Hindustan College of Science and Technology
Farah-Mathura
(AICTE approved & affiliated to AKTU)

NAAC
CRITERIA-2

Metric No.- 2.6.1 (Q_lM)

Programme Outcomes (POs) and Course Outcomes (COs) for Electronics & Communication Engineering

B.Tech. (Electronics& Communication Engg.)

Semester III

Sr. No.	Course Code	Course Title	Periods			Evaluation Scheme				End Semester		Total	Credits
			L	T	P	CT	TA	Total	PS	TE	PE		
	KOE031-38/ KAS302	Engg. Science Course /Maths IV	3	1	0	30	20	50		100		150	4
1.	KAS301/KV E301	Technical Communication /Universal Human values	2	1	0	30	20	50		100		150	3
			3	0	0								
2.	KEC301	Electronic Devices	3	1	0	30	20	50		100		150	4
3.	KEC302	Digital System Design	3	1	0	30	20	50		100		150	4
4.	KEC303	Network Analysis and Synthesis	3	0	0	30	20	50		100		150	3
6.	KEC351	Electronics Devices Lab	0	0	2				25		25	50	1
7.	KEC352	Digital System Design Lab	0	0	2				25		25	50	1
8.	KEC353	Network Analysis and Synthesis lab	0	0	2				25		25	50	1
9.	KEC354	Mini Projector Internship Assessment	0	0	2			50				50	1
10.	KNC301 /KNC302	Computer System Security /Python Programming	2	0	0	15	10	25		50			0
11.		MOOCs(Essential for Hons. Degree)											
		TOTAL										**950**	**22**

*TheMiniProjectorinternship(3-4weeks)conducteddduringsummerbreakafterIIsemesterandwillbeassessedduringIII semester.

Semester IV

Sr. No.	Course Code	Course Title	Periods			Evaluation Scheme				End Semester		Total	Credits
			L	T	P	CT	TA	Total	PS	TE	PE		
1.	KAS402/ KOE041-48	Maths-IV/Engg. Science Course	3	1	0	30	20	50		100		150	4
2.	KVE401/KA S401	Universal Human Values/Technical Communication	3	0	0	30	20	50		100		150	3
			2	1	0								
3.	KEC401	Communication Engineering	3	0	0	30	20	50		100		150	3
4.	KEC402	Analog Circuits	3	1	0	30	20	50		100		150	4
5.	KEC403	Signal System	3	1	0	30	20	50		100		150	4
6.	KEC451	Communication Engineering Lab	0	0	2				25		25	50	1
7.	KEC452	Analog Circuits Lab	0	0	2				25		25	50	1
8.	KEC453	Signal System Lab	0	0	2				25		25	50	1
9.	KNC402/ KNC401	Python Programming/ Computer System Security	2	0	0	15	10	25		50			0
10.		MOOCs(Essential for Hons. Degree)											
		TOTAL										**900**	**21**

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Electronics and Communication Engineering

B.Tech. V Semester

S. No.	Course Code	Course Title	Periods			Evaluation Scheme				End Semester		Total	Credits
			L	T	P	CT	TA	Total	PS	TE	PE		
1	KEC-501	Integrated Circuits	3	1	0	30	20	50		100		150	4
2	KEC-502	Microprocessor& Microcontroller	3	1	0	30	20	50		100		150	4
3	KEC-503	Digital Signal Processing	3	1	0	30	20	50		100		150	4
4	KEC-053	VLSI Technology	3	0	0	30	20	50		100		150	3
5	KEC-057	Electronics Measurement & Instrumentation	3	0	0	30	20	50		100		150	3
6	KEC-551	Integrated Circuits Lab	0	0	2				25		25	50	1
7	KEC-552	Microprocessor& Microcontroller Lab	0	0	2				25		25	50	1
8	KEC-553	Digital Signal Processing Lab	0	0	2				25		25	50	1
9	KEC-554	Mini Project/Internship**	0	0	2				50			50	1
10	KNC501/KNC502	Constitution of India ,Law and Engineering / Indian Tradition, Culture and Society	2	0	0	15	10	25		50			NC
11		MOOCs (Essential for Hons. Degree)											
		Total										**950**	**22**

**The Mini Projector Internship(4weeks)conductedduringsummerbreakafterIVSemesterandwillbeassessedduringVthSemester.

B.Tech.VI Semester

S. No.	Course Code	Course Title	Periods			Evaluation Scheme				End Semester		Total	Credits
			L	T	P	CT	TA	Total	PS	TE	PE		
1	KEC-601	Digital Communication	3	1	0	30	20	50		100		150	4
2	KEC-602	Control System	3	1	0	30	20	50		100		150	4
3	KEC-603	Antenna and Wave Propagation	3	1	0	30	20	50		100		150	4
4	KEC-062	Satellite Communication	3	0	0	30	20	50		100		150	3
5	KOE-064	Object oriented programming	3	0	0	30	20	50		100		150	3
6	KEC-651	Digital Communication Lab	0	0	2				25		25	50	1
7	KEC-652	Control System Lab	0	0	2				25		25	50	1
8	KEC-653	Elective Lab	0	0	2				25		25	50	1
9	KNC601/KNC602	Constitution of India, Law and Engineering/Indian Tradition, Culture and Society	2	0	0	15	10	25		50			NC
10		MOOCs (Essential for Hons .Degree)											
		Total										**900**	**21**

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B.Tech.VII Semester

Electronics and Communication Engineering

S. No.	Course Code	Course Title	Periods			Evaluation Scheme				End Semester		Total	Credits
			L	T	P	CT	TA	Total	PS	TE	PE		
1.	KHU 702	Project Management & Entrepreneurship	3	0	0	30	20	50		100		150	3
2.	KEC-074	Microwave & Radar Engineering	3	0	0	30	20	50		100		150	3
3.	KEC-076	Wireless & Mobile Communication	3	0	0	30	20	50		100		150	3
4.	KOE076	Vision for Human Society	3	0	0	30	20	50		100		150	3
5.	KEC-751D	Microwave & Radar Engineering Lab	0	0	2				25		25	50	1
6.	KEC-752	Mini Project or Internship Assessment**	0	0	2				50			50	1
7.	KEC-753	Project I	0	0	8				150			150	4
		MOOCs (Essential for Hons. Degree)											
		Total										**850**	**18**

B.Tech. VIII Semester

S. No.	Course Code	Course Title	Periods			Evaluation Scheme				End Semester		Total	Credits
			L	T	P	CT	TA	Total	PS	TE	PE		
1.	KHU-801	RURAL DEVELOPMENT: ADMINISTRATION AND PLANNING	3	0	0	30	20	50		100		150	3
2.	KOE083	ENTREPRENEURSHIP DEVELOPMENT	3	0	0	30	20	50		100		150	3
3.	KOE090	ELECTRIC VEHICLES	3	0	0	30	20	50		100		150	3
4.	KEC-851	Project II	0	0	18				100		300	400	9
		MOOCs (Essential for Hons.											
		Total										**850**	**18**

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Program Outcomes (POs)

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcome (PSOs)

1. To apply fundamentals of science, engineering and mathematics for finding solutions of real time problems in the field of electronics & communication engineering.

2. To demonstrate proficiency in hardware and software development and adapt to emerging technologies like embedded systems, wireless networks, telecommunications, digital signal processing, computer system security.

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Department: Electronics & Communication Engineering

Course Outcomes(COs):B.Tech.2nd , 3rdand 4th year

Batch :2020-24

B.Tech:2nd Semester		
Code	**Course Name**	**Course Outcomes**
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.
KAS302	**Math 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.
KEC301	**Electronic 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.
KEC302	**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.

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KEC303	**Network Analysis and Synthesis**	CO1: Understand basics electrical circuits with nodal and mesh analysis.
		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	**Electronics 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.
		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.
KEC354	**Mini Project or Internship Assessment**	CO1: Understand research papers for exploring new fields and review reporting.
		CO2: Evaluate new directions of various cutting edge technologies.
		CO3: Create various skills by preparing detailed project report including all the findings.
		CO4: Effective communication by making an oral presentation to show the findings.
		CO5: Create facts related knowledge by preparing detailed report including outcomes.
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
		CO5: To articulate the well knowncyber attack incidents, explain the attack scenarios, and explain mitigation techniques.

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B.Tech:4th Semester		
KOE033	**Energy Science & Engineering**	CO1:The basics of various forms of energy and its inter-conversion with the help of engines/systems based on thermodynamic cycle and others.
		CO2:To recognize and recall the basics of nuclear reactor terminology, definitions, and concepts associated with reactor physics and theory and technology of nuclear power plant.
		CO3:To explain the principles that underlies the ability of various natural phenomena to deliver solar energy. Outline the technologies that are used to harness the power of solar energy.
		CO4:To understand processing and limitations of fossil fuels (coal, petroleum and natural gas) and identify and explain necessasity of harnessing alternate energy resources.
		CO5:Students may realize the environmental problems directly related to energy production and consumption includes environmental pollution, monitoring and life cycle assessment.
KVE401	**Universal Human Values**	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 and meaning of natural acceptance.
		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 in family and society.
		CO4: Understand the harmony in nature and existence, and work out their mutually fulfilling participation in the nature. harmony in nature and existence.
		CO5: Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work. harmony of professional ethics.
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.
KEC402	**Analog Circuits**	CO1:Understand the characteristics of diodes and transistors.
		CO2: . Design and analyze various rectifier and amplifier circuits
		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.

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KEC403	**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	**Communication Engineering Lab**	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.
KEC452	**Analog Circuits Lab**	CO1. Understand the characteristics of diodes and transistors.
		CO2.Design and analyze various rectifier and amplifier circuits.
		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.
KEC453	**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.
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
B.Tech:5th Semester		

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KEC-501	**Integrated Circuits**	CO1:AnalyzecompleteinternalanalysisofOp-amp741-IC1
		CO2:Examine Op-amp based circuits & basic components of ICs such as various types of filters
		CO3:Implement the concept of Op-Amp to design Op-amp based non - linear applications and wave shaping circuits
		CO4:Analyze basic digital IC circuits using CMOS technology
		CO5:Analyze the functioningofapplicationspecificICssuchas555 timer, VCOIC 566 and PLL.
KEC-502	**Microprocessor & Microcontroller**	CO1: Demonstrate the basic architecture of 8085.
		CO2: Illustrate the programming model of microprocessors & write program using 8085 microprocessor.
		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-057	**Electronics Measurement & Instrumentation**	CO1: Classify the Instrumentation and Measurement system and various measurement
		CO2: Analyze and design voltmeter circuits, AC electronic voltmeter, digital frequency meter and current measurement with electronic instruments.
		CO3: Evaluate various resistance and impedance measuring methods using Bridges and Q-meter.
		CO4: Analyze fundamental operation of CRO and some special type of oscilloscopes like DSO, Sampling oscilloscope.
		CO5: Demonstrate calibration method to calibrate various instruments and classify transducers like for force, pressure, motion, temperature measurement etc.

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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 learn and demonstrate arithmetic and logical operations on 8 bit data using microprocessor 8085.
		CO2: Analyze 8085 microprocessor and its interfacing with peripheral devices.
		CO3: Learn about various conversion techniques using 8085 and generate waveforms using 8085.
		CO4: Learn programming concept of 8051 Microcontroller
		CO5: Learn 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
KEC-554	**Mini Project/Internship ****	CO1: Understand research papers for exploring new fields and review reporting.
		CO2: Evaluate new directions of various cutting-edge technologies.
		CO3:Create various skills by preparing detailed project report including all the findings.
		CO4: Effective communication by making an oral presentation to show the findings.
		CO5: Create facts related knowledge by preparing detailed report including outcomes.
KNC502	**Indian Tradition, Culture and Society**	CO1: To identify and understand the roots and details of Society State and Polity in India.
		CO2: To understand the importance of Indian Literature, Culture, Tradition, Practices and to apply in present system
		CO3: To analyze the Indian Religion, Philosophy, Practices and in shadow of Pre-Vedic and Vedic Religion, Buddhism, Jainism, Six System Indian Philosophy and to apply in
		CO4: To analyze the Science, Management and Indian Knowledge System and to apply in present system.
		CO5: To evaluate the Indian Architect, Engineering and Architecture in Ancient India, Indian's Cultural Contribution to the World and to create environment in Arts and
B.Tech:6th Semester		
KEC-601	**Digital**	CO1: To formulate basic statistics involved in communication theory.

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	Communication	
		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.
KEC-603	**Antenna and 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-062	**Satellite Communication**	CO1: 1. Define and list the benefits of satellite communication.
		CO2: Demonstrate orbital mechanics principles of satellite communication systems and solve problems related to it.
		CO3: Describe a satellite link and identify ways to improve the link performance.
		CO4: Classify new technologies of satellite communication systems as per given specifications.
		CO5: . Examine advanced technologies of satellite launching and describe the Indian satellite system.
KOE064	**OBJECT ORIENTED**	CO1: Understand the Basic concept of Object Orientation, object identity and Encapsulation.

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	PROGRAMMING	CO2: Understand the Basic concept of Basic Structural Modeling.
		CO3: Know the knowledge of Object oriented design, Object design.
		CO4: Know the knowledge of C++ Basics.
		CO5: Understand the Basics of object and class in C++.
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.
KEC-653B	**Cad for Electronics Lab**	CO1:Design and analyze the performance of different type of inverters.
		CO2: Design and analyze the performance of the basic logic gates using CMOS inverter circuit.
		CO3: Design and analyze the performance of the memory based digital circuits using CMOS inverter circuit
		CO4: Analyze the performance of the different configuration of MOS amplifier circuits
KNC601	**Constitution of India, Law and Engineering**	CO1: To acquaint the students with legacies of constitutional development in India and help those to understand the most diversified legal document of India and philosophy behind it.
		CO2: To make students aware of the theoretical and functional aspects of the Indian Parliamentary System.
		CO3: To channelize students' thinking towards basic understanding of the legal concepts and its implications for engineers
		CO4: To acquaint students with latest intellectual property rights and innovation environment with related regulatory framework
		CO5: To make students learn about role of engineering in business organizations and e-governance.
B.Tech:7th Semester		

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KHU702	**PROJECT MANAGEMENT & ENTREPRENEURSHIP**	CO1: Learners will pick up about Foundation of Entrepreneurship Development and its theories
		CO2: Learners will explore entrepreneurial skills and management function of a company with special reference to SME sector
		CO3: Learners will identify the type of entrepreneur and the steps involved in an entrepreneurial venture.
		CO4: Learners will understand various steps involved in starting a venture and to explore marketing methods & new trends in entrepreneurship.
		CO5: Learners will pick up about Foundation of Entrepreneurship Development and its theories
KEC-074	**Microwave & Radar Engineering**	CO1: Analyze various parameters and characteristics of the transmission line and waveguide and also use of wave guide component as per applications.
		CO2: Describe, analyze and design simple microwave circuits and devices e g couplers, Attenuators, Phase Shifter and Isolators. Student will also understand the microwave propagation in ferrites.
		CO3: Analyze the difference between the conventional tubes and the microwave tubes for the transmission of the EM waves.
		CO4: Acquire knowledge about the handling and measurement of microwave equipment.
		CO5: Differentiate different Radars, find applications and use of its supporting systems.
KEC-076	**Wireless & Mobile Communication**	CO1: Express the basic knowledge of mobile radio & cellular communication fundamentals and their application to propagation mechanisms, path loss models and multi-path phenomenon.
		CO2: Analyze the performance of various voice coding and diversity techniques.
		CO3: Apply the knowledge of wireless transmission basics to understand the concepts of equalization and multiple access techniques.
		CO4: Examine the performance of cellular systems being employed such as GSM, CDMA and LTE using various theoretical and mathematical aspects.
		CO5: Express basic knowledge of Mobile Adhoc networks and the existing & upcoming data communication networks in wireless and mobile communication domain.
KOE076	**VISION FOR HUMANE SOCIETY**	CO1: To help the students to understand the importance and types of relationship with expressions CO2: To develop the competence to think about the conceptual framework of undivided society as well as universal human order.
		CO3: To help the students to develop the exposure for transition from current state to the undivided society and universal human order.
KEC751D	**Microwave &**	CO1: Describe working on microwave testing bench.

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	Radar Engineering Lab	CO2: . Practically demonstrate the Characteristics of Reflex klystron using Microwave bench setup
		CO3: Demonstrate the performance of the Gunn diode using Microwave bench setup.
		CO4: Perform measurement of Frequency, attenuation, VSWR, Impedance of microwave passive device using Klystron Bench Setup
		CO5: Interpret the basics of Smith chart for solution of transmission line problems and impedance matching.
KEC-752	**Mini Project or Internship Assessment****	CO1: To learn the application of knowledge in real world problems..
		CO2: To get exposure to team-work and leadership quality
		CO3: To deal with industry-professionals and ethical issues in the work environment.
		CO4: Student is able to determine the challenges and future potential for his / her internship organization in particular and the sector in general.
		CO5: Student is able to apply various soft skills such as time management, positive attitude and communication skills during performance of the tasks assigned in internship organization.
KEC-753	**Project I**	CO1: In a specialization domain of his / her choice, student will be able to choose an appropriate topic for study
		CO2: Student will form group and will be able to clearly formulate & state a research problem
		CO3: For a selected research topic, student will be able to compile the relevant literature and frame hypotheses for research as applicable
		CO4: For a selected research topic, student will be able to plan a research design including the sampling, observational, statistical and operational designs if any
		CO5: For a selected research topic, student will be able to compile relevant data, interpret & analyze it and test the hypotheses wherever applicable
B.Tech:8th Semester		
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
KOE-083	**ENTREPRENEURSHIP DEVELOPMENT**	CO1: Understand the process of entrepreneurship and the institutional facilities available to an entrepreneur in India
		CO2: Know the process of starting a new venture and create their business plan
		CO3: Recognize the importance of the application of management accounting concepts in various managerial decision making process
		CO4: Know about the project planning and control
		CO5: Gain the knowledge on legal aspects and government policy relating to entrepreneurship
KOE-090	**ELECTRIC**	1 Understand the Concepts and basics of Electric Vehicles.

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	VEHICLES	2 Understand Different types of Electric Motor Drives for EV applications.
		3 Manage EV Batteries and Battery Management System
		4 Design Charging system technology for EV applications.
		5 Plan EV Charging Facility.
KEC-851	**Project II**	CO1: Based on the analysis and interpretation of the data collected, student manager will be able to arrive at logical conclusions and propose suitable recommendations on the research problem
		CO2: Demonstrate a sound technical knowledge of their selected project topic. Undertake problem identification, formulation and solution.
		CO3: Design engineering solutions to complex problems utilising a systems approach. Conduct an engineering project.
		CO4: Student manager will be able to create a logically coherent project report and will be able to defend his / her work in front of a panel of examiners
		CO5: Communicate with engineers and the community at large in written an oral forms.Demonstrate the knowledge, skills and attitudes of a professional engineer.

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