GNIOT
ENGG. INSTITUTE

1.1.1

The Institution ensures effective curriculum planning and delivery through a well-planned and documented process including Academic calendar and conduct of continuous internal Assessment.

Vision Mission, Programme outcomes (POs), Programme Specific Outcomes (PSOs) and Course Outcomes (COs)

Greater Noida Institute of Technology (Engg. Institute)

Plot No. 7, Knowledge Park II, Greater Noida
Uttar Pradesh 201310 India

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Director

Office of Director

Ref .No : GNIOT- 28/11/2021

Vision, Mission, Quality Policy and Core Values for GNIOT-Engineering Institute (Code132)

Vision:

"Be known globally for value added education, innovation, and research at the intersection of disciplines in service of humankind"

Mission:

- Place a multidisciplinary engineering education ecosystem that transforms learners into future innovators, entrepreneurs, and professional leaders.
- Create an ambiance of interdisciplinary research, innovation, and creativity to address regional and global challenges for benefit of human life and the environment.
- Provide the environment for enhancing knowledge, and inculcating critical & design thinking, life skills through quality learning systems.
- Collaborate with globally renowned academic & research institutions and corporate for improving productivity and economics.

Quality Policy:

Continuing to prosper a clean and healthy learning environment and culture of intelligence for staff and students that can encourage active teacher participation and foster a deep desire for students to provide an industry readiness education and thus be a useful and confident person in the society.

Core Values:

"At GNIOT we believe in laying a solid foundation for our emerging professionals. The current situation requires innovation, ingenuity, continuous improvement and the right ideas to make the way of our life easier. We strongly believe in these values and urge participants to adhere to them!"

Director (Chairman-IQAC)

Director

PROGRAMME OUTCOMES

Program Outcome	Statement Engineering Graduates will be able to:
PO1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex highway engineering problems.
PO2	**Problem analysis:**Identity, formulate, review research literature, and analyze complex computer engineering problems reaching substantiated conclusions using the first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions:** Design solutions for complex irrigation and different water resources for any easy or complicated irrigation areadesign-related engineering problems and design system components or processes that meet the specific needs with appropriate considerations for public health and safety, and the cultural, societal, and environmental considerations.
PO4	**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 conclusions
PO5	**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
PO6	**The engineer and society:** Apply to reason informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent relevance to the professional engineering practices
PO7	**Environment and sustainability:** Understand the impact of professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norm of the engineering practices
PO9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
PO10	**Communications:** 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
PO11	**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.
PO12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life learning in the broadest context of technological change.

Director

CSE Department Vision and Mission

Vision of the Department

To produce Computer Science and Engineering graduates with problem-solving abilities, research aptitude, teamwork, and ethical values to meet the needs of industry and society.

Mission of the Department

- ✓ To prepare students with strong technical skills and analytical minds for real time industrial needs.
- ✓ To nurture the students to contribute in research and innovation for nation building.
- ✓ To develop students with leadership qualities to be entrepreneurs and contribute their services to society.

Program Specific Outcomes (PSO's)

PSO 1: Comprehend the core subjects of CSE and apply them to resolve domain-specific tribulations.

PSO 2: Extrapolate fundamental engineering concepts and apply cutting-edge technology and programming language skills to develop, test, implement, and maintain software products.

Director

IT Department Vision and Mission

Vision

To provide a forum for software professionals and researchers in IT to lead innovative computation, interdisciplinary approach, advanced technologies and entrepreneurship by globally accepted education.

Mission

- ✓To enhance multidisciplinary skills, innovations and leadership to gain value added education system to be a perspective long life learner.
- ✓To inculcate knowledge and learning process with work ethics to make students excellent human for competitive and social relevance by the philosophy of innovative learning.
- ✓To investigate research-based project for workable solution by high quality professional training with modern software tools to handle the real time requirement of environment and society.
- ✓To collaborate for advanced IT infrastructure with industry globally to improve students for sustained growth in technical and research in leadership aspects.

Program Specific Outcomes (PSOs)

The Graduates of B.Tech. Information technology will be able to

PSO-1: Analyze and recommend the appropriate IT infrastructure required for the implementation of a project.

PSO-2: Identify, analyze, design, develop and test software systems for world-wide network of computers to provide solutions to real world problems.

Director

ECE DEPARTMENT - VISION & MISSION

Vision:

To empower our students with good quality and value based education along with research aptitude to meet the elevated standards of global market in the field of electronics and communication engineering.

Mission:

- ✓To achieve the vision, the department will ensure
- ✓To develop and create strong foundation of engineering basic sciences.
- ✓To encourage lifelong learning in students to enhance their performance.
- ✓To impart academics and emotional intelligence in students to perform with energy, erudition, devotion and achievements.
- ✓To inculcate personal integrity, human values, professional commitments and ethics in students.

PROGRAM SPECIFIC OUTCOMES (PSOs):

PSO 1: Graduates will be able to apply their knowledge to analyze industry relevant problems in the field of electronics and communication engineering.

PSO 2: Graduates will be able to design and develop machines, processes, systems and networks to contribute to modern technological world.

Director

EE DEPARTMENT - MISSION AND VISION

VISION:

Inculcating the abilities of leadership, team working, logical thinking and research qualities in Electrical Engineering graduates.

MISSION:

- ✓To provide high quality professional training that helps our students to improve their logical thinking including problem solving skills.
- ✓To reinforce links with industry and corporate world through associations and shared progress works.
- ✓To achieve leadership qualities including team work through research, projects, and consultancy and advancement activities
- ✓To impart social awareness and human values in students through various programs.

PROGRAM SPECIFIC OUTCOMES (PSOs):

PSO1: To impart proper knowledge of basic science, mathematics and electrical engineering related subjects to the students.

PSO2: To enhance the skills of the students with the ability to implement the scientific concepts for betterment of the society in professional and ethical manner.

PSO3: To prepare the students to understand physical systems, electrical components and processes to address social, technical and engineering challenges.

Director

CE DEPARTMENT VISION AND MISSION

Vision:

"To provide an environment which is par-excellent in terms of academia, research and innovation for our students so that they are able to hone their skills and personality and attain new heights in the National / International arena in the field of "Civil Engineering."

Mission:

Consistent with our vision we are committed to:

- ✓ The mission of the Civil Engineering Department is to shape the students to be innovative, entrepreneurial, supportive assured, and intellectual.
- ✓ Development of competent, committed, and result-oriented students at the National and International levels.
- ✓ Provide experienced and accomplished faculty.
- ✓ Regular assessment of students.
- ✓ Periodic review of study material and tutorials.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

(PSO)	Statement
PSO1	Professional Skill: The ability to understand, analyze and develop irrigation designs and new techniques for irrigation & best way to use water resources for irrigation. Apply theoretical knowledge in the design of all three modes of transportation in a way that demonstrates comprehension of the trade-offs involved in design choices.
PSO2	Problem-Solving Skills: The ability to apply standard principles, practices, and strategies for highway development and apply design and development principles in the construction of highways of varying complexity.
PSO3	Successful Career: The ability to become an Employee, Entrepreneur, and/or Life Long Leaner in the domain of highway construction.

Director

Vision and mission of the ME Department

Vision:

To be recognized as a premier Mechanical Engineering Department by providing education that enables graduates and Post graduates to meet current requirements pertaining to industry and equip them to excel in the area of innovation, research & development.

Mission:

- ✓Nurture young individuals into knowledgeable, skilful and ethical professionals in their pursuit of mechanical engineering
- ✓Sustain high performance by excellence in teaching research and innovations
- ✓Develop Industry interaction for innovation and product development
- ✓To educate prepare and mentor students to excel as professionals
- ✓To provide the facilities and environment conducive to high quality education to get diverse careers as well as research in the field of mechanical engineering

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	To impart proper knowledge of science and mechanical engineering related subjects to the students.
PSO 2	To enhance the skills of the students with the ability to implement the scientific concepts for betterment of the society.
PSO 3	To prepare the students to become innovators who can address social, technical and engineering challenges.

Director

Department of CSE (AI-ML)

Vision

The Department of Computer Science Artificial Intelligence and Machine Learning will strive to be the most effective research and innovative center in the field of information and other fields focused on empowering people to provide scientific and social assistance.

Mission:

Enhancing an excellent learning environment and creating opportunities for a person to emerge as an expert who will be able to analyze complex engineering problems in society and provide new and just solutions using modern technology knowledge and tools to facilitate their acceptance in society.

Director

Department of CSE-IoT

Vision of Department

To inculcate the ability among the students by which versatile development can be done, and they can be prepared to excel globally with ethical values.

Mission of Department

- ✓To empower technical, leadership and interpersonal skills in the field of Computer
- ✓Science and Engineering–IoT, and encourage them to apply their learning for solving the societal issues.
- ✓To provide a framework for promoting collaborative and multidisciplinary activities with an emphasis on the advancement of Internet of Things
- ✓To develop continuous learning environment among students to inculcate innovative research in Computer Science and Engineering-IoT to serve the needs of Industry, Government and Society globally.

Program Specific Outcomes for CSE- IoT:

PSO 1 The ability to develop problem solving skills through programming techniques for addressing real life problems using appropriate principles and concepts of Internet of Things.

PSO 2 Develop the understanding of various IOT application development tools and its implementation for IOT applications.

Director

VISION AND MISSION for the DEPARTMENT OF MCA

VISION:

To be a department of excellence ih technical education, widely known for the development of competent and socially responsible professionals, entrepreneurs and researchers and thereby succeed and contribute value to the knowledge-based economy and society.

MISSION:

- ✓To impart established and contemporary technical knowledge.
- ✓To synchronize concepts, logic and skills for effective decision making.
- ✓To provide conducive environment so as to achieve excellence in teaching-learning, and research and development activities.
- ✓To undertake collaborative projects which offer opportunities for long-term interaction with academia and industry.
- ✓To provide appropriate forums to develop innovative talents, practice ethical values and inculcate as enduring learners.
- ✓To utilize technical knowledge of students towards social issues through various group activities and events.

PROGRAM SPECIFIC OBJECTIVES (PSO's)

PSO-1: Design, develop and implement interdisciplinary application software projects to meet the demands of industry requirements using modern tools and technologies.

PSO-2: Ability to pursue careers in IT industry/ consultancy/ research and development, teaching and associated areas related to computer science.

PSO-3: Perceive, explore and build up computer programs in the areas linked to Algorithms, System Software, Multimedia, Web Technology and Big Data Analytics for efficient design of computer-based systems of varying complexity.

Director

2.6.1 : Programme and course outcomes for all Programme offered by the institution are stated and displayed on website and communicated to teachers and students

COs for all Programme

DEPARTMENT: CSE/IT/EC/AIML/IOT/CE/EE/ME		
Course Outcomes (COs): B.Tech. I & II Semester		
Session:2021-22		
Code	**Course Name**	**Course Outcomes**
B.Tech.-I Semester		
KAS101T	ENGINEERING PHYSICS	CO1. To solve the classical and wave mechanics problems
		CO2. To develop the understanding of laws of thermodynamics and their application in various processes.
		CO3. To formulate and solve the engineering problems on Electromagnetism & Electromagnetic Field Theory.
		CO4. To aware of limits of classical physics & to apply the ideas in solving the problems in their parent streams.
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
		CO3. Measure hardness of water.
		CO4. Estimate the rate constant of reaction.
KAS-103T	ENGINEERING MATHMATICS I	CO1. To Remember the concept of matrices and apply for solving linear simultaneous equations.
		CO2. To 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. To Identify the application of partial differentiation and apply for evaluating maxima, minima, series and Jacobians.
		CO4. To Illustrate the working methods of multiple integral and apply for finding area, volume, centre of mass and centre of gravity.

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		CO5. To Remember the concept of vector and apply for directional derivatives, tangent and normal planes. Also evaluate line, surface and volume integrals.
KEE-101T	ELECTRICAL ENGINEERING	CO1. To 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.
		CO6. Understand the concept of IoT system & Understand the component of IoT system.
KCS101T	PROGRAMMING FOR PROBLEM SOLVING	CO1. To develop simple algorithms for arithmetic and logical problems.
		CO2. To translate the algorithms to programs & execution (in C language)
		CO3. To implement conditional branching, iteration and recursion.
		CO4. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
		CO5. To use arrays, pointers and structures to develop algorithms and programs.
KME101T	FUNDAMENTAL OF MECHANICAL ENGINEERING AND 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.
		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.
KCE15	ENGINEERI	CO1. Understanding of the visual aspects of engineering design

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1P	NG GRAPHICS AND DESIGN LAB	CO2. Understanding of engineering graphics standards and solid Modeling
		CO3. Effective communication through graphics
		CO4. Applying modern engineering tools necessary for engineering practice
		CO5. Appling computer-aided geometric design
		CO6. Analysis of Isometric views
		CO7. Creating working drawings
KWS1 51P	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
KAS15 4P	ENGLISH LAB	CO1. 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.
		CO2. 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.
		CO3. 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.
		CO4. 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 &presentation at their work place and also for academic uses.
		CO5. 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.
KCS1 51P	PROGRA MMING FOR PROBLE M SOLVING	CO1. Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems.
		CO2. Demonstrate an understanding of computer programming language concepts.
		CO3. Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.
		CO4. 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.
		CO5. Develop confidence for self education and ability for life-long learning needed for Computer language.
KEE151P	ELECTRICAL ENGINEERING	CO1. Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits.

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	LAB	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.
KMC101	ARTIFICAL INTELLIGENCE FOR ENGINEERS	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 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.
KNC-101	SOFT SKILLS-I	CO1. Students will be enabled to understand the correct usage of grammar.
		CO2. Students will apply the fundamental inputs of communication skills in making speech delivery, individual conference, and group communication.
		CO3. Students will 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. 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.Tech-II Semester		
KAS201T	ENGINEERING PHYSICS	CO1. To solve the classical and wave mechanics problems
		CO2. To develop the understanding of laws of thermodynamics and their application in various processes.
		CO3. To formulate and solve the engineering problems on Electromagnetism & Electromagnetic Field Theory.
		CO4. To aware of limits of classical physics & to apply the ideas in solving the problems in their parent streams.

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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.
KAS-203T	ENGINEERING MATHMATICS 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 concept of complex functions for finding Taylor's series, Laurent's series and evaluation of definite integrals.
KEE-201T	ELECTRICAL ENGINEERING	CO1. To 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.
		CO6. Understand the concept of IoT system & Understand the component of IoT system.
KCS201T	PROGRAMMING FOR PROBLEM SOLVING	CO1. To develop simple algorithms for arithmetic and logical problems.
		CO2. To translate the algorithms to programs & execution (in C language)
		CO3. To implement conditional branching, iteration and recursion.
		CO4. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
		CO5. To use arrays, pointers and structures to develop algorithms and programs.
KME201T	FUNDAMENTAL OF MECHANICAL ENGINEERING	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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	AND MECHATRONICS	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.
KCE251P	ENGINEERING GRAPHICS AND DESIGN LAB	CO1. Understanding of the visual aspects of engineering design
		CO2. Understanding of engineering graphics standards and solid Modeling
		CO3. Effective communication through graphics
		CO4. Applying modern engineering tools necessary for engineering practice
		CO5. Appling computer-aided geometric design
		CO6. Analysis of Isometric views
		CO7. Creating working drawings
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
KAS254P	ENGLISH LAB	CO1. 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.
		CO2. 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.
		CO3. 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.
		CO4. 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 &presentation at their work place and also for academic uses.
		CO5. 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.
KCS251P	PROGRAMMING FOR	CO1. Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems.

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	PROBLEM SOLVING	CO2. Demonstrate an understanding of computer programming language concepts.
		CO3. Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.
		CO4. 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.
		CO5. Develop confidence for self education and ability for life-long learning needed for Computer language.
KEE251P	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.
KMC201	ARTIFICAL INTELLIGENCE FOR ENGINEERS	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.
KNC-201	SOFT SKILLS-II	CO1. Students will be able to converse well with effective LSRW skills in English.
		CO2. Students will evaluate the importance of conversation in their personal and professional domain and apply it for extending their professional frontiers.
		CO3. Students will learn to apply motivation skills for their individual and professional excellence.
		CO4. Students will utilize their teamwork and their interpersonal communication skills to survive and excel at their work-place
		CO5. Students will learn to evaluate creativity for their professional innovation and critical thinking for their competence

Director

COMPUTER SCIENCE & ENGINEERING			
COURSE OUTCOMES (COS): B.TECH. III,IV,V,VI,VII & VIII SEMESTERS			
Session 2021-22			
Code	Course Name	Course Outcomes	
1. B.Tech. III Semester			
KAS302	Maths III	CO1	The students will be able to learn the idea of partial differentiation and types of partial differential equations
		CO2	The students will be able to learn the idea of classification of second partial differential equations, wave, heat equation and transmission lines
		CO3	The students will be able to learn the basic ideas of statistics including measures of central tendency, correlation, regression and their properties.
		CO4	The students will be able to learn the idea s of probability and random variables and various discrete and continuous probability distributions and their properties.
		CO5	The students will be able to learn the statistical methods of studying data samples, hypothesis testing and statistical quality control, control charts and their properties.
KVE-301	Universal Human Values	CO1	Students who complete this course should be able to realize the importance & need of human values and value education to human being.
		CO2	Students should be able to realize the importance of self exploration in harmony of family.
		CO3	They should be able to understand and appreciate role of harmonious family in peaceful society.
		CO4	Students who complete this course should be able to investigate his/her self & make it suitable to society and existence.
		CO5	CO5.Students should be able to apply the ethical and human values in family, society, nature and professional life.
KCS-301	Data Structure	CO1	Describe how arrays, linked lists, stacks, queues, trees, and graphs are represented in memory, used by the algorithms and their common applications.
		CO2	Discuss the computational efficiency of the sorting and searching algorithms.
		CO3	Implementation of Trees and Graphs and perform various operations on these data structure.
		CO4	Understanding the concept of recursion, application of recursion and its implementation and removal of recursion.
		CO5	Identify the alternative implementations of data structures with respect to its performance to solve a real world problem.

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KCS-302	Computer Organization & Architecture	CO1	Study of the basic structure of Buses, Processor organization and operation of a digital computer system.
		CO2	Analysis of the design of arithmetic & logic unit and understanding of the fixed point and floating-point arithmetic operations.
		CO3	Implementation of control unit techniques and the concept of Pipelining
		CO4	Understanding the hierarchical memory system, cache memories and virtual memory
		CO5	Understanding the different ways of communicating with I/O devices and standard I/O interfaces
KCS-303	Discrete Structures & Theory of Logic	CO1	Students will be able to Write an argument using logical notation and determine if the argument is or is not valid.
		CO2	Students will able to Understand the basic principles of sets and operations in sets.
		CO3	Students will able to Demonstrate an understanding of relations and functions and be able to determine their properties.
		CO4	Students will able to Demonstrate different traversal methods for trees and graphs
		CO5	Students will able to Model problems in Computer Science using graphs and trees.
KCS-351	Data Structure Using C lab	CO1	To learn elementary data structures such as stacks, queues, linked lists, trees and graphs. Students must be able to perform operations like searching, insertion and deletion, traversing mechanism etc. on various data structures.
		CO2	Students must be able to understand the logic behind the experiment & demonstrate the outcomes effectively.
		CO3	Students must be able to present the experiment & its results effectively in documentation.
KCS-352	Computer Organization Lab	CO1	Students must be able to verify combinational circuits in assigned labs.
		CO2	Students must be able to Design the concept of Multiplexers, Decoders and Flip Flops.
		CO3	Students must be able to explain the outcomes of experiments using Logistic Simulator and effectively document them in lab files.
KCS-353	Discrete Structures & Logic Lab	CO1	Students must be able to analyze the various problems on their own.
		CO2	Students must be able to implement logics for problem solving
		CO3	Students must be able to represent the outputs of problems and its documentation effectively.
		CO1	Students must be able to demonstrate their learning effectively through presentation.

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KCS-354	Mini Project or Internship Assessment	CO2	Students are expected to apply & demonstrate their learning through a meaningful project
		CO3	Students must learn to demonstrate their learning & work done through effective documentation in the form of project report
2. B.Tech. IV Semester			
KOE048	Electronics Engineering	CO1.	Understand the concept of PN junction and special purpose diodes
		CO2.	Study the application of conventional diode and semiconductor diode.
		CO3.	Analyze the I-V characteristics of BJT and FET.
		CO4.	Analyze the of Op-Amp, amplifiers, integrator, and differentiator.
		CO5.	Understand the concept of digital storage oscilloscope and compare of DSO with analog oscilloscope.
KAS301	Technical Communication	CO1.	Students will be enabled to understand the nature and objective of Technical Communication relevant for the work place as Engineers.
		CO2.	Students will utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions
		CO3.	Students would imbibe inputs by presentation skills to enhance confidence in face of diverse audience.
		CO4.	Technical communication skills will create a vast know-how of the application of the learning to promote their technical competence
		CO5.	It would enable them to evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics
KCS401	Operating Systems	CO1.	Describe the fundamentals and structure of operating systems.
		CO2.	Analyze Process Synchronization and the solution of various critical section problem using software and hardware approaches.
		CO3.	Explain the mechanism to handle threads, process scheduling and deadlock.
		CO4.	Discuss the concept of memory management along with page replacement and thrashing.
		CO5.	Classify various file system concepts and disk Scheduling.
	Theory of	CO1.	Students will be able to describe basic concepts of alphabets, strings, languages and should be able to understand automata, grammars and their relationships.
		CO2.	Students should be able to design Finite Automata (FA) and to understand the equivalence of DFA and NFA and evaluate whether a given Language is regular and Able to compute the equivalent DFA with the minimum number of states.

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KCS402	Automata and Formal Languages	CO3.	Students should be able to apply the concept of CFG and measure normal forms and ambiguity in grammar.
		CO4.	Students should be able to create PDA by given CFL and convert CFG to PDA and vice versa.
		CO5.	Graduate will be able to design turing machine for given language and to compare decidable and undecidable problems.
KCS403	Microprocessor	CO1.	Apply a basic concept of digital fundamental to microprocessor based computer system.
		CO2.	Analyze a detailed software and hardware structure of the microprocessor
		CO3.	Illustrate how the different peripherals (8085/8086) are interfaced with microprocessor
		CO4.	Analyze the characteristics of Microprocessor
		CO5.	Evaluate the data transfer information through serial and parallel ports
KNC401	Computer System Security	CO1.	To discover software bugs that pose cyber security threats and to explain how to fix the bugs to mitigate such threats
		CO2.	To discover cyber attack scenarios to web browsers and web servers and to explain how to mitigate such threats
		CO3.	To discover and explain mobile software bugs posing cyber security threats, explain and recreate exploits, and to explain mitigation techniques.
		CO4.	To articulate the urgent need for cyber security in critical computer systems, networks, and world wide web, and to explain various threat scenarios
		CO5.	To articulate the well known cyber attack incidents, explain the attack scenarios, and explain mitigation techniques.
KCS451	Operating Systems Lab	CO1.	Students must be able to perform the experiments using C/Unix language in assigned labs.
		CO2.	Students must be able to understand the logic behind different programs & demonstrate the outcomes effectively using C/Unix during viva.
		CO3.	Students must be able to explain the outcomes of experiments using C/Unix and effectively document them in lab files.
KCS452	Microprocessor Lab	CO1.	Students must be able to perform the experiments by his own
		CO2.	Students must be able to understand the logic behind the experiment & demonstrate the outcomes effectively.
		CO3.	Students must be able to present the experiment & its results effectively in documentation.
		CO1.	Students must be able to perform the experiments by his own

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KCS453	Python Language Programming Lab	CO2.	Students must be able to understand the logic behind the experiment & demonstrate the outcomes effectively.
		CO3.	Students must be able to present the experiment & its results effectively in documentation.
3. B.Tech. V Semester			
KCS-501	Database Management System	CO1.	Apply knowledge of database for real life applications.
		CO2.	Apply query processing techniques to automate the real time problems of databases.
		CO3.	Identify and solve the redundancy problem in database tables using normalization..
		CO4.	Understand the concepts of transactions, their processing so they will familiar with broad range of database management issues including data integrity, security and recovery.
		CO5.	Design, develop and implement a small database project using database tools.
KCS-502	Compiler Design	CO1.	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.
		CO2.	Understand the parser and its types i.e. Top-Down and Bottom-up parsers and construction of LL, SLR, CLR, and LALR parsing table.
		CO3.	Implement the compiler using syntax-directed translation method and get knowledge about the synthesized and inherited attributes.
		CO4.	Acquire knowledge about run time data structure like symbol table organization and different techniques used in that.
		CO5.	Understand the target machine's run time environment, its instruction set for code generation and techniques used for code optimization.
KCS-503	Design and Analysis of Algorithm	CO1.	Design new algorithms, prove them correct, and analyze their asymptotic and absolute runtime and memory demands.
		CO2.	Find an algorithm to solve the problem (create) and prove that the algorithm solves the problem correctly (validate).
		CO3.	Understand the mathematical criterion for deciding whether an algorithm is efficient, and know many practically important problems that do not admit any efficient algorithms.
		CO4.	Apply classical sorting, searching, optimization and graph algorithms.
		CO5.	Understand basic techniques for designing algorithms, including the techniques of recursion, divide-and-conquer and greedy.
KCS051	Data Analytics	CO1.	Describe the life cycle phases of Data Analytics through discovery, planning and building.
		CO2.	Understand and apply Data Analysis Techniques..
		CO3.	Implement various Data streams.

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		CO4.	Understand item sets, Clustering, frame works & Visualizations.
		CO5.	Apply R tool for developing and evaluating real time applications.
KCS055	Machine Learning Techniques	CO1.	To understand the need for machine learning for various problem solving.
		CO2.	To understand a wide variety of learning algorithms and how to evaluate models generated from data.
		CO3.	To understand the latest trends in machine learning
		CO4.	To design appropriate machine learning algorithms and apply the algorithms to a real-world problem.
		CO5.	To optimize the models learned and report on the expected accuracy that can be achieved by applying the models.
KNC501	CONSTITUTION OF INDIA, LAW AND ENGINEERING	CO1.	Identify and explore the basic features and modalities about Indian constitution.
		CO2.	Differentiate and relate the functioning of Indian parliamentary system at the center and state level.
		CO3.	Differentiate different aspects of Indian Legal System and its related bodies.
		CO4.	Discover and apply different laws and regulations related to engineering practices.
		CO5.	Correlate role of engineers with different organizations and governance models.
KCS-551	Database Management System Lab	CO1	Understand and apply oracle 11 g products for creating tables, views, indexes, sequences and other database objects.
		CO2	Design and implement a database schema for company data base, banking data base, library information system, payroll processing system, student information system.
		CO3	Write and execute simple and complex queries using DDL, DML, DCL and TCL
		CO4	Write and execute PL/SQL blocks, procedure functions, packages and triggers, cursors.
		C05	Enforce entity integrity, referential integrity, key constraints, and domain constraints on database.
KCS-552	COMPILER DESIGN LAB	CO1	Identify patterns, tokens & regular expressions for lexical analysis.
		CO2	Design Lexical analyser for given language using C and LEX /YACC tools
		CO3	Design and analyze top down and bottom up parsers.
		CO4.	Generate the intermediate code.
		CO5.	Generate machine code from the intermediate code forms.
KCS-553	Design and Analysis of Algorithm Lab	CO1	Implement algorithm to solve problems by iterative approach.
		CO2	Implement algorithm to solve problems by divide and conquer approach.
		CO3	Implement algorithm to solve problems by Greedy algorithm approach.
		CO4.	Implement algorithm to solve problems by Dynamic programming, backtracking, branch and bound approach.

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		CO5.	Implement algorithm to solve problems by branch and bound approach
4. B.Tech. VI Semester			
KCS-601	Software Engineering	CO1.	Explain various software characteristics and analyze different software Development Models.
		CO2.	Demonstrate the contents of a SRS and apply basic software quality assurance practices to ensure that design, development meet or exceed applicable standards.
		CO3.	Compare and contrast various methods for software design
		CO4.	Formulate testing strategy for software systems, employ techniques such as unit testing, Test driven development and functional testing
		CO5.	Manage software development process independently as well as in teams and make use of Various software management tools for development, maintenance and analysis.
KCS-602	Web Technology	CO1.	Explain web development Strategies and Protocols governing Web
		CO2.	Develop Java programs for window/web-based applications.
		CO3.	Design web pages using HTML, XML, CSS and JavaScript.
		CO4.	Creation of client-server environment using socket programming.
		CO5.	Building enterprise level applications and manipulate web databases using JDBC.
KCS-603	Computer Networks	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.
		CO2.	Apply channel allocation, framing, error and flow control techniques.
		CO3.	Describe the functions of Network Layer i.e. Logical addressing, subnetting & Routing Mechanism.
		CO4.	Explain the different Transport Layer function i.e. Port addressing, Connection Management, Error control and Flow control mechanism.
		CO5.	Explain the functions offered by session and presentation layer and their Implementation.
		CO6.	Explain the different protocols used at application layer i.e. HTTP, SNMP, SMTP, FTP, TELNET and VPN.
KCS-061	Big Data	CO1.	Demonstrate knowledge of Big Data Analytics concepts and its applications in business.
		CO2.	Demonstrate functions and components of Map Reduce Framework and HDFS.
		CO3.	Discuss Data Management concepts in NoSQL environment.
		CO4.	Explain process of developing Map Reduce based distributed processing applications.
		CO5.	Explain process of developing applications using HBASE, Hive, Pig etc.
KCS-062	Image Processing	CO1.	Explain the basic concepts of two-dimensional signal acquisition, sampling, quantization and color model.

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		CO2.	Apply image processing techniques for image enhancement in both the spatial and frequency domains.
		CO3.	Apply and compare image restoration techniques in both spatial and frequency domain.
		CO4.	Compare edge based and region based segmentation algorithms for ROI extraction.
		CO5.	Explain compression techniques and descriptors for image processing.
KCS-651	Software Engineering Lab	CO1.	Identify ambiguities, inconsistencies and incompleteness from a requirements specification and state functional and non-functional requirement.
		CO2.	Identify different actors and use cases from a given problem statement and draw use case diagram to associate use cases with different types of relationship.
		CO3.	Draw a class diagram after identifying classes and association among them.
		CO4.	Graphically represent various UML diagrams , and associations among them and identify the logical sequence of activities undergoing in a system, and represent them pictorially.
		CO5.	Able to use modern engineering tools for specification, design, implementation and testing.
KCS-652	WebTechnology Lab	CO1.	Develop static web pages using HTML
		CO2.	Develop Java programs for window/web-based applications.
		CO3.	Design dynamic web pages using Javascript and XML.
		CO4.	Design dynamic web page using server site programming Ex. ASP/JSP/PHP.
		CO5.	Design server site applications using JDDC, ODBC and section tracking API.
KCS-654	Computer Networks Lab	CO1.	Simulate different network topologies.
		CO2.	Implement various framing methods of Data Link Layer.
		CO3.	Implement various Error and flow control techniques.
		CO4.	Implement network routing and addressing techniques
		CO5.	Implement transport and security mechanisms.
		5. B.Tech. VII Semester	
KHU701/ KHU801	RURAL DEVELOPMENT: ADMINISTRATION AND PLANNING	CO1	Students can understand the definitions, concepts and components of Rural Development
		CO2	Students will know the importance, structure, significance, resources of Indian rural economy.
		CO3	Students will have a clear idea about the area development programmes and its impact.
		CO4.	Students will be able to acquire knowledge about rural entrepreneurship.
		CO5.	Students will be able to understand about the using of different methods for human resource planning
	Artificial	CO1.	Understand the basics of the theory and practice of Artificial Intelligence as a discipline and about intelligent agents.
		CO2.	Understand search techniques and gaming theory.

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KCS071	Intelligence	CO3.	The student will learn to apply knowledge representation techniques and problem solving strategies to common AI applications.
		CO4.	Student should be aware of techniques used for classification and clustering.
		CO5.	Student should aware of basics of pattern recognition and steps required for it.
KCS713	Cloud Computing	CO1.	Describe architecture and underlying principles of cloud computing.
		CO2.	Explain need, types and tools of Virtualization for cloud.
		CO3.	Describe Services Oriented Architecture and various types of cloud services.
		CO4.	Explain Inter cloud resources management cloud storage services and their providers Assess security services and standards for cloud computing.
		CO5.	Analyze advanced cloud technologies.
KCS 751	Artificial Intelligence Lab	CO1.	Students must be able to perform the various experiments using Prolog language in assigned labs.
		CO2.	Students must be able to understand the logic behind different programs & demonstrate the outcomes effectively during viva.
		CO3.	Students must be able to explain the outcomes of experiments and effectively document them in lab files.
KCS 752	Mini Project or Internship Assessment	CO1.	Developing a technical artifact requiring new technical skills and effectively utilizing a new software tool to complete a task.
		CO2.	Writing requirements documentation, Selecting appropriate technologies, identifying and creating appropriate test cases for systems.
		CO3.	Demonstrating understanding of professional customs & practices and working with professional standards.
		CO4.	Improving problem-solving, critical thinking skills and report writing.
		CO5.	Learning professional skills like exercising leadership, behaving professionally, behaving ethically, listening effectively, participating as a member of a team, developing appropriate workplace attitudes.
KCS 753	Project	CO1	Analyze and understand the real life problem and apply their knowledge to get programming solution.
		CO2	Engage in the creative design process through the integration and application of diverse technical knowledge and expertise to meet customer needs and address social issues.
		CO3	Use the various tools and techniques, coding practices for developing real life solution to the problem.
		CO4	Find out the errors in software solutions and establishing the process to design maintainable software applications.
		CO5.	Write the report about what they are doing in project and learning the team working skills.

6. B.Tech. VIII Semester

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KCS082	Image Processing	CO1.	Student will be able to apply principles of image formation and analyze image enhancement in frequency domain.
		CO2.	Student will be able to identify & apply filters in spatial domain for image enhancements.
		CO3.	Student will be able to interpret various noise models and propose appropriate restoration techniques.
		CO4.	Student will be able to analyze morphological image processing.
		CO5.	Student will be able to demonstrate various segmentation processes and devise novel approach for segmentation.
KCS087	Data Compression	CO1.	Students will be able to understand the basics of data compression and learn to solve the problems associated with different source coding techniques.
		CO2.	Students will be able to apply the compression techniques to compress the different raw data and summarize the concepts associated with text, image and audio compression.
		CO3.	Students will be able to learn different data compression principles and algorithms like LZ77&78,LZW,BWT,CALIC,MTF etc.
		CO4.	Students will be able to evaluate the quantization problem and to classify different types of quantization.
		CO5.	Students will be able to identify and apply the operation of vector quantizer.
KOE081	Digital & Social Media Marketing	CO1.	To help students understand digital marketing practices, inclination of digital consumers and role of content marketing
		CO2.	To provide understanding of the concept of E-commerce and developing marketing strategies in the virtual world.
		CO3.	To impart learning on various digital channels and how to acquire and engage consumers online.
		CO4.	To provide insights on building organizational competency by way of digital marketing practices and cost considerations
		CO5.	To develop understanding of the latest digital practices for marketing and promotion.
KCS 851	Project	CO1.	Analyze and understand the real life problem and apply their knowledge to get programming solution.
		CO2.	Engage in the creative design process through the integration and application of diverse technical knowledge and expertise to meet customer needs and address social issues.
		CO3.	Use the various tools and techniques, coding practices for developing real life solution to the problem.
		CO4.	Find out the errors in software solutions and establishing the process to design maintainable software applications.
		CO5.	Write the report about what they are doing in project and learning the team working skills.

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Course Outcomes (COs): B.Tech. III,IV,V,VI,VII & VIII Semester		
Session:2020-21		
Code	**Course Name**	**Course Outcomes**
B.Tech-IT III Semester		
KCS 301	DATA STRUCTURE	CO 1 Describe how arrays, linked lists, stacks, queues, trees, and graphs are represented in memory, used by the algorithms and their common applications
		CO 2 Discuss the computational efficiency of the sorting and searching algorithms.
		CO 3 Implementation of Trees and Graphs and perform various operations on the data structure
		CO 4 Understanding the concept of recursion, application of recursion and its implementation and removal of recursion.
		CO 5 Identify the alternative implementations of data structures with respect to its performance to solve a real world problem.
KCS302	Computer Organization and Architecture	CO 1 Study of the basic structure and operation of a digital computer system.
		CO 2 Analysis of the design of arithmetic & logic unit and understanding of the fixed point and floatingpoint arithmetic operations
		CO 3 Implementation of control unit techniques and the concept of Pipelining.
		CO 4 Understanding the hierarchical memory system, cache memories and virtual memory.
		CO 5 Understanding the different ways of communicating with I/O devices and standard I/O interfaces.
KCS 303	Discrete Structures & Theory of Logic	CO 1 Write an argument using logical notation and determine if the argument is or is not valid.
		CO 2 Understand the basic principles of sets and operations in sets.
		CO 3 Demonstrate an understanding of relations and functions and be able to determine their properties
		CO 4 Demonstrate different traversal methods for trees and graphs.
		CO 5 Model problems in Computer Science using graphs and trees.
		CO 1 To discover software bugs that pose cyber security threats and to explain how to fix the bugs to mitigate such threats
		CO 2 To discover cyber attack scenarios to web browsers and web servers and to explain how to mitigate such threats

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KNC301	COMPUTER SYSTEM SECURITY	CO 3 To discover and explain mobile software bugs posing cyber security threats, explain and recreate exploits, and to explain mitigation techniques.
		CO 4 To articulate the urgent need for cyber security in critical computer systems, networks, and world wide web, and to explain various threat scenarios
		CO 5 To articulate the well known cyber attack incidents, explain the attack scenarios, and explain mitigation techniques.
KOE 034	Sensor & Instrumentation	CO1. Apply the use of sensors for measurement of displacement, force and pressure.
		CO2. Employ commonly used sensors in industry for measurement of temperature,position, accelerometer, vibration sensor, flow and level.
		CO3. Demonstrate the use of virtual instrumentation in automation industries.
		CO4. Identify and use data acquisition methods.
		CO5. Comprehend intelligent instrumentation in industrial automation.
KAS301	Universal Human Values and Professional Ethics	CO 1 Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society mitigate such threats
		CO 2 Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body
		CO 3 Understand the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society
		CO 4 Understand the harmony in nature and existence, and work out their mutually fulfilling participation in the nature
		CO 5 Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.
KCS-351	Data STRUCTURE Lab	CO1: nterpret and compute asymptotic notations of an algorithm to analyze the consumption of resources (time/space).
		CO2: Exemplify and implement stack, queue and list ADT, tree and graph to manage the memory using static and dynamic allocations.
		CO3: Implement binary search tree to design applications like expression trees.
		CO4: Identify, model, solve and develop code for real life problems like shortest path and MST using graph theory.

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		CO4: Develop and compare the comparison-based search algorithms and sorting Algorithms.
		CO5: Identify appropriate data structure and algorithm for a given contextual problem and develop in C.
KCS-352	Computer Organization Lab	CO1: Define, Apply and Design basic digital circuits
		CO2: Discuss, Design and Calculate 8 bits I/O, ALU and RTL
		CO3: Explain, apply and design the concept of control unit and memory unit
		CO4: Define and design algorithm using simulators
KCS-353	Discrete Structures & Theory of Logic Lab	CO1: Students would be having understanding of working with a mathematical tool Maple
		CO2: Students would be able to perform programs of recursion, combinatorics and counting
		CO3: Students would be able to perform programs of set theroy, set operations and probability
		CO4: Student would be able to implement classical mathematical problme like Birthday paradox based on pigeonhole principle.
KCS-354	Mini Project	CO1. Developing a technical artifact requiring new technical skills and effectively utilizing a new software tool to complete a task
		CO2. Writing requirements documentation, Selecting appropriate technologies, identifying and creating appropriate test cases for systems.
		CO3. Demonstrating understanding of professional customs & practices and working with professional standards.
		CO4. Improving problem-solving, critical thinking skills and report writing.
		CO5. Learning professional skills like exercising leadership, behaving professionally, behaving ethically, listening effectively, participating as a member of a team, developing appropriate workplace attitudes.
B.Tech-IT IV Semester		
KCS 401	Operating systems	CO 1 Understand the structure and functions of OS.
		CO 2 Learn about Processes, Threads and Scheduling algorithms.
		CO 3 Understand the principles of concurrency and Deadlocks
		CO 4 Learn various memory management scheme.
		CO 5 Study I/O management and File systems.
		CO 1 Analyse and design finite automata, pushdown automata, Turing machines, formal languages, and grammars
		CO 2 Analyse and design, Turing machines, formal languages, and grammars.

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KCS 402	Theory of Automata and Formal Languages	CO 3 Demonstrate the understanding of key notions, such as algorithm, computability, decidability, and complexity through problem solving.
		CO 4 Prove the basic results of the Theory of Computation.
		CO 5 State and explain the relevance of the Church-Turing thesis.
KIT 401	Web Designing	CO 1 Understand principle of Web page design and about types of websites.
		CO 2 Visualize and Recognize the basic concept of HTML and application in web designing.
		CO 3 Recognize and apply the elements of Creating Style Sheet (CSS).
		CO 4 Understanding the basic concept of Java Script and its application.
		CO 5 Introduce basics concept of Web Hosting and apply the concept of SEO.
KAS402	Mathematics-IV	CO1. Remember the concept of partial differential equation and to solve partial differential equations
		CO2. Analyze the concept of partial differential equations to evaluate the problems concerned with partial differential equations
		CO3. Understand the concept of correlation, moments, skewness and kurtosis and curve fitting
		CO4. Remember the concept of probability to evaluate probability distributions
		CO5. Apply the concept of hypothesis testing and statistical quality control to create control charts
KNC 402	PYTHON PROGRAMMING	CO 1 To read and write simple Python programs.
		CO 2 To develop Python programs with conditionals and loops.
		CO 3 To define Python functions and to use Python data
		structures — lists, tuples, dictionaries.
		CO 4 To do input/output with files in Python.
		CO 5 To do searching, sorting and merging in Python.
KCS -402	Technical Communication	CO 1 Students will be enabled to understand the nature and objective of Technical Communication relevant for the work place as Engineers.
		CO 2 Students will utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions.
		CO 3 Students would imbibe inputs by presentation skills to enhance confidence in face of diverse audience.
		CO 4 Technical communication skills will create a vast know-how of the application of the learning to promote their technical competence.

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		CO 5 It would enable them to evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics.
KCS-451	Operating systems Lab	CO1: Students will be able to design and interpret various CPU scheduling algorithm.
		CO2: Students will be able to design, develop and implement programs for deadlock handling..
		CO3: Students will be able to apply and analyze different page replacement algorithms.
		CO4: Students will be able to develop and compare various disk scheduling algorithms
KIT-451	Web Designing Lab	CO1: Understand fundamentals of web development
		CO2: Understand, analyze and apply the role of scripts/languages like HTML, DHTML, CSS
		CO3: Understand, analyze and design the role of JavaScript for dynamic web pages.
KCS-453	Python Language Programming Lab	CO1: Students will be able to describe the numbers, math functions, strings, list, tuples and dictionaries in python
		Students wil be able to acquire the skills to apply different decision making statements and functions in python
		CO2: Students will be able to interpret object oriented programming in python
		CO3: Students will be able to develop skill to understand and summarize different file handling operations
		CO4:Students will be able to demonstrate the ability to design GUI applications in python and evaluate different database Operations
B.Tech-IT V Semester		
KCS-601	Software Engineering	CO1. Explain various software characteristics and analyze different software Development Models
		CO2. Demonstrate the contents of a SRS and apply basic software quality assurance practices to ensure that design, development meet or exceed applicable standards
		CO3. Compare and contrast various methods for software design.
		CO4. Formulate testing strategy for software systems, employ techniques such as unit testing, Test driven development and functional testing
		CO5. Manage software development process independently as well as in teams and make use of Various software management tools for development, maintenance and analysis.
		CO1. Discuss various concepts of data analytics pipeline
		CO2. Apply classification and regression techniques
		CO3. Explain and apply mining techniques on streaming data

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(KIT 601)	Data Analytics	CO4. Compare different clustering and frequent pattern mining algorithms
		CO5. Describe the concept of R programming and implement analytics on Big data using R.
KCS-603	Computer Networks	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
		CO2. Apply channel allocation, framing, error and flow control techniques.
		CO3. Describe the functions of Network Layer i.e. Logical addressing, subnetting & Routing Mechanism.
		CO4. Explain the different Transport Layer function i.e. Port addressing, Connection Management, Error control and Flow control mechanism
		CO5. Explain the functions offered by session and presentation layer and their Implementation.
		CO6. Explain the different protocols used at application layer i.e. HTTP, SNMP, SMTP, FTP, TELNET and VPN.
KCS-061	BIG DATA	CO1. Demonstrate knowledge of Big Data Analytics concepts and its applications in business
		CO2. Demonstrate functions and components of Map Reduce Framework and HDFS.
		CO3. Discuss Data Management concepts in NoSQL environment.
		CO4. Explain process of developing Map Reduce based distributed processing applications.
		CO5. Explain process of developing applications using HBASE, Hive, Pig etc.
KOE-062	Embedded System	CO1. Understand the basics of embedded system and its structural units.
		CO2. Analyze the embedded system specification and develop software programs.
		CO3. Evaluate the requirements of the programming embedded systems, related software architecture
		CO4. Understand the RTOS based embedded system design.
		CO5. Understand all the applications of the embedded system and designing issues.
KNC -602	CONSTITUTION OF INDIA, LAW AND ENGINEERING	CO1. Identify and explore the basic features and modalities about Indian constitution
		CO2. Differentiate and relate the functioning of Indian parliamentary system at the center and state level.
		CO3. Differentiate different aspects of Indian Legal System and its related bodies.
		CO4. Discover and apply different laws and regulations related to engineering practices

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		CO5. Correlate role of engineers with different organizations and governance models
KCS-651	Software Engineering Lab	CO1. Identify ambiguities, inconsistencies and incompleteness from a requirements specification and state functional and non-functional requirement
		CO2. Identify different actors and use cases from a given problem statement and draw use case diagram to associate use cases with different types of relationship
		CO3. Draw a class diagram after identifying classes and association among them
		CO4. Graphically represent various UML diagrams , and associations among them and identify the logical sequence of activities undergoing in a system, and represent them pictorially
		CO5. Able to use modern engineering tools for specification, design, implementation and testing
		ORACLE/ MYSQL
		CO4. Student should be able to solve normalization in oracle
		CO5. Student should be able to create and demonstrate cursor, procedure, functions, packages and triggers
KIT-651	Data Analytics Lab	CO1. Implement numerical and statistical analysis on various data sources
		CO2. Apply data preprocessing and dimensionality reduction methods on raw data
		CO3. Implement linear regression technique on numeric data for prediction
		CO4. Execute clustering and association rule mining algorithms on different datasets.
		CO5. Implement and evaluate the performance of KNN algorithm on different datasets
KCS-653	Computer Networks Lab	CO1. Simulate different network topologies.
		CO2. Implement various framing methods of Data Link Layer.
		CO3. Implement various Error and flow control techniques.
		CO4. Implement network routing and addressing techniques.
		CO5. Implement transport and security mechanisms
B.Tech-IT VI Semester		
KCS-501	DBMS	CO1. Apply knowledge of database for real life applications.
		CO2. Apply query processing techniques to automate the real time problems of databases
		CO3. Identify and solve the redundancy problem in database tables using normalization.
		CO4. Understand the concepts of transactions, their processing so they will familiar with broad range of database management issues including data integrity, security and recovery.

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		CO5. Design, develop and implement a small database project using database tools.
KIT - 501	Web Technology	CO1. Apply the knowledge of the internet and related internet concepts that are vital in understanding web application development and analyze the insights of internet programming to implement complete application over the web.
		CO2. Understand, analyze and apply the role of mark up languages like HTML, DHTML, and XML in the workings of the web and web applications.
		CO3. Use web application development software tools i.e. XML, Apache Tomcat etc. and identifies the environments currently available on the market to design web sites.
		CO4. Understand, analyze and build dynamic web pages using client side programming JavaScript and also develop the web application using servlet and JSP.
		CO 5. Understand the impact of web designing by database connectivity with JDBC in the current market place where everyone use to prefer electronic medium for shopping, commerce, fund transfer and even social life also
KCS-503	DAA	CO1. Design new algorithms, prove them correct, and analyze their asymptotic and absolute runtime and memory demands.
		CO2. Find an algorithm to solve the problem (create) and prove that the algorithm solves the problem correctly (validate).
		CO3. Understand the mathematical criterion for deciding whether an algorithm is efficient, and know many practically important problems that do not admit any efficient algorithms..
		CO4. Apply classical sorting, searching, optimization and graph algorithms.
		CO5. Understand basic techniques for designing algorithms, including the techniques of recursion, divide-and-conquer, and greedy.
KCS-055	Machine Learning Techniques	CO1. To understand the need for machine learning for various problem solving
		CO2. To understand a wide variety of learning algorithms and how to evaluate models generated from data
		CO 3. To understand the latest trends in machine learning
		CO4. To design appropriate machine learning algorithms and apply the algorithms to a real-world problems
		CO5. To optimize the models learned and report on the expected accuracy that can be achieved by applying the models
KCS-054	OOSD	CO1. To Understand the application development and analyze the insights of object oriented programming to implement application
		CO2. To Understand, analyze and apply the role of overall modeling concepts (i.e. System, structural)
		CO3. To Understand, analyze and apply oops concepts (i.e. abstraction, inheritance)

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		CO4. To know the concepts of C++ for understanding the implementation of object oriented concepts
		CO5. To understand and apply object oriented paradigm concepts to implement real world problems.
KNC-601	CONSTITUTION OF INDIA, LAW AND ENGINEERING	CO1. Identify and explore the basic features and modalities about Indian constitution.
		CO2. Differentiate and relate the functioning of Indian parliamentary system at the center and state level.
		CO3. Differentiale different aspects of Indian Legal System and its related bodies.
		CO4. Discover and apply different laws and regulations related to engineering practices.
		CO5. Correlate role of engineers with different organizations and governance models
KCS-551	DBMS Lab	CO1. Understand and apply oracle 11 g products for creating tables, views, indexes, sequences and other database objects.
		CO2. Design and implement a database schema for company data base, banking data base, library information system, payroll processing system, student information system.
		CO3. Write and execute simple and complex queries using DDL, DML, DCL and TCL.
		CO4. Write and execute PL/SQL blocks, procedure functions, packages and triggers, cursors.
		CO5. Enforce entity integrity, referential integrity, key constraints, and domain constraints on database.
KIT-551	WT Lab	CO1. Understand fundamentals of web development and Java, including defining classes, invoking methods, using class libraries, Applet, AWT.
		CO2. Understand, analyze and apply the role of scripts/languages like HTML, DHTML, CSS, XML, DOM, and SAX to solve real world problems.
		CO3. Understand, analyze and design the role of JavaScript for dynamic web pages.
		CO4. Design and deploy different components using EJB, and database tables using JDBC and produce various results based on given query.
		CO5. Design and deploy a server-side java application called Servlet & JSP tools to catch form data sent from client, process it and store it on database.
KCS-553	DAA Lab	CO1. Understand and implement algorithm to solve problems by iterative approach
		CO2. Understand and implement algorithm to solve problems by divide and conquer approach.
		CO3. Understand and implement algorithm to solve problems by Greedy algorithm approach.

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		CO4. Understand and analyze algorithm to solve problems by Dynamic programming, backtracking.
		CO5. Understand and analyze the algorithm to solve problems by branch and bound approach.
KCS-554	Mini Project	CO1. Developing a technical artifact requiring new technical skills and effectively utilizing a new software tool to complete a task
		CO2. Writing requirements documentation, Selecting appropriate technologies, identifying and creating appropriate test cases for systems.
		CO3. Demonstrating understanding of professional customs & practices and working with professional standards.
		CO4. Improving problem-solving, critical thinking skills and report writing.
		CO5. Learning professional skills like exercising leadership, behaving professionally, behaving ethically, listening effectively, participating as a member of a team, developing appropriate workplace attitudes.
B.Tech-IT VII Semester		
KCS076	Software Testing	CO1. Have an ability to apply software testing knowledge and engineering methods.
		CO2. Have an ability to design and conduct a software test process for a software testing project.
		CO3. Have an ability to identify the needs of software test automation, and define and develop a test tool to support test automation.
		CO4. 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.
		CO5. Have basic understanding and knowledge of contemporary issues in software testing, such as component-based software testing problems.
KCS-713	CLOUD COMPUTING	CO1. Describe architecture and underlying principles of cloud computing.
		CO2. Explain need, types and tools of Virtualization for cloud.
		CO3. Describe Services Oriented Architecture and various types of cloud services
		CO4. Explain Inter cloud resources management cloud storage services and their providers Assess security services and standards for cloud computing
		CO5. Analyze advanced cloud technologies
KOE -074	RENEWABLE ENERGY RESOURCES	CO1: Students will be able to understand Various non-conventional energy resources.
		CO2. Students will be able to understand Solar Thermal, Geothermal Energy resources

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		CO3. Students will be able to understand the importance of managing, financial and social factors affecting Innovation.
		CO4. Students will be able to understand Thermo-electrical and thermionic Conversions.
		CO5. Students will understand the Availability of bio-mass and its conversion theory.
KHU -702	PM & E	CO1: Students will be able to understand basic concept of Entrepreneurial competencies & traits,
		CO2. Students will be able to understand Management skills for Entrepreneurs and Innovations
		CO3. Students will be able to understand the importance of managing, financial and social factors affecting Innovation.
KIT-751A	ST LAB	CO1. To understand the concepts of software testing
		CO2. To perform manual testing
		CO3. Students will learn Behavior modeling using UML: Finite state machines (FSM)
		CO4. Students will learn various Software Testing tools
		CO5. Application of software testing techniques in commercial environments
KIT 752	MINI PROJECT/IA	CO1. Developing a technical artifact requiring new technical skills and effectively utilizing a new software tool to complete a task
		CO2. Writing requirements documentation, Selecting appropriate technologies, identifying and creating appropriate test cases for systems.
		CO3. Demonstrating understanding of professional customs & practices and working with professional standards.
		CO4. Improving problem-solving, critical thinking skills and report writing.
		CO5. Learning professional skills like exercising leadership, behaving professionally, behaving ethically, listening effectively, participating as a member of a team, developing appropriate workplace attitudes.
KIT753	Project	CO1. Analyze and understand the real life problem and apply their knowledge to get programming solution.
		CO2. Engage in the creative design process through the integration and application of diverse technical knowledge and expertise to meet customer needs and address social issues.
		CO3. Use the various tools and techniques, coding practices for developing real life solution to the problem.
		CO4. Find out the errors in software solutions and establishing the process to design maintainable software applications
		CO5. Write the report about what they are doing in project and learning the team working skills.

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KOE-093	DATA WAREHOUSING & DATA MINING	CO1: Students will learn Data Warehousing Components
		CO2: Students will understand Hardware and Operating Systems for Data Warehousing
		CO3: Students will learn Data Mining concepts and tools
		CO4: Students will study about classification and clustering
		CO5: Students will study applications of Data Ware Housing
KOE -085	QUALITY MANAGEMENT	CO1. Students will understand Quality Concepts
		CO2. Students will learn Human Factor in quality Attitude of top management
		CO3. Students will learn Attributes of Control Chart and R chart
		CO4. Students will study Defects diagnosis and prevention defect study
		CO5. Students will learn ISO-9000 and series.
KHU -801	RURAL DEVELOPMENT: ADMINISTRATION AND PLANNING	CO1: Students can understand the definitions, concepts and components of Rural Development
		CO2: Students will know the importance, structure, significance, resources of Indian rural economy.
		CO3: Students will have a clear idea about the area development programmes and its impact
		CO4. Students will be able to acquire knowledge about rural entrepreneurship.
		CO5. Students will be able to understand about the using of different methods for human resource planning
KIT-851	Project	CO1. Analyze and understand the real life problem and apply their knowledge to get programming solution.
		CO2. Engage in the creative design process through the integration and application of diverse technical knowledge and expertise to meet customer needs and address social issues.
		CO3. Use the various tools and techniques, coding practices for developing real life solution to the problem.
		CO4. Find out the errors in software solutions and establishing the process to design maintainable software applications
		CO5. Write the report about what they are doing in project and learning the team working skills.

Course Outcomes (COs) B.Tech. III,IV,V,VI,VII & VIII semesters Department of EC		
Session: 2021-22		
Code	**Course Name**	**Course Outcomes**
B.Tech (ECE) 3rd Semester		
(KAS-302)	Maths-IV	CO1. Remember the concept of partial differential equation and to solve partial differential equations
		CO2. Analyze the concept of partial differential equations to evaluate the problems concerned with partial differential equations

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		CO3. Understand the concept of correlation, moments, skewness and kurtosis and curve fitting
		CO4. Remember the concept of probability to evaluate probability distributions
		CO5. Apply the concept of hypothesis testing and statistical quality control to create control charts
(KAS 301)	Technical Communication n	CO1. Students will be enabled to understand the nature and objective of Technical
		CO2. Students will utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions.
		CO3. Students would imbibe inputs by presentation skills to enhance confidence in face of diverse audience.
		CO4. Technical communication skills will create a vast know-how of the application of the learning to promote their technicalcompetence.
		CO5. It would enable them to evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics.
(KEC-301)	Electronics Devices	CO1. Understand the principles of semiconductor Physics.
		CO2. Understand and utilize the mathematical models of semiconductor junctions.
		CO3. Understand carrier transport in semiconductors and design resistors.
		CO4. Utilize the mathematical models of MOS transistors for circuits and systems.
		CO5. Analyse and find application of special purpose diodes.
(KEC-302)	Digital System Design	CO1. Design and analyze combinational logic circuits.
		CO2. Design and analyze modular combinational circuits with MUX / DEMUX, Decoder & Encoder
		CO3. Design & analyze synchronous sequential logic circuits
		CO4. Analyze various logic families.
		CO5. Design ADC and DAC and implement in amplifier, integrator, etc.
(KEC 303)	Network Analysis & Synthesis	CO1. Understand basics electrical circuits with nodal and meshanalysis.
		CO2. Appreciate electrical network theorems.
		CO3. Apply Laplace transform for steady state and transient analysis.
		CO4. Determine different network functions.
		CO5. Appreciate the frequency domain techniques.
(KEC351)	Electronic Devices Lab	CO1. Understand working of basic electronics lab equipment.
		CO2. Understand working of PN junction diode and its applications.
		CO3. Understand characteristics of Zener diode.
		CO4. Design a voltage regulator using Zener diode.
		CO5. Understand working of BJT, FET, MOSFET and apply the concept in designing of amplifiers.
(KEC352)	Digital System Design Lab	CO1. Design and analyze combinational logic circuits.
		CO2. Design & analyze modular combinational circuits with MUX/DEMUX, decoder, encoder.

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		CO3. Design & analyze synchronous sequential logic circuits.
		CO4. Design & build mini project using digital ICs.
(KEC353)	Network Analysis and Synthesis Lab	CO1. Understand basics of electrical circuits with nodal and mesh analysis.
		CO2. Appreciate electrical network theorems.
		CO3. Analyse RLC circuits.
		CO4. Determine the stability of an electrical circuit.
		CO5. Design network filters.
B.Tech (ECE) 4th Semester		
(KOE-044)	Introduction to Soft Computing	CO1 Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory.
		CO2 Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic
		CO3 Describe with genetic algorithms and other random search procedures useful while seeking global optimum in selflearning situations.
		CO4 Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications.
		CO5 Develop some familiarity with current research problems and research methods in Soft Computing Techniques.
(KVE-401)	Universal Human Values and	CO1. Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the
	Professional Ethics	meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society
		CO2. Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body.
		CO3. Understand the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human- human relationships and explore their role in ensuring a harmonious society
		CO4. Understand the harmony in nature and existence, and work out their mutually fulfilling participation in the nature.
		CO5. Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.
(KEC401)	Communication Engineering	CO1. Analyze and compare different analog modulation schemes for their efficiency and bandwidth.
		CO2. Analyze the behavior of a communication system in presence of noise.
		CO3. Investigate pulsed modulation system and analyze their system performance.
		CO4. Investigate various multiplexing techniques.
		CO5. Analyze different digital modulation schemes and compute the bit error performance.
(KEC-402)	Analog Circuits	CO1. Understand the characteristics of diodes and transistors.
		CO2. Design and analyze various rectifier and amplifier circuits.

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		CO3. Design sinusoidal and non-sinusoidal oscillators.
		CO4. Understand the functioning of OP-AMP and design OP-AMP based circuits.
		CO5. Design LPF, HPF, BPF, BSF.
(KEC-403)	Signal System	CO1. Analyze different types of signals.
		CO2. Analyze linear shift-invariant (LSI) systems.
		CO3. Represent continuous and discrete systems in time and frequency domain using Fourier series and transform.
		CO4. Analyze discrete time signals in z-domain.
		CO5. Study sampling and reconstruction of a signal.
(KEC451)	Communicatio n EngineeringLab	CO1. Analyze and compare different analog modulation schemes for their modulation factor and power.
		CO2. Study pulse amplitude modulation.
		CO3. Analyze different digital modulation schemes and can compute the bit error performance.
		CO4. Study and simulate the Phase shift keying
		CO5. Design a front end BPSK modulator and demodulator.
(KEC-	Analog Circuit	CO1. Understand the characteristics of transistors.
452)	Lab	CO2. Design and analyze various configurations of amplifier circuits.
		CO3. Design sinusoidal and non-sinusoidal oscillators.
		CO4. Understand the functioning of OP-AMP and design OP-AMP based circuits.
		CO5. Design ADC and DAC.
(KEC-453)	Signal System Lab	CO1. Understand the basics operation of MATLAB.
		CO2. Analysis the time domain and frequency domain signals.
		CO3. Implement the concept of Fourier series and Fourier transforms.
		CO4. Find the stability of system using pole-zero diagrams and bode diagram.
		CO5. Design frequency response of the system.
B.Tech (ECE) 5th Semester		
(KEC-501)	Integrated Circuits	CO 1. Explain complete internal analysis of Op-Amp 741-IC.
		CO 2. Examine and design Op-Amp based circuits and basic components of ICs such as various types of filter.
		CO 3. Implement the concept of Op-Amp to design Op-Amp based non-linear applications and wave-shaping circuits.
		CO 4. Analyse and design basic digital IC circuits using CMOS technology.
		CO 5. Describe the functioning of application specific ICs such as 555 timer ,VCO IC 566 and PLL
(KEC-502)	Microprocessor &	CO1 Demonstrate the basic architecture of 8085.
		CO2 Illustrate the programming model of microprocessors & write program using 8085 microprocessor.

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	Microcontroller	CO3 Demonstrate the basics of 8086 Microprocessor and interface different external Peripheral Devices like timer, USART etc. with Microprocessor (8085/8086).
		CO4 Compare Microprocessors & Microcontrollers, and comprehend the architecture of 8051 microcontroller
		CO5 Illustrate the programming model of 8051 and implement them to design projects on real time problems
(KEC-503)	Digital Signal Processing	CO1 Design and describe different types of realizations of digital systems (IIR and FIR) and their utilities.
		CO2 Select design parameters of analog IIR digital filters (Butterworth and Chebyshev filters) and implement various methods such as impulse invariant transformation and bilinear transformation of conversion of analog to digital filters.
		CO3 Design FIR filter using various types of window functions.
		CO4 Define the principle of discrete Fourier transform & its various properties and concept of circular and linear convolution. Also, students will be able to define and implement FFT i.e. a fast computation method of DFT.
		CO5 Define the concept of decimation and interpolation. Also, they will be able to implement it in various practical applications.
(KEC 053)	VLSI Technology	CO1 Interpret the basics of crystal growth, wafer preparation and wafer cleaning.
		CO2 Evaluate the process of Epitaxy and oxidation.
		CO3 Differentiate the lithography, etching and deposition process.
		CO4 Analyze the process of diffusion and ion implantation
		CO5 Express the basic process involved in metallization and packaging
(KEC 055)	Electronics Switching	CO1 Describe the fundamentals of circuit switching and distinguish complex telephone systems.
		CO2 Differentiate the fundamentals of Space division switching and time division switching.
		CO3 Design, develop and evaluate the telecom traffic to meet defined specifications and needs.
		CO4 Identify the control of switching networks and signalling concepts.
		CO5 Classify the engineering concepts of packet switching and routing which will help to design various switch architectures for future research work.
(KNC-501)	Constitution of India, Law And Engineering	CO1 Identify and explore the basic features and modalities about Indian constitution.
		CO2 Differentiate and relate the functioning of Indian parliamentary system at the center and state level.
		CO3 Differentiate different aspects of Indian Legal System and its related bodies.
		CO4 Discover and apply different laws and regulations related to engineering practices.
		CO5 Correlate role of engineers with different organizations and governance models

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(KEC-551)	Integrated Circuits Lab	CO1 Design different non-linear applications of operational amplifiers such as log, antilog amplifiers and voltage comparators.
		CO2 Explain and design different linear applications of operational amplifiers such as filters.
		CO3 Demonstrate the function of waveforms generator using op-Amp.
		CO4 Construct multivibrator and oscillator circuits using IC555 and IC566 and perform measurements of frequency and time.
		CO5 Design and practically demonstrate the applications based on IC555 and IC566.
(KEC-552)	Microprocessor & Microcontroller Lab	CO1 Use techniques, skills, modern engineering tools, instrumentation and software/hardware appropriately to list and demonstrate arithmetic and logical operations on 8 bit data using microprocessor 8085.
		CO2 Examine 8085 & 8086 microprocessor and its interfacing with peripheral devices.
		CO3 State various conversion techniques using 8085 & 8086 and generate waveforms using 8085.
		CO4 Implement programming concept of 8051 Microcontroller.
		CO5 Design concepts to Interface peripheral devices with Microcontroller so as to design Microcontroller based projects.
(KEC-553)	Digital Signal Processing Lab	CO1 Create and visualize various discrete/digital signals using MATLAB/Scilab.
		CO2 Implement and test the basic operations of Signal processing.
		CO3 Examine and analyse the spectral parameters of window functions.
		CO4 Design IIR and FIR filters for band pass, band stop, low pass and high pass filters.
		CO5 Design the signal processing algorithms using MATLAB/Scilab.
B.Tech (ECE) 6th Semester		
(KEC-601)	Digital Communication	CO1 To formulate basic statistics involved in communication theory.
		CO2 To demonstrate the concepts involved in digital communication.
		CO3 To explain the concepts of digital modulation schemes.
		CO4 To analyze the performance of digital communication systems.
		CO5 To apply the concept of information theory in digital systems.
(KEC-602)	Control System	CO1 Describe the basics of control systems along with different types of feedback and its effect. Additionally they will also be able to explain the techniques such as block diagrams reduction, signal flow graph and modelling of various physical systems along with modelling of DC servomotor.
		CO2 Explain the concept of state variables for the representation of LTI system.
		CO3 Interpret the time domain response analysis for various types of inputs along with the time domain specifications.
		CO4 Distinguish the concepts of absolute and relative stability for continuous data systems along with different methods.
		CO5 Interpret the concept of frequency domain response analysis and their specifications.

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(KEC-603)	Antenna & Wave Propagation	CO1 Identify different coordinate systems and their applications in electromagnetic field theory to establish a relation between any two systems using the vector calculus.
		CO2 Explain the concept of static electric field, current and properties of conductors.
		CO3 Express the basic concepts of ground, space, sky wave propagation mechanism.
		CO4 Demonstrate the knowledge of antenna fundamentals and radiation mechanism of the antenna.
		CO5 Analyze and design different types of basic antennas
(KEC 061)	Microcontroller & Embedded Systems Design	CO1 Explain the advance concept of 8051 architectures and AVR family architecture and compare them for different applications.
		CO2 To demonstrate the basics of MSP430x5x Microcontroller
		CO3 To execute the I/O interfacing and peripheral devices associated with Microcontroller SoC (system on chip).
		CO4 Explain the advance concept Arm Cortex-M4 Processor Architecture.
		CO5 Demonstrate the ability to do Demonstrate the basics of Embedded Systems, IoT and its application and design IoT based projects on Arm based development boards
(KOE 066)	GIS & Remote Sensing	CO1 Understand about the principles of Remote Sensing and its advantages and limitations.
		CO2 Retrieve the information content of remotely sensed data
		CO3 Apply problem-specific remote sensing data for engineering applications.
		CO4 Analyze spatial and attribute data for solving spatial problems.
		CO5 Create GIS and cartographic outputs for presentation
(KEC-651)	Digital Communication Lab	CO1 To formulate basic concepts of pulse shaping in digital communication.
		CO2 To identify different line coding techniques and demonstrate the concepts.
		CO3 To design equipments related to digital modulation and demodulation schemes.
		CO4 To analyze the performance of various digital communication systems and evaluate the key parameters.
		CO5 To conceptualize error detection & correction using different coding schemes in digital communication
(KEC-652)	Control System Lab	CO1 Classify different tools in MATLAB along with the basic matrix operations used in MATLAB.
		CO2 Evaluate the poles and zeros on s-plane along with transfer function of a given system.
		CO3 Construct state space model of a linear continuous system.
		CO4 Evaluate the various specifications of time domain response of a given system.
		CO5 Appraise the steady state error of a given transfer function.
		CO6 Examine the relative stability of a given transfer function using various methods such as root locus, Bode plot and Nyquist plot.

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(KEC-653)	MICROCONTROLLERS FOR EMBEDDED SYSTEM LAB	CO1 To understand the basis work of microcontroller and learn the working.
		CO2 To understand the building blocks of embedded system.
		CO3 To learn the concept of interfacing with different devices.
		CO4 To relate the concept of memory map and memory interface.
		CO5 To discover the characteristics of real time system.
		CO6 To validate the process using know input-output parameters.
		CO7 Demonstrate knowledge of programs environment and executing variety of programs.

Artificial Intelligence & Machine Learning/ Internet Of Things			
COURSE OUTCOMES (COS): B.TECH. III,IV SEMESTERS			
Session 2021-22			
Code	**Course Name**	**Course Outcomes**	
1. B.Tech. III Semester			
KAS302	Maths III	CO1	The students will be able to learn the idea of partial differentiation and types of partial differential equations
		CO2	The students will be able to learn the idea of classification of second partial differential equations, wave, heat equation and transmission lines
		CO3	The students will be able to learn the basic ideas of statistics including measures of central tendency, correlation, regression and their properties.
		CO4	The students will be able to learn the idea s of probability and random variables and various discrete and continuous probability distributions and their properties.
		CO5	The students will be able to learn the statistical methods of studying data samples, hypothesis testing and statistical quality control, control charts and their properties.
KVE-301	Universal Human Values	CO1	Students who complete this course should be able to realize the importance & need of human values and value education to human being.
		CO2	Students should be able to realize the importance of self exploration in harmony of family.
		CO3	They should be able to understand and appreciate role of harmonious family in peaceful society.
		CO4	Students who complete this course should be able to investigate his/her self & make it suitable to society and existence.
		CO5	CO5.Students should be able to apply the ethical and human values in family, society, nature and professional life.
		CO1	Describe how arrays, linked lists, stacks, queues, trees, and graphs are represented in memory, used by the algorithms and their common applications.

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KCS-301	Data Structure	CO2	Discuss the computational efficiency of the sorting and searching algorithms.
		CO3	Implementation of Trees and Graphs and perform various operations on these data structure.
		CO4	Understanding the concept of recursion, application of recursion and its implementation and removal of recursion.
		CO5	Identify the alternative implementations of data structures with respect to its performance to solve a real world problem.
KCS-302	Computer Organization & Architecture	CO1	Study of the basic structure of Buses, Processor organization and operation of a digital computer system.
		CO2	Analysis of the design of arithmetic & logic unit and understanding of the fixed point and floating-point arithmetic operations.
		CO3	Implementation of control unit techniques and the concept of Pipelining
		CO4	Understanding the hierarchical memory system, cache memories and virtual memory
		CO5	Understanding the different ways of communicating with I/O devices and standard I/O interfaces
KCS-303	Discrete Structures & Theory of Logic	CO1	Students will be able to Write an argument using logical notation and determine if the argument is or is not valid.
		CO2	Students will able to Understand the basic principles of sets and operations in sets.
		CO3	Students will able to Demonstrate an understanding of relations and functions and be able to determine their properties.
		CO4	Students will able to Demonstrate different traversal methods for trees and graphs
		CO5	Students will able to Model problems in Computer Science using graphs and trees.
KCS-351	Data Structure Using C lab	CO1	To learn elementary data structures such as stacks, queues, linked lists, trees and graphs. Students must be able to perform operations like searching, insertion and deletion, traversing mechanism etc. on various data structures.
		CO2	Students must be able to understand the logic behind the experiment & demonstrate the outcomes effectively.
		CO3	Students must be able to present the experiment & its results effectively in documentation.
KCS-352	Computer	CO1	Students must be able to verify combinational circuits in assigned labs.
		CO2	Students must be able to Design the concept of Multiplexers, Decoders and Flip Flops.

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	Organization Lab	CO3	Students must be able to explain the outcomes of experiments using Logistic Simulator and effectively document them in lab files.
KCS-353	Discrete Structures & Logic Lab	CO1	Students must be able to analyze the various problems on their own.
		CO2	Students must be able to implement logics for problem solving
		CO3	Students must be able to represent the outputs of problems and its documentation effectively.
KCS-354	Mini Project or Internship Assessment	CO1	Students must be able to demonstrate their learning effectively through presentation.
		CO2	Students are expected to apply & demonstrate their learning through a meaningful project
		CO3	Students must learn to demonstrate their learning & work done through effective documentation in the form of project report
		2. B.Tech. IV Semester	
KOE048	Electronics Engineering	CO1.	Understand the concept of PN junction and special purpose diodes
		CO2.	Study the application of conventional diode and semiconductor diode.
		CO3.	Analyze the I-V characteristics of BJT and FET.
		CO4.	Analyze the of Op-Amp, amplifiers, integrator, and differentiator.
		CO5.	Understand the concept of digital storage oscilloscope and compare of DSO with analog oscilloscope.
KAS301	Technical Communication	CO1.	Students will be enabled to understand the nature and objective of Technical Communication relevant for the work place as Engineers.
		CO2.	Students will utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions
		CO3.	Students would imbibe inputs by presentation skills to enhance confidence in face of diverse audience.
		CO4.	Technical communication skills will create a vast know-how of the application of the learning to promote their technical competence
		CO5.	It would enable them to evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics
KCS401	Operating Systems	CO1.	Describe the fundamentals and structure of operating systems.
		CO2.	Analyze Process Synchronization and the solution of various critical section problem using software and hardware approaches.
		CO3.	Explain the mechanism to handle threads, process scheduling and deadlock.

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		CO4.	Discuss the concept of memory management along with page replacement and thrashing.
		CO5.	Classify various file system concepts and disk Scheduling.
KCS402	Theory of Automata and Formal Languages	CO1.	Students will be able to describe basic concepts of alphabets, strings, languages and should be able to understand automata, grammars and their relationships.
		CO2.	Students should be able to design Finite Automata (FA) and to understand the equivalence of DFA and NFA and evaluate whether a given Language is regular and Able to compute the equivalent DFA with the minimum number of states.
		CO3.	Students should be able to apply the concept of CFG and measure normal forms and ambiguity in grammar.
		CO4.	Students should be able to create PDA by given CFL and convert CFG to PDA and vice versa.
		CO5.	Graduate will be able to design turing machine for given language and to compare decidable and undecidable problems.
KCS403	Microprocessor	CO1.	Apply a basic concept of digital fundamental to microprocessor based computer system.
		CO2.	Analyze a detailed software and hardware structure of the microprocessor
		CO3.	Illustrate how the different peripherals (8085/8086) are interfaced with microprocessor
		CO4.	Analyze the characteristics of Microprocessor
		CO5.	Evaluate the data transfer information through serial and parallel ports
KNC401	Computer System Security	CO1.	To discover software bugs that pose cyber security threats and to explain how to fix the bugs to mitigate such threats
		CO2.	To discover cyber attack scenarios to web browsers and web servers and to explain how to mitigate such threats
		CO3.	To discover and explain mobile software bugs posing cyber security threats, explain and recreate exploits, and to explain mitigation techniques.
		CO4.	To articulate the urgent need for cyber security in critical computer systems, networks, and world wide web, and to explain various threat scenarios
		CO5.	To articulate the well known cyber attack incidents, explain the attack scenarios, and explain mitigation techniques.
KCS451	Operating Systems Lab	CO1.	Students must be able to perform the experiments using C/Unix language in assigned labs.
		CO2.	Students must be able to understand the logic behind different programs & demonstrate the outcomes effectively using C/Unix during viva.

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		CO3.	Students must be able to explain the outcomes of experiments using C/Unix and effectively document them in lab files.
KCS452	Microprocessor Lab	CO1.	Students must be able to perform the experiments by his own
		CO2.	Students must be able to understand the logic behind the experiment & demonstrate the outcomes effectively.
		CO3.	Students must be able to present the experiment & its results effectively in documentation.
KCS453	Python Language Programming Lab	CO1.	Students must be able to perform the experiments by his own
		CO2.	Students must be able to understand the logic behind the experiment & demonstrate the outcomes effectively.
		CO3.	Students must be able to present the experiment & its results effectively in documentation.

DEPARTMENT: CIVILENGINEERING		
Session:2021-2022		
Code	**Course Name**	**Course Outcome**
3RD SEMESTER		
KCE351	Building Planning & Drawing Lab	CO1.Get an Introduction to the tools and commands of drafting software. CO2. Work in layers, blocks, x-ref, drawing layout and print setup. CO3. Work on 3D drafting and rendering. CO4. Do the Planning and drafting of elevation and cross section of door and window, Dog legged and open well staircase, Residential building of 1 room set (plan and section) and 3 room residential building with staircase. CO5. Prepare the details and general arrangement drawing of 4 room duplex house including planning and drafting.
KCE352	Surveying and Geomatics Lab	CO1. Able to measure difference in elevation, length, calculate the area of a land and prepare the map. CO2. Gain basic understanding of the principle of chain survey, 8 compass survey and plane table survey. CO3. Able to prepare field book for planning and construction of any engineering project. CO4. Able to take and analyze field data and prepare detailed topography map.
KCE302	Surveying and Geomatics	CO1. Describe the function of surveying and work with survey instruments, take observations, and prepare plan, profile, and cross-section and performcalculations. CO2. Calculate, design and layout horizontal and vertical curves. CO3. Operate a total station and GPS to measure distance, angles, and to calculate differences in elevation. Reduce data for application in ageographic information system CO4. Relate and apply principles of photo grammetry forsurveying. CO5. Apply principles of Remote Sensing and Digital Image Processing for Civil Engineering problems.

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KCE301	Engg. Mechanics	CO1. Use scalar and vector analytical techniques for analyzing forces in statically determinate structures CO2. Apply fundamental concepts of kinematics and kinetics of particles to the analysis of simple,practical problems. CO3. Apply basic knowledge of mathematics and physics to solve real-world problems. CO4. Understand basic dynamics concepts – force, momentum, work and energy; CO5. Understand and be able to apply Newton's laws of motion.
KCE303	Fluid Mechanics	CO1. Understand the broad principles of fluid statics, kinematics and dynamics CO2. Understand definitions of the basic terms used in fluid mechanics CO3. Understand classifications of fluid flow CO4. Apply the continuity, momentum and energy principles CO5. Apply dimensional analysis.
KCE351	Fluid Mechanics Lab	CO1. Measure the properties of fluids CO2. Compare the actual discharge with theoretical discharge through pipes and notch and weirs. CO3. Validate the Bernoulli's theorem and Darcy's law. CO4. Measure the loss of fluid flow energy in pipe chain. CO5. Measure the efficiency of turbines on different loads. CO6. Measure the performance of the pump on different loads.
KAS301	Technical Communication	CO1. Students will be enabled to understand the nature and objective of Technical CO2. Communication relevant for the work place as Engineers. CO3. Students will utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions. CO4. Students would imbibe inputs by presentation skills to enhance confidence in face of diverse audience. CO5. Technical communication skills will create a vast know-how of the application of the learning to promote their technical competence. CO6. It would enable them to evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics.
		4th SEMESTER
KCE404	Hydraulic and hydraulic machine	CO1. Apply their knowledge of fluid mechanics in addressing problems in open channels. CO2. To know the different types of flows and channels. CO3. Solve problems in uniform, gradually and rapidly varied flows in steady state conditions. CO4. To understand the performance of turbines and pumps. CO5. Have knowledge in hydraulic machineries like pumps and turbines

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KCE453	Hydraulics & Hydraulic Machine Lab	CO1. To identify the behavior of analytical models introduced in lecture to the actual behavior of real fluid flows. CO2. To explain the standard measurement techniques of fluid mechanics and their applications. CO3. To illustrate the students with the components and working principles ofPumps. CO4. To illustrate the students with the components and working principles ofof Turbines, Pumps, and other miscellaneous hydraulics machines. CO5. To analyze the laboratory measurements and to document the results in an appropriate format.
KCE 401	Material testing & construction practices	CO1. Identify various building materials and to understand their basic properties. CO2.Understand the use of non- conventional civil engineering materials. CO3.Study suitable type of flooring and roofing in the construction process. CO4.Characterize the concept of plastering, pointing and various other building services. CO5.Exemplify the various fire protection, sound and thermal insulation techniques, maintenance and repair of buildings.
KCE451	Material Testing Lab	CO1.Develop knowledge of material science and behaviour of various building materials used in construction. CO2.Identify the construction materials required for the assigned work. CO3.Provide procedural knowledge of the simple testing methods of cement, lime and concrete etc. CO4.Identify, formulate and solve engineering problems of structural elements subjected to flexure. CO5.Evaluate the impact of engineering solutions on the society and also will be aware of contemporary issues regarding failure of structures due to unsuitable materials.
KCE452	Solid Mechanics Lab	CO1. Analyze and correlate stress, strain and elastic deformation of an engineering material. CO2. Predict the engineering property and behavior of material under different loading and support conditions under static loading conditions. CO3. Analyze and predict the engineering property and behavior of material under impact loading conditions CO4. Analyze and correlate the elastic constants and deformation under flexural loading and torsion.
KAS403	Maths III	CO1. The students will learn the idea of Laplace transform of functions and their application CO2. The students will learn the idea of Fourier transform of functions and their applications CO3. The students will learn the basic ideas of logic and Group and uses. CO4. The students will learn the idea s of sets, relation, function and counting techniques. CO5. The students will learn the idea of lattices, Boolean algebra, Tables and Karnaugh maps.

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KCE402	Introduction to Solid Mechanics	CO1. Describe the concepts andprinciples of stresses and strains CO2. Analyze solid mechanics problems using classical methods and energy methods CO3. Analyze structural members subjected to combined stresses CO4. Calculate the deflections at any point on a beam subjected to a combination of loads CO5. Understand the behaviour of columns, springs and cylinders against loads.
KNC402	Python Programming	CO1. Understand principles of Python. CO2. Understand the pros and cons on scripting language vs. classica programming languages (at a high level). CO3. Understand object oriented programming. CO4. Understand Problem solving and programming capability. CO5. Able to create small CLI base Game/ Project.
		5th SEMESTER
KCE501	Geotechnical Engineering	CO1. To provide a coherent development to the students for the courses in sector of Geotechnical Engineering & Soil Improvement Techniques etc. CO2. To present the foundations of many basic Engineering tools and concepts related to Geotechnical Engineering. CO3. To give an experience in the implementation of Engineering concepts which are applied in field of Geotechnical Engineering CO4. To involve the application of scientific and technical principles of planning, analysis, design of foundation along with soil improvement techniques. CO5. The students will gain an experience in the implementation o Geotechnical Engineering onengineering concepts which are applied in fiel Geotechnical Engineering.
KCE551	Geotechnical Lab	CO1. Determine index properties of soils CO2. Classify soils CO3. Determine engineering properties of soils CO4. Apply the concept of MDD and OMC to controlcompaction in the field. CO5. Analyze various soil parameters and prepare soilreport. CO6. Apply standard penetration test results fordetermination of soil characteristic.
KCE552	CAD LAB 1	Understand computer aided drafting and different coordinate system Drawing of Regular shapes using Editor Mode and Exercise on Draw tools and Modify tools Drawing of building components like walls, lintels, Doors, and Windows. Using CAD software Drawing a plan of Building and dimensioning. Developing a 3-D plan from a given 2-D plan Developing sections and elevations for given a) Single storied buildings b) multi storied buildings

KCE502	Structural Analysis	CO1. Explain type of structures and method for their analysis. CO2. Analyze different types of trusses for member forces. CO3. Compute slope and deflection in determinate structures using different methods. CO4. Apply the concept of influence lines and moving loads to compute bending moment and shear force at different sections. CO5. Analyze determinate arches for different loading conditions.
KCE554	Concrete Lab	Outline the importance of testing of cement and its properties Assess the different properties of aggregate Summarize the concept of workability and testing of concrete Describe the preparation of green concrete Describe the properties of hardened concrete
KCE503	Quantity Estimation and Management	CO1. Understand the importance of units of measurement and preliminary estimate for administrative approval of projects. CO2. Understand the contracts and tender documents in construction projects. CO3. Analyze and assess the quantity of materials required for civil engineering works as per specifications. CO4. Evaluate and estimate the cost of expenditure and prepare a detailed rate analysis report. CO5. Analyze and choose cost effective approach for civil engineering projects.
KCE052	Concrete Technology	CO1. Understand the properties of constituent material of concrete. CO2. Apply admixtures to enhance the properties of concrete. CO3. Evaluate the strength and durability parameters of concrete. CO4 Design the concrete mix for various strengths using difference methods. CO5 Use advanced concrete types in construction industry.
		CE 6TH SEM
KCE601	Design of Concrete Structure	CO1. Analyse and Design RCC beams for flexure by IS methods. CO2. Analyse and Design RCC beams for shear by IS methods. CO3. Analyse and Design RCC slabs and staircase by IS methods. CO4. Design the RCC compression members by IS methods. CO5. Design various types of footings and cantilever retaining wall.
KCE602	Transportation Engineering	CO1. Understand the history of road development, their alignment & Survey. CO2. Design the various geometric parameters of road. CO3. Study the traffic characteristics & design of road intersections & signals. CO4. Examine the properties of highway materials & their implementation in design of pavements. CO5. Learn methods to construct various types of roads.
KCE603	Environmental Engineering	CO1. Assess water demand and optimal size of water mains. CO2. Layout the distribution system & assess the capacity of reservoir. CO3. Investigate physical, chemical & biological parameter of water. CO4. Design treatment units for water and waste water. CO5. Apply emerging technologies for treatment of waste water.

KCE061	Advance Structural Analysis	CO1. Analyze indeterminate structure to calculate unknown forces, slope and deflections by different methods. CO2. Apply principle of influence lines to analyze indeterminate beams and arches. CO3. Analyze and design cable structure with their influence line diagram. CO4. Apply basics of force and stiffness methods of matrix analysis for beams, frames and trusses. CO5. Apply the basic of plastic analysis to analyze the structure by using different mechanism.
KCE063	Repair and Rehabilitation of Structures	CO1. Understand the fundamentals of maintenance and repair strategies. CO2. Identify for serviceability and durability aspects of concrete. CO3. Know the materials and techniques used for repair of structures. CO4. Decide the appropriate repair and retrofitting techniques. CO5. Use appropriate health monitoring technique and demolition methods.
KCE064	Foundation Design	CO1. Understand various methods of Soil Exploration and its importance. CO2. Analyze bearing capacity and settlement of soil for shallow foundation. CO3. Design the various types of shallow foundation and understand the basics of deep foundation. CO4. Understand the characteristics of well foundations and retaining wall. CO5. Understand the concept of soil reinforcement.
KCE651	Transportation Engineering Lab	CO1. To Determine the Crushing Value, Impact Value, Flakiness Index and Elongation Index, Los Angeles Abrasion Value and Stripping Value of Coarse Aggregates. CO2. To determine the penetration Value, Softening Point, Ductility Value of Bitumen. CO3. To determine the Softening Point of Bituminous material. CO4. To determine the Ductility Value of Bituminous material. CO5.To determine the Flash and Fire Point of Bituminous material. CO6. To determine the Stripping Value of Bituminous material.
KCE652	Environmental Engineering LAB	CO1. Build knowledge about the crystal structure and classification of materials. CO2.Understand methods of determining mechanical properties and their suitability for applications. CO3. Classify cast irons and study their applications. CO4. Interpret the phase diagrams of materials. CO5. Select suitable heat-treatment process to achieve desired properties of metals and alloys. CO6.Appraise the applications of advanced materials technology in their daily life.
	7th SEMESTER	
KCE 074	Solid Waste Management	CO1. Understand the concept of solid waste management. CO2. Explain handling and processing of solid waste. CO3. Apply the concept of landfilling for disposal of solid waste. CO4. Design composting and other solid waste conversion units. CO5. Understand the various hazardous waste, risk assessment and legislation
KCE075	Design of Steel Structures	CO1. Understand properties of steel and types of loads acting on steel structures. CO2. Design welded and bolted type of connections for elementary steel structures CO3. Design tension members for elementary steel structures. CO4. Design compression members such as simple columns, braced and lattice columns and column bases. CO5. Design flexural members such as beams, purlins and girders.

KCE 751	Concrete Lab	CO1. Study of IS codes for (i) Aggregates (ii) Cements (iii) Admixtures (iv) Fl ash CO2. Concrete Mix design computation by ACI 211.1-91 method, IS code metho as per 10262-2019 & 456-2000, DOE method for given sample. CO3. Preparation and testing of samples as per any one of the above mentione computations (Minimum grade of concrete is M30) CO4. Tests on Concrete- (a) Workability tests - Slump cone test, compaction facto test, Veebee consistometer test, flow table test. (b) Strength tests- compressiv strength, flexural strength, split tensile strength. CO5. Effects of Admixture - Accelerator, Retarder, Super Plasticizer. CO6. Non destructive Testing - Rebound Hammer test, Ultrasonic Pulse Velocit test.
KHU- 702	Project Management & Entrepreneurship	CO1. To create creative & innovative ideas. CO2. Various business opportunities for the successful entrepreneur. CO3. Understand various project proposals and furcating about market. CO4. How to finance a new project? CO5. Benefits of social entrepreneurship for the society.
KOE-074	Renewable Energy Resources	CO1. Elaborate different types of energy sources CO2. Explain various solar PV technologies and its characteristics and solv numerical on it CO3. Describe various solar thermal technologies and its uses in variou applications CO4. Discuss wind energy technologies and explain its operations CO5. Explain grid integration of wind energy systems and its associated issues

CE 8TH SEM		
KOE-083	Entrepreneurship Development	CO1. Identify qualities of entrepreneurs. CO2. Write project proposal. CO3. Use various entrepreneurship models. CO4.Understand various schemes supporting entrepreneurship. CO5. Think creative and innovative.
KHU-801	Rural Development: Administration and Planning	CO1. Understand the basic concept of Rural Development. CO2. Know the various experiments carried out prior to independence for Rural Development. CO3. Understand the structure of Rural administration through Panchayat Raj. CO4. Infer the need for Human Resource for Rural Development. CO5. Understand the need for Rural Industrialization and Entrepreneurship.
KOE-094	Digital & Social Media Marketing	CO1. Understand what social media are, the various channels through which it operates, and its role in marketing strategy. CO2. Use principles of consumer and social psychology to develop social media content and campaigns that engage consumers. CO3. Draw on knowledge about word-of-mouth marketing to develop effective approaches for propagating ideas, messages, products, and behaviors across social networks. CO4. Measure the impact of a social media campaign in terms of a specific marketing objective. CO5. Use of online platforms for growth of any business.

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CODE	COURSE NAME	COURSE OUTCOMES
	B.TECH 3RD SEMESTER	
KEE301	Electromagnetic Field Theory	CO1 Apply different coordinate systems and their application in electromagnetic field theory, establish a relation between any two systems and also understand the vector calculus. 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 CO3: Understand the concept of static magnetic field, magnetic scalar and vector potential CO4 Understand the forces due to magnetic field, magnetization, magnetic boundary conditions and inductors. CO5: Understand displacement current, time varying fields, propagation and reflection of EM waves and transmission lines.
KEE302	Electrical Measurements & Instrumentation	CO1: Evaluate errors in measurement as well as identify and use different types of instruments for the measurement of voltage, current, power and energy CO2: Display the knowledge of measurement of electrical quantities resistance, inductance and capacitance with the help of bridges. CO3: Demonstrate the working of instrument transformers as well as calculate the errors in current and potential transformers. CO4 Manifest the working of electronic instruments like voltmeter, multi-meter, frequency meter and CRO. 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.
KEE303	BASIC SIGNALS AND SYSTEMS	CO1: Represent the various types of signals & systems and can perform mathematical operations on them CO2: Analyze the response of LTI system to Fourier series and Fourier transform and to evaluate their applications to network analysis. CO3: Analyze the properties of continuous time signals and system using Laplace transform and determine the response of linear system to known inputs. CO4 Implement the concepts of Z transform to solve complex engineering problems using difference equations. CO5: Develop and analyze the concept of state-space models for SISO & MIMO system.
KNC301	Computer System Security	CO1: To discover software bugs that pose cyber security threats and to explain how to fix the bugs to mitigate such threats. CO2: To discover cyber attack scenarios to web browsers and web servers and to explain how to mitigate such threats. CO3: To discover and explain mobile software bugs posing cyber security threats, explain and recreate exploits, and to explain mitigation techniques. CO4: To articulate the urgent need for cyber security in critical computer systems, networks, and world wide web, and to explain various threat scenarios.

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		CO5: To articulate the well known cyber attack incidents, explain the attack scenarios, and explain mitigation techniques.
KVE301	Universal Human Values and Professional Ethics	CO1. Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society CO2. Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body. CO3. Understand the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society CO4. Understand the harmony in nature and existence, and work out their mutually fulfilling participation in the nature. CO5. Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.
KEE351	ANALOG ELECTRONICS LAB	CO1: Understand the characteristics and applications of the Semiconductor devices. CO2: Draw the characteristics of BJT, FET and MOSFET. CO3: Understand the parameters of Operational Amplifier and instrumentation Amplifier with their applications. CO4 Implement the concepts of Z transform to solve complex engineering problems using difference equations. critical computer systems, networks, and world wide web, and to explain various threat scenarios CO5: To articulate the well known cyber attack incidents, explain the attack scenarios, and explain mitigation techniques.
KEE352	ELECTRICAL MEASUREMETS AND INSTRUMENTATI ON LAB	CO1: Understand the importance of calibration of measuring instruments. CO2: Demonstrate the construction and working of different measuring instruments. CO3: Demonstrate the construction and working of different AC and DC bridges, along with their applications. CO4: Ability to measure electrical engineering parameters like voltage, current, power & phase difference in industry as well as in power generation, transmission and distribution sectors.
KEE353	ELECTRICAL WORKSHOP	CO1: Perform various types of Electrical connections. CO2: Develop small circuits on PCB CO3: Differentiate between various electrical wires, cables and accessories. CO4: Demonstrate the layout of electrical substation & various safety measures.

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KEE354	Mini Project or Internship Assessment	CO1: Students must be able to demonstrate their learning effectively through presentation. CO2: Students are expected to apply & demonstrate their learning through a meaningful project. CO3: Students must learn to demonstrate their learning & work done through effective documentation in the form of project report.
	B.TECH 4TH SEMESTER	
KAS302	MATHEMATICS-IV	CO1: The idea of partial differentiation and types of partial differential equations CO2: The idea of classification of second partial differential equations, wave , heat equation and transmission lines CO3: The basic ideas of statistics including measures of central tendency, correlation, regression and their properties. CO4: The idea s of probability and random variables and various discrete and continuous probability distributions and their properties. CO5: The statistical methods of studying data samples, hypothesis testing and statistical quality control, control charts and their properties.
KAS301	Technical Communication	CO1: Students will be enabled to understand the nature and objective of Technical Communication relevant for the work place as Engineers. CO2: Students will utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions. CO3: Students would imbibe inputs by presentation skills to enhance confidence in face of diverse audience. CO4: Technical communication skills will create a vast know-how of the application of the learning to promote their technical competence. CO5: It would enable them to evaluate their efficacy as fluent & efficient communicators by learning the voice- dynamics.
KEE401	Digital Electronics	CO1: To familiarize students with the understanding of number representation and conversion between different representation in digital electronic circuits. CO2: To familiarize students with the process to analyze logic and implement logical operations using combinational logic circuits. CO3: To understand concepts of sequential circuits and to analyze sequential systems in terms of state machines. CO4: To familiarize students with the Design procedure of Synchronous & Asynchronous Sequential Circuits. CO5: To understand characteristics of memory and their classification. CO6: To understand concept of Programmable Devices, PLA, PAL, CPLD and FPGA.

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KEE402	Electrical Machines-I	CO1: Analyze the various principles & concepts involved in Electromechanical Energy conversion. 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. CO3: Evaluate the performance and characteristics of DC Machine as motor and as well as generator. CO4: Evaluate the performance of transformers, individually and in parallel operation. CO5: Demonstrate and perform various connections of three phase transformers.
KEE403	NETWORK ANALYSIS AND SYNTHESIS	CO1: Apply the knowledge of basic circuital law, nodal and mesh methods of circuit analysis and simplify the network using Graph Theory approach. CO2: Analyze the AC and DC circuits using Kirchhoff's law and Network simplification theorems. CO3: Analyze steady-state responses and transient response of DC and AC circuits using classical and Laplace transform methods. 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. CO5: Synthesize one port network and analyze different filters.
KNC402	PYTHON PROGRAMMING	CO1: To read and write simple Python programs. CO2: To develop Python programs with conditionals and loops. CO3: To define Python functions and to use Python data structures — lists, tuples, dictionaries CO4: To do input/output with files in Python CO5: To do searching, sorting and merging in Python
KEE451	CIRCUIT SIMULATION LAB	CO1: Apply the knowledge of basic circuital law, nodal and mesh analysis for given circuit. CO2: Analysis of the AC and DC circuits using simulation techniques. CO3: Analysis of transient response of AC circuits. CO4: Evaluation and analysis of two-port network parameters. CO5: Estimation of parameters of different filters.
KEE452	ELECTRICAL MACHINES-I LAB	CO1: Analyze and conduct basic tests on DC Machines and single-phase Transformer. CO2: Obtain the performance indices using standard analytical as well as graphical methods. CO3: Determine the magnetization, Load and speed-torque characteristics of DC Machines. CO4: Demonstrate procedures and analysis techniques to perform electromagnetic and electromechanical tests on electrical machines.

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KEE453	Digital Electronics Lab	CO1: Understanding of Digital Binary System and implementation of Gates. CO2: Design the Sequential circuits with the help of combinational circuits and feedback element. CO3: Design data selector circuits with the help of universal Gates. CO4: Design the counters with the help of sequential circuit and basic Gates. CO5: Implement the projects using the digital ICs and electronics components.
	BTECH 5th SEMESTER	
KEE501	Power System - I	CO1: Describe the working principle and basic components of conventional power plants as well as the other aspects of power generation. CO2: 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. CO3: 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. CO4: 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 on capacitance of transmission lines. CO5: Elucidate different types of cables and assess the Resistance and capacitance parameters of cables, grading of cables and compare overhead lines and cables.
KEE502	Control System	CO1: 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. CO2: Measure and evaluate the performance of basic control systems in time domain. Design specification for different control action. CO3: Analyze the stability of linear time-invariant systems in time domain using RouthHurwitz criterion and root locus technique. CO4: Determine the stability of linear time-invariant systems in frequency domain using Nyquist criterion and Bode plot. CO5: Design different type of compensators to achieve the desired performance of control System by root locus and Bode plot method. Develop and analyze the intermediate states of the system using state space analysis.

KEE503	Electrical Machines-II	CO1: Demonstrate the constructional details and principle of operation of three phase Induction and Synchronous Machines. CO2: Analyze the performance of the three phase Induction and Synchronous Machines using the phasor diagrams and equivalent circuits. CO3: Select appropriate three phase AC machine for any application and appraise its significance. CO4: Start and observe the various characteristics of three phase Induction & Synchronous Machines CO5: Explain the principle of operation and performance of Single-Phase Induction Motor & Universal Motor.
KEE052	SENSORS AND TRANSDUCERS	CO1: Understand the working of commonly used sensors in industry for measurement of displacement, force and pressure. CO2: Recognize the working of commonly used sensors in industry for measurement of temperature, position, accelerometer, vibration sensor, flow and level. CO3: Identify the application of machine vision. CO4: Conceptualize signal conditioning and data acquisition methods. CO5: Comprehend smart sensors and their applications in automation systems.
KEE058	ANALOG & DIGITAL COMMUNICATION	CO1: Understand the Amplitude Modulation in communication system. CO2: Comprehend the Frequency & Phase modulation. CO3: Realize the Pulse Modulation Techniques. CO4: Get the Digital Modulation Techniques and their use in communication system. CO5: Apply the concept of Information Theory in Communication Engineering.
KNC501	CONSTITUTION OF INDIA, LAW AND ENGINEERING	CO1: Identify and explore the basic features and modalities about Indian constitution. CO2: Differentiate and relate the functioning of Indian parliamentary system at the center and state level. CO3: Differentiate different aspects of Indian Legal System and its related bodies. CO4: Discover and apply different laws and regulations related to engineering practices. CO5: Correlate role of engineers with different organizations and governance models.
KEE551	POWER SYSTEM LABORATORY - I	CO1: Use programming tools /Software: Scilab, MATLAB or any C, C++ - Compiler and formulate a program/simulation model for calculation of various parameters related to transmission line.
KEE552	CONTROL SYSTEM LABORATORY	CO1: Determine the characteristics of control system components like ac servo motor, synchro, potentiometer, servo voltage stabilizer and use them in error detector mode. CO2: Compare the performance of control systems by applying different controllers / compensators. CO3: Analyze the behavior of dc motor in open loop and closed loop conditions at various loads & determine the response of 1st&

		2nd order systems for various values of constant K. CO4: Apply different stability methods of time & frequency domain in control systems using software & examine their stability. CO5: Convert the transfer function into state space & vice versa & obtain the time domain response of a second order system for step input and their performance parameters using software.
KEE553	ELECTRICAL MACHINE-II LABORATORY	CO1: Perform various tests and demonstrate the various characteristics of three phase induction motor. CO2: Demonstrate the working of three phase synchronous machine under different operating conditions. CO3: Evaluate the performance of single-phase induction motor under different operating conditions. CO4: Develop simulation models for Electrical Machines.
KEE554	Mini Project or Internship Assessment	CO1: Students must be able to demonstrate their learning effectively through presentation. CO2: Students are expected to apply & demonstrate their learning through a meaningful project. CO3: Students must learn to demonstrate their learning & work done through effective documentation in the form of project report.
		B.TECH 6th SEMESTER
KEE601	Power System-II	CO1: 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 Analyze a network under both balanced and unbalanced fault conditions and design the rating of circuit breakers. CO2: Perform load flow analysis of an electrical power network and interpret the results of the analysis. 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. CO4: Assess the steady state and transient stability of the power system under various conditions. CO5: Describe Operating Principle of a relay and classify them according to applications. Explain working principle of Circuit breaker and phenomenon of arc production and quenching.
KEE602	Microprocessor and Microcontroller	CO1: Demonstrate the basic architecture of 8085 & 8086 microprocessors. CO2: Illustrate the programming model of microprocessors & write program using 8085 microprocessor. CO3: Interface different external peripheral devices with 8085 microprocessor. CO4: Comprehend the architecture of 8051 microcontroller. CO5: Compare advance level microprocessor & microcontroller for different applications.

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KEE603	Power Electronics	CO1: 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. CO2: Comprehend the non-isolated DC-DC converters and apply their use in different Power electronics applications. CO3: Analyze the phase controlled rectifiers and evaluate their performance parameters. CO4: Apprehend the working of single-phase ac voltage controllers, cyclo-converters and their various applications. CO5: Explain the single-phase and three phase bridge inverters differentiate between CSI and VSI and apply PWM for harmonic reduction.
KEE651	Power System-II Lab	CO1: Test various relays for different characteristics and compare with the performance characteristics provided by manufacturers. CO2: Select the power system data for load-flow and fault studies and to develop a program to solve power flow problem using NR and GS methods CO3: Analyze variqus types of short circuit faults CO4: Demonstrate different numerical integration methods and factors influencing transient stability CO5: Determine the effect of load in long transmission line
KEE652	MICROPROCESSOR AND MICROCONTROLLER LAB	CO1: Study of microprocessor system. CO2: Development of flow chart for understanding the data flow. CO3: Learning assembly language to program microprocessor based system. CO4: Interfacing different peripheral devices with the microprocessor. CO5: Building logic for microprocessor based system.
KEE653	POWER ELECTRONICS LABORATORY	CO1: Demonstrate the characteristics and triggering of IGBT, MOSFET, Power transistor and SCR. CO2: Analyze the performance of single phase fully controlled bridge rectifiers under different loading conditions. CO3: Develop simulation models of power electronic circuits.
		B.TECH 7th SEMESTER
KHU702	PROJECT MANAGEMENT & ENTREPRENEURSHIP	CO1: Apply new ideas, methods and ways of thinking. CO2: Engage with a range of stakeholders to deliver creative and sustainable solutions to specific problems. CO3: Communicate effectively both orally and in writing. CO4: Work effectively with colleagues with diverse skills, experiences and be able to critically reflect on own practice.

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KEE079	UTILIZATION OF ELECTRICAL ENERGY & ELECTRIC TRACTION	CO1: Describe the methods of electric heating and their advantages. CO2: Explain the types of Electric welding and the principle of Electro-deposition, laws of electrolysis and its applications. CO3: Explain the laws of illumination and explain the principle of refrigeration and air-conditioning. CO4: Describe the different types of Electric traction, system of track electrification and its related mechanics. CO5: Describe the salient features of traction drive and concept of energy saving using power electronic control of AC and DC drives.
KEE074	POWER QUALITY AND FACTS	CO1: Classify the power quality issues in electrical distribution network. CO2: Describe the sources of voltage sag and protective devices including voltage regulators, active series compensator and UPS. CO3: Describe the different phenomenon causing electrical transients and devices for over voltage protection. CO4: Explain the working and application of different type of FACT devices like SSC, SVC, TSC, SSS, TCSC, UPFC. CO5: Explain the causes of harmonics, its effect on motor, capacitor, cables and mitigation techniques.
KEE751	INDUSTRIAL AUTOMATION & PLC LAB	CO1: Understand the hardware & software used in PLC and implementation of logic gates. CO2: Understand & develop the ladder program for DOL starter and its application as a timer. CO3: Understand the hardware & software platform for DCS. CO4: Understand the Performance of Timers & Counters. CO5: Understand the application of Up & Down Counter.
KEE752	Mini Project or Internship Assessment	CO1: Investigate the emerging problems in electrical engineering and solve them by referring standard journals. CO2: Illustrate the state-of-the-art technologies in the area of electrical engineering. CO3: Analyze various technological advancements in the area of machines, control system through software or hardware implementation. CO4: Understand and evaluate the area for future knowledge and skill development. CO5: Formulate a research paper and write the project report.
KEE753	Project-I	CO1: Identify the particular problem in the field and demonstrate independent learning. CO2: Plan, design and analyze the particular problem as project. CO3: Demonstrate the usefulness of project in society and understanding of professional ethics and participate in a class or project team.
B.TECH 8TH SEMESTER		

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KHU801	RURAL DEVELOPMENT: ADMINISTRATION AND PLANNING	CO1: Students can understand the definitions, concepts and components of Rural Development. CO2: Students will know the importance, structure, significance, resources of Indian rural economy. CO3: Students will have a clear idea about the area development programmes and its impact. CO4: Students will be able to acquire knowledge about rural entrepreneurship. CO5: Students will be able to understand about the using of different methods for human resource planning.
KOE085	QUALITY MANAGEMENT	CO1: Realize the importance of significance of quality. CO2: Manage quality improvement teams. CO3: Identify requirements of quality improvement programs. CO4: Identify improvement areas based on cost of poor quality. CO5: Organize for quality and development of quality culture through small group activities.
KOE094	Digital & Social Media Marketing	CO1: To help students understand digital marketing practices, inclination of digital consumers and role of content marketing. CO2: To provide understanding of the concept of E-commerce and developing marketing strategies in the virtual world. CO3: To impart learning on various digital channels and how to acquire and engage consumers online. CO4: To provide insights on building organizational competency by way of digital marketing practices and cost considerations. CO5: To develop understanding of the latest digital practices for marketing and promotion.
KEE851	PROJECT-II	CO1: Identify the particular problem in the field and demonstrate independent learning. CO2: Plan, design and analyze the particular problem as project. CO3: Demonstrate the usefulness of project in society and understanding of professional ethics and participate in a class or project team.

Department of Mechanical Engineering
Session 2021-22

3RD Semester		
CODE	COURSE NAME	COURSE OBJECTIVE
KME-301	THERMODYNAMICS	CO1 Students will be able to understand the concept of systems, surroundings and boundaries along with zeroth law of thermodynamics and first law of thermodynamics
		CO2 Students will be able to understand the concept of second law of thermodynamics and deep knowledge about entropy.
		CO3 Students will be able to understand the concept of Availability and Irreversibility, exergy analysis and thermodynamic relations.
		CO4 Students will be able to understand the properties of steam and cycle based on power production by using the heat energy of steam.

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		CO5 Students will be able to understand the concept of refrigeration cycles and performance of vapour compression refrigeration cycle.
KME-302	FLUID MECHANICS & FLUID MACHINES	the application of mass and momentum conservation laws for fluid flows.
		CO2. Understand the importance of dimensional analysis.
		CO3. Obtain the velocity and pressure variations in various types of simple flows.
		CO4. Analyze the flow in water pumps and turbines.
		CO5. Mathematically analyze simple flow situations.
		CO6. Evaluate the performance of pumps and turbines.
KME-303	MATERIAL ENGINEERING	CO1.Students will be able to understand basics of material structure, crystallography, imperfections and different mechanical properties with their testing.
		CO2.Students should have ability to explain the failure theory, fracture, fatigue properties and NDT testing for dofferent materials.
		CO3.Students should be ready to aquire the knowledge of solidification, phase & equilibrium diagram for different materials
		CO4.Students will be able to understand the various heat treatment processes for ferrous and nonferrous materials and their alloys.
		CO5.Students should understand the concept of basic properties, structure & applications of farrous and nonferrous metals and theiralloys
KME-351	FLUID MECHANICS LAB	CO1. Measure the properties of fluids
		CO2. Compare the actual discharge with theoretical discharge through pipesand notch and weirs.
		CO3. Validate the Bernoulli's theorem and Darcy's law.
		CO4. Measure the loss of fluid flow energy in pipe chain.
		CO5. Measure the efficiency of turbines on different loads.
		CO6. Measure the performance of the pump on different loads.
KME-352	MATERIAL TESTING LAB	CO1.Students will be able to analyse different types of strength testing on UTM machine.
		CO2.Students should have ability to explain and analyse the Impact test onimpact testing machine like Charpy, Izod or both.
		CO3.Students should be ready to aquire the knowledge to measure the Hardness of given specimen using Rockwell and Vickers/Brinell testing machines.
		CO4.Students will be able to understand the Spring index test on spring testing machine.
		CO5.Students will be able to analyse the Fatigue test and torsion test on fatigue testing & torsion testing machine.
		CO6.Students should have ability to explain the NDT testing for different materials.
KME-353	Computer Aided Machine Drawing-I Lab	CO1. The students will be able to understand the difference between designand drafting, views, quadrant etc.
		CO2. The students will be able to understand the projection of different machine elements.
		CO3. The students will be able to understand the different types of fastener

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		and their projection.
		CO4. The students will learn to draft coupling, riveting etc.
		CO5. The students will be able to understand assembly of differentmachines' elements with assembly drawing.
4TH Semester		
KME-401	APPLIED THERMODYNAMICS	CO1 Student must be able to explain the basic cycles involved in operationof petrol and diesel engines.
		CO2 Student must be able to test a actual running engine on the basis of various parameters.
		CO3 Student must be able to design and analyse a thermal power plant.
		CO4 Student must be able to apply the fundamentals of steam and gasnozzles in real world problems.
		CO5 Student must be able to understand the basics of gas turbine and jet propulsion.
KME-402	ENGINEERING MECHANICS	CO1 Students should be able to evaluate the resultant force of any coplanar force system and friction forces.
		CO2 Students should be able to determine the internal forces in trusses and understand how to draw the variation of shear load and bending momentacting over entire length of different beams
		CO3 Students should be able to obtain centroid and second moment of area.
		CO4 Students should be able to describe the motion of a rigid body in terms of its position, velocity and acceleration and to analyze the forces causingthe motion of a particle.
		CO5 Students should be able to apply work, energy, impulse and momentum relationships for a particle in motion.
		CO6 Students should be able to describe and find the strength of material in bending and torsion.
KME-403	MANUFACTURING PROCESS	CO1.Students should be able to understand importance of the casting method, design considerations and their types, metal forming processes and their analysis & sheet metal operations like cup/deep drawing and bending.
		CO2.Students should be able to understand metal cutting operation.
		CO3.Students should be able to learn grinding and super finishing processes.
		CO4.Students should be able to Identify the use and applications of welding equipment.
		CO5.Students should be able to learn the basics of unconventional machining processes.
KME 451	Applied thermodynamics Lab	CO1. Students will be able to analyse and understand the working of different types of Boiler.
		CO2. Students should have ability to explain and analyse the two stroke and four stroke engine.
		CO3. Students should be ready to aquire the knowledge to measure the heat

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		balance sheet.
		CO4. Students will be able to understand the steam engines.
		CO5. Students will be able to analyse the gas turbine.
KME 452	Manufacturing Processes Lab.	CO1. The students will understand the construction & working principle ofLathe machine and their application
		CO2. The students will be able to analyse the working of milling machines & shaper machine.
		CO3. The students will learn to analyse grinding machine, surface grindingmachine and drilling machine.
		CO4. The students can able to understand the design of different types oftool angles, tool materials, tool wear & tool life.
		CO5. The students will be able to know the design and drawing of Jigs &Fixture to hold the job on different machines.
		CO6. The students will be able to know the different types of welding processes and also the latest welding (joining) process like TIG & MIG.
KME -453	COMPUTER AIDED MACHINE DRAWING-II LAB	CO1. The students will understand the Conventional representation ofmachine components and materials.
		CO2. The students can able to understand Surface Roughness and nomenclature, machining symbols, indication of surface roughness.
		CO3. The students will learn Limits, Tolerance and Fits system of engineering design.
		CO4. The students will be able to understand and draw Part and AssemblyDrawing of various machine parts.
		CO5. The students will understand Specification of Engineering materials,representation, Code designation.
		CO6. The students will be able to understand design and drawing of Production Drawing system.
		CO7. The students will be able to work on varrious Computer Aided Drafting software like AutoCAD, ProE etc.
5TH Semester		
KME -501	HEAT & MASS TRANSFER	CO-1 Understand the fundamentals of heat and mass transfer
		CO-2 Apply the concept of steady and transient heat conduction
		CO-3 Apply the concept of thermal behavior of fins
		CO-4 Apply the concept of forced and free convection.
		CO-5 Apply the concept of radiation for black and non-black bodies.
		CO-6 Conduct thermal analysis of heat exchangers.
KME -502	STRENGTH OF MATERIALS	CO 1 Understand the concept of stress and strain under different conditions of loading
		CO 2 Determine the principal stresses and strains in structural members
		CO 3 Determine the stresses and strains in the members subjected to axial, bending and torsional loads
		CO 4 Apply the concepts of stresses and strain in solving problems related to springs, column and pressure vessels
		CO 5 Calculate the slope, deflection and buckling of loaded members

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		CO 6 Analyze the stresses developed in straight and curved beams of different cross sections
KME -503	INDUSTRIAL ENGINEERING	CO1 Understand the concept of production system, productivity, facility and process planning in various industries
		CO2 Apply the various forecasting and project management techniques
		CO3 Apply the concept of break-even analysis, inventory control and resource utilization using queuing theory
		CO4 Apply principles of work study and ergonomics for design of work systems
		CO5 Formulate mathematical models for optimal solution of industrial problems using linear programming approach
KME -051	COMPUTER INTEGRATED MANUFACTURING	CO 1 Understand the basic concepts of automation, computer numeric control machining
		CO 2 Understand the algorithms of line generation, circle generation, transformation, curve, surface modeling and solid modeling
		CO 3 Understand group technology, computer aided process planning, flexible manufacturing, Industry 4.0, robotics
		CO 4 Understand information system and material handling in CIM environment, rapid prototyping
		CO 5 Apply the algorithms of line & circle generation and geometric transformations
		CO6 Develop CNC program for simple operations
KME -055	ADVANCE WELDING	CO 1 Understand the physics of arc welding process and various operating characteristics of welding power source.
		CO 2 Analyse various welding processes and their applications
		CO 3 Apply the knowledge of welding for repair & maintenance, along with the weldability of different materials.
		CO 4 Apply the concept of quality control and testing of weldments in industrial environment
		CO 5 Evaluate heat flow in welding and physical metallurgy of weldments
KME -551	HEAT TRANSFER LAB	CO1 Apply the concept of conductive heat transfer.
		CO2 Apply empirical correlations for both forced and free convection to determine the value of convection heat transfer coefficient
		CO3 Apply the concept of radiation heat transfer for black and grey body.
		CO4 Analyze the thermal behaviour of parallel or counter flow heat exchangers
		CO5 Conduct thermal analysis of a heat pipe
6TH Semester		
KME -601	REFRIGERATION &	CO1 Understand the basics concepts of Refrigeration & Air-Conditioning and its future prospects
		CO2 Explain the construction and working of various components in Refrigeration & Air-Conditioning systems.

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	AIR CONDITIONING	CO3 Understand the different types of RAC systems with their respective applications.
		CO4 Apply the basic laws to the thermodynamic analysis of different processes involved in Refrigeration and Air-Conditioning.
		CO5 Apply the basic concepts to calculate the COP and other performance parameters for different RAC systems
		CO6 Analyze the effects of performance parameters on COP.
KME -602	MACHINE DESIGN	CO 1 Recall the basic concepts of Solid Mechanics to understand the subject.
		CO 2 Classify various machine elements based on their functions and applications.
		CO 3 Apply the principles of solid mechanics to machine elements subjected to static and fluctuating loads.
		CO 4 Analyze forces, bending moments, twisting moments and failure causes in various machine elements to be designed.
		CO 5 Design the machine elements to meet the required specification.
KME -603	THEORY OF MACHINE	CO1 Understand the principles of kinematics and dynamics of machines.
		CO2 Calculate the velocity and acceleration for 4-bar and slider crank mechanism
		CO3 Develop cam profile for followers executing various types of motions
		CO4 Apply the concept of gear, gear train and flywheel for power transmission
		CO5 Apply dynamic force analysis for slider crank mechanism and balance rotating &
		CO6 Apply the concepts of gyroscope, governors in fluctuation of load and brake & dynamometer in power transmission
KME -061	NON-DESTRUCTIVE TESTING	CO 1 Understand the concept of destructive and Non-destructive testing methods.
		CO 2 Explain the working principle and application of die penetrant test and magnetic particle inspection.
		CO3 Understand the working principle of eddy current inspection.
		CO 4 Apply radiographic techniques for testing.
		CO 5 Apply the principle of Ultrasonic testing and applications in medical and engineering areas.
KOE-060	IDEA TO BUSINESS MODEL	CO 1 This course can motivate students to have an overall idea how to start and sustain a business enterprise.
		CO 2 The students will learn basics of choosing an idea of a business model.
		CO 3 The core areas of choosing a business model are encompassed with Entrepreneurship development
		CO 4 The students will learn about PPC & communication system.
		CO 5 The students will develop basic competencies how to run a business enterprise.
KME	RAC LAB	CO1 Determine the performance of different refrigeration and air-conditioning systems.

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-651		CO2 Apply the concept of psychrometry on different air cooling systems.
		CO3 Interpret the use of different components, control systems and tools used in RAC systems
		CO4 Demonstrate the working of practical applications of RAC systems.
KME -652	MD LAB	CO-1 Apply the principles of solid mechanics to design various machine Elements subjected to static and fluctuating loads.
		CO-2 Write computer programs and validate it for the design of different machine elements
		CO-3 Evaluate designed machine elements to check their safety.
KME -653	TOM LAB	CO1 Demonstrate various mechanisms, their inversions and brake and clutches in automobiles
		CO2 Apply cam-follower mechanism to get desired motion of follower
		CO3 Apply the concepts of gears and gear train to get desired velocity ratio for power transmission.
		CO4 Apply the concept of governors to control the fuel supply in engine
		CO5 Determine the balancing load in static and dynamic balancing problem
7TH Semester		
KME -071	ADDITIVE MANUFACTURING	CO 1 Understanding the basics of additive manufacturing/rapid prototyping and its advantages and disadvantages
		CO 2 Understanding the role of additive manufacturing in the design process and the implications for design.
		CO 3 Understanding the processes used in additive manufacturing for a range of materials and applications
		CO 4 Understand the various software tools, processes and techniques that enable advanced/additive manufacturing and personal fabrication
		CO 5 Apply knowledge of additive manufacturing for various real-life applications
KME -073	Mathematical Modeling of Manufacturing Processes	CO1 Understand the fundamentals of manufacturing processes, mathematical models and their solutions
		CO2 Understand unconventional and conventional machining, their discrete-time linear, non-linear models and solutions
		CO3 Analyze the mechanism of forming and heat transfer in welding
		CO4 Apply the principles of casting, powder metallurgy, coating and additive Manufacturing
		CO5 Understand the fundamental of heat treatment, micro / nano manufacturing and processing of non-metallic materials.
KOE-074	RENEWABLE ENERGY RESOURSES	CO 1 Understand about Solar Cells: Theory of solar cells. Solar cell materials, solar cell array, solar cell power plant & its limitations.
		CO 2 understands about solar thermal energy system and their limitations.
		CO 3 Students will learn about Resources of geothermal energy, Principle of working of MHD Power plant, performance and

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		limitations. Fuel cell technologies.
		CO 4 Understanding and working of Wind energy.
		CO5 Understanding and working of Bio-Mass energy.
KHU-702	PROJECT MANAGEMENT & ENTREPRENEURSHIP	CO 1 Understand about Entrepreneurship: need, and its scope
		CO 2 understands about Innovation, Identifying Business Opportunities, Management skills for Entrepreneurs and managing for Value Creation
		CO 3 Students will learn Project management: meaning, scope & importance, role of project manager
		CO 4 Understanding about Project cost estimation & working capital requirements, sources of funds, capital budgeting
		CO5 Understanding about Social Sector Perspectives and Social Entrepreneurship, Social Entrepreneurship Opportunities and Successful Models
KME -751	Measurement & Metrology Lab	CO-1 Understand the basic principles of instrumentation for measurement of surface finish, strain, temperature, pressure and flow
		CO-2 Understand the principle and operation of Coordinate Measuring Machine (CMM)
		CO-3 Apply Sine Bar, Slip Gauges, Bevel Protractor, Stroboscope, Dial Indicator etc. for measurement of different attributes.
		CO-4 Apply the basic concepts of limits, fits & tolerances for selective assembly.
8TH Semester		
KOE085	QUALITY MANAGEMENT	CO 1 Understand about Evolution of Quality Control, concept change, TQM Modern concept
		CO 2 understands about Organization structure and design, quality function, decentralization, designing and fitting
		CO 3 Students will learn about Control Charts, Theory of control charts, measurement range, construction and analysis of R charts
		CO 4 Understanding about Defects diagnosis and prevention defect study, identification and analysis of defects
		CO5 Understanding about ISO-9000 and its concept of Quality Management, ISO 9000 series, Taguchi method, JIT in some details.
KOE091	AUTOMATION AND ROBOTICS	CO 1 Understand about Definition, Advantages, types, need, laws and principles of Automation. Elements of Automation.
		CO 2 understands about Classification and type of automatic transfer machines; Automation in part handling and feeding
		CO 3 Students will learn about Classification of Robots - Geometric classification and Control classification, Laws of Robotics, Robot Components, Coordinate Systems
		CO 4 Understanding about Robot drive mechanisms: Hydraulic/Electric/Pneumatics, servo & stepper motor drives
		CO5 Understanding about Methods of robot programming, Simulation concept, Off-line programming, advantages of offline programming.

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KHU801	RURAL DEVELOPMENT: ADMINISTRATION AND PLANNING	CO 1 Students can understand the definitions, concepts and components of Rural Development
		CO 2 Students will know the importance, structure, significance, resources of Indian rural economy
		CO 3 Students will have a clear idea about the area development programmes and its impact.
		CO 4 Students will be able to acquire knowledge about rural entrepreneurship.
		CO 5 Students will be able to understand about the using of different methods for human resource planning

MASTER OF COMPUTER OF APPLICATION			
COURSE OUTCOMES (COS): MCA. I,II,III & IV SEMESTERS			
Session 2020-21			
Code	**Course Name**	**Course Outcomes**	
1. MCA. I Semester			
KCA101	FUNDAMENTAL OF COMPUTERS & EMERGING TECHNOLOGIES	CO1	Demonstrate the knowledge of the basic structure, components, features and generations of computers.
		CO2	Describe the concept of computer languages, language translators and construct algorithms to solve problems using programming concepts.
		CO3	Compare and contrast features, functioning & types of operating system andcomputer networks.
		CO4	Demonstrate architecture, functioning & services of the Internet and basics of multimedia.
		CO5	Illustrate the emerging trends and technologies in the field of Information Technology.
KCA102	PROBLEM SOLVING USING C	CO1	Describe the functional components and fundamental concepts of a digital computer system including number systems.
		CO2	Construct flowchart and write algorithms for solving basic problems.
		CO3	Write 'C' programs that incorporate use of variables, operators and expressions along with data types.
		CO4	Write simple programs using the basic elements like control statements, functions, arrays and strings.
		CO5	Write advanced programs using the concepts of pointers, structures, unions and enumerated data types.
KCA103	PRINCIPLES OF MANAGEMENT & COMMUNICATION	CO1	Describe primary features, processes and principles of management.
		CO2	Explain functions of management in terms of planning, decision making and organizing.
		CO3	Illustrate key factors of leadership skill in directing and controlling business resources and processes.
		CO4	Exhibit adequate verbal and non-verbal communication skills
		CO5	Demonstrate effective discussion, presentation and writing skills.
KCA104	DISCRETE MATHEMATICS	CO1	Use mathematical and logical notation to define and formally reason about basic discrete structures such as Sets, Relations and Functions

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		CO2	Apply mathematical arguments using logical connectives and quantifiers to check the validity of an argument through truth tables and propositional and predicate logic
		CO3	Identify and prove properties of Algebraic Structures like Groups, Rings and Fields
		CO4	Formulate and solve recurrences and recursive functions
		CO5	Apply the concept of combinatorics to solve basic problems in discrete mathematics
KCA105	COMPUTER ORGANIZATION & ARCHITECTURE	CO1	Describe functional units of digital system and explain how arithmetic and logical operations are performed by computers
		CO2	Describe the operations of control unit and write sequence of instructions for carrying out simple operation using various addressing modes.
		CO3	Design various types of memory and its organization.
		CO4	Describe the various modes in which IO devices communicate with CPU and memory.
		CO5	List the criteria for classification of parallel computer and describe various architectural schemes.
KCA151	PROBLEM SOLVING USING C LAB	CO1	Write, compile, debug and execute programs in a C programming environment.
		CO2	Write programs that incorporate use of variables, operators and expressions along with data types.
		CO3	Write programs for solving problems involving use of decision control structures and loops.
		CO4	Write programs that involve the use of arrays, structures and user defined functions.
		CO5	Write programs using graphics and file handling operations.
KCA152	COMPUTER ORGANIZATION & ARCHITECTURE LAB	CO1	Design and verify combinational circuits (adder, code converter, decoder, multiplexer) using basic gates.
		CO2	Design and verify various flip-flops.
		CO3	Design I/O system and ALU.
		CO4	Demonstrate combinational circuit using simulator
KCA153	PROFESSIONAL COMMUNICATION LAB	CO1	Develop the ability to work as a team member as an integral activity in the workplace.
		CO2	Increase confidence in their ability to read, comprehend, organize, and retain written information. Improve reading fluency.
		CO3	Write coherent speech outlines that demonstrate their ability to use organizational formats with a specific purpose; Deliver effective speeches that are consistent with and appropriate for the audience and purpose.
		CO4	Develop proper listening skills; articulate and enunciate words and sentences clearly and efficiently.
		CO5	Show confidence and clarity in public speaking projects; be schooledin preparation and research skills for oral presentations.
			2. MCA. II Semester
KCA201	THEORY OF AUTOMATA & FORMAL	CO1.	Define various types of automata for different classes of formal languages and explain their working.
		CO2.	State and prove key properties of formal languages and automata.

	LANGUAGES	CO3.	Construct appropriate formal notations (such as grammars, acceptors, transducers and regular expressions) for given formal languages.
		CO4.	Convert among equivalent notations for formal languages.
		CO5.	Explain the significance of the Universal Turing machine, Church- Turing thesis and concept of Undecidability.
KCA202	OBJECT ORIENTED PROGRAMMING	CO1.	List the significance and key features of object oriented programming and modeling using UML
		CO2.	Construct basic structural, behavioral and architectural models using object oriented software engineering approach.
		CO3.	Integrate object oriented modeling techniques for analysis and design of a system.
		CO4.	Use the basic features of data abstraction and encapsulation in C++ programs.
		CO5.	Use the advanced features such as Inheritance, polymorphism and virtual function in C++ programs.
KCA203	OPERATING SYSTEMS	CO1.	Explain main components, services, types and structure of Operating Systems.
		CO2.	Apply the various algorithms and techniques to handle the various concurrency control issues.
		CO3.	Compare and apply various CPU scheduling algorithms for process execution.
		CO4.	Identify occurrence of deadlock and describe ways to handle it.
		CO5.	Explain and apply various memory, I/O and disk management techniques.
KCA204	DATABASE MANAGEMENT SYSTEMS	CO1.	Describe the features of a database system and its application and compare various types of data models.
		CO2.	Construct an ER Model for a given problem and transform it into a relation database schema.
		CO3.	Formulate solution to a query problem using SQL Commands, relational algebra, tuple calculus and domain calculus.
		CO4.	Explain the need of normalization and normalize a given relation to the desired normal form.
		CO5.	Explain different approaches of transaction processing and concurrency control.

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KCA205	DATA STRUCTURES & ANALYSIS OF ALGORITHMS	CO1.	Explain the concept of data structure, abstract data types, algorithms, analysis of algorithms and basic data organization schemes such as arrays and linked lists.
		CO2.	Describe the applications of stacks and queues and implement various operations on them using arrays and linked lists.
		CO3.	Describe the properties of graphs and trees and implement various operations such as searching and traversal on them.
		CO4.	Compare incremental and divide-and-conquer approaches of designing algorithms for problems such as sorting and searching.
		CO5.	Apply and analyze various design approaches such as Divide-and-Conquer, greedy and dynamic for problem solving .
KCAA01	CYBER SECURITY	CO1.	Identify and analyze nature & inherent difficulties in the security of theInformation System.
		CO2.	Analyze various threats and attacks, corresponding counter measures and various vulnerability assessment and security techniques in an organization.
		CO3.	Applications of cyber based policies and use of IPR and patent law for software-based design. Define E-commerce types and threats to E-commerce.
		CO4.	Explain concepts and theories of networking and apply them to various situations, classifying networks, analyzing performance.
		CO5.	Identify and analyze nature & inherent difficulties in the security of theInformation System.
KCA251	OBJECT ORIENTED PROGRAMMING LAB	CO1.	Use the Concept of Data Abstraction and Encapsulation in C++programs.
		CO2.	Design and Develop C++ program using the concept such as polymorphism, virtual function, exception handling and template.
		CO3.	Apply object oriented techniques to analyze, design and develop acomplete solution for a given problem.
KCA252	DATABASE MANAGEMENT SYSTEMS LAB	CO1.	Use the Concept of Data Abstraction and Encapsulation in C++programs.
		CO2.	Write SQL commands to query a database.
		CO3.	Write PL/SQL programs for implementing stored procedures, storedfunctions, cursors, trigger and packages.

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KCA253	DATA STRUCTURES & ANALYSIS OF ALGORITHMS LAB	CO1.	Write and execute programs to implement various searching andsorting algorithms.
		CO2.	Write and execute programs to implement various operations ontwo-dimensional arrays.
		CO3.	Implement various operations of Stacks and Queues using botharrays and linked lists data structures.
		CO4.	Implement graph algorithm to solve the problem of minimumspanning tree
3. MCA. III Semester			
KCA301	Artificial Intelligence	CO1.	Define the meaning of intelligence and study various intelligent agents.
		CO2.	Understand, analyze and apply AI searching algorithms in different problem domains.
		CO3.	Study and analyze various models for knowledge representation.
		CO4.	Understand the basic concepts of machine learning to analyze and implement widely used learning methods and algorithms.
		CO5.	Understand the concept of pattern classification and clustering techniques
KCA302	Software Engineering	CO1.	Explain various software characteristics and analyze different software Development Models.
		CO2.	Demonstrate the contents of a SRS and apply basic software quality assurance practices to ensure that design, development meet or exceed applicable standards.
		CO3.	Compare and contrast various methods for software design.
		CO4.	Formulate testing strategy for software systems, employ techniques suchas unit testing, Test driven development and functional testing.
		CO5.	Manage software development process independently as well as inteams and make use of various software management tools for development, maintenance and analysis.
KCA303	Computer Networks	CO1.	Describe communication models TCP/IP, ISO-OSI model, network topologies along with communicating devices and connecting media.
		CO2.	Apply knowledge of error detection, correction and learn concepts offlow control along with error control.
		CO3.	Classify various IP addressing techniques, subnetting along with network routing protocols and algorithms.
		CO4.	Understand various transport layer protocols and their design considerations along with congestion control to maintain Quality ofService.

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		CO5.	Understand applications-layer protocols and elementary standards of cryptography and network security.
KCA014	Cloud Computing	CO1.	Understand the concepts of Cloud Computing, key technologies, strengths and limitations of cloud computing.
		CO2.	Develop the ability to understand and use the architecture to computeand storage cloud, service and models.
		CO3.	Understand the application in cloud computing.
		CO4.	Learn the key and enabling technologies that help in the development ofcloud.
		CO5.	Explain the core issues of cloud computing such as resourcemanagement and security.
KCA024	Software Testing & Quality Assurance	CO1.	Test the software by applying testing techniques to deliver a product free frombugs.
		CO2.	Investigate the scenario and select the proper testing technique.
		CO3.	Explore the test automation concepts and tools and estimation of cost, schedulebased on standard metrics.
		CO4.	Understand how to detect, classify, prevent and remove defects.
		CO5.	Choose appropriate quality assurance models and develop quality. Ability toconduct formal inspections, record and evaluate results of inspections.
KCA351	Artificial Intelligence Lab	CO1.	Study and understand AI tools such as Python / MATLAB.
		CO2.	Apply AI tools to analyze and solve common AI problems.
		CO3.	Implement and compare various AI searching algorithms.
		CO4.	Implement various machine learning algorithms.
		CO5.	Implement various classification and clustering techniques.
KCA352	Software Engineering Lab	CO1	Identify ambiguities, inconsistencies and incompleteness from a requirementsspecification and state functional and non-functional requirement.
		CO2	Identify different actors and use cases from a given problem statement and draw use case diagram to associate use cases with different types ofrelationship.
		CO3	Draw a class diagram after identifying classes and association among them.
		CO4	Graphically represent various UML diagrams and associations among them and identify the logical sequence of activities undergoing in a system, andrepresent them pictorially.
		C05	Able to use modern engineering tools for specification, design, implementationand testing.

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Department of MBA			
Session: 2021 - 2022			
Code	**Course Name**	**Course Outcomes**	
SEMESTER I			
KMB 101	Management Concepts & Application	CO1	Developing understanding of managerial practices and their perspectives
		CO2	Applying planning and managerial decision making skills
		CO3	Develop analytical and problem soving skills, based on understanding of management concepts and theories
		CO4	Comprehend and practice Indian Ethos and Value Systems
		CO5	Applying value based management and ethical practices
KMB 102	ManagerialEconomics	CO1	Students will be able to remember the concepts of micro economics and also able to understand the various micro economic principles to make effective economic decisions under conditions of risk and uncertainty.
		CO2	The students would be able to understand the law of demand & supply & their elasticities , evaluate &analyse these concepts and apply them in various changing situations in industry . Students would be able to apply various techniques to forecast demand for better utilization of resources.
		CO3	The students would be able to understand the production concept and how the production output changes with the change in inputs and able to analyse the effect of cost to business and their relation to analyze the volatility in the business world
		CO4	The students would be able to understand & evaluate the different market structure and their different equilibriums for industry as well as for consumers for the survival in the industry by the application of various pricing strategic
		CO5	The students would be able to analyse the macroeconomic concepts & their relation to micro economic concept & how they affect the business & economy.
KMB 103	Financial Accounting for Managers	CO1	Understand and apply accounting concepts, principles and conventions for their routine monetary transaction.
		CO2	Recognize circumstances providing for increased exposure to fraud and define preventative internal control measures.
		CO3	Create and Prepare financial statements in accordance with Generally Accepted Accounting Principles
		CO4	Utilize the technology (such as computers, information databases) in facilitating and enhancing accounting and financial reporting processes
		CO5	Recognize circumstances providing for increased exposure to fraud and define preventative internal control measures Employable skills
		CO6	Understand the basic concepts and importance of working capital management
		CO1	Gaining knowledge of basic concepts/fundamentals of business statistics.
		CO2	To develop practical understanding of various statistical concepts.

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KMB 104	Business Statistics & Analytics	CO3	To compute various measures of central tendeency, measures of dispersion, time series analysis, index number, correlation and regression analysis and their implication on business performance.
		CO4	Evaluating basic concepts of probability and perform probability theoretical distributions.
		CO5	Taking managerial decision and applying the concept of business analytics.
KMB 105	Organisational Behaviour	CO1	Comprehending the nature, functioning and design of organizations as social collectives
		CO2	To evaluate the reciprocal relationship between the organizational characteristics and managerial behaviour
		CO3	Develop practical insights and problem solving capabilities for effectively managing thr Organisational processes
		CO4	Analysing the behaviour of individuals and groups in orgnaizations
		CO5	Developing conceptual understanding of change and its implementation
KMB 106	Marketing Management I	CO1	Remember and comprehend basic marketing concepts
		CO2	Understand marketing insights on application of basic marketing concepts
		CO3	Able to apply and develop marketing strategies and plans
		CO4	Understand and analyzing Business/Consumer markets
		CO5	Develop skills and ability to identify and evaluate market segments and Targeting,
KMB 107	Business Communication	CO1	Apply business communication strategies and principles to prepare effective communication for domestic and international business situations
		CO2	Analyse ethical, legal, cultural and global issues affecting business communication
		CO3	Develop an understanding of appropriate organizational formats and channels used in business communication
		CO4	Gaining an understanding of emerging electronic modes of communication
		CO5	Develop effective verbal and non verbal communication skills
KMB 108	Computer Application in Management	CO1	The course aims to provide knowledge about basic components of a computer and their significance.
		CO2	To provide hands on learning of applications of MS Office and Internet in businesses.
		CO3	To provide an orientation about the increasing role of management information system in managerial decision making to gain Competitive edge in all aspects of Business.
		CO4	To understand various MIS operating in functional areas of an organization.
		CO5	To create awareness in upcoming managers, of different types of information systems in an organization so as to enable the use of computer resources efficiently, for effective decision making.
SEMESTER II			
		CO1	Comprehend the forces that shape business and economic structure and develop strategies to cope with the same.

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KMB 201	Business Environment	CO2	Evaluate the economic & political environment dynamics to cope with the changing regulations affecting business and its profitability.
		CO3	Analyse the competitive forces in environment and accordingly devise business policies and strategies to stay in competitive position.
		CO4	Analyse the desirability of technological advancement in the current setup and how to gain technological advancement with least cost.
		CO5	Understand the international influences on domestic business and measures to be taken for successful global business operations.
KMB 202	Human Resource Management	CO1	Synthesize the role of human resources management as it supports the success of the organization including the effective development of human capital as an agent for organizational change
		CO2	Demonstrate knowledge of laws that impact behaviour in relationships between employers and employees that ultimately impact the goals and strategies of the organization
		CO3	Understand the role of employee benefits and compensation as a critical component of employee performance, productivity and organizational effectiveness
		CO4	Show evidence of the ability to analyze, manage and problem solve to deal with challenges and complexities of the practice of collective bargaining
		CO5	Demonstrate knowledgeof practical application of training and employee development as it impacts organizational strategy and competitive advantage
KMB 203	Business Research Methods	CO1	Knowledge of concept / fundamentals for different types of research.
		CO2	Applying relevant research techniques.
		CO3	Understanding relevant scaling & measurement techniques and should use appropriate sampling techniques
		CO4	Synthesizing different techniques of coding, editing, tabulation and analysis in doing research. .
		CO5	Evaluating statistical analysis which includes various parametric test and non parametric test and ANOVA technique and prepare report.
KMB 204	Financial Management & Corporate Finance	CO1	Understand the different basic concept / fundamentals of Corporate Finance
		CO2	Understand the practical application of time value of money and evaluating long term investment decisions
		CO3	Developing analytical skills to select the best source of capital ,its structure on the basis of cost of capital
		CO4	Understand the use and application of different models for firm's optimum dividend payout.
		CO5	Understand the recent trends of primary and secondary market and developing skills for application of various financial services.
	Operations	CO1	Understand the role of operation in overall business strategy of the firm - the application of OM policies and techniques to the sevice sector as well as manufacturing firms
		CO2	Understand and apply the concepts of material management, supply chain management and TQM perpectives

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KMB 205	Management	CO3	Identify and evaluate the key factors and their interdependence of these key factors in the design of effective operatign systems
		CO4	Analyze / Understand the trends and challenges of operations management in the current business environment
		CO5	Apply techniques for effective utilization of operational resources and managing th processes to produce good quality products and services at competitive prices
KMB 206	Quantitative Techniques for Managers	CO1	Understand the basic operations research concepts and terminology involved in optimization techniques
		CO2	Understand how to interpret and solve business-related problems
		CO3	Apply ceertain mathematical techniques in getting the best possible solution to a problem involving limited resources
		CO4	Apply the most widely used quantitative techniques in decision making
		CO5	Identify project goals, constraints, deliverables, performance criteria, control needs and resource requirements in order to achieve project success
KMB 207	Legal Aspects of Business	CO1	Acquire a sound understanding of the legal aspects of the laws affecting buisness.
		CO2	Apply basic knowledge to business transactions.
		CO3	Communicate effectively using standard and legal terminology
		CO4	Analyse a given business context using basic understanding of the Applicable acts and develop a suitable operational framework.
		CO5	Describe curmet Laws, rules and regulations related to settling business disputes.
KMB 208	Marketing Management II	CO1	Undertnd and analyse marketing for creating value with product and price strategy
		CO2	Develop aptitude to create and craft the brand positioning/equity by evaluating brands and identifying market segments and targets
		CO3	Understand and analyze marketing for delivering and communicating value with integrated marketing channels and promotion strategy
		CO4	Remember and comprehend advanced marketing concepts for the new realities and digital aspects of marketing
		CO5	Creating and developing marketing strategies and plans for conducting marketing responsibly for long term success
SEMESTER III			
KMB 301	Strategic Management	CO1	Formulate organizational vision, mission, goals and values
		CO2	Develop strategies and action plans to achieve an organization's vision, mission and goals
		CO3	Develop powers of managerial judgement, how to assess business risk and improve ability to make sound decisions and achieve effective outcomes
		CO4	Evaluate and revise programs and procedures in order to achieve organizational goals

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		CO5	Consider the ethical dimensions of strategic management process
KMB 302	International Business Management	CO1	To get an overview of the key issues and concepts of International Business
		CO2	Understand how and why the world's countries differ
		CO3	Understand the monetary framework in which international business transactions are conducted .
		CO4	Understand the role of International Organizations and Regional Trade blocks
		CO5	Implement the decisions for international operations in a superior manner
KMB HR 01	Talent Management	CO1	Knowledge of Talent Management Processes
		CO2	Understanding for analysis of the impacts of Talent managment in the organization
		CO3	Competency to implement Talent management practices
		CO4	Competency to develop leadership qualities among subordinate
		CO5	Knowledge about the reward system to support Talent management
KMB HR 02	Performance & Reward Management	CO1	knowledge of Performance management and performance appraisal
		CO2	Competency to understand the importance of performance management
		CO3	Knowledge about the Compensation and Reward systems in the organization
		CO4	Competency to implement the effective reward systems in the organization
		CO5	Ability to explain the relevance of competency mapping and understanding its linkage with career development
KMB HR 03	Employee Relations & Labour Laws	CO1	Knowledge of Industrial Relation framework .
		CO2	Competency to understand the importance of Employee Relation within the perspective of Industrial Relation
		CO3	Knowledge about relevant Laws of HR management
		CO4	Competency to interpreted and implement the Labour Laws within organization
		CO5	Competency to use Collective Bargaining and Grievance redressal Mechanism
KMB MK 01	Sales & Retail Management	CO1	Student will develop the skill in sales force management and distribution channel management
		CO2	Acquianted with better understanding of implementation of sales and channel management strategies
		CO3	Develop analytical skills for better decision alternatives in sales and channel management problems
	Consumer	CO1	To understand consumer behavior and explain the consumer decision making process

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KMB MK 02	Behaviour & Marketing Management	CO2	To define external and internal influences on buying behavior
		CO3	To provide an understanding of integrated marketing communications (IMC) and its influences on other marketing functions and other promotional activities.
		CO4	Help to understand what advertising is and its role in advertising and brand promotion.
		CO5	Understand the importance of message design and the creativity involved in message designing.
KMB MK 03	Digital & Social Media Marketing	CO1	Develop proficiency in interpreting marketing strategies in the digital age and provide fundamental knowledge for working in an online team
		CO2	Enable them to develop various online marketing strategies for various marketing mix measures
		CO3	Guide them to use various digital marketing channels for consumer acquisition and engagement
		CO4	Help in evaluating the productivity of digital marketing channels for business success
		CO5	Prepare candidates for global exposure of digital marketing practices to make them employable in high growth industry
KMB FM 01	Investment Analysis & Portfolio Management	CO1	Understand about various investment avenues.
		CO2	Understand the value of assets and manage investment portfolio.
		CO3	Understand various models of investment & its application.
		CO4	Understand and create various investment strategies on the basis of various market conditions.
		CO5	Measure riskiness of a stock or a portfolio position.
KMB FM 02	Tax Planning & Management	CO1	Understand about various tax provisions & Tax Planning.
		CO2	Understand the scope of tax planning.
		CO3	Have knowledge about various tax dates, Rates & Forms.
		CO4	Measure corporate tax & Taxation in case of business restructuring.
		CO5	Understand how GST can be calculated & managed.
KMB FM 03	Financial Market & Services	CO1	To impart knowledge of the financial system of India, the role of important financial institutions, financial markets and financial instruments.
		CO2	Familiarizing the students with the mechanism of commercial banking, its operations, instruments regulations etc.
		CO3	Helping students in acquiring analytical skills in the money and capital market in the context of raising medium and long term funds
		CO4	Familiarizing the students with the microfinance as a growing source of financial mechanism
		CO5	Developing an appreciation among the students for the Banking services and products.
SEMESTER IV			
KMB 401	Project Management	CO1	Students will be able to understand the characteristics of Project and Project Management Knowledge
		CO2	The students will understand the managerial process along with tools

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			& techniques used in Project management Knowledge
		CO3	Students will understand the scheduling and monitoring process in Project. They will be able to apply PERT and CPM method for project scheduling Comprehending
		CO4	Students will understand the perspectives in which optimum decisions are to be taken in case of risks with planned activities in project.
KMB 402	Entrepreneurship Development	CO1	Developing understanding of basic concepts of entrepreneurship.
		CO2	Develop knowledge on Entrepreneurial Finance, Assistance and role of Entrepreneurial Development Agencies
		CO3	Develop understanding of converting an Idea to an opportunity and develop understanding of various funding sources
		CO4	Comprehend and develop skills to Develop a Business Plan
		CO5	Students to have a basic understanding of Launching a New Venture
RVE 401	Universal Human Values & Professional Ethics	CO1	Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society
		CO2	Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body.
		CO3	Understand the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society
		CO4	Understand the harmony in nature and existence, and work out their mutually fulfilling participation in the nature.
		CO5	Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.
KMB HR 04	Strategic Human Resource Management	CO1	Understanding the dimensions of strategic HRM
		CO2	Applying the learning of SHRM in organizational context
		CO3	Able to evaluate the impacts of SHRM on competitive advantages
		CO4	Desired level of expertise on organizational knowledge management through SHRM
		CO5	Understanding the International culture in SHRM
KMB HR 05	International Human Resource Management	CO1	Understanding the contexts of International HRM
		CO2	Knowledge about the HR Processes in International Context
		CO3	Able to evaluate the impacts of Globalisation on HRM
		CO4	Desired level of expertise on organizational
		CO5	Understanding the international culture

KMB MK 04	Marketing of Services	CO1	Understand and explain the nature and objectives of Service Marketing
		CO2	Use critical analysis to percieve service shortcomings in reference to ingredients to create service excellence
		CO3	Be able to identify critical issues related to service design such as identifying and managing customer service experience, expectations, perceptions and outcomes
		CO4	Provide a theoretical and practical basis for assessing service performance using company examples
		CO5	Identify and discuss characteristics and challenges of managing service firms in modern world
KMB MK 05	Marketing Analytics	CO1	Students will develop the skills in Marketing Analytics
		CO2	Students will be acquainted with better understanding of real life marketing data and its analysis
		CO3	Students will develop analytical skill for effective marketing decision making in real life environment
KMB FM 04	Working Capital Management	CO1	Evaluate comparative working capital management policies and their impact on the firm's profitability, liquidity, risk and operating flexibility.
		CO2	Evaluate the importance of effective working capital management and its role in meeting the firm's strategic objectives and its impact in value creation.
		CO3	Investigate funds flow cycles and their impact on working capital management objectives.
		CO4	Compare and contrast the relative merits of alternative working capital policies and the likely short-term and long-term impact on the firm.
		CO5	Formulate appropriate working capital management policies to achieve corporate objectives.
		CO6	Apply corporate cash management, accounts receivable management, bank relations, and inventory management techniques to maximize the share holders' value.
		CO7	Write a plan for a balanced integration of cash, credit and other short-term topics and policies.
		CO8	Formulate and integrate an extended treatment on international working capital topics.
KMB FM05	Financial Derivatives	CO1	Understanding how derivative securities work and how they are traded.
		CO2	Understand the principles of derivative pricing, includiing the implictions of arbitrage.
		CO3	Be able to to price forward and futures contrats using the cost of carry model.
		CO4	Be able to to price forward and futures contrats using the cost of carry model.
		CO5	Be prepared to use futures and options in financial risk management, speculation and arbitrage.
		CO6	Learn important lessons from derivatives disasters.