

**PROGRAM OUTCOME (PO), PROGRAM SPECIFIC OUTCOME (PSO) (2021-22)****BTECH CIVIL ENGINEERING****PROGRAMME OUTCOME**

PO1: Use the knowledge of mathematics and sciences to be applied in the field of Civil Engineering.

PO2: Identify and critically analyze problems related to Civil Engineering by using appropriate analytical tools and through literature review.

PO3: Investigate the identified problem, plan and perform experiment, case studies and practices and use the result, data from the literature, databases & relevant codes to solve identified engineering problems & provide valid conclusions.

PO4: Select and apply appropriate techniques, resources and modern tools in civil engineering activities & also understand the limitation.

PO5: Understand the need for sustainable development in the field civil engineering.

PO6: Understand norms of engineering and be committed to ethical and professional responsibilities of a Civil engineer.

PO7: Communicate effectively by giving and receiving clear instructions, through effective presentations with the civil engineering community and the society at large and be able to design documents and write effective reports.

PO8: Engage in life-long learning particularly in innovative and specialized technologies.

PO9: Communication: An ability to apply oral, written and graphical communication in both technical and non-technical environments and ability to use appropriate technical literature.

PO10: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the context of technological changes.

**COURSE OUTCOME**

SEMESTER	COURSE NAME	COURSE CODE	COURSE OUTCOME
	ENGINEERING PHYSICS	KAS101T	1. To solve the classical and wave mechanics problems. 2. To develop the understanding of laws of thermodynamics and their application in various processes. 3. To formulate and solve the engineering problems on Electromagnetism & Electromagnetic Field Theory. 4. To aware of limits of classical physics & to apply the ideas in solving the problems in their parent Streams.
	ENGINEERING CHEMISTRY	KAS101T	1. Use of different analytical instruments. 2. Measure molecular/ system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water. 3. Measure hardness of water. 4. Estimate the rate constant of reaction.

<p><b>ENGINEERING MATHEMATICS-I</b></p>	<p><b>KAS103T</b></p>	<p>CO 1. Remember the concept of matrices and apply for solving linear simultaneous equations.  CO 2. Understand the concept of limit continuity and differentiability and apply in the study of Rolle,s, Lagrange,s and Cauchy mean value theorem and Leibnitz theorems .  CO 3. Identify the application of partial differentiation and apply for evaluating maxima, minima, series and Jacobians.  CO 4. Illustrate the working methods of multiple integral and apply for finding area, volume, centre of mass and centre of gravity.  CO 5. Remember the concept of vector and apply for directional derivatives, tangent and normal planes. Also evaluate line, surface and volume integrals.</p>
<p><b>BASIC ELECTRICAL ENGINEERING</b></p>	<p><b>KEE101T</b></p>	<p>1. Apply the concepts of KVL/KCL and network theorems in solving DC circuits.  2. Analyze the steady state behavior of single phase and three phase AC electrical circuits.  3. Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer.  4. Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications.  5. Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.</p>
<p><b>EMERGING DOMAIN IN ELECTRONICS ENGINEERING</b></p>	<p><b>KEC101T</b></p>	<p>1. Understand the concept of PN Junction and devices.  2. Understand the concept of BJT, FET and MOFET.  3. Understand the concept of Operational amplifier  4. Understand the concept of measurement instrument.  5. Understand the working principle of different type of sensor and their uses.  6. Understand the concept of IoT system &amp; Understand the component of IoT system.</p>

<b>PROGRAMMING FOR PROBLEM SOLVING</b>	<b>KCS101T</b>	1. To develop simple algorithms for arithmetic and logical problems. 2. To translate the algorithms to programs & execution (in C language) 3. To implement conditional branching, iteration and recursion. 4. To decompose a problem into functions and synthesize a complete program using divide and conquer approach. 5. To use arrays, pointers and structures to develop algorithms and programs.
<b>FUNDAMENTALS OF MECHANICAL ENGINEERING &amp; MECHATRONICS</b>	<b>KME101T</b>	CO1. Understand the concept of stress and strain, factor of safety, beams. CO2. Understand the basic component and working of internal combustion engines, electric and hybrid vehicles, refrigerator and heat pump, air conditioning. CO3. Understand fluid properties, conservation laws, hydraulic machinery used in real life. CO4. Understand the working principle of different measuring instrument with the knowledge of accuracy, error and calibration, limit, fit, tolerance and control system. CO5. Understand concept of mechatronics with their advantages, scope and Industrial application, the different types of mechanical actuation system, the different types of hydraulic and pneumatic systems. CO6. Apply concepts of strength of material for safe design, refrigeration for calculation of COP, concepts of fluid mechanics in real life, concepts of measurements in production systems.
<b>ENGINEERING PHYSICS LAB</b>	<b>KAS151P</b>	1. To determine the wavelength of sodium light by Newton's ring Experiment. 2. To determine the wavelength of sodium light with the help of Fresnel's bi-prism. 3. To determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil. 4. To draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss.

SEM I

<b>ENGINEERING CHEMISTRY LAB</b>	<b>KAS152P</b>	<ol style="list-style-type: none"><li>1. Use of different analytical instruments.</li><li>2. Measure molecular/system properties such as surface tension, viscosity,</li><li>3. Measure conductance of solution, chloride and iron content in water, hardness of water.</li><li>4. Estimate the rate constant of reaction.</li></ol>
<b>BASIC ELECTRICAL ENGINEERING LAB</b>	<b>KEE151P</b>	<ol style="list-style-type: none"><li>1. Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits.</li><li>2. Demonstrate the behavior of AC circuits connected to single phase AC supply and measure power in single phase as well as three phase electrical circuits.</li><li>3. Perform experiment illustrating BH curve of magnetic materials.</li><li>4. Calculate efficiency of a single phase transformer and DC machine.</li><li>5. Perform experiments on speed measurement and reversal of direction of three phase induction motor and Identify the type of DC and AC machines based on their construction.</li></ol>
<b>ENGINEERING CHEMISTRY LAB</b>	<b>KAS152P</b>	<ol style="list-style-type: none"><li>1. Use of different analytical instruments.</li><li>2. Measure molecular/system properties such as surface tension, viscosity,</li><li>3. Measure conductance of solution, chloride and iron content in water, hardness of water.</li><li>4. Estimate the rate constant of reaction.</li></ol>
<b>BASIC ELECTRICAL ENGINEERING LAB</b>	<b>KEE151P</b>	<ol style="list-style-type: none"><li>1. Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits.</li><li>2. Demonstrate the behavior of AC circuits connected to single phase AC supply and measure power in single phase as well as three phase electrical circuits.</li><li>3. Perform experiment illustrating BH curve of magnetic materials.</li><li>4. Calculate efficiency of a single phase transformer and DC machine.</li><li>5. Perform experiments on speed measurement and reversal of direction of three phase induction motor and Identify the type of DC and AC machines based on their construction.</li></ol>

<p><b>PROGRAMMING FOR PROBLEM SOLVING LAB</b></p>	<p><b>KCS151P</b></p>	<p>CO 1 Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems.  CO 2 Demonstrate an understanding of computer programming language concepts.  CO 3 Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.  CO 4 Able to define data types and use them in simple data processing applications also he/she must be able to use the concept of array of structures.  CO 5 Develop confidence for self education and ability for life-long learning needed for Computer language.</p>
<p><b>ENGLISH LANGUAGE LAB</b></p>	<p><b>KAS154P</b></p>	<p>1. Students will be enabled to understand the basic objective of the course by being acquainted with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking.  2. Students would be able to create substantial base by the formation of strong professional vocabulary for its application at different platforms and through numerous modes as Comprehension, reading, writing and speaking etc.  3. Students will apply it at their work place for writing purposes such as Presentation/official drafting/ administrative communication and use it for document/project/report/research paper writing.  4. Students will be made to evaluate the correct and error-free writing by being well-versed in rules of English grammar and cultivate relevant technical style of communication &amp; presentation at their work place and also for academic uses.  5. Students will apply it for practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics. They will apply techniques for developing interpersonal communication skills and positive attitude leading to their professional competence.</p>

<b>ENGINEERING GRAPHICS &amp; DESIGN LAB</b>	<b>KCE151P</b>	<ol style="list-style-type: none"> <li>1. Understanding of the visual aspects of engineering design.</li> <li>2. Understanding of engineering graphics standards and solid modeling.</li> <li>3. Effective communication through graphics.</li> <li>4. Applying modern engineering tools necessary for engineering practice.</li> <li>5. Applying computer-aided geometric design.</li> <li>6. Analysis of Isometric views.</li> <li>7. Creating working drawings.</li> </ol>
<b>MECHANICAL WORKSHOP LAB</b>	<b>KWS151P</b>	<p>CO1 Use various engineering materials, tools, machines and measuring equipments.</p> <p>CO2 Perform machine operations in lathe and CNC machine.</p> <p>CO3 Perform manufacturing operations on components in fitting and carpentry shop.</p> <p>CO4 Perform operations in welding, moulding, casting and gas cutting.</p> <p>CO5 Fabricate a job by 3D printing manufacturing technique.</p>
<b>ARTIFICIAL INTELLIGENCE FOR ENGINEERS</b>	<b>KMC101</b>	<p>CO1 Understand the evolution and various approaches of AI</p> <p>CO2 Understand data storage, processing, visualization, and its use in regression, clustering etc.</p> <p>CO3 Understand natural language processing and chatbots.</p> <p>CO4 Understand the concepts of neural networks.</p> <p>CO5 Understand the concepts of face, object, speech recognition and Robots.</p>
<b>EMERGING TECHNOLOGY FOR ENGINEERING</b>	<b>KMC102</b>	<p>CO1 Understand the concepts of internet of things, smart cities and industrial internet of things.</p> <p>CO2 Understand the concepts of cloud computing.</p> <p>CO3 Understand the concepts of block chain, cryptocurrencies, smart Contracts.</p> <p>CO4 Understand design principles, tools, trends in 3 D printing and drones.</p> <p>CO5 Understand augmented reality ( AR), virtual reality (VR), 5G technology, brain computer interface and human brain.</p>

<b>SOFT SKILL I</b>	<b>KNC101</b>	<p>Unit 1- Students will be enabled to understand the correct usage of grammar.</p> <p>Unit 2- Students will apply the fundamental inputs of communication skills in making speech delivery, individual conference, and group communication.</p> <p>Unit 3-Students will evaluate the impact of interpersonal Communication on their performance as a professional and in obtaining professional excellence at the workplace.</p> <p>Unit 4-Skills and techniques of persuasion and negotiation would enhance the level of students at multifarious administrative and managerial platforms.</p> <p>Unit 5-Student will be able to equip with basics of communication skills and will apply it for practical and oral purposes by being honed up in presentation skills and voice-dynamics.</p>
<b>ENGINEERING PHYSICS</b>	<b>KAS201T</b>	<ol style="list-style-type: none"> <li>1. To solve the classical and wave mechanics problems.</li> <li>2. To develop the understanding of laws of thermodynamics and their application in various processes</li> <li>3. To formulate and solve the engineering problems on Electromagnetism &amp; Electromagnetic Field Theory.</li> <li>4. To aware of limits of classical physics &amp; to apply the ideas in solving the problems in their parent streams.</li> </ol>
<b>ENGINEERING CHEMISTRY</b>	<b>KAS202T</b>	<ol style="list-style-type: none"> <li>1. Use of different analytical instruments.</li> <li>2. Measure molecular/ system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water.</li> <li>3. Measure hardness of water.</li> <li>4. Estimate the rate constant of reaction.</li> </ol>

<p><b>ENGINEERING MATHEMATICS-II</b></p>	<p><b>KAS203T</b></p>	<p>CO 1 Understand the concept of differentiation and apply for solving differential equations. CO 2 Remember the concept of definite integral and apply for evaluating surface areas and volumes. K1, K3 &amp; K5 CO 3 Understand the concept of convergence of sequence and series. Also evaluate Fourier series. CO 4 Illustrate the working methods of complex functions and apply for finding analytic functions. CO 5 Apply the concept of complex functions for finding Taylor's series, Laurent's series and evaluation of definite integrals.</p>
<p><b>BASIC ELECTRICAL ENGINEERING</b></p>	<p><b>KEE201T</b></p>	<p>1. Apply the concepts of KVL/KCL and network theorems in solving DC circuits. 2. Analyze the steady state behavior of single phase and three phase AC electrical circuits. 3. Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer. 4. Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications. 5. Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.</p>
<p><b>EMERGING DOMAIN IN ELECTRONICS ENGINEERING</b></p>	<p><b>KEC201T</b></p>	<p>1. Understand the concept of PN Junction and devices. 2. Understand the concept of BJT, FET and MOFET. 3. Understand the concept of operational amplifier 4. Understand the concept of measurement instrument. 5. Understand the working principle of different type of sensor and their uses. 6. Understand the concept of IoT system &amp; Understand the component of IoT system.</p>

<b>PROGRAMMING FOR PROBLEM SOLVING</b>	<b>KCS201T</b>	<ol style="list-style-type: none"> <li>1. To develop simple algorithms for arithmetic and logical problems.</li> <li>2. To translate the algorithms to programs &amp; execution (in C language).</li> <li>3. To implement conditional branching, iteration and recursion.</li> <li>4. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.</li> <li>5. To use arrays, pointers and structures to develop algorithms and programs.</li> </ol>
<b>FUNDAMENTALS OF MECHANICAL ENGINEERING &amp; MECHATRONICS</b>	<b>KME201T</b>	<p>CO1 Understand the concept of stress and strain, factor of safety, beams.</p> <p>CO2 Understand the basic component and working of internal combustion engines, electric and hybrid vehicles, refrigerator and heat pump, air conditioning.</p> <p>CO3 Understand fluid properties, conservation laws, hydraulic machinery used in real life.</p> <p>CO4 Understand the working principle of different measuring instrument with the knowledge of accuracy, error and calibration, limit, fit, tolerance and control system.</p> <p>CO5 Understand concept of mechatronics with their advantages, scope and Industrial application, the different types of mechanical actuation system, the different types of hydraulic and pneumatic systems.</p> <p>CO6 Apply concepts of strength of material for safe design, refrigeration for calculation of COP, concepts of fluid mechanics in real life, concepts of measurements in production systems.</p>
<b>ENGINEERING PHYSICS LAB</b>	<b>KAS251P</b>	<ol style="list-style-type: none"> <li>1. To determine the wavelength of sodium light by Newton's ring Experiment.</li> <li>2. To determine the wavelength of sodium light with the help of Fresnel's bi-prism.</li> <li>3. To determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil.</li> <li>4. To draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss.</li> </ol>

SEM II

<b>ENGINEERING CHEMISTRY LAB</b>	<b>KAS252P</b>	<ol style="list-style-type: none"><li>1. Use of different analytical instruments.</li><li>2. Measure molecular/system properties such as surface tension, viscosity.</li><li>3. Measure conductance of solution, chloride and iron content in water, hardness of water.</li><li>4. Estimate the rate constant of reaction.</li></ol>
<b>BASIC ELECTRICAL ENGINEERING LAB</b>	<b>KEE251P</b>	<ol style="list-style-type: none"><li>1. Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits.</li><li>2. Demonstrate the behavior of AC circuits connected to single phase AC supply and measure power in single phase as well as three phase electrical circuits.</li><li>3. Perform experiment illustrating BH curve of magnetic materials.</li><li>4. Calculate efficiency of a single phase transformer and DC machine.</li><li>5. Perform experiments on speed measurement and reversal of direction of three phase induction motor and Identify the type of DC and AC machines based on their construction.</li></ol>
<b>PROGRAMMING FOR PROBLEM SOLVING LAB</b>	<b>KCS251P</b>	<p>CO 1 Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems.</p> <p>CO 2 Demonstrate an understanding of computer programming language concepts.</p> <p>CO 3 Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.</p> <p>CO 4 Able to define data types and use them in simple data processing applications also he/she must be able to use the concept of array of structures.</p> <p>CO 5 Develop confidence for self education and ability for life-long learning needed for Computer language.</p>

<b>ENGLISH LANGUAGE LAB</b>	<b>KAS254P</b>	<ol style="list-style-type: none"> <li>1. Students will be enabled to understand the basic objective of the course by being acquainted with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking.</li> <li>2. Students would be able to create substantial base by the formation of strong professional vocabulary for its application at different platforms and through numerous modes as Comprehension, reading, writing and speaking etc.</li> <li>3. Students will apply it at their work place for writing purposes such as Presentation/official drafting/ administrative communication and use it for document/project/report/research paper writing.</li> <li>4. Students will be made to evaluate the correct and error-free writing by being well-versed in rules of English grammar and cultivate relevant technical style of communication &amp; presentation at their work place and also for academic uses.</li> <li>5. Students will apply it for practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics. They will apply techniques for developing interpersonal communication skills and positive attitude leading to their professional competence.</li> </ol>
<b>ENGINEERING GRAPHICS &amp; DESIGN LAB</b>	<b>KCE251P</b>	<ol style="list-style-type: none"> <li>1. Understanding of the visual aspects of engineering design.</li> <li>2. Understanding of engineering graphics standards and solid modeling.</li> <li>3. Effective communication through graphics.</li> <li>4. Applying modern engineering tools necessary for engineering practice.</li> <li>5. Applying computer-aided geometric design.</li> <li>6. Analysis of Isometric views.</li> <li>7. Creating working drawings.</li> </ol>
<b>MECHANICAL WORKSHOP LAB</b>	<b>KWS251P</b>	<p>CO1 Use various engineering materials, tools, machines and measuring equipments.</p> <p>CO2 Perform machine operations in lathe and CNC machine.</p> <p>CO3 Perform manufacturing operations on components in fitting and carpentry shop.</p> <p>CO4 Perform operations in welding, moulding, casting and gas cutting.</p> <p>CO5 Fabricate a job by 3D printing manufacturing technique.</p>

<b>ARTIFICIAL INTELLIGENCE FOR ENGINEERS</b>	<b>KMC201</b>	<p>CO1 Understand the evolution and various approaches of AI.</p> <p>CO2 Understand data storage, processing, visualization, and its use in regression, clustering etc.</p> <p>CO3 Understand natural language processing and chatbots.</p> <p>CO4 Understand the concepts of neural networks.</p> <p>CO5 Understand the concepts of face, object, speech recognition and Robots.</p>
<b>EMERGING TECHNOLOGY FOR ENGINEERING</b>	<b>KMC202</b>	<p>CO1 Understand the concepts of internet of things, smart cities and industrial internet of things.</p> <p>CO2 Understand the concepts of cloud computing.</p> <p>CO3 Understand the concepts of block chain, cryptocurrencies, smart Contracts.</p> <p>CO4 Understand design principles, tools, trends in 3 D printing and drones.</p> <p>CO5 Understand augmented reality ( AR), virtual reality (VR), 5G technology, brain computer interface and human brain.</p>
<b>SOFT SKILL II</b>	<b>KNC201</b>	<p>Unit 1- Students will be able to converse well with effective LSRW skills in English.</p> <p>Unit 2- Students will evaluate the importance of conversation in their personal and professional domain and apply it for extending their professional frontiers.</p> <p>Unit 3- Students will learn to apply motivation skills for their individual and professional excellence.</p> <p>Unit 4- Students will utilize their teamwork and their interpersonal communication skills to survive and excel at their work-place.</p> <p>Unit 5-Students will learn to evaluate creativity for their professional innovation and critical thinking for their competence.</p>

<b>ENGG. MECHANICS</b>	<b>KCE301</b>	<ol style="list-style-type: none"> <li>1. Use scalar and vector analytical techniques for analyzing forces in statically determinate structures</li> <li>2. Apply fundamental concepts of kinematics and kinetics of particles to the analysis of simple, practical problems.</li> <li>3. Apply basic knowledge of mathematics and physics to solve real-world problems.</li> <li>4. Understand basic dynamics concepts – force, momentum, work and energy.</li> <li>5. Understand and be able to apply Newton’s laws of motion.</li> </ol>
<b>SURVEYING AND GEOMATICS</b>	<b>KCE302</b>	<ol style="list-style-type: none"> <li>1. Describe the function of surveying and work with survey instruments, take observations, and prepare plan, profile, and cross-section and perform calculations.</li> <li>2. Calculate, design and layout horizontal and vertical curves.</li> <li>3. Operate a total station and GPS to measure distance, angles, and to calculate differences in elevation. Reduce data for application in a geographic information system.</li> <li>4. Relate and apply principles of photogrammetry for surveying.</li> <li>5. Apply principles of Remote Sensing and Digital Image Processing for Civil Engineering problems.</li> </ol>
<b>FLUID MECHANICS</b>	<b>KCE303</b>	<ol style="list-style-type: none"> <li>1. Understand the broad principles of fluid statics, kinematics and dynamics</li> <li>2. Understand definitions of the basic terms used in fluid mechanics</li> <li>3. Understand classifications of fluid flow</li> <li>4. Apply the continuity, momentum and energy principles</li> <li>5. Apply dimensional analysis</li> </ol>

SEM III

<b>BUILDING PLANNING &amp; DRAWING LAB</b>	<b>KCE351</b>	<ol style="list-style-type: none"><li>1. Introduction to the tools and commands of drafting software.</li><li>2. Working in layers, blocks, x-ref, drawing layout and print setup.</li><li>3. 3D drafting and rendering</li><li>4. Planning and drafting of elevation and cross section of door and window</li><li>5. Planning and drafting of plan and cross section of Dog legged and open well staircase.</li><li>6. Planning and Drawings of Residential building of 1 room set (plan and section).</li><li>7. Planning and drawing of 3 room residential building with staircase.</li><li>8. Preparation of details general arrangement drawing of 4 room duplex house including planning and drafting</li></ol>
<b>SURVEYING AND GEOMATICS LAB</b>	<b>KCE352</b>	<ol style="list-style-type: none"><li>1. To measure bearings of a closed traverse by prismatic compass and to adjust the traverse by graphical method.</li><li>2. To find out reduced levels of given points using Auto/dumpy level.</li><li>3. To study parts of a Vernier and electronic theodolite and measurement of horizontal and vertical angle.</li><li>4. To measure horizontal angle between two objects by repetition/ reiteration method.</li><li>5. To determine the height of a vertical structure (e.g. chimney/ water tank etc.) using trigonometrical leveling by taking observations in single vertical plane.</li><li>6. To set out a simple circular curve by Rankine's method.</li><li>7. Demonstration and working on Electronic Total Station. Measurement of distances, horizontal &amp; vertical angles, coordinates and area of a land parcel.</li><li>8. Demonstration and working with Mirror stereoscopes, Parallax bar and Aerial photographs.</li><li>9. Visual Interpretation of standard FCC (False colour composite).</li><li>10. Digitization of physical features on a map/image using GIS software.</li><li>11. Coordinates measurement using GPS.</li></ol>

	<b>FLUID MECHANICS LAB</b>	<b>KCE353</b>	<ol style="list-style-type: none"> <li>1. To verify the momentum equation using the experimental set-up on impact of jet.</li> <li>2. To determine the coefficient of discharge of an orifice of a given shape. Also to determine the coefficient of velocity and the coefficient of contraction of the orifice mouth piece.</li> <li>3. To calibrate an orifice meter and study the variation of the co-efficient of discharge with the Reynolds number.</li> <li>4. To calibrate a Venturimeter and study the variation of the co-efficient of discharge with the Reynolds number.</li> <li>5. To calibrate a bend meter and study the variation of the co-efficient of discharge with the Reynolds number.</li> <li>6. Verification of Bernoulli's Theorem</li> <li>7. To study the transition from laminar to turbulent flow and to determine the lower critical Reynolds number.</li> <li>8. To study the velocity distribution in a pipe and also to compute the discharge by integrating the velocity profile.</li> <li>9. To study the variation of friction factor, 'f' for turbulent flow in commercial pipes.</li> <li>10. To study the boundary layer velocity profile over a flat plate and to determine the boundary layer thickness.</li> </ol>
	<b>MATERIALS, TESTING &amp; CONSTRUCTION PRACTICES</b>	<b>KCE401</b>	<ol style="list-style-type: none"> <li>1. Identify various building materials and to understand their basic properties.</li> <li>2. Understand the use of non-conventional civil engineering materials.</li> <li>3. Study suitable type of flooring and roofing in the construction process.</li> <li>4. Characterize the concept of plastering, pointing and various other building services.</li> <li>5. Exemplify the various fire protection, sound and thermal insulation techniques, maintenance and repair of buildings.</li> </ol>
SEM IV	<b>INTRODUCTION TO SOLID MECHANICS</b>	<b>KCE402</b>	<ol style="list-style-type: none"> <li>1. Describe the concepts and principles of stresses and strains.</li> <li>2. Analyze solid mechanics problems using classical methods and energy methods.</li> <li>3. Analyze structural members subjected to combined stresses.</li> <li>4. Calculate the deflections at any point on a beam subjected to a combination of loads.</li> <li>5. Understand the behavior of columns, springs and cylinders against loads.</li> </ol>

<b>HYDRAULIC ENGINEERING AND MACHINES</b>	<b>KCE403</b>	<p>1. Apply their knowledge of fluid mechanics in addressing problems in open channels.</p> <p>2. Solve problems in uniform, gradually and rapidly varied flows in steady state conditions.</p> <p>3. Have knowledge in hydraulic machineries like pumps and turbines.</p>
<b>Geotechnical Engineering</b>	<b>KCE 501</b>	<p>CO-1 Classify the soil and determine its Index properties.</p> <p>CO-2 Evaluate permeability and seepage properties of soil.</p> <p>CO-3 Interpret the compaction and consolidation characteristics &amp; effective stress concept of soil.</p> <p>CO-4 Determine the vertical and shear stress under different loading conditions and explain the phenomenon of soil liquefaction.</p> <p>CO-5 Interpret the earth pressure and related slope failures.</p>
<b>Structural Analysis</b>	<b>KCE 502</b>	<ul style="list-style-type: none"> <li>• CO-1 Explain type of structures and method for their analysis.</li> <li>• CO-2 Analyze different types of trusses for member forces.</li> <li>• CO-3 Compute slope and deflection in determinate structures using different methods.</li> <li>• CO-4 Apply the concept of influence lines and moving loads to compute bending moment and shear force at different sections</li> <li>• CO-5 Analyze determinate arches for different loading conditions</li> </ul>
<b>Quantity Estimation and Construction Management</b>	<b>KCE 503</b>	<p>CO-1 Understand the importance of units of measurement and preliminary estimate for administrative approval of projects.</p> <p>CO-2 Understand the contracts and tender documents in construction projects.</p> <p>CO-3 Analyze and assess the quantity of materials required for civil engineering works as per specifications.</p> <p>CO 4 Evaluate and estimate the cost of expenditure and prepare a detailed rate analysis report.</p> <p>CO-5 Analyze and choose cost effective approach for civil engineering projects.</p>

SEM V

<b>Concrete Technology</b>	<b>KCE 051</b>	CO-1 Understand the properties of constituent material of concrete. CO-2 Apply admixtures to enhance the properties of concrete. CO-3 Evaluate the strength and durability parameters of concrete. CO-4 Design the concrete mix for various strengths using difference methods. CO-5 Use advanced concrete types in construction industry.
<b>Modern Construction Materials</b>	<b>KCE 052</b>	CO-1 Understand the use of modern construction materials. CO-2 Use geosynthetics and bituminous materials in constructions. CO-3 Apply knowledge of modern materials in production of variety of concrete. CO-4 Apply knowledge of composites and chemicals in production of modern concrete. CO-5 Use modern water proofing and insulating materials in constructions
<b>Open Channel Flow</b>	<b>KCE 053</b>	CO-1 Apply knowledge of fluid flow for designing of channel sections. CO-2 Analyze the gradually varied flow in channel section. CO-3 Analyze the rapidly varied flow in channel sections. CO-4 Apply numerical methods for profile computation in channels. CO-5 Design channels for sub critical and super critical flows.
<b>Engineering Geology</b>	<b>KCE 054</b>	CO-1 Understand the scope of geological studies. CO-2 Understand the rocks and its engineering properties. CO-3 Understand the minerals and constituents of rocks. CO-4 Understand the rock deformations, their causes effects and preventive measures. CO-5 Understand the ground water reserves, Geophysical exploration methods and site selection for mega projects. Unit
<b>Engineering Hydrology</b>	<b>KCE 055</b>	CO-1 Understand the basic concept of hydrological cycle and its various phases. CO-2 Understand the concept of runoff and apply the knowledge to construct the hydrograph. CO-3 Apply the various methods to assess the flood. CO-4 Assess the quality of various forms of water and their aquifer properties. CO-5 Understand the well hydraulics and apply ground water modelling techniques

<b>Sensor and Instrumentation Technologies for Civil Engineering Applications</b>	<b>KCE 056</b>	CO-1 Analyze the errors during measurements CO-2 Describe the measurement of electrical variables CO-3 Describe the requirements during the transmission of measured signals CO-4 Construct Instrumentation/Computer Networks CO-5 Suggest proper sensor technologies for specific applications CO-6 Design and set up measurement systems and do the studies
<b>Air and Noise Pollution Control</b>	<b>KCE 057</b>	CO-1 Understand air pollutants and their impacts. CO-2 Explain air pollution chemistry and meteorological aspects of air pollutants. CO-3 Demonstrate methods for controlling particulate air pollutants. CO-4 Demonstrate methods for controlling gaseous air pollutants. CO-5 Understand automotive emission standards. CO-6 Apply methods for controlling noise pollution.
<b>GIS and Advance Remote Sensing</b>	<b>KCE 058</b>	CO-1 Understand the concepts of Photogrametry and compute the heights of objects CO-2 Understand the principles of aerial and satellite remote sensing, Able to comprehend the energy interactions with earth surface features, spectral properties of water bodies . CO-3 Understand the basic concept of GIS and its applications, know different types of data representation in GIS CO-4 Understand and Develop models for GIS spatial Analysis and will be able to know what the questions that GIS can answer are CO-5 Illustrate spatial and non-spatial data features in GIS and understand the map projections and coordinates systems CO-6 Apply knowledge of GIS and understand the integration of Remote Sensing and GIS

SEM VI	<b>Design of Concrete Structures</b>	<b>KCE 601</b>	<p>CO-1 Analyse and Design RCC beams for flexure by IS methods.</p> <p>CO-2 Analyse and Design RCC beams for shear by IS methods.</p> <p>CO-3 Analyse and Design RCC slabs and staircase by IS methods.</p> <p>CO-4 Design the RCC compression members by IS methods.</p> <p>CO-5 Design various types of footings and cantilever retaining wall</p>
	<b>Transportation Engineering</b>	<b>KCE 602</b>	<p>CO-1 Understand the history of road development , their alignment &amp; Survey.</p> <p>CO-2 Design the various geometric parameters of road.</p> <p>CO-3 Study the traffic characteristics &amp; design of road intersections &amp; signals.</p> <p>CO-4 Examine the properties of highway materials &amp; their implementation in design of pavements.</p> <p>CO-5 Learn methods to construct various types of roads.</p>
	<b>Environmental Engineering</b>	<b>KCE 603</b>	<p>CO-1 Assess water demand and optimal size of water mains. CO-2 Layout the distribution system &amp; assess the capacity of reservoir. CO-3 Investigate physical, chemical &amp; biological parameter of water. CO-4 Design treatment units for water and waste water.</p> <p>CO-5 Apply emerging technologies for treatment of waste water</p>
	<b>Advance Structural Analysis</b>	<b>KCE 061</b>	<p>CO-1 Analyze indeterminate structure to calculate unknown forces, slope and deflections by different methods. CO-2 Apply principle of influence lines to analyze indeterminate beams and arches. CO-3 Analyze and design cable structure with their influence line diagram. CO-4 Apply basics of force and stiffness methods of matrix analysis for beams, frames and trusses.</p> <p>CO-5 Apply the basic of plastic analysis to analyze the structure by using different mechanism.</p>
	<b>River Engineering</b>	<b>KCE 062</b>	<p>CO-1 Explain river morphology and its classification.</p> <p>CO-2 Explain hydraulic geometry and behavior of river.</p> <p>CO-3 Explain socio-cultural influences and ethics of stream restorations.</p> <p>CO-4 Analyze flow and sediment transport in rivers and channels.</p> <p>CO-5 Design guide band, embankments and flood protection systems</p>

<b>Repair and Rehabilitation of Structures</b>	<b>KCE 063</b>	<p>CO-1 Understand the fundamentals of maintenance and repair strategies.</p> <p>CO-2 Identify for serviceability and durability aspects of concrete.</p> <p>CO-3 Know the materials and techniques used for repair of structures.</p> <p>CO-4 Decide the appropriate repair and retrofitting techniques.</p> <p>CO-5 Use appropriate health monitoring technique and demolition methods</p>
<b>Foundation Design</b>	<b>KCE 064</b>	<p>CO-1 Understand various methods of Soil Exploration and its importance. CO-2 Analyze bearing capacity and settlement of soil for shallow foundation. CO-3 Design the various types of shallow foundation and understand the basics of deep foundation. CO-4 Understand the characteristics of well foundations and retaining wall.</p> <p>CO-5 Understand the concept of soil reinforcement.</p>
<b>Railway, Waterway and Airway Engineering</b>	<b>KCE070</b>	<ol style="list-style-type: none"> <li>1. Explain the importance of railway infrastructure.</li> <li>2. Identify the factors governing design of railway infrastructures.</li> <li>3. Analysis and design the railway track system.</li> <li>4. Understand the concepts of airport engineering and design components of airport.</li> <li>5. Associate with the concepts of water transport system</li> </ol>
<b>Sustainable Construction Methods</b>	<b>KCE071</b>	<ol style="list-style-type: none"> <li>1. Classify the sustainable construction materials.</li> <li>2. Apply cutting-edge construction technologies.</li> <li>3. Evaluate different sustainable construction methods.</li> <li>4. Apply different rating systems of construction/buildings as a professional.</li> <li>5. Apply life cycle approach to optimize the performance of green construction materials</li> </ol>

SEM VII

<b>Probability Methods in Civil Engineering</b>	<b>KCE072</b>	<ol style="list-style-type: none"><li>1. Apply probabilistic techniques for the analysis of complex Civil Engineering structures using advanced techniques.</li><li>2. Demonstrate mathematical and statistical knowledge and skills to be applied in various civil engineering structures.</li><li>3. Apply the laws of logic to mathematical statements.</li><li>4. Develop mathematical thinking in the conduct of different experiments and presentation of results precisely.</li></ol>
<b>Design of Steel Structures</b>	<b>KCE075</b>	<ol style="list-style-type: none"><li>1. Understand properties of steel and types of loads acting on steel structures.</li><li>2. Design welded and bolted type of connections for elementary steel structures.</li><li>3. Design tension members for elementary steel structures.</li><li>4. Design compression members such as simple columns, braced and latticed columns and column bases.</li><li>5. Design flexural members such as beams, purlins and girders</li></ol>
<b>Solid Waste Management</b>	<b>KCE074</b>	<ol style="list-style-type: none"><li>1. Understand the concept of solid waste management.</li><li>2. Explain handling and processing of solid waste.</li><li>3. Apply the concept of landfilling for disposal of solid waste.</li><li>4. Design composting and other solid waste conversion units.</li><li>5. Understand the various hazardous waste, risk assessment and legislation</li></ol>
<b>Geo-synthetics and Reinforced Soil Structures</b>	<b>KCE077</b>	<ol style="list-style-type: none"><li>1. Identify the type of Geosynthetic and their relevance.</li><li>2. Analyze &amp; compute different properties of Geosynthetics.</li><li>3. Understand the emerging trends of Geosynthetic in geotechnical applications.</li><li>4. Design the Reinforced Earth Walls using Geosynthetic material.</li><li>5. Design the Reinforced Foundation using Geosynthetic materials</li></ol>

	<b>Urban Transportation Planning</b>	<b>KCE076</b>	<ol style="list-style-type: none"> <li>1. Understand the basic concepts of planning at urban and regional levels.</li> <li>2. Distinguish between the Conventional and current approaches for travel demand estimation.</li> <li>3. Implement various types of models and trip generation.</li> <li>4. Analyze the urban travel markets.</li> <li>5. Evaluate the transport planning proposals</li> </ol>
	<b>Irrigation and Water Resource Engineering</b>	<b>KCE078</b>	<ol style="list-style-type: none"> <li>1. Describe the components of hydrological cycle, evaporation process and consumptive use.</li> <li>2. Apply the knowledge of stream flow measurement techniques and hydrograph theory for computation of run-off.</li> <li>3. Design different types of irrigation channels and water logging preventive measures.</li> <li>4. Design the regulatory and control systems of canal and irrigation outlets.</li> <li>5. Apply the knowledge of ground water hydrology and determination of discharge through wells.</li> </ol>
	<b>Disaster Preparedness and Management</b>	<b>KCE079</b>	<ol style="list-style-type: none"> <li>1. Understand the basic concepts of disasters and hazards</li> <li>2. Classify the natural disasters.</li> <li>3. Analyze the impacts of disaster on various societal components</li> <li>4. Understand the components of disaster management cycle and roles of various agencies its risk reduction</li> <li>5. Understand the process of recovery, reconstruction and development methods</li> </ol>
	<b>Advance Concrete Design</b>	<b>KCE073</b>	<ol style="list-style-type: none"> <li>1. Understand the design criteria as well as design concept of circular and rectangular tanks.</li> <li>2. Design the Intz tank, RC domes and beams, cylindrical and rectangular tanks.</li> <li>3. Understand the concept of pre tensioning and post tensioning and different systems used in pre tensioning.</li> <li>4. Analysis and design the simple prestressed beams .</li> <li>5. Design deep beams and corbel as per IS 456.</li> </ol>
SEM VIII	<b>HSMC-1* / HSMC-2*</b>	<b>KHU801/ KHU802</b>	Mentioned in university syllabus
	<b>Project</b>	<b>KCE851</b>	
	<b>Open Elective-III</b>	<b>KOE08X</b>	
	<b>Open Elective -IV</b>	<b>KOE08X</b>	

**PROGRAM OUTCOME (PO), PROGRAM SPECIFIC OUTCOME (PSO) (2021-22)****BTECH COMPUTER SCIENCE ENGGINERING****PROGRAMME OUTCOME**

PO1:The graduates are expected to develop an ability to apply knowledge of mathematics, science and engineering appropriate to the discipline.

PO2:The graduates are expected to apply mathematical foundations, algorithmic principles and computer science theory in modeling, design and conduct of experiments as well as data interpretation and analysis.

PO3:The graduates are expected to develop an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.

PO4:The graduates are expected to develop an ability to identify, formulate and solve real engineering problems and understand the global impact of engineering solutions.

PO5:The graduates are expected to develop an ability to function effectively on multidisciplinary teams to accomplish a common goal.

PO6:The graduates are expected to develop an understanding of professional, ethical, legal, security and social issues as well as responsibilities.

PO7:The graduates should have good knowledge of contemporary issues and are expected to communicate effectively with a range of audiences.

PO8:The graduates should be able to recognize the need for lifelong learning and are expected to apply the techniques, skills and modern engineering tools necessary for engineering practice.

**PROGRAM SPECIFIC OUTCOMES**

PSO1:Apply the fundamentals of mathematics, science and engineering knowledge to understand, analyze and develop computer programs in the areas related to algorithms, multimedia, big data analytics, machine learning, artificial intelligence and networking for efficient design of computer-based systems of varying complexity.

PSO2:Apply appropriate techniques and modern engineering hardware and software tools for the design and integration of computer system and related technologies, to engage in lifelong learning for the advancement of technology and its adaptation in multi-disciplinary environments.

PSO3:Implementation of professional engineering solutions for the betterment of society keeping the environmental context in mind, be aware of professional ethics and be able to communicate effectively.

**COURSE OUTCOME**

SEMESTER	COURSE NAME	COURSE CODE	COURSE OUTCOME
SEM I	ENGINEERING PHYSICS	KAS101T	1. To solve the classical and wave mechanics problems. 2. To develop the understanding of laws of thermodynamics and their application in various processes. 3. To formulate and solve the engineering problems on Electromagnetism & Electromagnetic Field Theory. 4. To aware of limits of classical physics & to apply the ideas in solving the problems in their parent Streams.

<b>ENGINEERING CHEMISTRY</b>	<b>KAS101T</b>	<ol style="list-style-type: none"> <li>1. Use of different analytical instruments.</li> <li>2. Measure molecular/ system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water.</li> <li>3. Measure hardness of water.</li> <li>4. Estimate the rate constant of reaction.</li> </ol>
<b>ENGINEERING MATHEMATICS-I</b>	<b>KAS103T</b>	<p>CO 1. Remember the concept of matrices and apply for solving linear simultaneous equations.</p> <p>CO 2. Understand the concept of limit continuity and differentiability and apply in the study of Rolle,s, Lagrange,s and Cauchy mean value theorem and Leibnitz theorems .</p> <p>CO 3. Identify the application of partial differentiation and apply for evaluating maxima, minima, series and Jacobians.</p> <p>CO 4. Illustrate the working methods of multiple integral and apply for finding area, volume, centre of mass and centre of gravity.</p> <p>CO 5. Remember the concept of vector and apply for directional derivatives, tangent and normal planes. Also evaluate line, surface and volume integrals.</p>
<b>BASIC ELECTRICAL ENGINEERING</b>	<b>KEE101T</b>	<ol style="list-style-type: none"> <li>1. Apply the concepts of KVL/KCL and network theorems in solving DC circuits.</li> <li>2. Analyze the steady state behavior of single phase and three phase AC electrical circuits.</li> <li>3. Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer.</li> <li>4. Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications.</li> <li>5. Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.</li> </ol>

<b>EMERGING DOMAIN IN ELECTRONICS ENGINEERING</b>	<b>KEC101T</b>	<ol style="list-style-type: none"> <li>1. Understand the concept of PN Junction and devices.</li> <li>2. Understand the concept of BJT, FET and MOFET.</li> <li>3. Understand the concept of Operational amplifier</li> <li>4. Understand the concept of measurement instrument.</li> <li>5. Understand the working principle of different type of sensor and their uses.</li> <li>6. Understand the concept of IoT system &amp; Understand the component of IoT system.</li> </ol>
<b>PROGRAMMING FOR PROBLEM SOLVING</b>	<b>KCS101T</b>	<ol style="list-style-type: none"> <li>1. To develop simple algorithms for arithmetic and logical problems.</li> <li>2. To translate the algorithms to programs &amp; execution (in C language)</li> <li>3. To implement conditional branching, iteration and recursion.</li> <li>4. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.</li> <li>5. To use arrays, pointers and structures to develop algorithms and programs.</li> </ol>
<b>FUNDAMENTALS OF MECHANICAL ENGINEERING &amp; MECHATRONICS</b>	<b>KME101T</b>	<p>CO1. Understand the concept of stress and strain, factor of safety, beams.</p> <p>CO2. Understand the basic component and working of internal combustion engines, electric and hybrid vehicles, refrigerator and heat pump, air conditioning.</p> <p>CO3. Understand fluid properties, conservation laws, hydraulic machinery used in real life.</p> <p>CO4. Understand the working principle of different measuring instrument with the knowledge of accuracy, error and calibration, limit, fit, tolerance and control system.</p> <p>CO5. Understand concept of mechatronics with their advantages, scope and Industrial application, the different types of mechanical actuation system, the different types of hydraulic and pneumatic systems.</p> <p>CO6. Apply concepts of strength of material for safe design, refrigeration for calculation of COP, concepts of fluid mechanics in real life, concepts of measurements in production systems.</p>

<b>ENGINEERING PHYSICS LAB</b>	<b>KAS151P</b>	<ol style="list-style-type: none"> <li>1. To determine the wavelength of sodium light by Newton's ring Experiment.</li> <li>2. To determine the wavelength of sodium light with the help of Fresnel's bi-prism.</li> <li>3. To determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil.</li> <li>4. To draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss.</li> </ol>
<b>ENGINEERING CHEMISTRY LAB</b>	<b>KAS152P</b>	<ol style="list-style-type: none"> <li>1. Use of different analytical instruments.</li> <li>2. Measure molecular/system properties such as surface tension, viscosity,</li> <li>3. Measure conductance of solution, chloride and iron content in water, hardness of water.</li> <li>4. Estimate the rate constant of reaction.</li> </ol>
<b>BASIC ELECTRICAL ENGINEERING LAB</b>	<b>KEE151P</b>	<ol style="list-style-type: none"> <li>1. Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits.</li> <li>2. Demonstrate the behavior of AC circuits connected to single phase AC supply and measure power in single phase as well as three phase electrical circuits.</li> <li>3. Perform experiment illustrating BH curve of magnetic materials.</li> <li>4. Calculate efficiency of a single phase transformer and DC machine.</li> <li>5. Perform experiments on speed measurement and reversal of direction of three phase induction motor and Identify the type of DC and AC machines based on their construction.</li> </ol>

<b>ENGINEERING CHEMISTRY LAB</b>	<b>KAS152P</b>	<ol style="list-style-type: none"> <li>1. Use of different analytical instruments.</li> <li>2. Measure molecular/system properties such as surface tension, viscosity,</li> <li>3. Measure conductance of solution, chloride and iron content in water, hardness of water.</li> <li>4. Estimate the rate constant of reaction.</li> </ol>
<b>BASIC ELECTRICAL ENGINEERING LAB</b>	<b>KEE151P</b>	<ol style="list-style-type: none"> <li>1. Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits.</li> <li>2. Demonstrate the behavior of AC circuits connected to single phase AC supply and measure power in single phase as well as three phase electrical circuits.</li> <li>3. Perform experiment illustrating BH curve of magnetic materials.</li> <li>4. Calculate efficiency of a single phase transformer and DC machine.</li> <li>5. Perform experiments on speed measurement and reversal of direction of three phase induction motor and Identify the type of DC and AC machines based on their construction.</li> </ol>
<b>PROGRAMMING FOR PROBLEM SOLVING LAB</b>	<b>KCS151P</b>	<p>CO 1 Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems.</p> <p>CO 2 Demonstrate an understanding of computer programming language concepts.</p> <p>CO 3 Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.</p> <p>CO 4 Able to define data types and use them in simple data processing applications also he/she must be able to use the concept of array of structures.</p> <p>CO 5 Develop confidence for self education and ability for life-long learning needed for Computer language.</p>

<b>ENGLISH LANGUAGE LAB</b>	<b>KAS154P</b>	<p>1. Students will be enabled to understand the basic objective of the course by being acquainted with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking.</p> <p>2. Students would be able to create substantial base by the formation of strong professional vocabulary for its application at different platforms and through numerous modes as Comprehension, reading, writing and speaking etc.</p> <p>3. Students will apply it at their work place for writing purposes such as Presentation/official drafting/ administrative communication and use it for document/project/report/research paper writing.</p> <p>4. Students will be made to evaluate the correct and error-free writing by being well-versed in rules of English grammar and cultivate relevant technical style of communication &amp; presentation at their work place and also for academic uses.</p> <p>5. Students will apply it for practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics. They</p>
<b>ENGINEERING GRAPHICS &amp; DESIGN LAB</b>	<b>KCE151P</b>	<p>1. Understanding of the visual aspects of engineering design.</p> <p>2. Understanding of engineering graphics standards and solid modeling.</p> <p>3. Effective communication through graphics.</p> <p>4. Applying modern engineering tools necessary for engineering practice.</p> <p>5. Applying computer-aided geometric design.</p> <p>6. Analysis of Isometric views.</p> <p>7. Creating working drawings.</p>
<b>MECHANICAL WORKSHOP LAB</b>	<b>KWS151P</b>	<p>CO1 Use various engineering materials, tools, machines and measuring equipments.</p> <p>CO2 Perform machine operations in lathe and CNC machine.</p> <p>CO3 Perform manufacturing operations on components in fitting and carpentry shop.</p> <p>CO4 Perform operations in welding, moulding, casting and gas cutting.</p> <p>CO5 Fabricate a job by 3D printing manufacturing technique.</p>

<b>ARTIFICIAL INTELLIGENCE FOR ENGINEERS</b>	<b>KMC101</b>	<p>CO1 Understand the evolution and various approaches of AI</p> <p>CO2 Understand data storage, processing, visualization, and its use in regression, clustering etc.</p> <p>CO3 Understand natural language processing and chatbots.</p> <p>CO4 Understand the concepts of neural networks.</p> <p>CO5 Understand the concepts of face, object, speech recognition and Robots.</p>
<b>EMERGING TECHNOLOGY FOR ENGINEERING</b>	<b>KMC102</b>	<p>CO1 Understand the concepts of internet of things, smart cities and industrial internet of things.</p> <p>CO2 Understand the concepts of cloud computing.</p> <p>CO3 Understand the concepts of block chain, cryptocurrencies, smart Contracts.</p> <p>CO4 Understand design principles, tools, trends in 3 D printing and drones.</p> <p>CO5 Understand augmented reality ( AR), virtual reality (VR), 5G technology, brain computer interface and human brain.</p>
<b>SOFT SKILL I</b>	<b>KNC101</b>	<p>Unit 1- Students will be enabled to understand the correct usage of grammar.</p> <p>Unit 2- Students will apply the fundamental inputs of communication skills in making speech delivery, individual conference, and group communication.</p> <p>Unit 3-Students will evaluate the impact of interpersonal Communication on their performance as a professional and in obtaining professional excellence at the workplace.</p> <p>Unit 4-Skills and techniques of persuasion and negotiation would enhance the level of students at multifarious administrative and managerial platforms.</p> <p>Unit 5-Student will be able to equip with basics of communication skills and will apply it for practical and oral purposes by being honed up in presentation skills and voice-dynamics.</p>

SEM II	<b>ENGINEERING PHYSICS</b>	<b>KAS201T</b>	<ol style="list-style-type: none"> <li>1. To solve the classical and wave mechanics problems.</li> <li>2. To develop the understanding of laws of thermodynamics and their application in various processes</li> <li>3. To formulate and solve the engineering problems on Electromagnetism &amp; Electromagnetic Field Theory.</li> <li>4. To aware of limits of classical physics &amp; to apply the ideas in solving the problems in their parent streams.</li> </ol>
	<b>ENGINEERING CHEMISTRY</b>	<b>KAS202T</b>	<ol style="list-style-type: none"> <li>1. Use of different analytical instruments.</li> <li>2. Measure molecular/ system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water.</li> <li>3. Measure hardness of water.</li> <li>4. Estimate the rate constant of reaction.</li> </ol>
	<b>ENGINEERING MATHEMATICS-II</b>	<b>KAS203T</b>	<p>CO 1 Understand the concept of differentiation and apply for solving differential equations.</p> <p>CO 2 Remember the concept of definite integral and apply for evaluating surface areas and volumes. K1, K3 &amp; K5</p> <p>CO 3 Understand the concept of convergence of sequence and series. Also evaluate Fourier series.</p> <p>CO 4 Illustrate the working methods of complex functions and apply for finding analytic functions.</p> <p>CO 5 Apply the concept of complex functions for finding Taylor's series, Laurent's series and evaluation of definite integrals.</p>

<b>BASIC ELECTRICAL ENGINEERING</b>	<b>KEE201T</b>	<ol style="list-style-type: none"> <li>1. Apply the concepts of KVL/KCL and network theorems in solving DC circuits.</li> <li>2. Analyze the steady state behavior of single phase and three phase AC electrical circuits.</li> <li>3. Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer.</li> <li>4. Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ. them in different area of applications.</li> <li>5. Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.</li> </ol>
<b>EMERGING DOMAIN IN ELECTRONICS ENGINEERING</b>	<b>KEC201T</b>	<ol style="list-style-type: none"> <li>1. Understand the concept of PN Junction and devices.</li> <li>2. Understand the concept of BJT, FET and MOFET.</li> <li>3. Understand the concept of perational amplifier</li> <li>4. Understand the concept of measurement instrument.</li> <li>5. Understand the working principle of different type of sensor and their uses.</li> <li>6. Understand the concept of IoT system &amp; Understand the component of IoT system.</li> </ol>
<b>PROGRAMMING FOR PROBLEM SOLVING</b>	<b>KCS201T</b>	<ol style="list-style-type: none"> <li>1. To develop simple algorithms for arithmetic and logical problems.</li> <li>2. To translate the algorithms to programs &amp; execution (in C language).</li> <li>3. To implement conditional branching, iteration and recursion.</li> <li>4. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.</li> <li>5. To use arrays, pointers and structures to develop algorithms and programs.</li> </ol>

<b>FUNDAMENTALS OF MECHANICAL ENGINEERING &amp; MECHATRONICS</b>	<b>KME201T</b>	<p>CO1 Understand the concept of stress and strain, factor of safety, beams.</p> <p>CO2 Understand the basic component and working of internal combustion engines, electric and hybrid vehicles, refrigerator and heat pump, air conditioning.</p> <p>CO3 Understand fluid properties, conservation laws, hydraulic machinery used in real life.</p> <p>CO4 Understand the working principle of different measuring instrument with the knowledge of accuracy, error and calibration, limit, fit, tolerance and control system.</p> <p>CO5 Understand concept of mechatronics with their advantages, scope and Industrial application, the different types of mechanical actuation system, the different types of hydraulic and pneumatic systems.</p> <p>CO6 Apply concepts of strength of material for safe design, refrigeration for calculation of COP, concepts of fluid mechanics in real life, concepts of measurements in production systems.</p>
<b>ENGINEERING PHYSICS LAB</b>	<b>KAS251P</b>	<ol style="list-style-type: none"> <li>1. To determine the wavelength of sodium light by Newton's ring Experiment.</li> <li>2. To determine the wavelength of sodium light with the help of Fresnel's bi-prism.</li> <li>3. To determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil.</li> <li>4. To draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss.</li> </ol>
<b>ENGINEERING CHEMISTRY LAB</b>	<b>KAS252P</b>	<ol style="list-style-type: none"> <li>1. Use of different analytical instruments.</li> <li>2. Measure molecular/system properties such as surface tension, viscosity.</li> <li>3. Measure conductance of solution, chloride and iron content in water, hardness of water.</li> <li>4. Estimate the rate constant of reaction.</li> </ol>

<b>BASIC ELECTRICAL ENGINEERING LAB</b>	<b>KEE251P</b>	<ol style="list-style-type: none"> <li>1. Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits.</li> <li>2. Demonstrate the behavior of AC circuits connected to single phase AC supply and measure power in single phase as well as three phase electrical circuits.</li> <li>3. Perform experiment illustrating BH curve of magnetic materials.</li> <li>4. Calculate efficiency of a single phase transformer and DC machine.</li> <li>5. Perform experiments on speed measurement and reversal of direction of three phase induction motor and Identify the type of DC and AC machines based on their construction.</li> </ol>
<b>PROGRAMMING FOR PROBLEM SOLVING LAB</b>	<b>KCS251P</b>	<p>CO 1 Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems.</p> <p>CO 2 Demonstrate an understanding of computer programming language concepts.</p> <p>CO 3 Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.</p> <p>CO 4 Able to define data types and use them in simple data processing applications also he/she must be able to use the concept of array of structures.</p> <p>CO 5 Develop confidence for self education and ability for life-long learning needed for Computer language.</p>

<b>ENGLISH LANGUAGE LAB</b>	<b>KAS254P</b>	<p>1. Students will be enabled to understand the basic objective of the course by being acquainted with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking.</p> <p>2. Students would be able to create substantial base by the formation of strong professional vocabulary for its application at different platforms and through numerous modes as Comprehension, reading, writing and speaking etc.</p> <p>3. Students will apply it at their work place for writing purposes such as Presentation/official drafting/ administrative communication and use it for document/project/report/research paper writing.</p> <p>4. Students will be made to evaluate the correct and error-free writing by being well-versed in rules of English grammar and cultivate relevant technical style of communication &amp; presentation at their work place and also for academic uses.</p> <p>5. Students will apply it for practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics. They will apply techniques for developing</p>
<b>ENGINEERING GRAPHICS &amp; DESIGN LAB</b>	<b>KCE251P</b>	<p>1. Understanding of the visual aspects of engineering design.</p> <p>2. Understanding of engineering graphics standards and solid modeling.</p> <p>3. Effective communication through graphics.</p> <p>4. Applying modern engineering tools necessary for engineering practice.</p> <p>5. Applying computer-aided geometric design.</p> <p>6. Analysis of Isometric views.</p> <p>7. Creating working drawings.</p>
<b>MECHANICAL WORKSHOP LAB</b>	<b>KWS251P</b>	<p>CO1 Use various engineering materials, tools, machines and measuring equipments.</p> <p>CO2 Perform machine operations in lathe and CNC machine.</p> <p>CO3 Perform manufacturing operations on components in fitting and carpentry shop.</p> <p>CO4 Perform operations in welding, moulding, casting and gas cutting.</p> <p>CO5 Fabricate a job by 3D printing manufacturing technique.</p>

<b>ARTIFICIAL INTELLIGENCE FOR ENGINEERS</b>	<b>KMC201</b>	<p>CO1 Understand the evolution and various approaches of AI.</p> <p>CO2 Understand data storage, processing, visualization, and its use in regression, clustering etc.</p> <p>CO3 Understand natural language processing and chatbots.</p> <p>CO4 Understand the concepts of neural networks.</p> <p>CO5 Understand the concepts of face, object, speech recognition and Robots.</p>
<b>EMERGING TECHNOLOGY FOR ENGINEERING</b>	<b>KMC202</b>	<p>CO1 Understand the concepts of internet of things, smart cities and industrial internet of things.</p> <p>CO2 Understand the concepts of cloud computing.</p> <p>CO3 Understand the concepts of block chain, cryptocurrencies, smart Contracts.</p> <p>CO4 Understand design principles, tools, trends in 3 D printing and drones.</p> <p>CO5 Understand augmented reality ( AR), virtual reality (VR), 5G technology, brain computer interface and human brain.</p>
<b>SOFT SKILL II</b>	<b>KNC201</b>	<p>Unit 1- Students will be able to converse well with effective LSRW skills in English.</p> <p>Unit 2- Students will evaluate the importance of conversation in their personal and professional domain and apply it for extending their professional frontiers.</p> <p>Unit 3- Students will learn to apply motivation skills for their individual and professional excellence.</p> <p>Unit 4- Students will utilize their teamwork and their interpersonal communication skills to survive and excel at their work-place.</p> <p>Unit 5-Students will learn to evaluate creativity for their professional innovation and critical thinking for their competence.</p>

SEM III	<b>Data Structure</b>	<b>KCS301</b>	<p>Describe how arrays, linked lists, stacks, queues, trees, and graphs are represented in memory, used by the algorithms and their common applications.</p> <p>Discuss the computational efficiency of the sorting and searching algorithms.</p> <p>Implementation of Trees and Graphs and perform various operations on these data structure.</p> <p>Understanding the concept of recursion, application of recursion and its implementation and removal of recursion.</p> <p>Identify the alternative implementations of data structures with respect to its performance to solve a real world problem.</p>
	<b>Computer Organization and Architecture</b>	<b>KCS302</b>	<p>CO 1 Study of the basic structure and operation of a digital computer system. K1, K2</p> <p>CO 2 Analysis of the design of arithmetic &amp; logic unit and understanding of the fixed point and floating point arithmetic operations.</p> <p>CO 3 Implementation of control unit techniques and the concept of Pipelining K3</p> <p>CO 4 Understanding the hierarchical memory system, cache memories and virtual memory K2</p> <p>CO 5 Understanding the different ways of communicating with I/O devices and standard I/O interfaces</p>
	<b>Discrete Structures &amp; Theory of Logic</b>	<b>KCS303</b>	<p>CO 1 Write an argument using logical notation and determine if the argument is or is not valid. K3, K4</p> <p>CO 2 Understand the basic principles of sets and operations in sets. K1, K2</p> <p>CO 3 Demonstrate an understanding of relations and functions and be able to determine their properties.</p> <p>CO 4 Demonstrate different traversal methods for trees and graphs. K1, K4</p> <p>CO 5 Model problems in Computer Science using graphs and trees. K2, K6</p>

SEM IV	<b>Operating Systems</b>	<b>KCS401</b>	<p>CO 1 Understand the structure and functions of OS K1, K2</p> <p>CO 2 Learn about Processes, Threads and Scheduling algorithms. K1, K2</p> <p>CO 3 Understand the principles of concurrency and Deadlocks K2</p> <p>CO 4 Learn various memory management scheme K2</p> <p>CO 5 Study I/O management and File systems. K2,K4</p>
	<b>Theory of Automata and Formal Languages</b>	<b>KCS402</b>	<p>CO 1 Analyse and design finite automata, pushdown automata, Turing machines, formal languages, and grammars K4, K6</p> <p>CO 2 Analyse and design, Turing machines, formal languages, and grammars K4, K6</p> <p>CO 3 Demonstrate the understanding of key notions, such as algorithm, computability, decidability, and complexity through problem solving K1, K5</p> <p>CO 4 Prove the basic results of the Theory of Computation. K2,K3</p> <p>CO 5 State and explain the relevance of the Church-Turing thesis. K1, K5</p>
	<b>Microprocessor</b>	<b>KCS403</b>	<p>CO 1 Apply a basic concept of digital fundamentals to Microprocessor based personal computer system. K3, K4</p> <p>CO 2 Analyze a detailed s/w &amp; h/w structure of the Microprocessor. K2,K4</p> <p>CO 3 Illustrate how the different peripherals (8085/8086) are interfaced with Microprocessor. K3</p> <p>CO 4 Analyze the properties of Microprocessors(8085/8086) K4</p> <p>CO 5 Evaluate the data transfer information through serial &amp; parallel ports. K5</p>

SEM V	<b>Database Management System</b>	<b>KCS501</b>	<p>CO 1 Apply knowledge of database for real life applications. K3</p> <p>CO 2 Apply query processing techniques to automate the real time problems of databases. K3, K4</p> <p>CO 3 Identify and solve the redundancy problem in database tables using normalization. K2, K3</p> <p>CO 4 Understand the concepts of transactions, their processing so they will familiar with broad range of database management issues including data integrity, security and recovery. K2, K4</p> <p>CO 5 Design, develop and implement a small database project using database tools.</p>
	<b>Compiler Design</b>	<b>KCS502</b>	<p>CO 1 Acquire knowledge of different phases and passes of the compiler and also able to use the compiler tools like LEX, YACC, etc. Students will also be able to design different types of compiler tools to meet the requirements of the realistic constraints of compilers. K3, K6</p> <p>CO 2 Understand the parser and its types i.e. Top-Down and Bottom-up parsers and construction of LL, SLR, CLR, and LALR parsing table. K2, K6</p> <p>CO 3 Implement the compiler using syntax-directed translation method and get knowledge about the synthesized and inherited attributes. K4, K5</p> <p>CO 4 Acquire knowledge about run time data structure like symbol table organization and different techniques used in that. K2, K3</p> <p>CO 5 Understand the target machine's run time</p>

<b>Design and Analysis of Algorithm</b>	<b>KCS503</b>	<p>CO 1 Design new algorithms, prove them correct, and analyze their asymptotic and absolute runtime and memory demands. K4, K6</p> <p>CO 2 Find an algorithm to solve the problem (create) and prove that the algorithm solves the problem correctly (validate). K5, K6</p> <p>CO 3 Understand the mathematical criterion for deciding whether an algorithm is efficient, and know many practically important problems that do not admit any efficient algorithms. K2, K5</p> <p>CO 4 Apply classical sorting, searching, optimization and graph algorithms. K2, K4</p> <p>CO 5 Understand basic techniques for designing algorithms, including the techniques of recursion, divide-and-conquer, and greedy. K2, K3</p>
<b>Data Analytics</b>	<b>KCS-051</b>	<p>CO 1 Describe the life cycle phases of Data Analytics through discovery, planning and building. K1,K2</p> <p>CO 2 Understand and apply Data Analysis Techniques. K2, K3</p> <p>CO 3 Implement various Data streams. K3</p> <p>CO 4 Understand item sets, Clustering, frame works &amp; Visualizations. K2</p> <p>CO 5 Apply R tool for developing and evaluating real time applications. K3,K5,K6</p>

<b>Web Designing</b>	<b>KCS-052</b>	<p>CO 1 Understand principle of Web page design and about types of websites K3, K4</p> <p>CO 2 Visualize and Recognize the basic concept of HTML and application in web designing. K1, K2</p> <p>CO 3 Recognize and apply the elements of Creating Style Sheet (CSS). K2, K4</p> <p>CO 4 Understand the basic concept of Java Script and its application. K2, K3</p> <p>CO 5 Introduce basics concept of Web Hosting and apply the concept of SEO K2, K3</p>
<b>Computer Graphics</b>	<b>KCS-053</b>	<p>CO 1 Understand the graphics hardware used in field of computer graphics. K2</p> <p>CO 2 Understand the concept of graphics primitives such as lines and circle based on different algorithms. K2, K4</p> <p>CO 3 Apply the 2D graphics transformations, composite transformation and Clipping concepts. K4</p> <p>CO 4 Apply the concepts of and techniques used in 3D computer graphics, including viewing transformations. K2, K3</p> <p>CO 5 Perform the concept of projections, curve and hidden surfaces in real life. K2, K3</p>

<p><b>Object Oriented System Design</b></p>	<p><b>KCS-054</b></p>	<p>CO 1 Understand the application development and analyze the insights of object oriented programming to implement application K2, K4 CO 2 Understand, analyze and apply the role of overall modeling concepts (i.e. System, structural) K2, K3 CO 3 Understand, analyze and apply oops concepts (i.e. abstraction, inheritance) K2, K3, K4 CO 4 Understand the basic concepts of C++ to implement the object oriented concepts K2, K3 CO 5 To understand the object oriented approach to implement real world problem. K2, K3</p>
<p><b>Machine Learning Techniques</b></p>	<p><b>KCS-055</b></p>	<p>CO 1 To understand the need for machine learning for various problem solving K1 , K2 CO 2 To understand a wide variety of learning algorithms and how to evaluate models generated from data K1 , K3 CO 3 To understand the latest trends in machine learning K2 , K3 CO 4 To design appropriate machine learning algorithms and apply the algorithms to a real-world problems K4 , K6 CO 5 To optimize the models learned and report on the expected accuracy that can be achieved by applying the models K4, K5</p>

<b>Application of Soft Computing</b>	<b>KCS-056</b>	<p>CO 1 Recognize the feasibility of applying a soft computing methodology for a particular problem K2, K4 CO 2</p> <p>Understand the concepts and techniques of soft computing and foster their abilities in designing and implementing soft computing based solutions for real-world and engineering problems. K2,K4, K6 CO 3 Apply neural networks to pattern classification and regression problems and compare solutions by various soft computing approaches for a given problem. K3, K5 CO 4 Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems K3, K4 CO 5 Apply genetic algorithms to combinatorial optimization problems K3, K5</p>
<b>Augmented &amp; Virtual Reality</b>	<b>KCS-057</b>	<p>CO 1 To make students know the basic concept and understand the framework of virtual reality. K1 , K2 CO 2 To understand principles and multidisciplinary features of virtual reality and apply it in developing applications. K2 , K4 CO 3 To know the technology for multimodal user interaction and perception VR, in particular the visual, audial and haptic interface and behavior. K2 , K3 CO 4 To understand and apply technology for managing large scale VR environment in real time. K2 , K3 CO 5 To understand an introduction to the AR system framework and apply AR tools in software development. K2 , K3,</p>

	<p><b>Human Computer Interface</b></p>	<p><b>KCS-058</b></p>	<p>CO 1 Understand and analyze the common methods in the user-centered design process and the appropriateness of individual methods for a given problem. K2, K4</p> <p>CO 2 Apply , adapt and extend classic design standards, guidelines, and patterns. K3, K5</p> <p>CO 3 Employ selected design methods and evaluation methods at a basic level of competence. K4, K5</p> <p>CO 4 Build prototypes at varying levels of fidelity, from paper prototypes to functional, interactive prototypes. K4, K5</p> <p>CO 5 Demonstrate sufficient theory of human computer interaction, experimental methodology and inferential statistics to engage with the contemporary research literature in interface technology and design. K3, K4</p>
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SEM VI

<b>Software Engineering</b>	<b>KCS 601</b>	CO 1 Explain various software characteristics and analyze different software Development Models. K1, K2 CO 2 Demonstrate the contents of a SRS and apply basic software quality assurance practices to ensure that design, development meet or exceed applicable standards. K1, K2 CO 3 Compare and contrast various methods for software design K2, K3 CO 4 Formulate testing strategy for software systems, employ techniques such as unit testing, Test driven development and functional testing. K3 CO 5 Manage software development process independently as well as in teams and make use of Various software management tools for development, maintenance and analysis.
<b>Web Technology</b>	<b>KCS 602</b>	CO 1 Explain web development Strategies and Protocols governing Web. K1, K2 CO 2 Develop Java programs for window/web-based applications. K2, K3 CO 3 Design web pages using HTML, XML, CSS and JavaScript. K2, K3 CO 4 Creation of client-server environment using socket programming K1, K2, CO 5 Building enterprise level applications and manipulate web databases using JDBC K3, K4 CO6 Design interactive web applications using Servlets and JSP K2, K3

<b>Computer Networks</b>	<b>KCS 603</b>	<p>CO1 Explain basic concepts, OSI reference model, services and role of each layer of OSI model and TCP/IP, networks devices and transmission media, Analog and digital data transmission K1,K2 CO2 Apply channel allocation, framing, error and flow control techniques. K3 CO3 Describe the functions of Network Layer i.e. Logical addressing, subnetting &amp; Routing Mechanism. K2,K3 CO4 Explain the different Transport Layer function i.e. Port addressing, Connection Management, Error control and Flow control mechanism. K2,K3 CO5 Explain the functions offered by session and presentation layer and their Implementation. K2,K3 CO6</p>
<b>Big Data</b>	<b>KCS-061</b>	<p>CO 1 Demonstrate knowledge of Big Data Analytics concepts and its applications in business. K1,K2 CO 2 Demonstrate functions and components of Map Reduce Framework and HDFS. K1,K2 CO 3 Discuss Data Management concepts in NoSQL environment. K6 CO 4 Explain process of developing Map Reduce based distributed processing applications. K2,K5 CO 5 Explain process of developing applications using HBASE, Hive, Pig etc. K2,</p>

<p><b>Image Processing</b></p>	<p><b>KCS-062</b></p>	<p>CO 1 Explain the basic concepts of two-dimensional signal acquisition, sampling, quantization and color model. K1, K2 CO 2 Apply image processing techniques for image enhancement in both the spatial and frequency domains. K2, K3 CO 3 Apply and compare image restoration techniques in both spatial and frequency domain. K2, K3 CO 4 Compare edge based and region based segmentation algorithms for ROI extraction. K3, K4 CO 5 Explain compression techniques and descriptors for image processing. K2, K3</p>
<p><b>Real Time Systems</b></p>	<p><b>KCS-063</b></p>	<p>CO 1 illustrate the need and the challenges in the design of hard and soft real time systems. K3 CO 2 Compare different scheduling algorithms and the schedulable criteria. K4 CO 3 Discuss resource sharing methods in real time environment. K3 CO 4 Compare and contrast different real time communication and medium access control techniques. K4, K5 CO 5 Analyze real time Operating system and Commercial databases K2, K4</p>

	<b>Data Compression</b>	<b>KCS-064</b>	<p>CO 1 Describe the evolution and fundamental concepts of Data Compression and Coding Techniques. K1, K2</p> <p>CO 2 Apply and compare different static coding techniques (Huffman &amp; Arithmetic coding) for text compression. K2, K3</p> <p>CO 3 Apply and compare different dynamic coding techniques (Dictionary Technique) for text compression. K2, K3</p> <p>CO 4 Evaluate the performance of predictive coding technique for Image Compression. K2, K3</p> <p>CO 5 Apply and compare different Quantization Techniques for Image Compression. K2, K3</p>
SEM VII	<b>Artificial Intelligence</b>	<b>KCS071</b>	<p>CO 1 Understand the basics of the theory and practice of Artificial Intelligence as a discipline and about intelligent agents. K2</p> <p>CO 2 Understand search techniques and gaming theory. K2, K3</p> <p>CO 3 The student will learn to apply knowledge representation techniques and problem solving strategies to common AI applications. K3, K4</p> <p>CO 4 Student should be aware of techniques used for classification and clustering. K2, K3</p> <p>CO 5 Student should aware of basics of pattern recognition and steps required for it. K2, K4</p>

<b>Natural language processing</b>	<b>KCS072</b>	<p>CO 1 To learn the fundamentals of natural language processing K1 , K2</p> <p>CO 2 To understand the use of CFG and PCFG in NLP K1 , K2</p> <p>CO 3 To understand the role of semantics of sentences and pragmatic K2</p> <p>CO 4 To Introduce Speech Production And Related Parameters Of Speech. K1 , K2</p> <p>CO 5 To Show The Computation And Use Of Techniques Such As Short Time Fourier Transform, Linear Predictive Coefficients And Other Coefficients In The Analysis Of Speech. K3, K4</p>
<b>High Performance Computing</b>	<b>KCS073</b>	<p>CO 1 Able to understand the basic concept of Computer architecture and Modern Processor K2</p> <p>CO 2 Able to understand the basic concepts of access optimization and parallel computers K2, K3</p> <p>CO 3 Able to describe different parallel processing platforms involved in achieving high performance computing K3 , K4</p> <p>CO 4 Develop efficient and high performance parallel programming. K2 , K3</p> <p>CO 5 Able to learn parallel programming using message passing paradigm. K2 , K4</p>
<b>Cryptography and Network Security</b>	<b>KCS074</b>	<p>CO 1 Classify the symmetric encryption techniques and Illustrate various Public key cryptographic techniques. K2 , K3</p> <p>CO 2 Understand security protocols for protecting data on networks and be able to digitally sign emails and files. K1 , K2</p> <p>CO 3 Understand vulnerability assessments and the weakness of using passwords for authentication K4</p> <p>CO 4 Be able to perform simple vulnerability assessments and password audits K3</p> <p>CO 5 Summarize the intrusion detection and its solutions to overcome the attacks. K2</p>

<b>Design &amp; Development of Applications</b>	<b>KCS075</b>	<p>CO 1 Be exposed to technology and business trends impacting mobile applications K1 , K2</p> <p>CO 2 Be competent with the characterization and architecture of mobile applications. K3</p> <p>CO 3 Be competent with understanding enterprise scale requirements of mobile applications. K1 , K2</p> <p>CO 4 Be competent with designing and developing mobile applications using one application development framework. K3</p> <p>CO 5 Be exposed to Android and iOS platforms to develop the mobile applications K1 , K2</p>
<b>Software Testing</b>	<b>KCS076</b>	<p>CO 1 Have an ability to apply software testing knowledge and engineering methods. K2 , K3</p> <p>CO 2 Have an ability to design and conduct a software test process for a software testing project. K3, K4</p> <p>CO 3 Have an ability to identify the needs of software test automation, and define and develop a test tool to support test automation. K1 , K2</p> <p>CO 4 Have an ability understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods. K1 , K2</p> <p>CO 5 Have basic understanding and knowledge of contemporary issues in software testing, such as component-based software testing problems. K2</p>

<b>Distributed Systems</b>	<b>KCS077</b>	<p>CO 1 To provide hardware and software issues in modern distributed systems. K1 , K2</p> <p>CO 2 To get knowledge in distributed architecture, naming, synchronization, consistency and replication, fault tolerance, security, and distributed file systems. K2</p> <p>CO 3 To analyze the current popular distributed systems such as peer-to-peer (P2P) systems will also be analyzed. K4</p> <p>CO 4 To know about Shared Memory Techniques and have Sufficient knowledge about file access K1</p> <p>CO 5 Have knowledge of Synchronization and Deadlock. K1</p>
<b>Deep Learning</b>	<b>KCS078</b>	<p>CO 1 To present the mathematical, statistical and computational challenges of building neural networks K1 , K2</p> <p>CO 2 To study the concepts of deep learning K1 , K2</p> <p>CO 3 To introduce dimensionality reduction techniques K2</p> <p>CO 4 To enable the students to know deep learning techniques to support real-time applications K2 , K3</p> <p>CO 5 To examine the case studies of deep learning techniques K3, K6</p>
<b>Service Oriented Architecture</b>	<b>KCS079</b>	<p>CO 1 Comprehend the need for SOA and its systematic evolution. K1 , K2</p> <p>CO 2 Apply SOA technologies to enterprise domain. K3</p> <p>CO 3 Design and analyze various SOA patterns and techniques. K4</p> <p>CO 4 Compare and evaluate best strategies and practices of SOA. K2</p> <p>CO 5 Understand the business case for SOA K1</p>

<p><b>Quantum Computing</b></p>	<p><b>KCS710</b></p>	<p>CO 1 Distinguish problems of different computational complexity and explain why certain problems are rendered tractable by quantum computation with reference to the relevant concepts in quantum theory. K1 , K2</p> <p>CO 2 Demonstrate an understanding of a quantum computing algorithm by simulating it on a classical computer, and state some of the practical challenges in building a quantum computer. K2 , K3</p> <p>CO 3 Contribute to a medium-scale application program as part of a co-operative team, making use of appropriate collaborative development tools (such as version control systems). K2 , K3</p> <p>CO 4 Produce code and documentation that is comprehensible to a group of different programmers and present the theoretical background and results of a project in written and verbal form.</p>
<p><b>Mobile Computing</b></p>	<p><b>KCS711</b></p>	<p>CO 1 Explain and discuss issues in mobile computing and illustrate overview of wireless telephony and channel allocation in cellular systems. K1, K4</p> <p>CO 2 Explore the concept of Wireless Networking and Wireless LAN. K1</p> <p>CO 3 Analyse and comprehend Data management issues like data replication for mobile computers, adaptive clustering for mobile wireless networks and Disconnected operations. K4</p> <p>CO 4 Identify Mobile computing Agents and state the issues pertaining to security and fault tolerance in mobile computing environment. K1, K2</p> <p>CO 5 Compare and contrast various routing protocols and will identify and interpret the performance of network systems using Adhoc networks. K2</p>

	<b>Internet of Things</b>	<b>KCS712</b>	CO 1 Demonstrate basic concepts, principles and challenges in IoT. K1,K2 CO 2 Illustrate functioning of hardware devices and sensors used for IoT. K2 CO 3 Analyze network communication aspects and protocols used in IoT. K4 CO 4 Apply IoT for developing real life applications using Arduino programming. K3 CP 5 To develop IoT infrastructure for popular applications K2, K3
	<b>Cloud Computing</b>	<b>KCS713</b>	CO 1 Describe architecture and underlying principles of cloud computing. K3 CO 2 Explain need, types and tools of Virtualization for cloud. K3, K4 CO 3 Describe Services Oriented Architecture and various types of cloud services. K2, K3 CO 4 Explain Inter cloud resources management cloud storage services and their providers Assess security services and standards for cloud computing. K2, K4 CO 5 Analyze advanced cloud technologies. K3, K6
	<b>Blockchain Architecture Design</b>	<b>KCS714</b>	CO 1 Describe the basic understanding of Blockchain architecture along with its primitive. K1, K2 CO 2 Explain the requirements for basic protocol along with scalability aspects. K2, K3 CO 3 Design and deploy the consensus process using frontend and backend. K3, K4 CO 4 Apply Blockchain techniques for different use cases like Finance, Trade/Supply and Government activities. K4, K5
SEM VIII	<b>HSMC-1* / HSMC-2*</b>	<b>KHU801/ KHU802</b>	Mentioned in university syllabus
	<b>Project</b>	<b>KCS851</b>	
	<b>Open Elective-III</b>	<b>KOE08X</b>	
	<b>Open Elective -IV</b>	<b>KOE08X</b>	

**PROGRAM OUTCOME (PO), PROGRAM SPECIFIC OUTCOME (PSO) (2021-22)****BTECH ELECTRICAL ENGGINERING****PROGRAMME OUTCOME**

specialization to the solution of complex engineering problems.

2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

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

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

6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

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

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

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

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

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

**COURSE OUTCOME**

<b>SEMESTER</b>	<b>COURSE NAME</b>	<b>COURSE CODE</b>	<b>COURSE OUTCOME</b>
	<b>ENGINEERING PHYSICS</b>	<b>KAS101T</b>	1. To solve the classical and wave mechanics problems. 2. To develop the understanding of laws of thermodynamics and their application in various processes. 3. To formulate and solve the engineering problems on Electromagnetism & Electromagnetic Field Theory. 4. To aware of limits of classical physics & to apply the ideas in solving the problems in their parent Streams.
	<b>ENGINEERING CHEMISTRY</b>	<b>KAS101T</b>	1. Use of different analytical instruments. 2. Measure molecular/ system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water. 3. Measure hardness of water. 4. Estimate the rate constant of reaction.

<b>ENGINEERING MATHEMATICS-I</b>	<b>KAS103T</b>	<p>CO 1. Remember the concept of matrices and apply for solving linear simultaneous equations.</p> <p>CO 2. Understand the concept of limit continuity and differentiability and apply in the study of Rolle,s, Lagrange,s and Cauchy mean value theorem and Leibnitz theorems .</p> <p>CO 3. Identify the application of partial differentiation and apply for evaluating maxima, minima, series and Jacobians.</p> <p>CO 4. Illustrate the working methods of multiple integral and apply for finding area, volume, centre of mass and centre of gravity.</p> <p>CO 5. Remember the concept of vector and apply for directional derivatives, tangent and normal planes. Also evaluate line, surface and volume integrals.</p>
<b>BASIC ELECTRICAL ENGINEERING</b>	<b>KEE101T</b>	<ol style="list-style-type: none"> <li>1. Apply the concepts of KVL/KCL and network theorems in solving DC circuits.</li> <li>2. Analyze the steady state behavior of single phase and three phase AC electrical circuits.</li> <li>3. Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer.</li> <li>4. Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications.</li> <li>5. Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.</li> </ol>
<b>EMERGING DOMAIN IN ELECTRONICS ENGINEERING</b>	<b>KEC101T</b>	<ol style="list-style-type: none"> <li>1. Understand the concept of PN Junction and devices.</li> <li>2. Understand the concept of BJT, FET and MOFET.</li> <li>3. Understand the concept of Operational amplifier</li> <li>4. Understand the concept of measurement instrument.</li> <li>5. Understand the working principle of different type of sensor and their uses.</li> <li>6. Understand the concept of IoT system &amp; Understand the component of IoT system.</li> </ol>

<b>PROGRAMMING FOR PROBLEM SOLVING</b>	<b>KCS101T</b>	<ol style="list-style-type: none"> <li>1. To develop simple algorithms for arithmetic and logical problems.</li> <li>2. To translate the algorithms to programs &amp; execution (in C language)</li> <li>3. To implement conditional branching, iteration and recursion.</li> <li>4. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.</li> <li>5. To use arrays, pointers and structures to develop algorithms and programs.</li> </ol>
<b>FUNDAMENTALS OF MECHANICAL ENGINEERING &amp; MECHATRONICS</b>	<b>KME101T</b>	<p>CO1. Understand the concept of stress and strain, factor of safety, beams.</p> <p>CO2. Understand the basic component and working of internal combustion engines, electric and hybrid vehicles, refrigerator and heat pump, air conditioning.</p> <p>CO3. Understand fluid properties, conservation laws, hydraulic machinery used in real life.</p> <p>CO4. Understand the working principle of different measuring instrument with the knowledge of accuracy, error and calibration, limit, fit, tolerance and control system.</p> <p>CO5. Understand concept of mechatronics with their advantages, scope and Industrial application, the different types of mechanical actuation system, the different types of hydraulic and pneumatic systems.</p> <p>CO6. Apply concepts of strength of material for safe design, refrigeration for calculation of COP, concepts of fluid mechanics in real life, concepts of measurements in production systems.</p>
<b>ENGINEERING PHYSICS LAB</b>	<b>KAS151P</b>	<ol style="list-style-type: none"> <li>1. To determine the wavelength of sodium light by Newton's ring Experiment.</li> <li>2. To determine the wavelength of sodium light with the help of Fresnel's bi-prism.</li> <li>3. To determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil.</li> <li>4. To draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss.</li> </ol>
<b>ENGINEERING CHEMISTRY LAB</b>	<b>KAS152P</b>	<ol style="list-style-type: none"> <li>1. Use of different analytical instruments.</li> <li>2. Measure molecular/system properties such as surface tension, viscosity,</li> <li>3. Measure conductance of solution, chloride and iron content in water, hardness of water.</li> <li>4. Estimate the rate constant of reaction.</li> </ol>

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<b>BASIC ELECTRICAL ENGINEERING LAB</b>	<b>KEE151P</b>	<ol style="list-style-type: none"><li>1. Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits.</li><li>2. Demonstrate the behavior of AC circuits connected to single phase AC supply and measure power in single phase as well as three phase electrical circuits.</li><li>3. Perform experiment illustrating BH curve of magnetic materials.</li><li>4. Calculate efficiency of a single phase transformer and DC machine.</li><li>5. Perform experiments on speed measurement and reversal of direction of three phase induction motor and Identify the type of DC and AC machines based on their construction.</li></ol>
<b>ENGINEERING CHEMISTRY LAB</b>	<b>KAS152P</b>	<ol style="list-style-type: none"><li>1. Use of different analytical instruments.</li><li>2. Measure molecular/system properties such as surface tension, viscosity,</li><li>3. Measure conductance of solution, chloride and iron content in water, hardness of water.</li><li>4. Estimate the rate constant of reaction.</li></ol>
<b>BASIC ELECTRICAL ENGINEERING LAB</b>	<b>KEE151P</b>	<ol style="list-style-type: none"><li>1. Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits.</li><li>2. Demonstrate the behavior of AC circuits connected to single phase AC supply and measure power in single phase as well as three phase electrical circuits.</li><li>3. Perform experiment illustrating BH curve of magnetic materials.</li><li>4. Calculate efficiency of a single phase transformer and DC machine.</li><li>5. Perform experiments on speed measurement and reversal of direction of three phase induction motor and Identify the type of DC and AC machines based on their construction.</li></ol>

<b>PROGRAMMING FOR PROBLEM SOLVING LAB</b>	<b>KCS151P</b>	<p>CO 1 Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems.</p> <p>CO 2 Demonstrate an understanding of computer programming language concepts.</p> <p>CO 3 Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.</p> <p>CO 4 Able to define data types and use them in simple data processing applications also he/she must be able to use the concept of array of structures.</p> <p>CO 5 Develop confidence for self education and ability for life-long learning needed for Computer language.</p>
<b>ENGLISH LANGUAGE LAB</b>	<b>KAS154P</b>	<ol style="list-style-type: none"> <li>1. Students will be enabled to understand the basic objective of the course by being acquainted with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking.</li> <li>2. Students would be able to create substantial base by the formation of strong professional vocabulary for its application at different platforms and through numerous modes as Comprehension, reading, writing and speaking etc.</li> <li>3. Students will apply it at their work place for writing purposes such as Presentation/official drafting/administrative communication and use it for document/project/report/research paper writing.</li> <li>4. Students will be made to evaluate the correct and error-free writing by being well-versed in rules of English grammar and cultivate relevant technical style of communication &amp; presentation at their work place and also for academic uses.</li> <li>5. Students will apply it for practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics. They will apply techniques for developing interpersonal communication skills and positive attitude leading to their professional competence.</li> </ol>

<b>ENGINEERING GRAPHICS &amp; DESIGN LAB</b>	<b>KCE151P</b>	<ol style="list-style-type: none"> <li>1. Understanding of the visual aspects of engineering design.</li> <li>2. Understanding of engineering graphics standards and solid modeling.</li> <li>3. Effective communication through graphics.</li> <li>4. Applying modern engineering tools necessary for engineering practice.</li> <li>5. Applying computer-aided geometric design.</li> <li>6. Analysis of Isometric views.</li> <li>7. Creating working drawings.</li> </ol>
<b>MECHANICAL WORKSHOP LAB</b>	<b>KWS151P</b>	<p>CO1 Use various engineering materials, tools, machines and measuring equipments.</p> <p>CO2 Perform machine operations in lathe and CNC machine.</p> <p>CO3 Perform manufacturing operations on components in fitting and carpentry shop.</p> <p>CO4 Perform operations in welding, moulding, casting and gas cutting.</p> <p>CO5 Fabricate a job by 3D printing manufacturing technique.</p>
<b>ARTIFICIAL INTELLIGENCE FOR ENGINEERS</b>	<b>KMC101</b>	<p>CO1 Understand the evolution and various approaches of AI</p> <p>CO2 Understand data storage, processing, visualization, and its use in regression, clustering etc.</p> <p>CO3 Understand natural language processing and chatbots.</p> <p>CO4 Understand the concepts of neural networks.</p> <p>CO5 Understand the concepts of face, object, speech recognition and Robots.</p>
<b>EMERGING TECHNOLOGY FOR ENGINEERING</b>	<b>KMC102</b>	<p>CO1 Understand the concepts of internet of things, smart cities and industrial internet of things.</p> <p>CO2 Understand the concepts of cloud computing.</p> <p>CO3 Understand the concepts of block chain, cryptocurrencies, smart Contracts.</p> <p>CO4 Understand design principles, tools, trends in 3 D printing and drones.</p> <p>CO5 Understand augmented reality ( AR), virtual reality (VR), 5G technology, brain computer interface and human brain.</p>

<b>SOFT SKILL I</b>	<b>KNC101</b>	<p>Unit 1- Students will be enabled to understand the correct usage of grammar.</p> <p>Unit 2- Students will apply the fundamental inputs of communication skills in making speech delivery, individual conference, and group communication.</p> <p>Unit 3-Students will evaluate the impact of interpersonal Communication on their performance as a professional and in obtaining professional excellence at the workplace.</p> <p>Unit 4-Skills and techniques of persuasion and negotiation would enhance the level of students at multifarious administrative and managerial platforms.</p> <p>Unit 5-Student will be able to equip with basics of communication skills and will apply it for practical and oral purposes by being honed up in presentation skills and voice-dynamics.</p>
<b>ENGINEERING PHYSICS</b>	<b>KAS201T</b>	<ol style="list-style-type: none"> <li>1. To solve the classical and wave mechanics problems.</li> <li>2. To develop the understanding of laws of thermodynamics and their application in various processes</li> <li>3. To formulate and solve the engineering problems on Electromagnetism &amp; Electromagnetic Field Theory.</li> <li>4. To aware of limits of classical physics &amp; to apply the ideas in solving the problems in their parent streams.</li> </ol>
<b>ENGINEERING CHEMISTRY</b>	<b>KAS202T</b>	<ol style="list-style-type: none"> <li>1. Use of different analytical instruments.</li> <li>2. Measure molecular/ system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water.</li> <li>3. Measure hardness of water.</li> <li>4. Estimate the rate constant of reaction.</li> </ol>

<b>ENGINEERING MATHEMATICS-II</b>	<b>KAS203T</b>	<p>CO 1 Understand the concept of differentiation and apply for solving differential equations.</p> <p>CO 2 Remember the concept of definite integral and apply for evaluating surface areas and volumes. K1, K3 &amp; K5</p> <p>CO 3 Understand the concept of convergence of sequence and series. Also evaluate Fourier series.</p> <p>CO 4 Illustrate the working methods of complex functions and apply for finding analytic functions.</p> <p>CO 5 Apply the concept of complex functions for finding Taylor's series, Laurent's series and evaluation of definite integrals.</p>
<b>BASIC ELECTRICAL ENGINEERING</b>	<b>KEE201T</b>	<ol style="list-style-type: none"> <li>1. Apply the concepts of KVL/KCL and network theorems in solving DC circuits.</li> <li>2. Analyze the steady state behavior of single phase and three phase AC electrical circuits.</li> <li>3. Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer.</li> <li>4. Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications.</li> <li>5. Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.</li> </ol>
<b>EMERGING DOMAIN IN ELECTRONICS ENGINEERING</b>	<b>KEC201T</b>	<ol style="list-style-type: none"> <li>1. Understand the concept of PN Junction and devices.</li> <li>2. Understand the concept of BJT, FET and MOFET.</li> <li>3. Understand the concept of operational amplifier</li> <li>4. Understand the concept of measurement instrument.</li> <li>5. Understand the working principle of different type of sensor and their uses.</li> <li>6. Understand the concept of IoT system &amp; Understand the component of IoT system.</li> </ol>

<b>PROGRAMMING FOR PROBLEM SOLVING</b>	<b>KCS201T</b>	<ol style="list-style-type: none"> <li>1. To develop simple algorithms for arithmetic and logical problems.</li> <li>2. To translate the algorithms to programs &amp; execution (in C language).</li> <li>3. To implement conditional branching, iteration and recursion.</li> <li>4. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.</li> <li>5. To use arrays, pointers and structures to develop algorithms and programs.</li> </ol>
<b>FUNDAMENTALS OF MECHANICAL ENGINEERING &amp; MECHATRONICS</b>	<b>KME201T</b>	<p>CO1 Understand the concept of stress and strain, factor of safety, beams.</p> <p>CO2 Understand the basic component and working of internal combustion engines, electric and hybrid vehicles, refrigerator and heat pump, air conditioning.</p> <p>CO3 Understand fluid properties, conservation laws, hydraulic machinery used in real life.</p> <p>CO4 Understand the working principle of different measuring instrument with the knowledge of accuracy, error and calibration, limit, fit, tolerance and control system.</p> <p>CO5 Understand concept of mechatronics with their advantages, scope and Industrial application, the different types of mechanical actuation system, the different types of hydraulic and pneumatic systems.</p> <p>CO6 Apply concepts of strength of material for safe design, refrigeration for calculation of COP, concepts of fluid mechanics in real life, concepts of measurements in production systems.</p>
<b>ENGINEERING PHYSICS LAB</b>	<b>KAS251P</b>	<ol style="list-style-type: none"> <li>1. To determine the wavelength of sodium light by Newton's ring Experiment.</li> <li>2. To determine the wavelength of sodium light with the help of Fresnel's bi-prism.</li> <li>3. To determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil.</li> <li>4. To draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss.</li> </ol>

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<b>ENGINEERING CHEMISTRY LAB</b>	<b>KAS252P</b>	<ol style="list-style-type: none"> <li>1. Use of different analytical instruments.</li> <li>2. Measure molecular/system properties such as surface tension, viscosity.</li> <li>3. Measure conductance of solution, chloride and iron content in water, hardness of water.</li> <li>4. Estimate the rate constant of reaction.</li> </ol>
<b>BASIC ELECTRICAL ENGINEERING LAB</b>	<b>KEE251P</b>	<ol style="list-style-type: none"> <li>1. Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits.</li> <li>2. Demonstrate the behavior of AC circuits connected to single phase AC supply and measure power in single phase as well as three phase electrical circuits.</li> <li>3. Perform experiment illustrating BH curve of magnetic materials.</li> <li>4. Calculate efficiency of a single phase transformer and DC machine.</li> <li>5. Perform experiments on speed measurement and reversal of direction of three phase induction motor and Identify the type of DC and AC machines based on their construction.</li> </ol>
<b>PROGRAMMING FOR PROBLEM SOLVING LAB</b>	<b>KCS251P</b>	<p>CO 1 Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems.</p> <p>CO 2 Demonstrate an understanding of computer programming language concepts.</p> <p>CO 3 Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.</p> <p>CO 4 Able to define data types and use them in simple data processing applications also he/she must be able to use the concept of array of structures.</p> <p>CO 5 Develop confidence for self education and ability for life-long learning needed for Computer language.</p>

<b>ENGLISH LANGUAGE LAB</b>	<b>KAS254P</b>	<ol style="list-style-type: none"> <li>1. Students will be enabled to understand the basic objective of the course by being acquainted with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking.</li> <li>2. Students would be able to create substantial base by the formation of strong professional vocabulary for its application at different platforms and through numerous modes as Comprehension, reading, writing and speaking etc.</li> <li>3. Students will apply it at their work place for writing purposes such as Presentation/official drafting/administrative communication and use it for document/project/report/research paper writing.</li> <li>4. Students will be made to evaluate the correct and error-free writing by being well-versed in rules of English grammar and cultivate relevant technical style of communication &amp; presentation at their work place and also for academic uses.</li> <li>5. Students will apply it for practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics. They will apply techniques for developing interpersonal communication skills and positive attitude leading to their professional competence.</li> </ol>
<b>ENGINEERING GRAPHICS &amp; DESIGN LAB</b>	<b>KCE251P</b>	<ol style="list-style-type: none"> <li>1. Understanding of the visual aspects of engineering design.</li> <li>2. Understanding of engineering graphics standards and solid modeling.</li> <li>3. Effective communication through graphics.</li> <li>4. Applying modern engineering tools necessary for engineering practice.</li> <li>5. Applying computer-aided geometric design.</li> <li>6. Analysis of Isometric views.</li> <li>7. Creating working drawings.</li> </ol>
<b>MECHANICAL WORKSHOP LAB</b>	<b>KWS251P</b>	<p>CO1 Use various engineering materials, tools, machines and measuring equipments.</p> <p>CO2 Perform machine operations in lathe and CNC machine.</p> <p>CO3 Perform manufacturing operations on components in fitting and carpentry shop.</p> <p>CO4 Perform operations in welding, moulding, casting and gas cutting.</p> <p>CO5 Fabricate a job by 3D printing manufacturing technique.</p>

<b>ARTIFICIAL INTELLIGENCE FOR ENGINEERS</b>	<b>KMC201</b>	<p>CO1 Understand the evolution and various approaches of AI.</p> <p>CO2 Understand data storage, processing, visualization, and its use in regression, clustering etc.</p> <p>CO3 Understand natural language processing and chatbots.</p> <p>CO4 Understand the concepts of neural networks.</p> <p>CO5 Understand the concepts of face, object, speech recognition and Robots.</p>
<b>EMERGING TECHNOLOGY FOR ENGINEERING</b>	<b>KMC202</b>	<p>CO1 Understand the concepts of internet of things, smart cities and industrial internet of things.</p> <p>CO2 Understand the concepts of cloud computing.</p> <p>CO3 Understand the concepts of block chain, cryptocurrencies, smart Contracts.</p> <p>CO4 Understand design principles, tools, trends in 3 D printing and drones.</p> <p>CO5 Understand augmented reality ( AR), virtual reality (VR), 5G technology, brain computer interface and human brain.</p>
<b>SOFT SKILL II</b>	<b>KNC201</b>	<p>Unit 1- Students will be able to converse well with effective LSRW skills in English.</p> <p>Unit 2- Students will evaluate the importance of conversation in their personal and professional domain and apply it for extending their professional frontiers.</p> <p>Unit 3- Students will learn to apply motivation skills for their individual and professional excellence.</p> <p>Unit 4- Students will utilize their teamwork and their interpersonal communication skills to survive and excel at their work-place.</p> <p>Unit 5-Students will learn to evaluate creativity for their professional innovation and critical thinking for their competence.</p>

SEM III	<b>Electromagnetic Field Theory</b>	<b>KEE301</b>	<p>CO 1 Apply different coordinate systems and their application in electromagnetic field theory, establish a relation between any two systems and also understand the vector calculus. K3</p> <p>CO2 Understand the concept of static electric field. Understand the concept of current and properties of conductors. Establish boundary conditions and to calculate capacitances of different types of capacitors K4</p> <p>CO3 Understand the concept of static magnetic field, magnetic scalar and vector potential K4</p> <p>CO4 Understand the forces due to magnetic field, magnetization, magnetic boundary conditions and inductors. K4</p> <p>CO5 Understand displacement current, time varying fields, propagation and reflection of EM waves and transmission lines. K3</p>
	<b>Electrical Measurements &amp; Instrumentation</b>	<b>KEE302</b>	<p>CO 1 Evaluate errors in measurement as well as identify and use different types of instruments for the measurement of voltage, current, power and energy. K1</p> <p>CO2 Display the knowledge of measurement of electrical quantities resistance, inductance and capacitance with the help of bridges. K2</p> <p>CO3 Demonstrate the working of instrument transformers as well as calculate the errors in current and potential transformers. K2</p> <p>CO4 Manifest the working of electronic instruments like voltmeter, multi-meter, frequency meter and CRO. K2</p> <p>CO5 Display the knowledge of transducers, their classifications and their applications for the measurement of physical quantities like motion, force, pressure, temperature, flow and liquid level. K3</p>

	<b>Basic Signals &amp; Systems</b>	<b>KEE303</b>	<p>CO 1 Represent the various types of signals &amp; systems and can perform mathematical operations on them. K2</p> <p>CO2 Analyze the response of LTI system to Fourier series and Fourier transform and to evaluate their applications to network analysis. K4</p> <p>CO3 Analyze the properties of continuous time signals and system using Laplace transform and determine the response of linear system to known inputs. K4</p> <p>CO4 Implement the concepts of Z transform to solve complex engineering problems using difference equations. K3</p>
SEM IV	<b>Digital Electronics</b>	<b>KEE401</b>	<p>CO 1 Apply concepts of Digital Binary System and implementation of Gates. K3 K4</p> <p>CO2 Analyze and design of Combinational logic circuits. K4</p> <p>CO3 Analyze and design of Sequential logic circuits with their applications. K4</p> <p>CO4 Implement the Design procedure of Synchronous &amp; Asynchronous Sequential Circuits. K3</p> <p>CO5 Apply the concept of Digital Logic Families with circuit implementation. K3</p>
	<b>Electrical Machines-I</b>	<b>KEE402</b>	<p>CO 1 Analyze the various principles &amp; concepts involved in Electromechanical Energy conversion. K4</p> <p>CO2 Demonstrate the constructional details of DC machines as well as transformers, and principle of operation of brushless DC motor, Stepper and DC Servo motors. K2</p> <p>CO3 Evaluate the performance and characteristics of DC Machine as motor and as well as generator. K4</p> <p>CO4 Evaluate the performance of transformers, individually and in parallel operation. K4</p> <p>CO5 Demonstrate and perform various connections of three phase transformers. K3</p>

	<b>Networks Analysis &amp; Synthesis</b>	<b>KEE403</b>	<p>CO 1 Apply the knowledge of basic circuit law, nodal and mesh methods of circuit analysis and simplify the network using Graph Theory approach.</p> <p>K3</p> <p>CO2 Analyze the AC and DC circuits using Kirchhoff's law and Network simplification theorems.</p> <p>K4</p> <p>CO3 Analyze steady-state responses and transient response of DC and AC circuits using classical and Laplace transform methods.</p> <p>K4</p> <p>CO4 Demonstrate the concept of complex frequency and analyze the structure and function of one and two port network. Also evaluate and analysis two-port network parameters.</p> <p>K4</p> <p>CO5 Synthesize one port network and analyze different filters. K4</p>
	<b>Power System - I</b>	<b>KEE501</b>	<p>Describe the working principle and basic components of conventional power plants as well as the other aspects of power generation.</p> <p>K2</p> <p>CO2</p> <p>Recognize elements of power system and their functions, as well as compare the different types of supply systems. Illustrate different types of conductors, transmission lines and various performance parameters of transmission line for short, medium and long transmission line.</p> <p>K4</p> <p>CO3</p> <p>Calculate sag and tension in overhead lines with and without wind and ice loading. Classify different type of insulators, determine potential distribution over a string of insulator, string efficiency and its improvement.</p> <p>K4</p> <p>CO4</p> <p>Compute the inductance and capacitance of single phase, three phase lines with symmetrical and unsymmetrical spacing, Composite conductors-transposition, bundled conductors, and understand the effect of earth</p>

<b>Control System</b>	<b>KEE502</b>	<p>Obtain transfer functions to predict the correct operation of open loop and closed loop control systems and identify the basic elements, structures and the characteristics of feedback control systems.</p> <p>K3 CO 2</p> <p>Measure and evaluate the performance of basic control systems in time domain.</p> <p>Design specification for different control action.</p> <p>K4 CO 3</p> <p>Analyze the stability of linear time-invariant systems in time domain using Routh-Hurwitz criterion and root locus technique.</p> <p>K4 CO 4</p> <p>Determine the stability of linear time-invariant systems in frequency domain using Nyquist criterion and Bode plot.</p> <p>K4 CO 5</p> <p>Design different type of compensators to achieve the desired performance of control System by root locus and Bode plot method.</p> <p>Develop and analyze the intermediate states of the system using state space</p>
<b>Electrical Machines-II</b>	<b>KEE503</b>	<p>CO 1</p> <p>Demonstrate the constructional details and principle of operation of three phase Induction and Synchronous Machines.</p> <p>K3 CO 2</p> <p>Analyze the performance of the three phase Induction and Synchronous Machines using the phasor diagrams and equivalent circuits.</p> <p>K4 CO 3</p> <p>Select appropriate three phase AC machine for any application and appraise its significance.</p> <p>K4 CO 4</p> <p>Start and observe the various characteristics of three phase Induction &amp; Synchronous Machines</p> <p>K4 CO 5</p> <p>Explain the principle of operation and performance of Single-Phase Induction Motor &amp; Universal Motor.</p> <p>K3</p>

SEM V

<b>Robotics</b>	<b>KEE051</b>	CO1 Learn the basic terminology used in robotics. K2 CO2 Conceptualize 3-D translation & orientation of robot arm kinematics. K3 CO3 Understand different robotic actuators and power transmission systems. K3 CO4 Classify the types of robotic grippers used in automation industries. K2 CO5 Realization of robotic sensoric system and their interfacing with robot controller. K3
<b>Sensors and Transducers</b>	<b>KEE052</b>	CO 1 Understand the working of commonly used sensors in industry for measurement of displacement, force and pressure. K3 CO2 Recognize the working of commonly used sensors in industry for measurement of temperature, position, accelerometer, vibration sensor, flow and level. K3 CO3 Identify the application of machine vision. K2 CO4 Conceptualize signal conditioning and data acquisition methods. K2 CO5 Comprehend smart sensors and their applications in automation systems. K4
<b>Industrial Automation and Control</b>	<b>KEE053</b>	CO1 Understand the concept of automation, its terminology and basic communication protocol. K2 CO2 Apply Relay logic for automation. K3 CO3 Learn about PLC, its operation and application in automation. K3 CO4 Analyze the industrial sensors, its terminology and how one can interface with PLC. K3 CO5 Demonstrate Pneumatic system and its application in industry. K3
<b>Electrical Standards and Engineering Practices</b>	<b>KEE054</b>	CO1 Interpret different National & International Electrical Standards in practice K2 CO2 Understand Indian standards for cables, lighting and motors. K3 CO3 Understand Indian standards of transformers, LV & HV switchgears K3 CO4 Demonstrate the basic guidelines for National codes and design practices K3 CO5 Select the size and type of transformer, cable & switchgear for electrical applications. K4

<b>Optimization Techniques</b>	<b>KEE055</b>	<p>CO 1 Understand the importance of optimization techniques in engineering applications K2  CO2 Learn optimization methods for solving linear programming problems K3  CO3 Learn optimization methods for solving nonlinear programming problems K3  CO4 Be aware of the concept of simulation and modern methods of optimization K3  CO5 Apply optimization techniques to electrical engineering problems K4</p>
<b>Neural Networks &amp; Fuzzy System</b>	<b>KEE056</b>	<p>CO 1 Apply the concepts of feed forward neural networks and their learning techniques. K3  CO2 Comprehend the architecture, develop algorithms and apply the concepts of back propagation networks.  K5  CO3 Differentiate between the fuzzy and the crisp sets, apply the concepts of fuzziness and the fuzzy set theory.  K4  CO4 Select the membership functions, write rules and develop the fuzzy controller for Industrial applications.  K5  CO5 Demonstrate the working of fuzzy neural networks and identify its applications. K3</p>
<b>Digital Signal Processing</b>	<b>KEE057</b>	<p>Represent discrete sequence and LTI systems, frequency domain of discrete sequence. Compute Fourier transform. Draw structure of systems based on System type-IIR &amp; FIR Systems.  K2  CO2  Describe sampling of signal and its reconstruction, processing of continuous time and discrete time signals. Sampling rate variation and application of multirate signal processing. Sampling effect in A/D and D/A conversion.  K3  CO3  Evaluate the response of LTI system and rational system function. Drive linear phase systems. Compute discrete Fourier transform (DFT) and calculate linear and circular convolution.  K5  CO4  Design IIR &amp; FIR filters with the desired specification with the help of impulse invariant and bilinear transformation method for IIR, with the help of window techniques for FIR. Design Butterworth and Chebyshev</p>

<b>Analog &amp; Digital Communication</b>	<b>KEE058</b>	<p>CO 1 Understand the Amplitude Modulation in communication system. K2  CO2 Comprehend the Frequency &amp; Phase modulation. K2  CO3 Realize the Pulse Modulation Techniques. K2  CO4 Get the Digital Modulation Techniques and their use in communication system. K2  CO5 Apply the concept of Information Theory in Communication Engineering. K3</p>
<b>Power System-II</b>	<b>KEE601</b>	<p>Identify power system components on one line diagram of power system and its representation including the behaviour of the constituent components and sub systems and Analyse a network under both balanced and unbalanced fault conditions and design the rating of circuit breakers. K4  CO2  Perform load flow analysis of an electrical power network and interpret the results of the analysis. K4  CO3  Describe the concept of travelling waves in transmission lines and use the travelling wave theory to determine the over voltage caused by surge propagation in transmission networks. K4  CO4  Assess the steady state and transient stability of the power system under various conditions. K4  CO5  Describe Operating Principle of a relay and classify them</p>
<b>Microprocessor and Microcontroller</b>	<b>KEE602</b>	<p>CO 1 Demonstrate the basic architecture of 8085 &amp; 8086 microprocessors K2  CO2  Illustrate the programming model of microprocessors &amp; write program using 8085 microprocessor K3  CO3 Interface different external peripheral devices with 8085 microprocessor K3  CO4 Comprehend the architecture of 8051 microcontroller K2  CO5  Compare advance level microprocessor &amp; microcontroller for different applications K4</p>

SEM VI

<b>Power Electronics</b>	<b>KEE603</b>	<p>CO 1 Demonstrate the characteristics as well as the operation of BJT, MOSFET, IGBT, SCR, TRIAC and GTO and identify their use in the power switching applications. K4</p> <p>CO2 Comprehend the non-isolated DC-DC converters and apply their use in different Power electronics applications. K3</p> <p>CO3 Analyze the phase controlled rectifiers and evaluate their performance parameters. K5</p> <p>CO4 Apprehend the working of single-phase ac voltage controllers, cyclo-converters and their various applications. K3</p> <p>CO5 Explain the single-phase and three phase bridge inverters differentiate between CSI and VSI and apply PWM for harmonic reduction. K4</p>
<b>Special Electrical Machines</b>	<b>KEE 061</b>	<p>CO 1 Describe the working principle, Constructional Features of different types of electrical machines including the fractional kilowatt machines. K2</p> <p>CO2 Analyse torque- speed characteristics of different electrical machines and interpret their performance and identify the suitable machine for an operation. K4</p> <p>CO3 Study different types of control techniques for a machine and identify the best control strategy based upon different constraints. K4</p> <p>CO4 Illustrate the use of stepper, BLDCs, SRM, and other special machines in the area of the various industrial and domestic as well as commercial applications of various fractional kilowatt machines. K3</p>

<b>Electrical Machine Design</b>	<b>KEE 062</b>	<p>CO 1 Classify insulating materials for electrical machines and calculate mmf and magnetizing current. K5</p> <p>CO2 Design the core, yoke, windings and the cooling system of a transformer. K6</p> <p>CO3 Illustrate the core and armature design of DC and 3-phase synchronous machine. Design design of three phase induction motors, field system of DC machine and synchronous machines. K6</p> <p>CO4 Analyse computer aided design approaches and apply the concepts of of optimization for the design of transformer, dc machine, three phase induction and synchronous machines. K6</p>
<b>Digital Control System</b>	<b>KEE 063</b>	<p>CO 1 Represent discrete time systems under the form of z-domain transfer functions and state-space models. K3</p> <p>CO 2 Obtain the model of discrete-time systems by pulse transfer function. K4</p> <p>CO 3 Analyze stability, transient response and steady state behaviour of linear discretetime systems, analytically and numerically using tools such as MATLAB and Simulink K4</p> <p>CO 4 Design sampled data control systems. K5</p> <p>CO 5 Describe Discrete state space model and test controllability and observability of systems. K5</p>
<b>Electrical and Hybrid Vehicles</b>	<b>KEE 064</b>	<p>CO1 Choose a suitable drive scheme for developing an electric hybrid vehicle depending on resources K3</p> <p>CO2 Design and develop basic schemes of electric vehicles and hybrid electric vehicles. K6</p> <p>CO3 Choose proper energy storage systems for vehicle applications K5</p> <p>CO4 Identify various communication protocols and technologies used in vehicle networks. K4</p>

<p><b>Advanced Micro processors &amp; Micro Controllers</b></p>	<p><b>KEE070</b></p>	<p>CO1 Explain the Architecture of 8086, memory segmentation and its mode. K2 CO2 Describe the Instruction set of 8086, and develop various type of programs. K2 CO3 Illustrate memory interfacing diagram , and explain various type of interfacing k3 CO4 Illustrate various modes of processor. K3 CO5 Explain the architecture of MSP430 and Develop GPIO controlling Program. K2</p>
<p><b>Energy Conservation and Auditing</b></p>	<p><b>KEE071</b></p>	<p>CO1 Identify and assess the energy conservation/saving opportunities in different electric system and understand related legislations. K1 CO2 Identify and assess the energy saving behavior of utilities through implementation of DSM and EMIS. K1 CO3 Explain energy audit &amp; management and to prepare energy audit report for different energy conservation instances. K2 CO4 Illustrate the energy audit for Mechanical Utilities. K3 CO5 Describe cost-effective measures towards improving energy efficiency and energy conservation by implementation of energy efficient technologies. K2</p>

<b>HVDC &amp; AC Transmission</b>	<b>KEE072</b>	<p>CO1 Describe the comparison of EHVAC and HVDC transmission while understanding various issues related to transmission. K1</p> <p>CO2 Calculate and study the corona loss and its impacts. Cite examples of the causes of switching overvoltage, Ferro-resonance. K3</p> <p>CO3 Explain the generation and measurement circuits for impulse, high DC &amp; AC voltages. While considering the design parameters evaluate the effect on the performance of the EHV lines.</p> <p>K2</p> <p>CO4 Classify the DC links and choice of converter configuration to investigate the impact of inductance on operation of converters and identify different control schemes as well as starting and stopping methods of DC links.</p> <p>K4</p> <p>CO5 Describe the converter faults, protections including MTDC types and applications . K2</p>
<b>High Voltage Engineering</b>	<b>KEE073</b>	<p>Describe conduction and breakdown phenomenon in gases, liquid dielectrics and solid dielectrics.</p> <p>K1</p> <p>CO2 Explain generation of high voltages and currents K2</p> <p>CO3 Explain measurement techniques for high voltages and currents</p> <p>K2</p> <p>CO4 Describe overvoltage phenomenon and insulation coordination in electric power systems.</p> <p>K2</p> <p>Describe non-destructive testing of materials and electric apparatus and high-voltage testing of electric apparatus</p> <p>K2</p>

SEM VII

<p><b>Power Quality and FACTS</b></p>	<p><b>KEE074</b></p>	<p>CO1 Classify the power quality issues in electrical distribution network K2            CO2 Describe the sources of voltage sag and protective devices including voltage regulators, active series compensator and UPS. K1            CO3 Describe the different phenomenon causing electrical transients and devices for over voltage protection. K2            CO4 Explain the working and application of different type of FACT devices like SSC, SVC, TSC, SSS, TCSC, UPFC. K2            CO5 Explain the causes of harmonics, its effect on motor ,capacitor, cables and mitigation techniques. K2</p>
<p><b>Electric drives</b></p>	<p><b>KEE075</b></p>	<p>CO1 Describe the operation of electric drives and its classification. K1            CO2 Explain the electric drive stability and selection of motor power rating. K2            CO3 Illustrate electric braking and its dynamics. K3            CO4 Describe the types of DC drives and its control. K2            CO5 Describe the types of AC drives and its control. K2</p>
<p><b>Power System dynamics and Control</b></p>	<p><b>KEE076</b></p>	<p>CO1 Explain the fundamental dynamic behavior and controls of power systems to perform basic stability analysis. K2            CO2 Describe modeling of Synchronous Machine and per unit quantities-Equivalent circuits. K2            CO3 Describe modeling of main power system components, such as synchronous machines, excitation systems and calculation of Initial conditions K2            CO4 Illustrate Small signal analysis, synchronizing and damping torque analysis. K3            CO5 Explain the concept of Power System Stabilizers, Structure &amp; tuning and dynamic compensator analysis. K2</p>

	<b>Power System Protection</b>	<b>KEE077</b>	CO1 Describe the relays and different protective schemes. K1 CO2 Explain Relay types and its application. K2 CO3 Describe types of faults and protection scheme for major components of power system. K2 CO4 Describe the circuit breaker operation, testing and types. K2 CO5 Explain the electronic relay, microprocessor and computer based protection schemes. K2
	<b>Deregulated Power System</b>	<b>KEE078</b>	CO1 Describe the deregulation, unbundling of electric utilities and its benefits. K1 CO2 Explain the operational planning activities of independent system operator in pool & bilateral markets and describe competitive bidding. K2 CO3 Explain the open access of transmission line and management of security & congestion in deregulation. K2 CO4 Describe the different types of Electric traction, system of track electrification and its related mechanics K2 CO5 Illustrate the Reliability Analysis of Generation, transmission and distribution and the regulation of the market. K3
	<b>Utilization of Electrical Energy &amp; Electric Traction</b>	<b>KEE079</b>	CO1 Describe the methods of electric heating and their advantages. K1 CO2 Explain the types of Electric welding and the principle of Electro-deposition, laws of electrolysis and its applications K2 CO3 Explain the laws of illumination and explain the principle of refrigeration and air-conditioning. K2 CO4 Describe the different types of Electric traction, system of track electrification and its related mechanics K2 CO5 Describe the salient features of traction drive and concept of energy saving using power electronic control of AC and DC drives K2
SEM VIII	<b>HSMC-1* / HSMC-2*</b>	<b>KHU801/ KHU802</b>	Mentioned in university syllabus
	<b>Project</b>	<b>KEE851</b>	
	<b>Open Elective-III</b>	<b>KOE08X</b>	
	<b>Open Elective -IV</b>	<b>KOE08X</b>	

**PROGRAM OUTCOME (PO), PROGRAM SPECIFIC OUTCOME (PSO) (2021-22)****BTECH MECHANICAL ENGGINERING****PROGRAMME OUTCOME**

By the culmination of this program, the graduate acquires the ability to

1. Analyze, identify and solve engineering problems, through application of knowledge in mathematics, science and engineering to function as good mechanical engineers and lead the people associated with.
2. Identify, formulate and solve engineering problems related to various materials and their properties using skills, techniques and state of art engineering tools.
3. Have good awareness of the trends in design, manufacturing, production and marketing.
4. Apply the mechanical engineering principles to design sound components which can be assembled into systems.
5. Select suitable materials with required properties for the designed components and system.
6. Understand and analyse the thermal and mechanical behaviour of the materials and systems.
7. Identify and apply the most suitable process to manufacture the components.
8. Interpret and use the experimental and field data to make oral / written presentations as required.
9. Understand the ethical requirements of the profession, the need for lifelong learning and the impacts of mechanical engineering activities on society.
10. Manage the job floor of an industry or a research organization efficiently and effectively by the optimized utilization of the resources for the maximum output.

**COURSE OUTCOME**

<b>SEMESTER</b>	<b>COURSE NAME</b>	<b>COURSE CODE</b>	<b>COURSE OUTCOME</b>
SEM I	<b>ENGINEERING PHYSICS</b>	<b>KAS101T</b>	<ol style="list-style-type: none"><li>1. To solve the classical and wave mechanics problems.</li><li>2. To develop the understanding of laws of thermodynamics and their application in various processes.</li><li>3. To formulate and solve the engineering problems on Electromagnetism &amp; Electromagnetic Field Theory.</li><li>4. To aware of limits of classical physics &amp; to apply the ideas in solving the problems in their parent Streams.</li></ol>
	<b>ENGINEERING CHEMISTRY</b>	<b>KAS101T</b>	<ol style="list-style-type: none"><li>1. Use of different analytical instruments.</li><li>2. Measure molecular/ system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water.</li><li>3. Measure hardness of water.</li><li>4. Estimate the rate constant of reaction.</li></ol>

<b>ENGINEERING MATHEMATICS-I</b>	<b>KAS103T</b>	<p>CO 1. Remember the concept of matrices and apply for solving linear simultaneous equations.</p> <p>CO 2. Understand the concept of limit continuity and differentiability and apply in the study of Rolle,s, Lagrange,s and Cauchy mean value theorem and Leibnitz theorems .</p> <p>CO 3. Identify the application of partial differentiation and apply for evaluating maxima, minima, series and Jacobians.</p> <p>CO 4. Illustrate the working methods of multiple integral and apply for finding area, volume, centre of mass and centre of gravity.</p> <p>CO 5. Remember the concept of vector and apply for directional derivatives, tangent and normal planes. Also evaluate line, surface and volume integrals.</p>
<b>BASIC ELECTRICAL ENGINEERING</b>	<b>KEE101T</b>	<ol style="list-style-type: none"> <li>1. Apply the concepts of KVL/KCL and network theorems in solving DC circuits.</li> <li>2. Analyze the steady state behavior of single phase and three phase AC electrical circuits.</li> <li>3. Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer.</li> <li>4. Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications.</li> <li>5. Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.</li> </ol>
<b>EMERGING DOMAIN IN ELECTRONICS ENGINEERING</b>	<b>KEC101T</b>	<ol style="list-style-type: none"> <li>1. Understand the concept of PN Junction and devices.</li> <li>2. Understand the concept of BJT, FET and MOFET.</li> <li>3. Understand the concept of Operational amplifier</li> <li>4. Understand the concept of measurement instrument.</li> <li>5. Understand the working principle of different type of sensor and their uses.</li> <li>6. Understand the concept of IoT system &amp; Understand the component of IoT system.</li> </ol>

<b>PROGRAMMING FOR PROBLEM SOLVING</b>	<b>KCS101T</b>	<ol style="list-style-type: none"> <li>1. To develop simple algorithms for arithmetic and logical problems.</li> <li>2. To translate the algorithms to programs &amp; execution (in C language)</li> <li>3. To implement conditional branching, iteration and recursion.</li> <li>4. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.</li> <li>5. To use arrays, pointers and structures to develop algorithms and programs.</li> </ol>
<b>FUNDAMENTALS OF MECHANICAL ENGINEERING &amp; MECHATRONICS</b>	<b>KME101T</b>	<p>CO1. Understand the concept of stress and strain, factor of safety, beams.</p> <p>CO2. Understand the basic component and working of internal combustion engines, electric and hybrid vehicles, refrigerator and heat pump, air conditioning.</p> <p>CO3. Understand fluid properties, conservation laws, hydraulic machinery used in real life.</p> <p>CO4. Understand the working principle of different measuring instrument with the knowledge of accuracy, error and calibration, limit, fit, tolerance and control system.</p> <p>CO5. Understand concept of mechatronics with their advantages, scope and Industrial application, the different types of mechanical actuation system, the different types of hydraulic and pneumatic systems.</p> <p>CO6. Apply concepts of strength of material for safe design, refrigeration for calculation of COP, concepts of fluid mechanics in real life, concepts of measurements in production systems.</p>
<b>ENGINEERING PHYSICS LAB</b>	<b>KAS151P</b>	<ol style="list-style-type: none"> <li>1. To determine the wavelength of sodium light by Newton's ring Experiment.</li> <li>2. To determine the wavelength of sodium light with the help of Fresnel's bi-prism.</li> <li>3. To determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil.</li> <li>4. To draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss.</li> </ol>
<b>ENGINEERING CHEMISTRY LAB</b>	<b>KAS152P</b>	<ol style="list-style-type: none"> <li>1. Use of different analytical instruments.</li> <li>2. Measure molecular/system properties such as surface tension, viscosity,</li> <li>3. Measure conductance of solution, chloride and iron content in water, hardness of water.</li> <li>4. Estimate the rate constant of reaction.</li> </ol>

<b>BASIC ELECTRICAL ENGINEERING LAB</b>	<b>KEE151P</b>	<ol style="list-style-type: none"> <li>1. Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits.</li> <li>2. Demonstrate the behavior of AC circuits connected to single phase AC supply and measure power in single phase as well as three phase electrical circuits.</li> <li>3. Perform experiment illustrating BH curve of magnetic materials.</li> <li>4. Calculate efficiency of a single phase transformer and DC machine.</li> <li>5. Perform experiments on speed measurement and reversal of direction of three phase induction motor and Identify the type of DC and AC machines based on their construction.</li> </ol>
<b>ENGINEERING CHEMISTRY LAB</b>	<b>KAS152P</b>	<ol style="list-style-type: none"> <li>1. Use of different analytical instruments.</li> <li>2. Measure molecular/system properties such as surface tension, viscosity,</li> <li>3. Measure conductance of solution, chloride and iron content in water, hardness of water.</li> <li>4. Estimate the rate constant of reaction.</li> </ol>
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<b>PROGRAMMING FOR PROBLEM SOLVING LAB</b>	<b>KCS151P</b>	<p>CO 1 Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems.</p> <p>CO 2 Demonstrate an understanding of computer programming language concepts.</p> <p>CO 3 Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.</p> <p>CO 4 Able to define data types and use them in simple data processing applications also he/she must be able to use the concept of array of structures.</p> <p>CO 5 Develop confidence for self education and ability for life-long learning needed for Computer language.</p>
<b>ENGLISH LANGUAGE LAB</b>	<b>KAS154P</b>	<ol style="list-style-type: none"> <li>1. Students will be enabled to understand the basic objective of the course by being acquainted with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking.</li> <li>2. Students would be able to create substantial base by the formation of strong professional vocabulary for its application at different platforms and through numerous modes as Comprehension, reading, writing and speaking etc.</li> <li>3. Students will apply it at their work place for writing purposes such as Presentation/official drafting/ administrative communication and use it for document/project/report/research paper writing.</li> <li>4. Students will be made to evaluate the correct and error-free writing by being well-versed in rules of English grammar and cultivate relevant technical style of communication &amp; presentation at their work place and also for academic uses.</li> <li>5. Students will apply it for practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics. They will apply techniques for developing interpersonal communication skills and positive attitude leading to their professional competence.</li> </ol>

<b>ENGINEERING GRAPHICS &amp; DESIGN LAB</b>	<b>KCE151P</b>	<ol style="list-style-type: none"> <li>1. Understanding of the visual aspects of engineering design.</li> <li>2. Understanding of engineering graphics standards and solid modeling.</li> <li>3. Effective communication through graphics.</li> <li>4. Applying modern engineering tools necessary for engineering practice.</li> <li>5. Applying computer-aided geometric design.</li> <li>6. Analysis of Isometric views.</li> <li>7. Creating working drawings.</li> </ol>
<b>MECHANICAL WORKSHOP LAB</b>	<b>KWS151P</b>	<p>CO1 Use various engineering materials, tools, machines and measuring equipments.</p> <p>CO2 Perform machine operations in lathe and CNC machine.</p> <p>CO3 Perform manufacturing operations on components in fitting and carpentry shop.</p> <p>CO4 Perform operations in welding, moulding, casting and gas cutting.</p> <p>CO5 Fabricate a job by 3D printing manufacturing technique.</p>
<b>ARTIFICIAL INTELLIGENCE FOR ENGINEERS</b>	<b>KMC101</b>	<p>CO1 Understand the evolution and various approaches of AI</p> <p>CO2 Understand data storage, processing, visualization, and its use in regression, clustering etc.</p> <p>CO3 Understand natural language processing and chatbots.</p> <p>CO4 Understand the concepts of neural networks.</p> <p>CO5 Understand the concepts of face, object, speech recognition and Robots.</p>
<b>EMERGING TECHNOLOGY FOR ENGINEERING</b>	<b>KMC102</b>	<p>CO1 Understand the concepts of internet of things, smart cities and industrial internet of things.</p> <p>CO2 Understand the concepts of cloud computing.</p> <p>CO3 Understand the concepts of block chain, cryptocurrencies, smart Contracts.</p> <p>CO4 Understand design principles, tools, trends in 3 D printing and drones.</p> <p>CO5 Understand augmented reality ( AR), virtual reality (VR), 5G technology, brain computer interface and human brain.</p>

	<b>SOFT SKILL I</b>	<b>KNC101</b>	<p>Unit 1- Students will be enabled to understand the correct usage of grammar.</p> <p>Unit 2- Students will apply the fundamental inputs of communication skills in making speech delivery, individual conference, and group communication.</p> <p>Unit 3-Students will evaluate the impact of interpersonal Communication on their performance as a professional and in obtaining professional excellence at the workplace.</p> <p>Unit 4-Skills and techniques of persuasion and negotiation would enhance the level of students at multifarious administrative and managerial platforms.</p> <p>Unit 5-Student will be able to equip with basics of communication skills and will apply it for practical and oral purposes by being honed up in presentation skills and voice-dynamics.</p>
SEM II	<b>ENGINEERING PHYSICS</b>	<b>KAS201T</b>	<ol style="list-style-type: none"> <li>1. To solve the classical and wave mechanics problems.</li> <li>2. To develop the understanding of laws of thermodynamics and their application in various processes</li> <li>3. To formulate and solve the engineering problems on Electromagnetism &amp; Electromagnetic Field Theory.</li> <li>4. To aware of limits of classical physics &amp; to apply the ideas in solving the problems in their parent streams.</li> </ol>
	<b>ENGINEERING CHEMISTRY</b>	<b>KAS202T</b>	<ol style="list-style-type: none"> <li>1. Use of different analytical instruments.</li> <li>2. Measure molecular/ system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water.</li> <li>3. Measure hardness of water.</li> <li>4. Estimate the rate constant of reaction.</li> </ol>
	<b>ENGINEERING MATHEMATICS-II</b>	<b>KAS203T</b>	<p>CO 1 Understand the concept of differentiation and apply for solving differential equations.</p> <p>CO 2 Remember the concept of definite integral and apply for evaluating surface areas and volumes.</p> <p>K1, K3 &amp; K5</p> <p>CO 3 Understand the concept of convergence of sequence and series. Also evaluate Fourier series.</p> <p>CO 4 Illustrate the working methods of complex functions and apply for finding analytic functions.</p> <p>CO 5 Apply the concept of complex functions for finding Taylor's series, Laurent's series and evaluation of definite integrals.</p>

<b>BASIC ELECTRICAL ENGINEERING</b>	<b>KEE201T</b>	<ol style="list-style-type: none"> <li>1. Apply the concepts of KVL/KCL and network theorems in solving DC circuits.</li> <li>2. Analyze the steady state behavior of single phase and three phase AC electrical circuits.</li> <li>3. Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer.</li> <li>4. Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications.</li> <li>5. Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.</li> </ol>
<b>EMERGING DOMAIN IN ELECTRONICS ENGINEERING</b>	<b>KEC201T</b>	<ol style="list-style-type: none"> <li>1. Understand the concept of PN Junction and devices.</li> <li>2. Understand the concept of BJT, FET and MOFET.</li> <li>3. Understand the concept of operational amplifier</li> <li>4. Understand the concept of measurement instrument.</li> <li>5. Understand the working principle of different type of sensor and their uses.</li> <li>6. Understand the concept of IoT system &amp; Understand the component of IoT system.</li> </ol>
<b>PROGRAMMING FOR PROBLEM SOLVING</b>	<b>KCS201T</b>	<ol style="list-style-type: none"> <li>1. To develop simple algorithms for arithmetic and logical problems.</li> <li>2. To translate the algorithms to programs &amp; execution (in C language).</li> <li>3. To implement conditional branching, iteration and recursion.</li> <li>4. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.</li> <li>5. To use arrays, pointers and structures to develop algorithms and programs.</li> </ol>

<b>FUNDAMENTALS OF MECHANICAL ENGINEERING &amp; MECHATRONICS</b>	<b>KME201T</b>	<p>CO1 Understand the concept of stress and strain, factor of safety, beams.</p> <p>CO2 Understand the basic component and working of internal combustion engines, electric and hybrid vehicles, refrigerator and heat pump, air conditioning.</p> <p>CO3 Understand fluid properties, conservation laws, hydraulic machinery used in real life.</p> <p>CO4 Understand the working principle of different measuring instrument with the knowledge of accuracy, error and calibration, limit, fit, tolerance and control system.</p> <p>CO5 Understand concept of mechatronics with their advantages, scope and Industrial application, the different types of mechanical actuation system, the different types of hydraulic and pneumatic systems.</p> <p>CO6 Apply concepts of strength of material for safe design, refrigeration for calculation of COP, concepts of fluid mechanics in real life, concepts of measurements in production systems.</p>
<b>ENGINEERING PHYSICS LAB</b>	<b>KAS251P</b>	<ol style="list-style-type: none"> <li>1. To determine the wavelength of sodium light by Newton's ring Experiment.</li> <li>2. To determine the wavelength of sodium light with the help of Fresnel's bi-prism.</li> <li>3. To determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil.</li> <li>4. To draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss.</li> </ol>
<b>ENGINEERING CHEMISTRY LAB</b>	<b>KAS252P</b>	<ol style="list-style-type: none"> <li>1. Use of different analytical instruments.</li> <li>2. Measure molecular/system properties such as surface tension, viscosity.</li> <li>3. Measure conductance of solution, chloride and iron content in water, hardness of water.</li> <li>4. Estimate the rate constant of reaction.</li> </ol>

<b>BASIC ELECTRICAL ENGINEERING LAB</b>	<b>KEE251P</b>	<ol style="list-style-type: none"> <li>1. Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits.</li> <li>2. Demonstrate the behavior of AC circuits connected to single phase AC supply and measure power in single phase as well as three phase electrical circuits.</li> <li>3. Perform experiment illustrating BH curve of magnetic materials.</li> <li>4. Calculate efficiency of a single phase transformer and DC machine.</li> <li>5. Perform experiments on speed measurement and reversal of direction of three phase induction motor and Identify the type of DC and AC machines based on their construction.</li> </ol>
<b>PROGRAMMING FOR PROBLEM SOLVING LAB</b>	<b>KCS251P</b>	<p>CO 1 Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems.</p> <p>CO 2 Demonstrate an understanding of computer programming language concepts.</p> <p>CO 3 Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.</p> <p>CO 4 Able to define data types and use them in simple data processing applications also he/she must be able to use the concept of array of structures.</p> <p>CO 5 Develop confidence for self education and ability for life-long learning needed for Computer language.</p>

<b>ENGLISH LANGUAGE LAB</b>	<b>KAS254P</b>	<ol style="list-style-type: none"> <li>1. Students will be enabled to understand the basic objective of the course by being acquainted with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking.</li> <li>2. Students would be able to create substantial base by the formation of strong professional vocabulary for its application at different platforms and through numerous modes as Comprehension, reading, writing and speaking etc.</li> <li>3. Students will apply it at their work place for writing purposes such as Presentation/official drafting/ administrative communication and use it for document/project/report/research paper writing.</li> <li>4. Students will be made to evaluate the correct and error-free writing by being well-versed in rules of English grammar and cultivate relevant technical style of communication &amp; presentation at their work place and also for academic uses.</li> <li>5. Students will apply it for practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics. They will apply techniques for developing interpersonal communication skills and positive attitude leading to their professional competence.</li> </ol>
<b>ENGINEERING GRAPHICS &amp; DESIGN LAB</b>	<b>KCE251P</b>	<ol style="list-style-type: none"> <li>1. Understanding of the visual aspects of engineering design.</li> <li>2. Understanding of engineering graphics standards and solid modeling.</li> <li>3. Effective communication through graphics.</li> <li>4. Applying modern engineering tools necessary for engineering practice.</li> <li>5. Applying computer-aided geometric design.</li> <li>6. Analysis of Isometric views.</li> <li>7. Creating working drawings.</li> </ol>
<b>MECHANICAL WORKSHOP LAB</b>	<b>KWS251P</b>	<p>CO1 Use various engineering materials, tools, machines and measuring equipments.</p> <p>CO2 Perform machine operations in lathe and CNC machine.</p> <p>CO3 Perform manufacturing operations on components in fitting and carpentry shop.</p> <p>CO4 Perform operations in welding, moulding, casting and gas cutting.</p> <p>CO5 Fabricate a job by 3D printing manufacturing technique.</p>

	<b>ARTIFICIAL INTELLIGENCE FOR ENGINEERS</b>	<b>KMC201</b>	CO1 Understand the evolution and various approaches of AI. CO2 Understand data storage, processing, visualization, and its use in regression, clustering etc. CO3 Understand natural language processing and chatbots. CO4 Understand the concepts of neural networks. CO5 Understand the concepts of face, object, speech recognition and Robots.
	<b>EMERGING TECHNOLOGY FOR ENGINEERING</b>	<b>KMC202</b>	CO1 Understand the concepts of internet of things, smart cities and industrial internet of things. CO2 Understand the concepts of cloud computing. CO3 Understand the concepts of block chain, cryptocurrencies, smart Contracts. CO4 Understand design principles, tools, trends in 3 D printing and drones. CO5 Understand augmented reality ( AR), virtual reality (VR), 5G technology, brain computer interface and human brain.
	<b>SOFT SKILL II</b>	<b>KNC201</b>	Unit 1- Students will be able to converse well with effective LSRW skills in English. Unit 2- Students will evaluate the importance of conversation in their personal and professional domain and apply it for extending their professional frontiers. Unit 3- Students will learn to apply motivation skills for their individual and professional excellence. Unit 4- Students will utilize their teamwork and their interpersonal communication skills to survive and excel at their work-place. Unit 5-Students will learn to evaluate creativity for their professional innovation and critical thinking for their competence.
SEM III	<b>Thermodynamics</b>	<b>KME301</b>	After completing this course, the students will be able to apply energy balance to systems and control volumes, in situations involving heat and work interactions. ☑ Students can evaluate changes in thermodynamic properties of substances. ☑ The students will be able to evaluate the performance of energy conversion devices. ☑ The students will be able to differentiate between high grade and low-grade energies

	<b>Fluid Mechanics &amp; Fluid Machines</b>	<b>KME302</b>	Upon completion of this course, students will be able to mathematically analyze simple flow situations. <input type="checkbox"/> They will be able to evaluate the performance of pumps and turbines
	<b>Materials Engineering</b>	<b>KME303</b>	Student will be able to identify crystal structures for various materials and understand the defects in such structures. <input type="checkbox"/> Understand how to tailor material properties of ferrous and non-ferrous alloys. <input type="checkbox"/> How to quantify mechanical integrity and failure in materials.
SEM IV	<b>Applied Thermodynamics</b>	<b>KME401</b>	After completing this course, the students will get a good understanding of various practical power cycles and heat pump cycles. <input type="checkbox"/> They will be able to analyze energy conversion in various thermal devices such as combustors, air coolers, nozzles, diffusers, steam turbines and reciprocating compressors. <input type="checkbox"/> They will be able to understand phenomena occurring in high speed compressible flows
	<b>Engineering Mechanics</b>	<b>KME402</b>	After completing this course, the students should be able to understand the various effect of force and motion on the engineering design structures
	<b>Manufacturing Processes</b>	<b>KME403</b>	Upon completion of this course, students will be able to understand the different conventional and unconventional manufacturing methods employed for making different products.
SEM V	<b>Heat and Mass Transfer</b>	<b>KME 501</b>	CO-1 Understand the fundamentals of heat and mass transfer. K2 CO-2 Apply the concept of steady and transient heat conduction. K3 CO-3 Apply the concept of thermal behavior of fins. K3 CO-4 Apply the concept of forced and free convection. K3 CO-5 Apply the concept of radiation for black and non-black bodies. K3 CO-6 Conduct thermal analysis of heat exchangers. K4

<b>Strength of Material</b>	<b>KME 502</b>	<p>CO 1 Understand the concept of stress and strain under different conditions of loading K2</p> <p>CO 2 Determine the principal stresses and strains in structural members K3</p> <p>CO 3 Determine the stresses and strains in the members subjected to axial, bending and torsional loads K3</p> <p>CO 4 Apply the concepts of stresses and strain in solving problems related to springs, column and pressure vessels K3</p> <p>CO 5 Calculate the slope, deflection and buckling of loaded members K3</p> <p>CO 6 Analyze the stresses developed in straight and curved beams of different cross sections K4</p>
<b>Industrial Engineering</b>	<b>KME 503</b>	<p>CO1 Understand the concept of production system, productivity, facility and process planning in various industries K2</p> <p>CO2 Apply the various forecasting and project management techniques K3</p> <p>CO3 Apply the concept of break-even analysis, inventory control and resource utilization using queuing theory K3</p> <p>CO4 Apply principles of work study and ergonomics for design of work systems K3</p> <p>CO5 Formulate mathematical models for optimal solution of industrial problems using linear programming approach K</p>
<b>Computer Integrated Manufacturing</b>	<b>KME 051</b>	<p>CO 1 Understand the basic concepts of automation, computer numeric control machining K2</p> <p>CO 2 Understand the algorithms of line generation, circle generation, transformation, curve, surface modeling and solid modeling K2</p> <p>CO 3 Understand group technology, computer aided process planning, flexible manufacturing, Industry 4.0, robotics K2</p> <p>CO 4 Understand information system and material handling in CIM environment, rapid prototyping K2</p> <p>CO 5 Apply the algorithms of line &amp; circle generation and geometric transformations K3</p> <p>CO6 Develop CNC program for simple operations K3</p>

<b>Mechatronics Systems</b>	<b>KME 052</b>	<p>CO 1 Identify key elements of mechatronics and its representation by block diagram. K 2</p> <p>CO 2 Understand the concept of sensors and use of interfacing systems. K 2</p> <p>CO 3 Understand the concept and applications of different actuators K 2</p> <p>CO 4 Illustrate various applications of mechatronic systems. K 2</p> <p>CO 5 Develop PLC ladder programming and implementation in real life problem. K 5</p>
<b>Finite Element Methods</b>	<b>KME 053</b>	<p>CO 1 Understand the basic concepts of FEM and its applications. K2</p> <p>CO 2 Apply the procedure involved to solve a problem using Finite Element Methods. K3</p> <p>CO 3 Develop the element stiffness matrices using different approach. K3</p> <p>CO 4 Analyze 1D and 2D problem using different methods. K4</p> <p>CO 5 Analyze the complex geometric problems through FEM software packages. K4</p>
<b>I C Engine Fuel and Lubrication</b>	<b>KME 054</b>	<p>CO 1 Explain the working principle, performance parameters and testing of IC Engine. K 2</p> <p>CO 2 Understand the combustion phenomena in SI and CI engines and factors influencing combustion chamber design. K 2</p> <p>CO 3 Understand the essential systems of IC engine and latest trends and developments in IC Engines. K 2</p> <p>CO 4 Understand the effect of engine emissions on environment and human health and methods of reducing it. K 2</p> <p>CO 5 Apply the concepts of thermodynamics to air standard cycle in IC Engines K 3</p> <p>CO 6 Analyze the effect of various operating parameters on IC engine performance. K 4</p>
<b>Advance welding</b>	<b>KME 055</b>	<p>CO 1 Understand the physics of arc welding process and various operating characteristics of welding power source. K2</p> <p>CO 2 Analyse various welding processes and their applications. K3</p> <p>CO 3 Apply the knowledge of welding for repair &amp; maintenance, along with the weldability of different materials. K3</p> <p>CO 4 Apply the concept of quality control and testing of weldments in industrial environment. K3</p> <p>CO 5 Evaluate heat flow in welding and physical metallurgy of weldments. K4</p>

	<b>Programming, Data Structures and Algorithms Using Python</b>	<b>KME 056</b>	CO 1 Understand the numbers, math's function, strings, list, tuples, and dictionaries in pythons K2 CO 2 Apply conditional statement and functions in python K3 CO 3 Apply file handling techniques in python K3 CO 4 Analyze the graphical demonstration in python K4 CO 5 Apply techniques of Classes and Object Concept in Python K3
	<b>Mechanical Vibrations</b>	<b>KME 057</b>	CO 1 Understand fundamentals of mechanical vibrations along with their classification. K2 CO 2 Differentiate among single, two and multiple degree of freedom (DOF) systems. K3 CO 3 Analyze, predict and measure the performance of systems undergoing single, two and multiple DOF. K4 CO 4 Design systems with optimized vibration absorption capabilities. K4 CO 5 Apply the fundamentals to the real life problems like whirling of shaft K3 CO 6 Solve complicated mathematical models using Numerical methods and software applications. K4
	<b>Fuels and Combustion</b>	<b>KME 058</b>	CO1 Understand the properties of different types of fuel with their application. K2 CO2 Classify different types of fuels. K2 CO3 Understand the concept of combustion. K2 CO4 Understand the fundamental concept of air pollution and its control. K2 CO5 Calculate various properties of the fuels. K3 CO6 Analyze the flue gases. K4
SEM VI	<b>Refrigeration and Air Conditioning</b>	<b>KME 601</b>	CO1 Understand the properties of different types of fuel with their application. K2 CO2 Classify different types of fuels. K2 CO3 Understand the concept of combustion. K2 CO4 Understand the fundamental concept of air pollution and its control. K2 CO5 Calculate various properties of the fuels. K3 CO6 Analyze the flue gases. K4
	<b>Machine Design</b>	<b>KME 602</b>	CO 1 Recall the basic concepts of Solid Mechanics to understand the subject. K2 CO 2 Classify various machine elements based on their functions and applications. K2 CO 3 Apply the principles of solid mechanics to machine elements subjected to static and fluctuating loads. K3 CO 4 Analyze forces, bending moments, twisting moments and failure causes in various machine elements to be designed. K4 CO 5 Design the machine elements to meet the required specification. K5

<b>Theory of Machines</b>	<b>KME 603</b>	CO1 Understand the principles of kinematics and dynamics of machines. K2 CO2 Calculate the velocity and acceleration for 4-bar and slider crank mechanism K3 CO3 Develop cam profile for followers executing various types of motions K3 CO4 Apply the concept of gear, gear train and flywheel for power transmission K3 CO5 Apply dynamic force analysis for slider crank mechanism and balance rotating & reciprocating masses in machines. K3 CO6 Apply the concepts of gyroscope, governors in fluctuation of load and brake & dynamometer in power transmission K3
<b>Nondestructive Testing</b>	<b>KME 061</b>	CO 1 Understand the concept of destructive and Non-destructive testing methods. K2 CO 2 Explain the working principle and application of die penetrant test and magnetic particle inspection. K2 CO3 Understand the working principle of eddy current inspection. K2 CO 4 Apply radiographic techniques for testing. K3 CO 5 Apply the principle of Ultrasonic testing and applications in medical and engineering areas. K3
<b>Artificial Intelligence</b>	<b>KME 062</b>	CO 1 Understand concepts of Artificial Intelligence K2 CO 2 Solve problem by Search-I & Search-II K3 CO 3 Understand Knowledge representation K2 CO 4 Apply concepts of Learning methods K3 CO 5 Analyse Decision Networks K4 CO 6 Build planning graphs K5
<b>Tribology</b>	<b>KME 063</b>	CO 1 Identify and explain various friction and wear mechanisms. K2 CO 2 Select proper lubricants for different applications. K3 CO 3 Select suitable lubrication methods in different bearings. K3 CO 4 Study the surfaces coating techniques for reduction of wear. K3 CO 5 Analyze the impact of friction in various kinematic pairs. K4
<b>Gas Dynamics and Jet Propulsion</b>	<b>KME 064</b>	CO1 Understand the concept of compressible fluid flow and flow through variable area ducts. K2 CO2 Understand the basic principle and types of jet and rocket propulsion. K2 CO3 Apply the basic laws for the investigation of flow through ducts. K3 CO4 Apply the basic laws for the thermodynamics analysis of jet and rocket propulsion. K3 CO5 Analyze the compressible flow through variable area ducts. K4

SEM VII	<b>Additive manufacturing</b>	<b>KME 071</b>	<p>CO 1 Understanding the basics of additive manufacturing/rapid prototyping and its advantages and disadvantages K2</p> <p>CO 2 Understanding the role of additive manufacturing in the design process and the implications for design. K2</p> <p>CO 3 Understanding the processes used in additive manufacturing for a range of materials and applications K2</p> <p>CO 4 Understand the various software tools, processes and techniques that enable advanced/additive manufacturing and personal fabrication. K2</p> <p>CO 5 Apply knowledge of additive manufacturing for various real-life applications K3</p>
	<b>HVAC systems</b>	<b>KME 072</b>	<p>CO1 Understand the basics concepts of HVAC and various HVAC systems. K2</p> <p>CO2 Understand the use of refrigerants with their respective applications and its future trends. K2</p> <p>CO3 Understand the use of different auxiliary systems used in HVAC systems. K2</p> <p>CO4 Apply the basic laws for thermodynamic analysis of different processes involved in HVAC systems. K3</p> <p>CO5 Apply the basic concepts to calculate the HVAC loads for different applications. K3</p> <p>CO6 Apply the concepts of psychrometry to design HVAC systems for different applications K3</p>

<p><b>Hybrid Vehicle Propulsion</b></p>	<p><b>KAU 072</b></p>	<p>CO-1 Understand the basics of the hybrid electric vehicles and it's types. K2 CO-2 Understand the types of drive trains used in hybrid vehicles K2 CO-3 Understand the propulsion units used in Hybrid Vehicles and their efficiency. K2 CO-4 Understand the requirements and devices of energy storage used in hybrid vehicles. K2 CO-5 Understand the concept of downsizing of IC engines in case of hybrid vehicles. K2 CO-6 Understand the principles of energy management and issues related to these strategies. K2</p>
<p><b>Mathematical Modeling of Manufacturing Processes</b></p>	<p><b>KME 073</b></p>	<p>CO1 Understand the fundamentals of manufacturing processes, mathematical models and their solutions K2 CO2 Understand unconventional and conventional machining, their discrete-time linear, non-linear models and solutions K2 CO3 Analyze the mechanism of forming and heat transfer in welding K4 CO4 Apply the principles of casting, powder metallurgy, coating and additive Manufacturing K3 CO5 Understand the fundamental of heat treatment, micro / nano manufacturing and processing of non-metallic materials. K2</p>

<b>Machine Learning</b>	<b>KME 074</b>	CO 1 Understand the need of machine learning concepts K2 CO 2 To Understand a wide variety of ML Algorithms and how to evaluate models generated from data K3 CO 3 Solve prediction based problems K3 CO 4 Analyze machine learning algorithms K4 CO 5 Apply the Algorithms to real-world problems K4
<b>Computer Graphics and product modeling</b>	<b>KME 075</b>	CO 1 Understand the components of a computer graphics with object representation and to develop algorithm for graphics system components. K2 CO 2 Understand the basic principles of 3- dimensional computer graphics and express the 3D model with illumination and shading effects. K2 CO 3 Develop a 3D solid model using 3D Solid Modeling Software K4 CO 4 Identify the customer needs in order to develop a business model for new product. K3 CO 5 Develop strategy for designing and development of a new product K4

<b>Power Plant Engineering</b>	<b>KME 076</b>	<p>CO-1 Understand the different sources of power generation and their impact on environment. K2</p> <p>CO-2 Understand the elements of power generation using conventional and non-conventional energy sources. K2</p> <p>CO-3 Understand the concepts of electrical systems used in power plants. K2</p> <p>CO-4 Apply the basic concepts of thermodynamics to measure the performance of different power plants. K3</p> <p>CO-5 Determine the performance of power plants based on load variations. K3</p>
<b>Vehicle Body Engineering &amp; safety</b>	<b>KAU 073</b>	<p>CO-1 Understand the classification of the vehicles on the basis of body. K2</p> <p>CO-2 Understand the importance of material selection in designing automotive bodies. K2</p> <p>CO-3 Understand the concepts of aerodynamics used in designing automobiles. K2</p> <p>CO-4 Understand the importance of interior and exterior ergonomics while designing the vehicle. K2</p> <p>CO-5 Identify various sources of noise and methods of noise separation and various safety aspects in a given vehicle. K2</p> <p>CO-6 Calculate various aerodynamic forces and moments acting on vehicle, load distribution in vehicle body and stability of vehicle. K3</p>

	<b>Measurement &amp; Metrology Lab</b>	<b>KME751</b>	<p>CO-1 Understand the basic principles of instrumentation for measurement of surface finish, strain, temperature, pressure and flow. K2</p> <p>CO-2 Understand the principle and operation of Coordinate Measuring Machine (CMM). K2</p> <p>CO-3 Apply Sine Bar, Slip Gauges, Bevel Protractor, Stroboscope, Dial Indicator etc. for measurement of different attributes. K3</p> <p>CO-4 Apply the basic concepts of limits, fits &amp; tolerances for selective assembly. K3</p>
SEM VIII	<b>HSMC-1* / HSMC-2*</b>	<b>KHU801/ KHU802</b>	Mentioned in university syllabus
	<b>Project</b>	<b>KME851</b>	
	<b>Open Elective-III</b>	<b>KOE08X</b>	
	<b>Open Elective -IV</b>	<b>KOE08X</b>	

**PROGRAM OUTCOME (PO), PROGRAM SPECIFIC OUTCOME (PSO) (2021-22)****BTECH ARTIFICIAL INTELLIGENCE & DATA SCIENCE****PROGRAMME OUTCOME**

engineering appropriate to the discipline.

PO2:The graduates are expected to apply mathematical foundations, algorithmic principles and computer science theory in modeling, design and conduct of experiments as well as data interpretation and analysis.

PO3:The graduates are expected to develop an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.

PO4:The graduates are expected to develop an ability to identify, formulate and solve real engineering problems and understand the global impact of engineering solutions.

PO5:The graduates are expected to develop an ability to function effectively on multidisciplinary teams to accomplish a common goal.

PO6:The graduates are expected to develop an understanding of professional, ethical, legal, security and social issues as well as responsibilities.

PO7:The graduates should have good knowledge of contemporary issues and are expected to communicate effectively with a range of audiences.

PO8:The graduates should be able to recognize the need for lifelong learning and are expected to apply the techniques, skills and modern engineering tools necessary for engineering practice.

**PROGRAM SPECIFIC OUTCOMES**

PSO1:Apply the fundamentals of mathematics, science and engineering knowledge to understand, analyze and develop computer programs in the areas related to algorithms, multimedia, big data analytics, machine learning, artificial intelligence and networking for efficient design of computer-based systems of varying complexity.

PSO2:Apply appropriate techniques and modern engineering hardware and software tools for the design and integration of computer system and related technologies, to engage in lifelong learning for the advancement of technology and its adaptation in multi-disciplinary environments.

PSO3:Implementation of professional engineering solutions for the betterment of society keeping the environmental context in mind, be aware of professional ethics and be able to communicate effectively.

**COURSE OUTCOME**

SEMESTER	COURSE NAME	COURSE CODE	COURSE OUTCOME
	ENGINEERING PHYSICS	KAS101T	1. To solve the classical and wave mechanics problems. 2. To develop the understanding of laws of thermodynamics and their application in various processes. 3. To formulate and solve the engineering problems on Electromagnetism & Electromagnetic Field Theory. 4. To aware of limits of classical physics & to apply the ideas in solving the problems in their parent Streams.
	ENGINEERING CHEMISTRY	KAS101T	1. Use of different analytical instruments. 2. Measure molecular/ system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water.
	ENGINEERING MATHEMATICS-I	KAS103T	CO 1. Remember the concept of matrices and apply for solving linear simultaneous equations. CO 2. Understand the concept of limit continuity and differentiability and apply in the study of Rolle,s, Lagrange,s and Cauchy mean

		value theorem and Leibnitz theorems . CO 3. Identify the application of partial differentiation and apply for
<b>BASIC ELECTRICAL ENGINEERING</b>	<b>KEE101T</b>	<ol style="list-style-type: none"> <li>1. Apply the concepts of KVL/KCL and network theorems in solving DC circuits.</li> <li>2. Analyze the steady state behavior of single phase and three phase AC electrical circuits.</li> <li>3. Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer.</li> <li>4. Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications.</li> <li>5. Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.</li> </ol>
<b>EMERGING DOMAIN IN ELECTRONICS ENGINEERING</b>	<b>KEC101T</b>	<ol style="list-style-type: none"> <li>1. Understand the concept of PN Junction and devices.</li> <li>2. Understand the concept of BJT, FET and MOFET.</li> <li>3. Understand the concept of Operational amplifier</li> <li>4. Understand the concept of measurement instrument.</li> <li>5. Understand the working principle of different type of sensor and their uses.</li> <li>6. Understand the concept of IoT system &amp; Understand the component of IoT system.</li> </ol>
<b>PROGRAMMING FOR PROBLEM SOLVING</b>	<b>KCS101T</b>	<ol style="list-style-type: none"> <li>1. To develop simple algorithms for arithmetic and logical problems.</li> <li>2. To translate the algorithms to programs &amp; execution (in C language)</li> <li>3. To implement conditional branching, iteration and recursion.</li> <li>4. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.</li> <li>5. To use arrays, pointers and structures to develop algorithms and programs.</li> </ol>

<b>FUNDAMENTALS OF MECHANICAL ENGINEERING &amp; MECHATRONICS</b>	<b>KME101T</b>	<p>CO1. Understand the concept of stress and strain, factor of safety, beams.</p> <p>CO2. Understand the basic component and working of internal combustion engines, electric and hybrid vehicles, refrigerator and heat pump, air conditioning.</p> <p>CO3. Understand fluid properties, conservation laws, hydraulic machinery used in real life.</p> <p>CO4. Understand the working principle of different measuring instrument with the knowledge of accuracy, error and calibration, limit, fit, tolerance and control system.</p> <p>CO5. Understand concept of mechatronics with their advantages, scope and Industrial application, the different types of mechanical actuation system, the different types of hydraulic and pneumatic systems.</p> <p>CO6. Apply concepts of strength of material for safe design, refrigeration for calculation of COP, concepts of fluid mechanics in real life, concepts of measurements in production systems.</p>
<b>ENGINEERING PHYSICS LAB</b>	<b>KAS151P</b>	<ol style="list-style-type: none"> <li>1. To determine the wavelength of sodium light by Newton's ring Experiment.</li> <li>2. To determine the wavelength of sodium light with the help of Fresnel's bi-prism.</li> <li>3. To determine the variation of magnetic field with the</li> </ol>
<b>ENGINEERING CHEMISTRY LAB</b>	<b>KAS152P</b>	<ol style="list-style-type: none"> <li>1. Use of different analytical instruments.</li> <li>2. Measure molecular/system properties such as surface tension, viscosity,</li> <li>3. Measure conductance of solution, chloride and iron content in water, hardness of water.</li> <li>4. Estimate the rate constant of reaction.</li> </ol>
<b>BASIC ELECTRICAL ENGINEERING LAB</b>	<b>KEE151P</b>	<ol style="list-style-type: none"> <li>1. Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits.</li> <li>2. Demonstrate the behavior of AC circuits connected to single phase AC supply and measure power in single phase as well as three phase electrical circuits.</li> <li>3. Perform experiment illustrating BH curve of magnetic materials.</li> <li>4. Calculate efficiency of a single phase transformer and DC machine.</li> <li>5. Perform experiments on speed measurement and reversal of direction of three phase induction motor and Identify the type of DC and AC machines based on their construction.</li> </ol>

SEM I

<b>ENGINEERING CHEMISTRY LAB</b>	<b>KAS152P</b>	<ol style="list-style-type: none"> <li>1. Use of different analytical instruments.</li> <li>2. Measure molecular/system properties such as surface tension, viscosity,</li> <li>3. Measure conductance of solution, chloride and iron content in water, hardness of water.</li> <li>4. Estimate the rate constant of reaction.</li> </ol>
<b>BASIC ELECTRICAL ENGINEERING LAB</b>	<b>KEE151P</b>	<ol style="list-style-type: none"> <li>1. Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits.</li> <li>2. Demonstrate the behavior of AC circuits connected to single phase AC supply and measure power in single phase as well as three phase electrical circuits.</li> <li>3. Perform experiment illustrating BH curve of magnetic materials.</li> <li>4. Calculate efficiency of a single phase transformer and DC machine.</li> <li>5. Perform experiments on speed measurement and reversal of direction of three phase induction motor and Identify the type of DC and AC machines based on their construction.</li> </ol>
<b>PROGRAMMING FOR PROBLEM SOLVING LAB</b>	<b>KCS151P</b>	<p>CO 1 Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems.</p> <p>CO 2 Demonstrate an understanding of computer programming language concepts.</p> <p>CO 3 Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.</p> <p>CO 4 Able to define data types and use them in simple data processing applications also he/she must be able to use the concept of array of structures.</p> <p>CO 5 Develop confidence for self education and ability for life-long learning needed for Computer language.</p>

<b>ENGLISH LANGUAGE LAB</b>	<b>KAS154P</b>	<p>objective of the course by being acquainted with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking.</p> <p>2. Students would be able to create substantial base by the formation of strong professional vocabulary for its application at different platforms and through numerous modes as Comprehension, reading, writing and speaking etc.</p> <p>3. Students will apply it at their work place for writing purposes such as Presentation/official drafting/administrative communication and use it for document/project/report/research paper writing.</p> <p>4. Students will be made to evaluate the correct and error-free writing by being well-versed in rules of English grammar and cultivate relevant technical style of communication &amp; presentation at their work place and also for academic uses.</p> <p>5. Students will apply it for practical and oral presentation purposes by being honed up in presentation skills and voice dynamics. They will apply techniques for developing interpersonal communication skills and positive attitude leading to their professional competence.</p>
<b>ENGINEERING GRAPHICS &amp; DESIGN LAB</b>	<b>KCE151P</b>	<ol style="list-style-type: none"> <li>1. Understanding of the visual aspects of engineering design.</li> <li>2. Understanding of engineering graphics standards and solid modeling.</li> <li>3. Effective communication through graphics.</li> <li>4. Applying modern engineering tools necessary for engineering practice.</li> <li>5. Applying computer-aided geometric design.</li> <li>6. Analysis of Isometric views.</li> <li>7. Creating working drawings.</li> </ol>
<b>MECHANICAL WORKSHOP LAB</b>	<b>KWS151P</b>	<p>CO1 Use various engineering materials, tools, machines and measuring equipments.</p> <p>CO2 Perform machine operations in lathe and CNC machine.</p> <p>CO3 Perform manufacturing operations on components in fitting and carpentry shop.</p> <p>CO4 Perform operations in welding, moulding, casting and gas cutting.</p> <p>CO5 Fabricate a job by 3D printing manufacturing technique.</p>

<b>ARTIFICIAL INTELLIGENCE FOR ENGINEERS</b>	<b>KMC101</b>	CO1 Understand the evolution and various approaches of AI CO2 Understand data storage, processing, visualization, and its use in regression, clustering etc. CO3 Understand natural language processing and chatbots. CO4 Understand the concepts of neural networks. CO5 Understand the concepts of face, object, speech recognition and Robots.
<b>EMERGING TECHNOLOGY FOR ENGINEERING</b>	<b>KMC102</b>	CO1 Understand the concepts of internet of things, smart cities and industrial internet of things. CO2 Understand the concepts of cloud computing. CO3 Understand the concepts of block chain, cryptocurrencies, smart Contracts. CO4 Understand design principles, tools, trends in 3 D printing and drones. CO5 Understand augmented reality ( AR), virtual reality (VR), 5G technology, brain computer interface and human brain.
<b>SOFT SKILL I</b>	<b>KNC101</b>	Unit 1- Students will be enabled to understand the correct usage of grammar. Unit 2- Students will apply the fundamental inputs of communication skills in making speech delivery, individual conference, and group communication. Unit 3-Students will evaluate the impact of interpersonal Communication on their performance as a professional and in obtaining professional excellence at the workplace. Unit 4-Skills and techniques of persuasion and negotiation would enhance the level of students at multifarious administrative and managerial platforms. Unit 5-Student will be able to equip with basics of communication skills and will apply it for practical and oral purposes by being honed up in presentation skills and voice-dynamics.
<b>ENGINEERING PHYSICS</b>	<b>KAS201T</b>	1. To solve the classical and wave mechanics problems. 2. To develop the understanding of laws of thermodynamics and their application in various processes 3. To formulate and solve the engineering problems on Electromagnetism & Electromagnetic Field Theory. 4. To aware of limits of classical physics & to apply the ideas in solving the problems in their parent streams.
<b>ENGINEERING CHEMISTRY</b>	<b>KAS202T</b>	1. Use of different analytical instruments. 2. Measure molecular/ system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water. 3. Measure hardness of water. 4. Estimate the rate constant of reaction.

<b>ENGINEERING MATHEMATICS-II</b>	<b>KAS203T</b>	<p>CO 1 Understand the concept of differentiation and apply for solving differential equations.</p> <p>CO 2 Remember the concept of definite integral and apply for evaluating surface areas and volumes.</p> <p>K1, K3 &amp; K5</p> <p>CO 3 Understand the concept of convergence of sequence and series. Also evaluate Fourier series.</p> <p>CO 4 Illustrate the working methods of complex functions and apply for finding analytic functions.</p> <p>CO 5 Apply the concept of complex functions for finding Taylor's series, Laurent's series and evaluation of definite integrals.</p>
<b>BASIC ELECTRICAL ENGINEERING</b>	<b>KEE201T</b>	<ol style="list-style-type: none"> <li>1. Apply the concepts of KVL/KCL and network theorems in solving DC circuits.</li> <li>2. Analyze the steady state behavior of single phase and three phase AC electrical circuits.</li> <li>3. Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer.</li> <li>4. Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications.</li> <li>5. Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.</li> </ol>
<b>EMERGING DOMAIN IN ELECTRONICS ENGINEERING</b>	<b>KEC201T</b>	<ol style="list-style-type: none"> <li>1. Understand the concept of PN Junction and devices.</li> <li>2. Understand the concept of BJT, FET and MOFET.</li> <li>3. Understand the concept of perational amplifier</li> <li>4. Understand the concept of measurement instrument.</li> <li>5. Understand the working principle of different type of sensor and their uses.</li> <li>6. Understand the concept of IoT system &amp; Understand the component of IoT system.</li> </ol>
<b>PROGRAMMING FOR PROBLEM SOLVING</b>	<b>KCS201T</b>	<ol style="list-style-type: none"> <li>1. To develop simple algorithms for arithmetic and logical problems.</li> <li>2. To translate the algorithms to programs &amp; execution (in C language).</li> <li>3. To implement conditional branching, iteration and recursion.</li> <li>4. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.</li> <li>5. To use arrays, pointers and structures to develop algorithms and programs.</li> </ol>

<b>FUNDAMENTALS OF MECHANICAL ENGINEERING &amp; MECHATRONICS</b>	<b>KME201T</b>	<p>CO1 Understand the concept of stress and strain, factor of safety, beams.</p> <p>CO2 Understand the basic component and working of internal combustion engines, electric and hybrid vehicles, refrigerator and heat pump, air conditioning.</p> <p>CO3 Understand fluid properties, conservation laws, hydraulic machinery used in real life.</p> <p>CO4 Understand the working principle of different measuring instrument with the knowledge of accuracy, error and calibration, limit, fit, tolerance and control system.</p> <p>CO5 Understand concept of mechatronics with their advantages, scope and Industrial application, the different types of mechanical actuation system, the different types of hydraulic and pneumatic systems.</p> <p>CO6 Apply concepts of strength of material for safe design, refrigeration for calculation of COP, concepts of fluid mechanics in real life, concepts of measurements in production systems.</p>
<b>ENGINEERING PHYSICS LAB</b>	<b>KAS251P</b>	<ol style="list-style-type: none"> <li>1. To determine the wavelength of sodium light by Newton's ring Experiment.</li> <li>2. To determine the wavelength of sodium light with the help of Fresnel's bi-prism.</li> <li>3. To determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil.</li> <li>4. To draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss.</li> </ol>
<b>ENGINEERING CHEMISTRY LAB</b>	<b>KAS252P</b>	<ol style="list-style-type: none"> <li>1. Use of different analytical instruments.</li> <li>2. Measure molecular/system properties such as surface tension, viscosity.</li> <li>3. Measure conductance of solution, chloride and iron content in water, hardness of water.</li> <li>4. Estimate the rate constant of reaction.</li> </ol>

SEM II

<b>BASIC ELECTRICAL ENGINEERING LAB</b>	<b>KEE251P</b>	<ol style="list-style-type: none"><li>1. Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits.</li><li>2. Demonstrate the behavior of AC circuits connected to single phase AC supply and measure power in single phase as well as three phase electrical circuits.</li><li>3. Perform experiment illustrating BH curve of magnetic materials.</li><li>4. Calculate efficiency of a single phase transformer and DC machine.</li><li>5. Perform experiments on speed measurement and reversal of direction of three phase induction motor and Identify the type of DC and AC machines based on their construction.</li></ol>
<b>PROGRAMMING FOR PROBLEM SOLVING LAB</b>	<b>KCS251P</b>	<p>CO 1 Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems.</p> <p>CO 2 Demonstrate an understanding of computer programming language concepts.</p> <p>CO 3 Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.</p> <p>CO 4 Able to define data types and use them in simple data processing applications also he/she must be able to use the concept of array of structures.</p> <p>CO 5 Develop confidence for self education and ability for life-long learning needed for Computer language.</p>

<b>ENGLISH LANGUAGE LAB</b>	<b>KAS254P</b>	<p>objective of the course by being acquainted with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking.</p> <p>2. Students would be able to create substantial base by the formation of strong professional vocabulary for its application at different platforms and through numerous modes as Comprehension, reading, writing and speaking etc.</p> <p>3. Students will apply it at their work place for writing purposes such as Presentation/official drafting/ administrative communication and use it for document/project/report/research paper writing.</p> <p>4. Students will be made to evaluate the correct and error-free writing by being well-versed in rules of English grammar and cultivate relevant technical style of communication &amp; presentation at their work place and also for academic uses.</p> <p>5. Students will apply it for practical and oral presentation purposes by being honed up in presentation skills and voice dynamics. They will apply techniques for developing interpersonal communication skills and positive attitude leading to their professional competence.</p>
<b>ENGINEERING GRAPHICS &amp; DESIGN LAB</b>	<b>KCE251P</b>	<ol style="list-style-type: none"> <li>1. Understanding of the visual aspects of engineering design.</li> <li>2. Understanding of engineering graphics standards and solid modeling.</li> <li>3. Effective communication through graphics.</li> <li>4. Applying modern engineering tools necessary for engineering practice.</li> <li>5. Applying computer-aided geometric design.</li> <li>6. Analysis of Isometric views.</li> <li>7. Creating working drawings.</li> </ol>
<b>MECHANICAL WORKSHOP LAB</b>	<b>KWS251P</b>	<p>CO1 Use various engineering materials, tools, machines and measuring equipments.</p> <p>CO2 Perform machine operations in lathe and CNC machine.</p> <p>CO3 Perform manufacturing operations on components in fitting and carpentry shop.</p> <p>CO4 Perform operations in welding, moulding, casting and gas cutting.</p> <p>CO5 Fabricate a job by 3D printing manufacturing technique.</p>

<b>ARTIFICIAL INTELLIGENCE FOR ENGINEERS</b>	<b>KMC201</b>	<p>CO1 Understand the evolution and various approaches of AI.</p> <p>CO2 Understand data storage, processing, visualization, and its use in regression, clustering etc.</p> <p>CO3 Understand natural language processing and chatbots.</p> <p>CO4 Understand the concepts of neural networks.</p> <p>CO5 Understand the concepts of face, object, speech recognition and Robots.</p>
<b>EMERGING TECHNOLOGY FOR ENGINEERING</b>	<b>KMC202</b>	<p>CO1 Understand the concepts of internet of things, smart cities and industrial internet of things.</p> <p>CO2 Understand the concepts of cloud computing.</p> <p>CO3 Understand the concepts of block chain, cryptocurrencies, smart Contracts.</p> <p>CO4 Understand design principles, tools, trends in 3 D printing and drones.</p> <p>CO5 Understand augmented reality ( AR), virtual reality (VR), 5G technology, brain computer interface and human brain.</p>
<b>SOFT SKILL II</b>	<b>KNC201</b>	<p>LSRW skills in English.</p> <p>Unit 2- Students will evaluate the importance of conversation in their personal and professional domain and apply it for extending their professional frontiers.</p> <p>Unit 3- Students will learn to apply motivation skills for their individual and professional excellence.</p> <p>Unit 4- Students will utilize their teamwork and their interpersonal communication skills to survive and excel at</p>