines
			MET203.5	explain the concept of boundary layer and its applications and use dimensional Analysis for model studies
19	S3	MET205 METALLURGY & MATERIAL SCIENCE	MET205.1	understand the basic chemical bonds, crystal structures (BCC, FCC, and HCP), and their relationship with the properties.
			MET205.2	analyze the microstructure of metallic materials using phase diagrams and

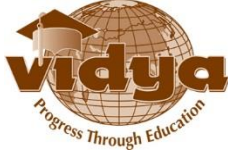


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				modify the microstructure and properties using different heat treatments.
			MET205.3	how to quantify mechanical integrity and failure in materials.
			MET205.4	apply the basic principles of ferrous and non-ferrous metallurgy for selecting materials for specific applications.
			MET205.5	define and differentiate engineering materials on the basis of structure and properties for engineering applications.
20	S3	HUT200 PROFESSIONAL ETHICS	HUT200.1	understand the core values that shape the ethical behaviour of a professional.
			HUT200.2	adopt a good character and follow an ethical life.
			HUT200.3	explain the role and responsibility in technological development by keeping personal ethics and legal ethics.
			HUT200.4	solve moral and ethical problems through exploration and assessment by established experiments.
			HUT200.5	apply the knowledge of human values and social values to contemporary ethical values and global issues.
21	S3	MCN201 SUSTAINABLE ENGINEERING	MCN201.1	understand the relevance and the concept of sustainability and the global initiatives in this direction
			MCN201.2	explain the different types of environmental pollution problems and their sustainable solutions
			MCN201.3	discuss the environmental regulations and standards
			MCN201.4	outline the concepts related to conventional and non-conventional energy



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			MCN201.5	demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles
22	S3	MEL201 COMPUTER AIDED MACHINE DRAWING (CAMD)	MEL201.1	apply the knowledge of engineering drawings and standards to prepare standard dimensioned drawings of machine parts and other engineering components.
			MEL201.2	prepare standard assembly drawings of machine components and valves using part drawings and bill of materials.
			MEL201.3	apply limits and tolerances to components and choose appropriate fits for given assemblies.
			MEL201.4	interpret the symbols of welded, machining and surface roughness on the component
			MEL201.5	prepare part and assembly drawings and Bill of Materials of machine components and valves using CAD software.
			23	S3
MEL203.2	to verify Clerk- Maxwell's Reciprocal Theorem and hence determine the Modulus of elasticity of steel.			
MEL203.3	to determine the Modulus of rigidity of steel using torsion test, spring test and torsion pendulum			
MEL203.4	to analyse the toughness of a specimen using Impact testing machine			
MEL203.5	to test the hardness of a material by Rockwell, Brinell and Vicker Hardness test.			
24	S4	MAT202 PROBABILITY,	MAT202.1	understand the concept, properties and important models of discrete random

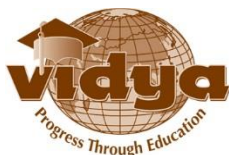


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		STATISTICS AND NUMERICAL METHODS		variables and, using them, analyse suitable random phenomena.
			MAT202.2	understand the concept, properties and important models of continuous random variables and, using them, analyse suitable random phenomena
			MAT202.3	perform statistical inferences concerning characteristics of a population based on attributes of samples drawn from the population
			MAT202.4	compute roots of equations, evaluate definite integrals and perform interpolation on given numerical data using standard numerical techniques
			MAT202.5	apply standard numerical techniques for solving systems of equations, fitting curves on given numerical data and solving ordinary differential equations
25	S4	MET202 ENGINEERING THERMODYNAMICS	MET202.1	understand basic concepts and laws of thermodynamics
			MET202.2	conduct first law analysis of open and closed systems
			MET202.3	determine entropy and availability changes associated with different processes
			MET202.4	understand the application and limitations of different equations of state
			MET202.5	determine change in properties of pure substances during phase change processes and Properties of ideal gas
26	S4	MET204 MANUFACTURING PROCESS	MET204.1	illustrate the basic principles of foundry practices and special casting processes, their advantages, limitations and applications.

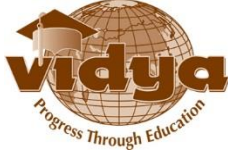


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			MET204.2	categorize welding processes according to welding principle and material
			MET204.3	understand requirements to achieve sound welded joint while welding different similar and dissimilar engineering materials.
			MET204.4	student will estimate the working loads for pressing, forging, wire drawing etc. processes
			MET204.5	recommend appropriate part manufacturing processes when provided a set of functional requirements and product development constraints.
27	S4	MET206 FLUID MACHINERY	MET206.1	explain the characteristics of centrifugal and reciprocating pumps
			MET206.2	calculate forces and work done by a jet on fixed or moving plate and curved plates
			MET206.3	explain the working of turbines and Select a turbine for specific application.
			MET206.4	analyse the working of air compressors and Select the suitable one based on application.
			MET206.5	analyse gas turbines and Identify the improvements in basic gas turbine cycles
28	S4	EST200 DESIGN AND ENGINEERING	EST200.1	explain the different concepts and principles involved in design engineering
			EST200.2	apply design thinking while learning and practicing engineering
			EST200.3	develop innovative, reliable designs incorporating knowledge in engineering.
			EST200.4	ability to work within multidisciplinary teams.



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			EST200.5	develop sustainable and economically viable designs incorporating knowledge in engineering.
29	S4	MEL202 FM & HM LAB	MEL202.1	determine coefficient of discharge of flow measuring devices (notches, orifice meter and venturimeter)
			MEL202.2	calibrate flow measuring devices (notches, orifice meter and venturimeter)
			MEL202.3	evaluate losses in pipes
			MEL202.4	determine the metacentric height and stability of floating bodies
			MEL202.5	determine the efficiency and plot the characteristic curves of different types of pumps and turbines
30	S4	MEL204 MACHINE TOOLS LAB-I	MEL204.1	operate different machine tools with understanding of work holders
			MEL204.2	apply cutting mechanics to metal machining based on cutting force and power consumption.
			MEL204.3	select appropriate machining processes and process parameters for different metals.
			MEL204.4	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.
			MEL204.5	infer the changes in properties of steel on annealing, normalizing, hardening and tempering.
31	S4	MCN202 CONSTITUTION OF INDIA	MCN202.1	explain the background of the present constitution of India and features
			MCN202.2	utilize the fundamental rights and duties.

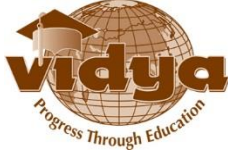


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			MCN202.3	understand the working of the union executive, parliament, state executive, legislature and judiciary.
			MCN202.4	utilize the special provisions and statutory institutions.
			MCN202.5	show national and patriotic spirit as responsible citizens of the country
32	S5	MET 307 MACHINE TOOLS AND METROLOGY	MET 307.1	analyze various machining process and calculate relevant quantities such as velocities, forces and powers.
			MET 307.2	analyze of the tool nomenclature with surface roughness obtainable in each machining processes.
			MET 307.3	understand the limitations of various machining process with regard to shape formation and surface texture
			MET 307.4	demonstrate knowledge of the underlying principles of measurement, as they relate to mechanical measurement, electronic instrumentation, and thermal effects.
			MET 307.5	get an exposure to advanced measuring devices and machine tool metrology
33	S5	MEL331 MACHINE TOOL LAB II	MEL331.1	to learn the measurement of bores by internal micrometers, bore indicators, indirect methods etc.
			MEL331.2	to learn the measurement of the Angle and taper by Bevel protractor, Sine bars, indirect methods etc.
			MEL331.3	allow to study the various limits, fits and tolerances adopted in the production drawings.



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			MEL331.4	to learn to measure straightness, flatness, roundness, profile, screw threads and gear teeth.
			MEL331.5	to learn, to prepare programs for CNC machines and measurements in CMM.
34	S5	MEL333 THERMAL ENGINEERING LAB I	MEL333.1	Measure thermo-physical properties of solid, liquid and gaseous fuels
			MEL333.2	Identify various systems and subsystems of Diesel and petrol engines
			MEL333.3	Analyze the performance characteristics of internal combustion engines
			MEL333.4	Investigate the emission characteristics of exhaust gasses from IC Engines
			MEL333.5	Interpret the performance characteristics of air compressors / blowers
35	S5	MET 303 THERMAL ENGINEERING	MET303.1	explain the working of steam power cycle and related components
			MET303.2	discuss the working of steam turbines and methods for evaluating the performance
			MET303.3	illustrate the performance testing and evaluation of IC engines
			MET303.4	explain the combustion phenomenon and pollution in IC engines
			MET303.5	discuss the principles of refrigeration and air-conditioning and basic design considerations
36	S5	MET305 INDUSTRIAL & SYSTEMS ENGINEERING	MET305.1	implement various tools and techniques in industrial engineering
			MET305.2	calculate the inventory system for a given requirement
			MET305.3	explain the importance of industrial relations

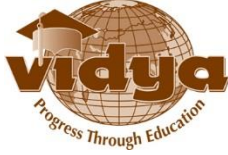


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			MET305.4	select the lean manufacturing tools to find and eliminate wastes and Identify the framework of agile manufacturing
			MET305.5	identify core and extended modules of enterprise resource planning.
37	S5	MCN 301 DISASTER MANAGEMENT	MCN 301.1	define and use various terminologies in use in disaster management parlance and organise each of these terms in relation to the disaster management
			MCN 301.2	distinguish between hazard types and vulnerability types and do vulnerability assessment
			MCN 301.3	identify the components and describe the process of risk assessment and apply appropriate methodologies to assess risk
			MCN 301.4	explain the core elements and phases of disaster risk management and develop possible measures to reduce disaster risks across sector and community.
			MCN 301.5	identify factors that determine the nature of disaster response and explain the various legislations and best practices for disaster management and risk reduction at national and international level.
38	S5	MET301 MECHANICS OF MACHINERY	MET301.1	explain the fundamentals of kinematics, various planar mechanisms and interpret the basic principles of mechanisms and machines
			MET301.2	perform analysis and synthesis of mechanisms
			MET301.3	solve the problem on cams and gear drives, including selection depending on requirement
			MET301.4	calculate the gyroscopic effect in various situations

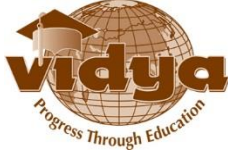


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			MET301.5	analyse rotating and reciprocating masses for its unbalance
39	S5	HUT 300 INDUSTRIAL ECONOMICS AND FOREIGN TRADE	HUT300.1	explain the problem of scarcity of resources and consumer behaviour, and to evaluate the impact of government policies on the general economic welfare. (Cognitive knowledge level: Understand)
			HUT300.2	take appropriate decisions regarding volume of output and to evaluate the social cost of production. (Cognitive knowledge level: Apply)
			HUT300.3	determine the functional requirement of a firm under various competitive conditions. (Cognitive knowledge level: Analyse)
			HUT300.4	examine the overall performance of the economy, and the regulation of economic fluctuations and its impact on various sections in the society. (Cognitive knowledge level: Analyse)
			HUT300.5	determine the impact of changes in global economic policies on the business opportunities of a firm. (Cognitive knowledge level: Analyse)
			40	S6
HUT310.2	describe the functions of management (Cognitive Knowledge level: Understand).			
HUT310.3	demonstrate ability in decision making process and productivity analysis			



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				(Cognitive Knowledge level: Understand).
			HUT310.4	illustrate project management technique and develop a project schedule (Cognitive Knowledge level: Apply).
			HUT310.5	summarize the functional areas of management and comprehend the concept of entrepreneurship and create business plans (Cognitive Knowledge level: Understand).
41	S6	MEL332 COMPUTERAIDED DESIGNANDANAL YSISLAB	MEL332.1	gain working knowledge in Computer Aided Design and modelling procedures.
			MEL332.2	gain knowledge in creating solid machinery parts.
			MEL332.3	gain knowledge in assembling machine elements.
			MEL332.4	gain working knowledge in Finite Element Analysis.
			MEL332.5	solve simple structural, heat and fluid flow problems using standard software
42	S6	MEL 334 THERMAL ENGINEERING LAB II	MEL334.1	evaluate thermal properties of materials in conduction, convection and radiation.
			MEL334.2	evaluate thermal properties of materials in convection.
			MEL334.3	evaluate thermal properties of materials in radiation.
			MEL334.4	analyse the performance of heat exchangers.
			MEL334.5	perform calibration of thermocouples and pressure gauges.
43	S6	MET 302 HEAT AND MASS TRANSFER	MET302.1	apply principles of conduction heat transfer and obtain solutions to problems involving conduction heat transfer

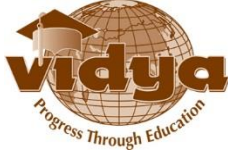


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			MET302.2	analyze and obtain solutions to problems involving convection heat transfer
			MET302.3	design heat transfer systems such as heat exchangers, fins etc.
			MET302.4	apply radiation heat transfer principles and design heat transfer systems such as radiation shields.
			MET302.5	apply principles of mass transfer to engineering problems
44	S6	MET304 DYNAMICS AND DESIGN OF MACHINERY	MET304.1	do engine force analysis and to draw turning moment diagrams.
			MET304.2	analyse free and forced vibrations of single degree of freedom systems.
			MET304.3	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.
			MET304.4	design machine elements subjected to fatigue loading and riveted joints.
			MET304.5	design welded joint and close coiled helical compression spring.
45	S6	MET306 ADVANCED MANUFACTURING ENGINEERING	MET306.1	to introduce machining principles and processes in the manufacturing of precision components and products that use conventional and nonconventional technologies
			MET306.2	to give basic understanding of the machining capabilities, limitations, and productivity of advanced manufacturing processes
			MET306.3	to describe how PLC's operate and how they control automated equipment and systems



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			MET306.4	to demonstrate tool path simulations with CNC powered equipment
			MET306.5	to introduce CNC programming
46	S6	MET352 AUTOMOBILE ENGINEERING	MET352.1	explain different automotive systems and subsystems
			MET352.2	illustrate the principles of transmission and suspension systems of an automobile
			MET352.3	illustrate the principles of braking systems of an automobile
			MET352.4	build a basic knowledge about the technology in electric vehicles
			MET352.5	summarize the concept of aerodynamics in automobiles.
			47	S6
MET312.2	the students will be able to differentiate various defect types and select the appropriate NDT methods for the specimen.			
MET312.3	calibrate the instrument and evaluate the component for imperfections.			
MET312.4	have a basic knowledge of ultrasonic testing which enables them to perform inspection of samples			
MET312.5	have a complete theoretical and practical understanding of the radiographic testing, interpretation and evaluation.			
48	S6	MET 308 COMPREHENSIVE COURSE WORK	MET308.1	learn to prepare for a competitive examination
			MET308.2	comprehend the questions in Mechanical Engineering field

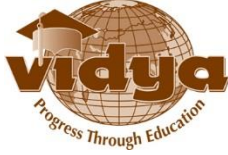


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			MET308.3	answer the questions in Mechanical Engineering field with confidence
			MET308.4	communicate effectively with faculty in scholarly environments
			MET308.5	analyze the comprehensive knowledge gained in basic courses in the field of Mechanical Engineering
49	S7	MET401 DESIGN OF MACHINE ELEMENTS	MET401.1	design shafts based on strength, rigidity and design for static and fatigue loads, design flat belts and connecting rod of IC engines
			MET401.2	design clutches and brakes
			MET401.3	analyse sliding contact bearings and understand design procedure of journal, ball and roller bearings.
			MET401.4	design Spur gear and helical gear
			MET401.5	design Bevel gears and worm gears
50	S7	MET463 OPERATIONS MANAGEMENT	MET463.1	understand operations, production system and perform facility location analysis.
			MET463.2	impart knowledge of facility layout, layout planning and perform linebalancing.
			MET463.3	compute demand forecast and forecast accuracy.
			MET463.4	perform aggregate planning and materials requirement planning.
			MET463.5	apply various algorithms for production scheduling
50	S7	MET473 AIR CONDITIONING AND REFRIGERATION	MET473.1	explain the basics of refrigeration process.
			MET473.2	analyse the vapour compression refrigeration system and to improve the performance

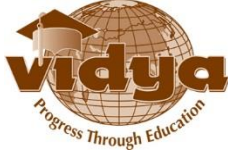


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			MET473.3	describe vapour absorption and steam refrigeration system.
			MET473.4	design refrigeration system by selecting suitable components and environmentally refrigerant
			MET473.5	evaluate the cooling load and capacity requirement of ac machine
51	S7	MCN401 INDUSTRIAL SAFETY ENGINEERING	MCN401.1	describe the theories of accident causation and preventive measures of industrial accidents. (Cognitive Knowledge level: Understand)
			MCN401.2	explain about personal protective equipment, its selection, safety performance & indicators and importance of housekeeping. (Cognitive Knowledge level: Understand)
			MCN401.3	explain different issues in construction industries. (Cognitive Knowledge level: Understand)
			MCN401.4	describe various hazards associated with different machines and mechanical material handling. (Cognitive Knowledge level: Understand)
			MCN401.5	utilise different hazard identification tools in different industries with the knowledge of different types of chemical hazards. (Cognitive Knowledge level: Apply)
51	S7	MEL411 MECHANICAL ENGINEERING LAB	MEL411.1	get practical knowledge on design and analysis of mechanisms in the machines.
			MEL411.2	measure the cutting forces associated with milling machining operations.
			MEL411.3	apply the basic concepts of hydraulic and pneumatic actuators and their applications in product and processes



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			MEL411.4	use appropriate systems for data acquisition and control of product and processes
			MEL411.5	apply the basic concepts of 3D printing and their applications in product and processes
52	S7	MEQ413 SEMINAR	MEQ413.1	identify academic documents from the literature which are related to her/his areas of interest (Cognitive knowledge level: Apply).
			MEQ413.2	read and apprehend an academic document from the literature which is related to her/ his areas of interest (Cognitive knowledge level: Analyze).
			MEQ413.3	prepare a presentation about an academic document (Cognitive knowledge level: Create).
			MEQ413.4	give a presentation about an academic document (Cognitive knowledge level: Apply).
			MEQ413.5	prepare a technical report (Cognitive knowledge level: Create).
52	S7	MED415 PROJECT PHASE I	MED415.1	model and solve real world problems by applying knowledge across domains (Cognitive knowledge level: Apply).
			MED415.2	develop products, processes or technologies for sustainable and socially relevant applications (Cognitive knowledge level: Apply).
			MED415.3	function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks. Organize and communicate

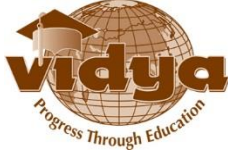


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				technical and scientific findings effectively in written and oral forms (Cognitive knowledge level: Apply).
			MED415.4	plan and execute tasks utilizing available resources within timelines, following ethical and professional norms (Cognitive knowledge level: Apply).
			MED415.5	identify technology/research gaps and propose innovative/creative solutions (Cognitive knowledge level: Analyze).
53	S8	MET402 MECHATRONICS	MET402.1	explain the sensors and actuators used in mechatronics
			MET402.2	design hydraulic and pneumatic circuits for automation.
			MET402.3	explain the manufacturing processes used in MEMS
			MET402.4	demonstrate the various components of a CNC machine
			MET402.5	create a PLC program
53	S8	MET414 QUALITY MANAGEMENT	MET414.1	to be conversant with important terms for quality management in organisations
			MET414.2	have a complete theoretical and practical understanding of the contributions of Quality Gurus
			MET414.3	demonstrate knowledge of the underlying principles of strategic quality management
			MET414.4	identify various human dimensions of TQM
			MET414.5	implement different tools and techniques in TQM
54	S8		MET466.1	be conversant with important terms for technology management in organisations



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		MET 466 TECHNOLOGY MANAGEMENT	MET466.2	explain the need of technology forecasting
			MET466.3	understand the essence of technology acquisition
			MET466.4	describe the elements of technology strategy
			MET466.5	outline the basics of innovation
54	S8	MET 458 ADVANCED ENERGY ENGINEERING	MET458.1	explain the concept of various types of power generation
			MET458.2	explain solar and wind power generation and its economics
			MET458.3	explain biomass energy sources and its economics
			MET458.4	explain various renewable energy sources
			MET458.5	explain environmental impacts of various energy generation
55	S8	MET 468 ADDITIVE MANUFACTURING	MET468.1	discuss various additive manufacturing processes
			MET468.2	explain slicing operations in additive manufacturing
			MET468.3	use liquid and solid based additive manufacturing system
			MET468.4	select powder based and use of pre requirement of AM
			MET468.5	apply rapid prototyping techniques for obtaining solutions
55	S8	MED416 PROJECT PHASE II	MED416.1	model and solve real world problems by applying knowledge across domains
			MED416.2	develop products, processes or technologies for sustainable and socially relevant applications

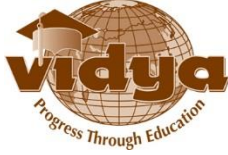


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			MED416.3	function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks
			MED416.4	plan and execute tasks utilizing available resources within timelines, following ethical and professional norms
			MED416.5	identify technology/research gaps and propose innovative/creative solutions



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