ESHAN COLLEGE OF ENGINEERING

(Approved by AICTE, New Delhi, Affiliated to Dr. A.P.J Abdul Kalam Technical University, Lucknow)
Sahzadpur Pauri, NH-2, Agra-Mathura Highway, Mathura-281122, Uttar Pradesh
Website: www.eshancollege.com

Department of Applied Sciences & Humanities (ASH)

Vision of Department

A department recognized for providing quality education and all-round development to students to facilitate various programmes running in college to attain their programme outcomes through effective linkage with first-year development.

Mission of Department

To pursue excellence in imparting quality education in basic engineering, basic sciences and humanities with special focus on development of communication skills, social responsibility and ethical values in students.

Course Outcomes (COs) of all Common Courses (Offered in 1st Year of all B.Tech Programmes)

1st Year (1st Semester)

2020-21 (Odd Semester)

Course Code	Course Name	Course Outcomes (COs) *At the completion of the course, students will be able to:*	
KAS101T	**Engineering Physics**	CO1	Solve the classical and wave mechanics problems
		CO2	Develop the understanding of laws of thermodynamics and their application in various processes
		CO3	Formulate and solve the engineering problems on Electromagnetism & Electromagnetic Field Theory
		CO4	Aware of limits of classical physics & to apply the ideas in solving the problems in their parent streams
		CO5	Aware about details of Fibre Optics & Laser
KAS102T	**Engineering Chemistry**	CO1	Use of different analytical instruments
		CO2	Measure molecular/ system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water.

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		CO3	Measure hardness of water.
		CO4	Estimate the rate constant of reaction
		CO5	Aware about general methods of synthesis of organo metallic compounds (Grignard reagent) and their applications
KAS103T	**Engineering Mathematics-I**	CO1	Remember the concept of matrices and apply for solving linear simultaneous equations
		CO2	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
		CO3	Identify the application of partial differentiation and apply for evaluating maxima, minima, series and Jacobians.
		CO4	Illustrate the working methods of multiple integral and apply for finding area, volume, center of mass and center of gravity
		CO5	Remember the concept of vector and apply for directional derivatives, tangent and normal planes. Also evaluate line, surface and volume
KEE101T	**Basic Electrical Engineering**	CO1	Apply the concepts of KVL/KCL and network theorems in solving DC circuits
		CO2	Analyze the steady state behavior of single phase and three phase AC electrical circuits
		CO3	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
		CO4	Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications
		CO5	Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption
KEC101T	**Emerging Domain in Electronics Engineering**	CO1	Understand the concept of PN Junction and devices
		CO2	Understand the concept of BJT, FET and MOFET
		CO3	Understand the concept of Operational amplifier
		CO4	Understand the concept of measurement instrument
		CO5	Understand the working principle of different type of sensor and their uses
KCS101T	**Programming for Problem Solving**	CO1	Develop simple algorithms for arithmetic and logical problems
		CO2	Translate the algorithms to programs & execution (in C language)
		CO3	Implement conditional branching, iteration and recursion
		CO4	Decompose a problem into functions and synthesize a complete program using divide and conquer approach
		CO5	Use arrays, pointers and structures to develop algorithms and programs
KME101T	**Fundamentals of Mechanical Engineering & Mechatronics**	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

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		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
KAS151P	Engineering Physics Lab	CO1	Determine the wavelength of sodium light by Newton's ring experiment
		CO2	Determine the wavelength of sodium light with the help of Fresnel's bi-prism.
		CO3	Determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil
		CO4	Draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss.
		CO5	Measure high resistance by leakage method
KAS152P	Engineering Chemistry Lab	CO1	Use of different analytical instruments.
		CO2	Measure molecular/system properties such as surface tension, viscosity
		CO3	Measure conductance of solution, chloride and iron content in water, hardness of water
		CO4	Estimate the rate constant of reaction
		CO5	Verify the Beer's law
KEE151P	Basic Electrical Engineering Lab	CO1	Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits
		CO2	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
		CO3	Perform experiment illustrating BH curve of magnetic materials
		CO4	Calculate efficiency of a single-phase transformer and DC machine
		CO5	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
KEC151P	Electronics Engineering Lab	CO1	Know various types of Active & Passive Components based on their ratings
		CO2	Identify various types of Printed Circuit Boards (PCB) and soldering Techniques
		CO3	Characterize the PN Junction diode
		CO4	Understand Operational Amplifier as Adder and Subtractor
		CO5	Implement of the given Boolean function using logic gates in both SOP and POS forms.
KCS151P	Programming for Problem Solving Lab	CO1	Implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems
		CO2	Demonstrate an understanding of computer programming

			language concepts
		CO3	Design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage
		CO4	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
		CO5	Develop confidence for self-education and ability for life-long learning needed for Computer language
KAS154P	**English Language Lab**	CO1	Understand the basic objective of the course by being acquainted with specific dimensions of communication skills i.e Reading, Writing, Listening, Thinking and Speaking.
		CO2	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.
		CO3	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
		CO4	Evaluate the correct and error-free writing by being well-versed in rules of English grammar and cultivate relevant technical style of communication &presentation at their work place and also for academic uses
		CO5	Apply it for practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics.
KCE151P	**Engineering Graphics & Design Lab**	CO1	Understand the visual aspects of engineering design
		CO2	Understand the engineering graphics standards and solid modelling
		CO3	Have effective communication through graphics
		CO4	Applying modern engineering tools necessary for engineering practice
		CO5	Appling computer-aided geometric design
KWS151P	**Mechanical Workshop Lab**	CO1	Use various engineering materials, tools, machines and measuring equipments
		CO2	Perform machine operations in lathe and CNC machine
		CO3	Perform manufacturing operations on components in fitting and carpentry shop
		CO4	Perform operations in welding, moulding, casting and gas cutting
		CO5	Fabricate a job by 3D printing manufacturing technique
KMC101	**Artificial Intelligence (AI) For Engineering**	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
KMC102	**Emerging Technology for**	CO1	Understand the concepts of internet of things, smart cities and industrial internet of things

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	Engineering	**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
KNC101	**Soft Skills-I**	**CO1**	Understand the correct usage of grammar.
		CO2	Apply the fundamental inputs of communication skills in making speech delivery, individual conference, and group communication
		CO3	Evaluate the impact of interpersonal communication on their performance as a professional and in obtaining professional excellence at the workplace
		CO4	Skills and techniques of persuasion and negotiation would enhance the level of students at multifarious administrative and managerial platforms
		CO5	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

2020-21 (Even Semester)

Course Code	Course Name	Course Outcomes (COs) *At the completion of the course, students will be able to:*	
KAS201T	**Engineering Physics**	**CO1**	Solve the classical and wave mechanics problems
		CO2	Develop the understanding of laws of thermodynamics and their application in various processes
		CO3	Formulate and solve the engineering problems on Electromagnetism & Electromagnetic Field Theory
		CO4	Aware of limits of classical physics & to apply the ideas in solving the problems in their parent streams
		CO5	Aware about details of Fibre Optics & Laser
KAS202T	**Engineering Chemistry**	**CO1**	Use of different analytical instruments
		CO2	Measure molecular/ system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water.
		CO3	Measure hardness of water.
		CO4	Estimate the rate constant of reaction
		CO5	Aware about general methods of synthesis of organo metallic compounds (Grignard reagent) and their applications
KAS203T	**Engineering Mathematics-II**	**CO1**	Understand the concept of differentiation and apply for solving differential equations
		CO2	Remember the concept of definite integral and apply for evaluating surface areas and volumes.
		CO3	Understand the concept of convergence of sequence and series.

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			Also evaluate Fourier series.
		CO4	Illustrate the working methods of complex functions and apply for finding analytic functions
		CO5	Apply the concept of complex functions for finding Taylor's series, Laurent's series and evaluation of definite integrals
KEE201T	**Basic Electrical Engineering**	CO1	Apply the concepts of KVL/KCL and network theorems in solving DC circuits
		CO2	Analyze the steady state behavior of single phase and three phase AC electrical circuits
		CO3	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
		CO4	Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications
		CO5	Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption
KEC201T	**Emerging Domain in Electronics Engineering**	CO1	Understand the concept of PN Junction and devices
		CO2	Understand the concept of BJT, FET and MOFET
		CO3	Understand the concept of Operational amplifier
		CO4	Understand the concept of measurement instrument
		CO5	Understand the working principle of different type of sensor and their uses
KCS201T	**Programming for Problem Solving**	CO1	Develop simple algorithms for arithmetic and logical problems
		CO2	Translate the algorithms to programs & execution (in C language)
		CO3	Implement conditional branching, iteration and recursion
		CO4	Decompose a problem into functions and synthesize a complete program using divide and conquer approach
		CO5	Use arrays, pointers and structures to develop algorithms and programs
KME201T	**Fundamentals of Mechanical Engineering & Mechatronics**	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
KAS251P	**Engineering Physics Lab**	CO1	Determine the wavelength of sodium light by Newton's ring experiment

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		CO2	Determine the wavelength of sodium light with the help of Fresnel's bi-prism.
		CO3	Determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil
		CO4	Draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss.
		CO5	Measure high resistance by leakage method
KAS252P	**Engineering Chemistry Lab**	CO1	Use of different analytical instruments.
		CO2	Measure molecular/system properties such as surface tension, viscosity
		CO3	Measure conductance of solution, chloride and iron content in water, hardness of water
		CO4	Estimate the rate constant of reaction
		CO5	Verify the Beer's law
KEE251P	**Basic Electrical Engineering Lab**	CO1	Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits
		CO2	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
		CO3	Perform experiment illustrating BH curve of magnetic materials
		CO4	Calculate efficiency of a single-phase transformer and DC machine
		CO5	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
KEC251P	**Electronics Engineering Lab**	CO1	Know various types of Active & Passive Components based on their ratings
		CO2	Identify various types of Printed Circuit Boards (PCB) and soldering Techniques
		CO3	Characterize the PN Junction diode
		CO4	Understand Operational Amplifier as Adder and Subtractor
		CO5	Implement of the given Boolean function using logic gates in both SOP and POS forms.
KCS251P	**Programming for Problem Solving Lab**	CO1	Implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems
		CO2	Demonstrate an understanding of computer programming language concepts
		CO3	Design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage
		CO4	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
		CO5	Develop confidence for self-education and ability for life-long learning needed for Computer language
KAS254P	**English Language Lab**	CO1	Understand the basic objective of the course by being acquainted with specific dimensions of communication skills i.e Reading,

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			Writing, Listening, Thinking and Speaking.
		CO2	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.
		CO3	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
		CO4	Evaluate the correct and error-free writing by being well-versed in rules of English grammar and cultivate relevant technical style of communication &presentation at their work place and also for academic uses
		CO5	Apply it for practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics.
KCE251P	**Engineering Graphics & Design Lab**	CO1	Understand the visual aspects of engineering design
		CO2	Understand the engineering graphics standards and solid modelling
		CO3	Have effective communication through graphics
		CO4	Applying modern engineering tools necessary for engineering practice
		CO5	Appling computer-aided geometric design
KWS251P	**Mechanical Workshop Lab**	CO1	Use various engineering materials, tools, machines and measuring equipments
		CO2	Perform machine operations in lathe and CNC machine
		CO3	Perform manufacturing operations on components in fitting and carpentry shop
		CO4	Perform operations in welding, moulding, casting and gas cutting
		CO5	Fabricate a job by 3D printing manufacturing technique
KMC201	**Artificial Intelligence (AI) For Engineering**	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
KMC202	**Emerging Technology for Engineering**	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
KNC201	**Soft Skills-II**	CO1	Converse well with effective LSRW skills in English.
		CO2	Evaluate the importance of conversation in his/her personal and professional domain and apply it for extending their professional frontiers

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		CO3	Apply motivation skills for their individual and professional excellence.
		CO4	Utilize their teamwork and their interpersonal communication skills to survive and excel at their work-place
		CO5	Evaluate creativity for their professional innovation and critical thinking for their competence

2018-19 (Odd Semester)

Course Code	Course Name	Course Outcomes (COs) *At the completion of the course, students will be able to:*	
KAS101	Physics	CO1	Solve the classical and wave mechanics problems
		CO2	Develop the understanding of laws of thermodynamics and their application in various processes
		CO3	Formulate and solve the engineering problems on Electromagnetism & Electromagnetic Field Theory
		CO4	Aware of limits of classical physics & to apply the ideas in solving the problems in their parent streams
		CO5	Compare and categorize the Laser and Fiber with losses
KAS151	Physics Lab	CO1	Determine the wavelength of sodium light by Newton's ring experiment
		CO2	Determine the wavelength of sodium light with the help of Fresnel's bi-prism
		CO3	Determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil.
		CO4	Draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss.
		CO5	Understand the concept of optical rotation and use it to find the specific rotation of an optically active substance
KAS102	Chemistry	CO1	Use of different analytical instruments
		CO2	Measure molecular/system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water
		CO3	Measure hardness of water
		CO4	Estimate the rate constant of reaction
		CO5	Know polymer Chemistry and Organometallic compounds to analyze/infer suitable methods for synthesis and industrial applications
KAS152	Chemistry Lab	CO1	Use of different analytical instruments.
		CO2	Measure molecular/system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water
		CO3	Measure hardness of water

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		CO4	Estimate the rate constant of reaction
		CO5	Synthesize Polymers used in daily life
KAS103	**Mathematics-I**	CO1	Remember the concept of matrices and apply for solving linear simultaneous equations.
		CO2	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
		CO3	Identify the application of partial differentiation and apply for evaluating maxima, minima, series and Jacobians
		CO4	Illustrate the working methods of multiple integral and apply for finding area, volume, center of mass and center of gravity
		CO5	Remember the concept of vector and apply for directional derivatives, tangent and normal planes. Also evaluate line, surface and volume integrals
KEE101	**Basic Electrical Engineering**	CO1	Apply the concepts of KVL/KCL and network theorems in solving DC circuits.
		CO2	Analyze the steady state behavior of single phase and three phase AC electrical circuits.
		CO3	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
		CO4	Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications
		CO5	Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.
KEE151	**Basic Electrical Engineering Laboratory**	CO1	Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits.
		CO2	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.
		CO3	Perform experiment illustrating BH curve of magnetic materials
		CO4	Calculate efficiency of a single-phase transformer and DC machine
		CO5	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
KCS101	**Programming for Problem Solving**	CO1	Develop simple algorithms for arithmetic and logical problems
		CO2	Translate the algorithms to programs & execution (in C language)
		CO3	Implement conditional branching, iteration and recursion
		CO4	Decompose a problem into functions and synthesize a complete program using divide and conquer approach.
		CO5	Use arrays, pointers and structures to develop algorithms and programs
KCS151	**Programming for Problem**	CO1	Write programs for arithmetic and logical problems
		CO2	Translate the algorithms to programs & execution (in C

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	Solving Lab		language)
		CO3	Write programs for conditional branching, iteration and recursion
		CO4	Write programs using functions and synthesize a complete program using divide and conquer approach
		CO5	Write programs using arrays, pointers and structures.
KCE101	Engineering Graphics & Design	CO1	Understand the visual aspects of engineering design
		CO2	Understand engineering graphics standards and solid modelling
		CO3	Effectively communicate through graphics
		CO4	Apply modern engineering tools necessary for engineering practice
		CO5	Apply computer-aided geometric design
KWS101	Workshop Practices	CO1	Study and practice on machine tools and their operations
		CO2	Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding
		CO3	Identify and apply suitable tools for machining processes including turning, facing, thread cutting and tapping
		CO4	Welding and soldering operations
		CO5	Apply basic electrical engineering knowledge for house wiring practice

2018-19 (Even Semester)

Course Code	Course Name	Course Outcomes (COs) *At the completion of the course, students will be able to:*	
KAS201	Physics	CO1	Solve the classical and wave mechanics problems
		CO2	Develop the understanding of laws of thermodynamics and their application in various processes
		CO3	Formulate and solve the engineering problems on Electromagnetism & Electromagnetic Field Theory
		CO4	Aware of limits of classical physics & to apply the ideas in solving the problems in their parent streams
		CO5	Compare and categorize the Laser and Fiber with losses
KAS251	Physics Lab	CO1	Determine the wavelength of sodium light by Newton's ring experiment
		CO2	Determine the wavelength of sodium light with the help of Fresnel's bi-prism
		CO3	Determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil.
		CO4	Draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss.
		CO5	Understand the concept of optical rotation and use it to find the specific rotation of an optically active substance
KAS202	Chemistry	CO1	Use of different analytical instruments
		CO2	Measure molecular/system properties such as surface tension,

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			viscosity, conductance of solution, chloride and iron content in water
		CO3	Measure hardness of water
		CO4	Estimate the rate constant of reaction
		CO5	Know polymer Chemistry and Organometallic compounds to analyze/infer suitable methods for synthesis and industrial applications
KAS252	**Chemistry Lab**	CO1	Use of different analytical instruments.
		CO2	Measure molecular/system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water
		CO3	Measure hardness of water
		CO4	Estimate the rate constant of reaction
		CO5	Synthesize Polymers used in daily life
KAS203	**Mathematics-II**	CO1	Understand the concept of differentiation and apply for solving differential equations
		CO2	Remember the concept of definite integral and apply for evaluating surface areas and volumes
		CO3	Understand the concept of convergence of sequence and series. Also evaluate Fourier series
		CO4	Illustrate the working methods of complex functions and apply for finding analytic functions
		CO5	Apply the complex functions for finding Taylor's series, Laurent's series and evaluation of definite integrals
KEE201	**Basic Electrical Engineering**	CO1	Apply the concepts of KVL/KCL and network theorems in solving DC circuits.
		CO2	Analyze the steady state behavior of single phase and three phase AC electrical circuits.
		CO3	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
		CO4	Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications
		CO5	Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.
KEE251	**Basic Electrical Engineering Lab**	CO1	Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits.
		CO2	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.
		CO3	Perform experiment illustrating BH curve of magnetic materials
		CO4	Calculate efficiency of a single-phase transformer and DC machine
		CO5	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

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KCS201	**Programming for Problem Solving**	CO1	Develop simple algorithms for arithmetic and logical problems
		CO2	Translate the algorithms to programs & execution (in C language).
		CO3	Implement conditional branching, iteration and recursion
		CO4	Decompose a problem into functions and synthesize a complete program using divide and conquer approach.
		CO5	Use arrays, pointers and structures to develop algorithms and programs
KCS251	**Programming for Problem Solving Lab**	CO1	Write programs for arithmetic and logical problems
		CO2	Translate the algorithms to programs & execution (in C language)
		CO3	Write programs for conditional branching, iteration and recursion
		CO4	Write programs using functions and synthesize a complete program using divide and conquer approach
		CO5	Write programs using arrays, pointers and structures.
KCE201	**Engineering Graphics & Design**	CO1	Understand the visual aspects of engineering design
		CO2	Understand engineering graphics standards and solid modelling
		CO3	Effectively communicate through graphics
		CO4	Apply modern engineering tools necessary for engineering practice
		CO5	Apply computer-aided geometric design
KWS201	**Workshop Practices**	CO1	Study and practice on machine tools and their operations
		CO2	Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding
		CO3	Identify and apply suitable tools for machining processes including turning, facing, thread cutting and tapping
		CO4	Welding and soldering operations
		CO5	Apply basic electrical engineering knowledge for house wiring practice
KAS204	**Professional English**	CO1	Understand the basic objective of the course by being acquainted with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking.
		CO2	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.
		CO3	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.
		CO4	Evaluate the correct & error-free writing by being well versed in rules of English grammar & cultivate relevant technical style of communication & presentation at their work place & also for academic uses.
		CO5	Apply it for practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics

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