K L UNIVERSITY
DEPARTMENT OF MECHANICAL ENGINEERING
2014-2018 BATCH Course Outcomes (COs)

S NO	Course Code	Course Title	CO NO	Description of the Course Outcome
1	11BS104	ENGINEERING CHEMISTRY	CO1	Examine water quality and select appropriate purification technique for intended problem
			CO2	Predict potential complications from combining various chemicals or metals in an engineering setting
			CO3	Discuss fundamental aspects of electrochemistry and materials science relevant to corrosion phenomena
			CO4	Apply phase rule, polymers, conducting polymers and nano chemistry to engineering processes
2	13ES106	ENGINEERING MECHANICS	CO1	Understand the concept of forces and apply the static equilibrium equations.
			CO2	Analyze co-planar and non co-planar system of forces.
			CO3	Apply the concept of centroid & centre of gravity to determine moment of inertia.
			CO4	Analyze the rigid bodies under translation and rotation with and without considering forces.
3	13BS103	ENGINEERING PHYSICS	CO1	Explain how ultrasonic waves are produced and detected, Determine flaws present inside a material using NDT techniques.
			CO2	Compute the magnetic induction produced by current carrying conductors by using Biot-Savart law & Ampere's law, Compute the Lorentz force experienced by a charged particle.
			CO3	Understand different aberrations in lenses and their corrections, phenomenon of interference in thin films of uniform thickness
			CO4	Explain the working of optoelectronic devices like LED, photodiode, photo transistor and solar cells, Explain the phenomenon of superconductivity and its applications
4	13HS102	LANGUAGE AND REASONING SKILLS	CO1	Understand the method of identifying the meaning of words and apply them in contexts.
			CO2	Understand and analyze different cultures and the importance of empathy in cross-cultural communication.
			CO3	Understand and analyze seven techniques of reading and improve reading speed.
			CO4	Understand and apply writing strategies in office/ formal communication
5	13BS102	DIFFERENTIAL EQUATIONS	CO1	Describe different situations required to model differential equations. Classify the differential equations and identify suitable solution techniques
			CO2	Illustrate modeling an engineering problem as a first order ordinary differential equation (ODE) and solving it using numerical methods available viz. Taylor, Euler, modified Euler and Runge-Kutta method
			CO3	Analyze engineering problem solutions in particular electric circuits, deflection of beams, free oscillations, forced oscillations and resonance through differential equations
			CO3	Illustrate to model an engineering problem second order PDEs namely one dimensional wave and heat equations, two dimensional Laplace equation into PDEs and find their general solutions using C.F and P.I.
			CO1	Understand the importance of Environmental education and conservation of natural resources

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6	11BS105	ECOLOGY AND ENVIRONMENT	CO2	Understand the importance of ecosystems and biodiversity.
			CO3	Understand the knowledge on solid waste management
			CO4	Understand the knowledge on disaster management and EIA process
7	13ES105	WORKSHOP PRACTICE	CO1	Project based workshop to prepare different models with the aid of workshop trades i.e., Carpentry and Tin smithy
			CO2	Project based workshop to prepare different models with the aid of workshop trades i.e.,House wiring and Fitting
			CO3	Project based workshop to prepare different models with the aid of workshop trades i.e.,Fitting
8	13BS101	LINEAR ALGEBRA AND MULTIVARIATE CALCULUS	CO1	Perform elementary operations on matrices including determination of rank and inverse, demonstrate mastery in using matrix algebra to find the solution to a linear system equations, iterative methods: Jacobi's method and Gauss - Seidal method .Determine the eigen values and eigen vectors, Cayley-Hamilton theorem and its applications, nature of the quadratic forms
			CO2	Interpret and apply differential calculus on problems involving rate of change. Explain the geometrical interpretation and applications of Rolle's theorem and mean value theorems.Analyze the maximization and minimization problems.
			CO3	Illustrate the applications of integral calculus in solving problems on area, volume, displacement, work, etc. Computing improper integrals, Beta, Gamma functions and their properties. Compute multiple integrals by changing the order of integration and change of variables such as polar, spherical and cylindrical coordinates.
			CO4	Determine gradient, divergence and curl of vector point functions with their properties. Calculate the line, surface and volume integrals, Green's, Gauss divergence and Stoke's theorems and their applications.
9	13ES101	PROBLEM SOLVING THROUGH PROGRAMMING	CO1	Illustrate how problems are solved using computers and programming.
			CO2	Interpret & Illustrate user defined C functions and different operations on list of data.
			CO3	Implement Linear Data Structures and compare them.
			CO4	Implement Binary Trees.
10	13ES102	MEASURMENTS	CO1	Understand and apply the fundamentals of a measurement system, characteristics, transducers and metrology using
			CO2	Understand various electrical & computer parameters, and apply different measuring techniques on various electrical
			CO3	Understand electronic & electro-physiological parameters, and apply measuring techniques on electronic parameters
			CO4	Understand and apply different measuring techniques on civil and mechanical parameters using simulation and experimentation tools
11	13HS101	ENGLISH	CO1	Kinesics: To enable the students with the study of body language as it is an essential component of soft skills.
			CO2	Lexis: Vocabulary building
			CO3	English usage and mechanics: Grammar and verbal reasoning
			CO4	Office communication to improve learning skills

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12	13ES103	ENGINEERING MATERIALS	CO1	Understands structure of crystalline solids, kinds of crystal imperfections and appreciates structure-property
			CO2	Understands the role of electronic energy band structures of solids in governing various electrical and optical
			CO3	Understands role of molecular vibrations in determining thermal properties of materials and deformation of
			CO4	Understands spin and orbital motion of electrons in determining magnetic properties of materials and identifies their role in classification soft & hard magnetic materials
13	13HS104	HUMAN VALUES	CO1	realize and understand the basic aspiration, harmony in the human being.
			CO2	envisage the roadmap to fulfill the basic aspiration of human beings.
			CO3	Aanalyze the profession and his role in this existence.
			CO4	Develops holistic perception by understanding harmony in nature
14	11ES104	ENGINEERING GRAPHICS WITH CAD	CO1	Draft Orthographic views, projections of planes and , solidsmanually and by using CAD software Tool (AutoCAD)
			CO2	Drafting Sectional views , Isometric views manually and by using AutoCAD
			CO3	Development of surfaces and perspectives views manually and by using AutoCAD
15	13BS201	MATHEMATICAL METHODS	CO1	Identify different mathematical problems and reformulate them to facilitate numerical treatment using an appropriate technique.
			CO2	Apply Fourier series, Fourier transforms and Z-transforms to analyze various signals.
			CO3	Construct the probability distribution of a random variable, based on a real-world situation, and use it to compute expectation and variance and to estimate unknown parameters of populations and apply the tests of hypotheses.
16	13ES203	NETWORK THEORY	CO1	Understand the VI characteristics of electrical elements, solution of complex problems of DC circuits using transformations, nodal, mesh analysis and theorems
			CO2	Understand the fundamentals and interconnection relations of 3 – phase circuits
			CO3	Analyze the series and parallel resonance and magnetic circuits
			CO4	Analyze the transient analysis of DC / AC circuits, two port networks and solve complex networks using topology
17	13ME201	FLUID MECHANICS & HYDRAULIC MACHINES	CO1	Apply physical laws related to fluid static (Pascal's law and Hydrostatic law) in applications involving fluid flow.
			CO2	Apply fluid governing equations related to Fluid kinematics and dynamics (Continuity, Euler's, and
			CO3	Estimate different losses in pipe and use impulse momentum equation to analyze impact of jet on various
			CO4	Demonstrate and analyze the appropriate use of water turbine and centrifugal pump in given application.
			CO5	Demonstrate the use of flow and pressure measuring devices in fluid flow applications.
18	13 ME204	MANUFACTURING PROCESSES	CO1	Understand the concepts of manufacturing processes and engineering materials.
			CO2	Choose appropriate casting technique's and apply them for making the desired castings with specified size and shape.
			CO3	Create the components of desired geometry by identifying appropriate forming processes.
			CO4	Evaluate the welded components produced by inspection and testing methods.

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19	13 ME205	STRENGTH OF MATERIALS	CO1	Apply concepts of stress and strain to analyze members with axial load and torsion individually
			CO2	Analyze the members subjected to combination of stresses; Examine the behavior of beams subjected to lateral loads
			CO3	Analyze structural behavior of beams by determining normal and
			CO4	Analyze structural behavior of columns under load and thin pressure vessels
			CO5	Identify various mechanical properties of materials by performing tests
20	13ES201	THERMODYNAMICS	CO1	Apply first law of thermodynamics to non flow systems
			CO2	Apply steady flow energy equation and second law of thermodynamics to various processes and engineering devices
			CO3	apply principle of entropy and thermodynamic relations to thermodynamic system and process
			CO4	Evaluate the performance of Otto, Diesel, Dual cycles and Refrigeration cycles
21	13ME202	APPLIED THERMODYNAMICS	CO1	Understand the properties of Pure substances and analyze the Rankine cycle efficiency
			CO2	Understand the working of Boilers and Analyze the performance of Steam turbines
			CO3	Apply the principles of nozzle and analyze the performance of Condensers
			CO4	Apply the principles of Refrigeration and Psychrometry to refrigeration and air conditioning units
			CO5	Able to do design a power plant , air conditioning unit and a refrigeration plant
22	13ME206	MECHANISMS AND MACHINE THEORY	CO1	Identify various possible 4 link mechanisms and their inversions and applicability
			CO2	Analyze mechanisms kinematically using velocity and acceleration diagrams
			CO3	Generate cam profiles and Analyze gears and gear trains kinematically
			CO4	Perform balancing of rotating and reciprocating parts and identify gyroscopic effects on Ships & Automobiles
			CO5	Design Kinematically and Simulate mechanisms by using ADAMS software and analyze the data
23	13ES202	OBJECT ORIENTED PROGRAMMING	CO1	Understand Basic Concepts of OOP and apply the concepts of classes and objects through Java Language
			CO2	Apply the concepts of constructors, Overloading, parameter passing, access control, Inheritance.
			CO3	Apply Packages, Interfaces, Exception Handling.
			CO4	Apply I/O Streams and understand Basic Concepts of Multi –Threading
			CO5	Develop programs and projects in Java.
24	13ES204	DATA STRUCTURES	CO1	Student will be able to apply measures of efficiency to algorithms and Compare various linear data structures like
			CO2	Student will be able to analyze and compare linear data structures and analyze different searching and hashing techniques
			CO3	Student will be able to analyze and compare various non – linear data structures like Trees and Graphs.
			CO4	Student will be able to analyze and compare various sorting algorithms, to select from a range of possible
			CO5	Student will be able to understand and execute lab experiments and develop a project along with his/her team members

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25	13ES205	SIGNAL PROCESSING	CO1	Understand the representation, manipulation and processing operations of DT signals and systems
			CO2	Interpret the analysis of DT systems using Z.T.
			CO3	Apply the Fourier Transformation techniques for DT sequences and their applications
			CO4	Ability to design, Implementation and realization of digital filters.
			CO5	Design and implementation of the Signal processing algorithms in Matlab
26	13 BS 202	COMPLEX VARIABLES AND DISCRETE MATHEMATICS	CO1	Construct the analytic function and evaluate the contour integrals also represent analytic function as a series.
			CO2	Evaluate the integrals involving Bessel and Legendre polynomials and Model the given phenomena as difference equation and solve it
			CO3	Use graphs and trees as tools to visualize network problems
			CO4	Apply algorithms and theorems for construction of spanning
27	14ME221	MACHINE DRAWING	CO1	Draw various machine elements and parts
			CO2	To Draw Assembly drawing from the given part drawings; To draw Part Drawings from the given assembly drawing
28	13AC201	ENERGY AND SOCIETY	CO1	Understand the various forms of available energy and energy related aspects.
			CO2	Apply energy auditing methodology to estimate energy conservation of different case studies.
			CO3	Understand the environmental and geological impacts on the energy vice versa.
			CO4	Apply the planning and controlling aspects for economical energy usage.
29	13ME203	METALLURGY	CO1	Identify and differentiate various types of materials, apply concepts of Miller indices and understand various material testing methods
			CO2	Analyze the concept of cooling curves, equilibrium phase diagrams, and heat treatment techniques.
			CO3	Identify the importance of composites, ceramics and strengthening mechanisms.
			CO4	Identify various nano, smart, bio-materials and powder metallurgy process and their applications.
			CO5	Identification of metals and their alloys from microstructure study.
30	13ME301	INTERNAL COMBUSTION ENGINES AND GAS TURBINES	CO1	To analyze various operating variables that effects I.C engines.
			CO2	To analyze the normal combustion and abnormal combustion in I.C engines
			CO3	Analyze the performance parameters of I.C engines, and able to solve the problems.
			CO4	Analyze various methods for improving efficiencies of gas turbines, Evaluate the efficiencies of Gas Turbines and Jet engines
			CO5	To design and conduct experiments as well as to analyze and interpret data
31	13ME302	MACHINE TOOL ENGINEERING	CO1	Explain about phenomenon of metal cutting, chip formation, types of chips and chip breakers, tool materials and measurement of tool forces and problems
			CO2	Identify and describe the functions of the parts of lathe, shaper, planar and slotting machines, explain operations performed on these machines and also tool and work
			CO3	Describe the components of drilling, boring, milling and grinding machines and also explain operations performed on these machines and tool and work holding devices

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			CO4	Identify and describe elements of Jigs and Fixtures and also explain types of locators and clamps used. Students can also understand basic functions of NC, CNC and DNC
			CO5	Demonstrate various operations performed on lathe, mill, shaper, slotter, and drill and grinding machines and also know how to use different tool and work piece holders
32	13ME303	OPERATIONS RESEARCH	CO1	Identify Optimum solutions for various single objective problems using Linear Programming models
			CO2	Identify Optimum Solutions through Transportation and Assignment models
			CO3	Identify Optimum Solutions through Game theory, DPP, Queuing theory & Simulation models
			CO4	Solve project management problems using CPM, PERT and Crashing
			CO5	Solve Various Linear Programming, Transportation, Assignment, Game Theory and Simulation models through POM Software
33	13ME305	FINITE ELEMENT METHODS	CO1	Analyze and evaluate 3Dstresses & strains and the basic concepts of FEM
			CO2	Analyze and evaluate 1D structural problems and plane trusses using FEM
			CO3	Analyze and evaluate 2D problems including axi-symmetric solids subjected to axi-symmetric loading using FEM
			CO4	Analyze and evaluate Scalar filed (thermal) problems and structural dynamic problems using FEM
			CO5	Apply the theoretical concepts to conduct various interpretation by using Analysis software's
34	13AC301	ADVANCED EMPLOYABILITY SKILLS	CO1	Understand and adopt appropriate behavior patterns
			CO2	Understand ,remember and apply lexical, syntactic skills related to grammar, usage and composition
			CO3	Analyze and apply various interpersonal skills in day-to-day communication
			CO4	Understand, learn and apply .the principles of various types of GDs and Personal Interviews
35	13ME306	MECHANICAL ENGINEERING DESIGN	CO1	Analyze the stress and strain on mechanical components; and understand, identify and quantify failures resulting
			CO2	Design of Shafts and Couplings
			CO3	Design of Power Screws temporary and permanent joints
			CO4	Design of Springs and Flywheels
			CO5	Analyze machine elements using ANSYS software
36	13ME304	METROLOGY AND INSTRUMENTATION	CO1	Understand the elements of measurement system, experimental test plan and to identify the importance of
			CO2	Apply gear measurements coordinate measuring machines, slip gauges, comparators, transducers, sine bar and angle
			CO3	Select profile projectors, autocollimators, stylus instruments and to understand temperature measurement
			CO4	Analyze strain, pressure, force & torque measurements and to understand D/A & A/D conversion
			CO5	Experimental Analysis with Measuring Equipment and Instrumentation Equipment's
			CO1	Apply Fourier law of conduction for one dimensional heat conduction in various systems
			CO2	Analyze combined conduction and convective heat transfer under steady and unsteady state condition

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37	13ME401	HEAT TRANSFER	CO3	Apply Newton's law of cooling and evaluate convective heat transfer coefficient for different fluids
			CO4	Thermal design of two fluid heat exchangers. Understand and apply laws of radiation and evaluate radiate heat
			CO5	Experimental verification of various heat transfer parameters (Lab)
38	13ME335	AUTOMIBILE ENGINEERING	CO1	Understand different types of chassis, engine components, fuel systems and its working principles
			CO2	Understand different components of transmission system, cooling and lubrication systems
			CO3	Understand different components of suspension, steering and braking systems
			CO4	Understand different electric and electronic systems used in automobiles and pollution control techniques used in SI
39	13ME365	FLEXIBLE MANUFACTURING SYSTEMS	CO1	Apply Group Technology concept to identify cells and machine sequencing with basic concepts of manufacturing
			CO2	Apply Operational parameters and System performance measures to evaluate FMS Components
			CO3	Schedule Jobs in FMS Environment by understanding FMS Host Computer and Tool Management System
			CO4	Understand Implementation Issues, Applications of FMS and Robot Classification, Programming, applications
40	13ME356	MECHATRONICS SYSTEM AND CONTROL	CO1	Understanding the basic concepts of Modeling, Testing in terms of time domain and frequency domain
			CO2	Analyze the basic designing concepts of Modern and optimal controllers such as state feedback and state
			CO3	Analyze the basic designing concepts of Digital controller for digital systems
			CO4	Analyze the basic designing concepts of Non-linear controllers for non-linear systems
41	13ME331	REFRIGERATION AND AIR CONDITIONING	CO1	Analyze COP of different refrigeration cycles with different methods of refrigeration using different
			CO2	Analyze the performance of Vapor Compression Refrigeration with modification of cycle and its
			CO3	Understanding the working of Cascade systems for low temperature Production and of VAR system
			CO4	Analyze cooling load for comfort and industrial air conditioning on basis of processes on psychometric charts
42	13ME345	COMPUTER AIDED DESIGN	CO1	Understand the Fundamentals of CAD and display devices
			CO2	Apply the concept of geometric modeling
			CO3	Able to apply concept of Surface and solid modeling
			CO4	Application of various Geometric transformations
43	13ME366	MODERN MANUFACTURING PROCESSES	CO1	Select an appropriate mechanical energy based machining processes for suitable application.
			CO2	Select an appropriate chemical energy and electro-chemical energy based machining processes for suitable
			CO3	Select an appropriate thermo electric energy based machining processes for suitable application.
			CO4	Select an appropriate advanced welding and advanced forming processes for suitable application.
44	13ME357	MODELLING AND SIMULATION OF MECHATRONIC	CO1	Build mathematical models of mechatronic systems comprising of combinations of mechanical, electrical, pneumatic/ hydraulic and thermal systems.
			CO2	Represent system models using transfer function and /or state space approach.

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		MECHATRONIC SYSTEMS	CO3	Understand and apply system identification techniques for synthesizing system models
			CO4	Evaluate time and frequency response of systems
45	13ME341	ADVANCED STRENGTH OF MATERIALS	CO1	Analyze Indeterminate Beams
			CO2	Analyze Curved Beams and Beams subjected to Unsymmetrical bending
			CO3	Apply Energy methods to find deflections in simple Structures
			CO4	Analyze Stresses in Rotating members and Thick cylinders
46	13ME337	COMPUTATIONAL FLUID DYNAMICS	CO1	Understand the Fundamentals of CFD and governing equations
			CO2	Understand different CFD techniques and methods of solutions
			CO3	Understand time integration methods and grid generation
			CO4	Solving N-S equations and understand turbulence modeling
47	13ME402	MACHINE DESIGN	CO1	Design and selection of various belt and chain drives
			CO2	Design and Selection of the suitable bearing for the given loading condition
			CO3	Analyze kinematic and dynamic aspects in design of brakes, clutches and IC engine components
			CO4	Design and analysis of different types of gear drives
			CO5	Analyze machine elements using analysis software
48	13ME403	INDUSTRIAL ENGINEERING TECHNIQUES	CO1	Apply various work-study techniques to determine the standard time and efficiency.
			CO2	Analyze various quality control techniques for bringing out the best quality output.
			CO3	Apply various plant layout and production scheduling techniques to optimize productivity.
			CO4	Calculate future demand for the product in the market by applying appropriate forecasting technique.
49	13ME346	VEHICLE DYNAMICS	CO1	Analysis of loads acting on vehicle with different conditions and Understanding of Aerodynamics
			CO2	Understanding of tires and Analysing performance of vehicle on braking conditions
			CO3	Understanding of Multi Body dynamics and Analyzing roll over
			CO4	Analysis of steering and suspension systems
50	13ME349	FATIGUE, CREEP AND FRACTURE	CO1	Assess the failure of unflawed structural components
			CO2	Assess the fatigue life of structural components under the specified load spectrum
			CO3	Evaluate the fracture toughness and assess the life of flawed structural components
			CO4	Assess the life of structural components under creep
51	13ME358	SIGNAL PROCESSING IN MECHATRONIC SYSTEMS	CO1	Understand the sampling theorem and its importance in the digital world
			CO2	Understand the concepts of z-transform, dft, fft algorithms and their computations, Design of fir and iir filters
			CO3	Analyze multirate signal processing ,decimation, interpolation, subband coding

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			CO4	Analyze various Texas processor and application of DSP to speech and radar signal processing
52	13ME334	POWER PLANT ENGINEERING	CO1	Understand the working of system and subsystems of Hydro power plant and to Draw their layout diagrams.
			CO2	Understand the working of system and subsystems of Diesel and Thermal power plants and to draw their layout
			CO3	Understand the working of system and subsystems of Nuclear and Non-conventional energy sources power
			CO4	Understand power plant economics, methods of tariff and conservation of energy.
53	13ME364	AUTOMIBILE CHASSIS AND BODY ENGINEERING	CO1	Understand different car body types and safety in car
			CO2	Understand construction of bus bodies and commercial vehicles
			CO3	Understand vehicle aerodynamics, body loads and noise reduction techniques
			CO4	Understand different materials used in the vehicle body construction and painting
54	13ME367	CELLULAR MANUFACTURING	CO1	Understand the concept of group machining, objectives, terminologies, factors influencing success, implementation
			CO2	Apply cell formation techniques to identify cells and part families.
			CO3	Evaluate solutions obtained by cell formation techniques using performance measures
			CO4	Apply production control activities to cellular manufacturing problems.
55	13ME359	FUZZY SETS AND ARTIFICIAL INTELIGENCE	CO1	Basic concepts of Fuzzy Sets, Fuzzy Logic, Operations on Fuzzy sets and Probability and Possibility Measures.
			CO2	Fuzzy Methodologies, Relations and Applications of Fuzzy sets in various domains.
			CO3	Introduction to AI, Production system , Interpret the Problems and search related to AI and Predicate Calculus
			CO4	Knowledge Representation, Semantics Nets, Frames, and developing Knowledge base expert systems for various
56	13ME369	ENGINE SYSTEMS AND PERFORMANCE	CO1	Review analysis on Engine Basic Theory and Different Engine Technologies
			CO2	Performance Analysis on Mixture preparation systems for SI and CI Engines, Combustion in Engines
			CO3	Analysis of Engine Friction and lubrication, Cooling Systems, Speed Governing and Air Induction
			CO4	Performance Analysis of Engine Exhaust and Emission, Engine Testing and Performance, New Engine
57	13ME368	COMPUTER INTEGRATED MANUFACTURING	CO1	Apply the concept of group technology to identify part families and applications
			CO2	Understand the concepts of Flexible Manufacturing System and computerized manufacturing planning systems
			CO3	Comprehend Computer aided quality control and automatic identification techniques
			CO4	Understand aspects of Computer networks and trends in Manufacturing systems
58	13ME360	ENGINEERING SMART MATERIALS FOR MECHATRONIC APPLICATIONS	CO1	Piezo electric materials to Sensing & Actuation
			CO2	Shape memory alloys(SMA) to Sensing & Actuation
			CO3	Electro-active polymers(EAPs) to Sensing & Actuation
			CO4	Magnetostrictive materials for Sensing & Actuation. Future applications, trends of smart materials and smart material

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59	13ME374	OPERATIONS MANAGEMENT	CO1	Classify and explain the benefits of various production systems, layouts and usage of material handling equipment.
			CO2	Calculate future demand for the product in the market by applying appropriate
			CO3	Apply various production scheduling techniques to optimize productivity.
			CO4	Analyze various quality control techniques for bringing out the best quality output.
60	13ME344	VIBRATIONS ENGINEERING	CO1	Develop a mathematical model of a vibrating system and Perform detailed analysis of the response of 1DOF undamped systems under free vibration regime
			CO2	Perform detailed analysis of the response of 1DOF damped systems under free vibration regime
			CO3	Perform detailed analysis of the response of 1DOF systems under forced vibration regime
			CO4	Perform detailed analysis of the response of two and multi DOF systems under both free and forced vibration regimes
61	11 -OE414	DISASTER MANAGEMENT	CO1	Understand the types of disasters, related hazards and the causes for disasters
			CO2	Apply the resilience and mitigation measures for various disasters by proper planning with respect to the kind of
			CO3	Understand the disaster risk, reduction and the various organisations involved with related to disasters.
			CO4	Understand the disaster vulnerability with the help of case studies
62	11OE309	REMOTE SENSING AND GIS	CO1	To understand the basic concepts of remote sensing and image processing.
			CO2	To understand the basic concepts of Geographical Information System
			CO3	To acquire the knowledge of Integrating the Remote sensing and GIS
			CO4	To apply the remote sensing and GIS tool for solving various civil engineering and societal problems
63	11OE408	IPR & PATENT LAWS	CO1	Recognise the importance of Intellectual property rights
			CO2	Discuss and describe principles, scope and functions of GATT & WTO
			CO3	Understand and summarise regulatory affairs
			CO4	Prepare Documentation and protocols; case studies on patents
64	11OE426	RENEWABLE ENERGY RESOURCES	CO1	Understand the different solar thermal applications and solar photovoltaic cells
			CO2	Understand the operation of wind turbine ,different types of wind turbines and wave energy conversion
			CO3	Understand the energy conversion of Tidal, ocean thermal and various the geo thermal power plants
			CO4	Analyze the operation of Bio energy conversion methods and the different bio gas plants
65	12OE442	MECHATRONICS	CO1	Identify appropriate sensors, Identify appropriate actuation system for a given application.
			CO2	Identify appropriate microcontroller for a given application and to build a mathematical Model of system for
			CO3	Suggest an appropriate closed loop control strategy to attain the desired system behavior
			CO4	Suggest a Mechatronic product design for a given application
66	12OE443	ROBOTICS	CO1	Analyze existing robotic systems with respect to their anatomy, type, performance specifications, end effectors
			CO2	Suggest a robotic system design with respect to the suitable sensors, actuators for an intended application and simulate

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66	12OE443	ROBOTICS	CO3	Analyze robot manipulator performance with respect to digital control architecture comprising of PLC's
			CO4	Comprehensive understanding and identification of suitable Robotic system
67	11OE433	E-COMMERCE	CO1	Understand the E-Commerce revolution ,infrastructure and Analyze various E-Commerce Business Models
			CO2	Analyze Building an E-Commerce website and focus on security, payment systems and Marketingconcepts.
			CO3	Analyze Marketing communications and understand the Ethical, Social and Political issues in E-Commerce
			CO4	Analyze the supply chain management, Internet resources and applications for E-Commerce
68	13OE429	FUNDAMENTALS OF INFORMATION TECHNOLOGY	CO1	Understand the architectural design of a computer and various basic concepts of operating systems and
			CO2	Analyze various software development methodologies and gain capability to design databases**.**
			CO3	Apply various SQL commands and Transaction Processing.
			CO4	Apply OOP and model for different case studies using UML
69	13OE421	LINUX PROGRAMMING	CO1	Understand the fundamental LINUX operating system and utilities.
			CO2	Develop shell scripts for solving logical problems
			CO3	Analyze the file System, Processes and Signals concepts
			CO4	Develop programs using various IPC mechanisms
70	11 OE 431	RADAR SYSTEMS	CO1	Understand the essential principles of operation and design of simple radar systems and the associated signal
			CO2	Apply the mathematical models relavent to radar systems to calculate system performance and apply the principles of
			CO3	Understand essential elements of Transmitters , Receivers and design of simple Radar Receiver
			CO4	Understand the concepts of different elements that protect the Radar Receives and Principles of various Synthetic
71	11-OE-422	OPTICAL ENGINEERING	CO1	Understand the basics of Light signals and different types of Optical Engineering methodologies
			CO2	Analyze the concepts of transmission characteristics of optical fibers and optical transmitters
			CO3	Understand the concepts of optical Detectors, optical Sensors and their applications
			CO4	Analyze the concept of optical fiber systems and instruments
72	11-OE-424	MOBILE COMMUNICATIONS	CO1	Describe various 2G,3G,4G,5G wireless network models.
			CO2	Explain three basic propagation mechanism .
			CO3	Discuss wireless system standards,gsm services
			CO4	Discuss ofdm wireless communication
73	11OE432	DATA WAREHOUSING AND MINING	CO1	Understand basic concepts of Databases and issues related to Data mining.
			CO2	Analyze Data warehouse Architecture and Data Pre-processing techniques
			CO3	Analyze Association rules in large data bases , Classification and Prediction techniques
			CO4	Analyze Clustering techniques on large data bases

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74	12OE445	FUNDAMENTALS OF DATABASE MANAGEMENT SYSTEMS	CO1	Understand the fundamentals of database management systems.
			CO2	Construct database tables using SQL
			CO3	Analyze various normalization techniques and develop procedures and functions in PL/SQL
			CO4	Understand the file storage structures in the Database Management and transaction processing.
75	13-OE475	MEASURMENTS AND INSTRUMENTATION	CO1	Understand the basic principles of Measurement Systems.
			CO2	Explore the Transducers and their classification.
			CO3	Elucidate the basic principles of Signal conditioning & signal analyzers.
			CO4	Understand Digital systems& Recording systems.
76	13 OE 432	ANIMATION FOR ENGINEERS	CO1	Understand about 3D interface environment and its functioning
			CO2	Apply primitive level 3d Models
			CO3	Apply basic 3d animation video with 3d elements.
			CO4	Apply basic 3d animation
77	13OE433	PHOTOGRAPHY	CO1	Demonstrate the photography history and changes in technology.
			CO2	Determine different Camera components and techniques involved in Basic Photography
			CO3	Identify the different dynamic methods of image making using light.
			CO4	Applying basic methods of photography for Engineering problems.
78	11HS 202	PARADIGMS IN MANAGEMENT THOUGHT	CO1	Understand the basic management concepts along with an insight into levels of management
			CO2	Understand the key contributions of classical approach to Management
			CO3	Understand and apply Quantitative methods to improve Management performance.
			CO4	Understand the key contributions of Behavioural and contemporary approaches to Management
79	11-HS-203	INDIAN ECONOMY	CO1	To have an understanding on various types of economic systems and their functioning, circular flow of economic
			CO2	To have an understanding on problems like un employment, poverty, and agricultural sector and
			CO3	To understand the importance of territory sector
			CO4	To know about economic planning in our Indian economy
80	11-HS-208	MANAGING PERSONAL FINANCE	CO1	Understand the need for effective financial planning
			CO2	Apply tax planning strategies to meet the Personal Financial goals.
			CO3	Evaluate strategies adopted for Home, Automobile, Equity and Bond investments.
			CO4	Evaluate various financial tax saving schemes such as insurance and mutual funds.
81	11 HS 209	BASICS OF MARKETING FOR ENGINEERS	CO1	Understand the concepts of marketing, factors influencing the consumer behavior, decision making process and
			CO2	Apply the insight earned about consumer psychology in improving the demand of the product in the market.
			CO3	Analyze the markets and consumers, the changing environmental factors with special focus on technology

S NO	Course Code	Course Title	CO NO	Description of the Course Outcome
			CO4	Create an appropriate strategy for the marketing of high tech products and services
82	11HS211	ORGANIZATION MANAGEMENT	CO1	Understand the various management theories and management approaches.
			CO2	Have knowledge in organization structures and organization principles.
			CO3	Have basic knowledge in motivation, motivation theories and leadership theories, moral and behavioral sciences and
			CO4	Understand the various issues in industrial relations, trade unions and college bargaining