SEMESTER V				
Sr. No.	**Subject**	**Subject Code**	**Theory/ Practical**	**Course Outcomes:**
1.	POWER SYSTEM-I	(KEE5010)	Theory	**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
2.	POWER SYSTEM LABORATORY – I	(KEE551)	Practical	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.

3.	Control System	KEE502	Theory	**CO 1:** 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 **CO 2:** Measure and evaluate the performance of basic control systems in time domain. Design specification for different control action **CO 3:** Analyze the stability of linear time-invariant systems in time domain using Routh- Hurwitz criterion and root locus technique 4. To draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss **CO 4:** Determine the stability of linear time-invariant systems in frequency domain using Nyquist criterion and Bode plot. **CO 5:** 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
4.	Control System Lab	KEE552	Practical	CO 1: 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 behaviour 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
5.	Electrical Machines-II	KEE503	Theory	CO 1: Demonstrate the constructional details and Induction and Synchronous Machines principle of operation of three phase CO 2: Analyze the performance of the three phase Induction and Synchronous Machines using the phasor diagrams and equivalent circuits CO 3: Select appropriate three phase AC machine for any application and appraise its significance. CO 4: Start and observe the various characteristics of three phase Induction & Synchronous Machines CO 5: Explain the principle of operation and performance of Single-Phase Induction Motor & Universal Motor.
6.	ELECTRICAL MACHINE-II LABORATORY	KEE553	Practical	CO 1: 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.
7.	Mini Project or Internship Assessment*	KEE554		

8.	Constitution of India, Law and Engineering	KNC501		**1.** Identify and explore the basic features and modalities about Indian constitution. **2.** Differentiate and relate the functioning of Indian parliamentary system at the center and state level. **3.** Differentiate different aspects of Indian Legal System and its related bodies. **4.** Discover and apply different laws and regulations related to engineering practices. **5.** Correlate role of engineers with different organizations and governance models
9.	Indian Tradition, Culture and Society	KNC502		Ability to understand, connect up and explain basics of Indian Traditional knowledge modern scientific perspective. Suggested Pedagogy for Teachers • Project based learning • Case studies • Group discussion • Presentations
10.	Engineering Mathematics-I	KAS 103T	Theory	CO 1: Remember the concept of matrices and apply for solving linear simultaneous equations. CO 2: Understand the concept of limit, continuity and differentiability and apply in the study
11.	Sensors and Transducers (Departmental Elective-I)	KEE052	Theory	CO 1: Understand the working of commonly used sensors in industry for measurement of displacement, force and pressure. CO 2: Recognize the working of commonly used sensors in industry for measurement of temperature, position, accelerometer, vibration sensor, flow and level. CO 3: Identify the application of machine vision. CO 4: Conceptualize signal conditioning and data acquisition methods. CO 5: Comprehend smart sensors and their applications in automation systems.

12.	Analog & Digital Communication (Departmental Elective-II)	KEE058	Theory	CO 1: Understand the Amplitude Modulation in communication system CO 2: Comprehend the Frequency & Phase modulation. CO 3: Realize the Pulse Modulation Techniques. CO 4: Get the Digital Modulation Techniques and their use in communication system. CO 5: Apply the concept of Information Theory in Communication Engineering..
11.	MOOCs (Essential for Hons. Degree)			

SEMESTER VI				
Sr. No.	**Subject**	**Subject Code**	**Theory/ Practical**	**Course Outcomes:**
1	Power System-II	KEE601	Theory	CO 1: Identify power system components on one-line diagram of power system and its representation including the behaviour of the constituent components and sub systems and Analyse a network under both balanced and unbalanced fault conditions and design the rating of circuit breakers. 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.
2.	Power System-II Lab	KEE651	Practical	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 various 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
3.	Microprocessor and Microcontroller	KEE602	Theory	CO 1: 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
4.	Microprocessor and Microcontroller Lab	KEE652	Practical	CO 1: 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.
5.	Power Electronics	KEE603	Theory	CO 1: Demonstrate the characteristics as well as the operation of BJT, MOSFET, IGBT, SCR, TRIAC and GTO and identify their use in the power switching applications. 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.

6.	Power Electronics Lab	KEE653	Practical	CO 1: 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
7.	Departmental Elective- III*(Special Electrical Machines)	KEE061	Theory	CO1: Describe the working principle, Constructional Features of different types of electrical machines including the fractional kilowatt machines. CO2: Analyse torque- speed characteristics of different electrical machines and interpret their performance and identify the suitable machine for an operation. CO3: Study different types of control techniques for a machine and identify the best control strategy based upon different constraints. CO4: Illustrate the use of stepper, BLDCs, SRM, and other special machines in the area of the various industrial and domestic as well as commercial applications of various fractional kilowatt machines.
8.	Open Elective-I (IDEA TO BUSINESS MODEL)	KOE060	Theory	1. Enhance creative knowledge of students regarding selection of a business idea and it's implementation process. 2. Acquire knowledge on entrepreneurship development, its Pro's and con's. 3. Acquire basic knowledge on how to become an Entrepreneur. 4. Develop knowledge on Production systems and it's sustainability through production, planning and control (PPC) 5. Develop appropriate business model and

				apply in a better way.
9.	Constitution of India, Law and Engineering	KNC601	Theory	**1.** Identify and explore the basic features and modalities about Indian constitution. **2.** Differentiate and relate the functioning of Indian parliamentary system at the center and state level. **3.** Differentiate different aspects of Indian Legal System and its related bodies. **4.** Discover and apply different laws and regulations related to engineering practices. **5.** Correlate role of engineers with different organizations and governance models
10.	Indian Tradition, Culture and Society	KNC602	Theory	Ability to understand, connect up and explain basics of Indian Traditional knowledge modern scientific perspective. Suggested Pedagogy for Teachers • Project based learning • Case studies • Group discussion • Presentations
DEPARTMENT ELECTIVE - III KEE 061 Special Electrical Machines KEE 062 Electrical Machine Design KEE 063 Digital Control System KEE 064 Electrical and Hybrid Vehicles				