



## Department of Electronics & Communication Engineering

**Vision of the Department:** To be recognized as a Center of Excellence in Electronics and Communication Engineering by providing valuable resources to the students for the purpose of nurturing their knowledge and skills to serve the nation by solving the technological problems of modern society in the field of Electronics and Communication.

### **SENSOR AND INSTRUMENTATION (KOE-034)**

**Year of Study: 2021-22**

<b>CO1</b>	Apply the use of sensors for measurement of displacement, force and pressure.	K3
<b>CO2</b>	Examine and design Op-Amp based circuits and basic components of ICs such as various types of filter.	K3
<b>CO3</b>	Implement the concept of Op-Amp to design Op-Amp based non-linear applications and wave shaping circuits.	K2
<b>CO4</b>	Analyse and design basic digital IC circuits using CMOS technology.	K4
<b>CO5</b>	Describe the functioning of application specific ICs such as 555 timer, VCO IC 566 and PLL.	K3

### **TECHNICAL COMMUNICATION (KAS-301)**

**Year of Study: 2021-22**

<b>CO1</b>	Students will be enabled to understand the nature and objective of Technical Communication relevant for the work place as Engineers.	K2
<b>CO2</b>	Students will utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions.	K3
<b>CO3</b>	Students would imbibe inputs by presentation skills to enhance confidence in face of diverse audience.	K3
<b>CO4</b>	Technical communication skills will create a vast know-how of the application of the learning to promote their technical competence.	K4
<b>CO5</b>	It would enable them to evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics.	K4

### **ELECTRONIC DEVICES (KEC-301)**

**Year of Study: 2021-22**

<b>CO1</b>	Understand the principles of semiconductor Physics.	K2
<b>CO2</b>	Understand and utilize the mathematical models of semiconductor junctions.	K2
<b>CO3</b>	Understand carrier transport in semiconductors and design resistors.	K2
<b>CO4</b>	Utilize the mathematical models of MOS transistors for circuits and systems.	K3
<b>CO5</b>	Analyse and find application of special purpose diodes.	K4

### **DIGITAL SYSTEM DESIGN (KEC-302)**

**Year of Study: 2021-22**

<b>CO1</b>	Design and analyze combinational logic circuits.	K5
<b>CO2</b>	Design and analyze modular combinational circuits with MUX / DEMUX, Decoder & Encoder.	K5
<b>CO3</b>	Design & analyze synchronous sequential logic circuits.	K5
<b>CO4</b>	Analyze various logic families.	K4
<b>CO5</b>	Design ADC and DAC and implement in amplifier, integrator, etc.	K5



## Department of Electronics & Communication Engineering

**Vision of the Department:** To be recognized as a Center of Excellence in Electronics and Communication Engineering by providing valuable resources to the students for the purpose of nurturing their knowledge and skills to serve the nation by solving the technological problems of modern society in the field of Electronics and Communication.

### **NETWORK ANALYSIS &SYNTHESIS (KEC-303)**

**Year of Study: 2021-22**

<b>CO1</b>	Understand basics electrical circuits with nodal and mesh analysis.	K2
<b>CO2</b>	Appreciate electrical network theorems.	K3
<b>CO3</b>	Apply Laplace transform for steady state and transient analysis.	K4
<b>CO4</b>	Determine different network functions.	K3
<b>CO5</b>	Appreciate the frequency domain techniques.	K3

### **ELECTRONICS DEVICES LAB (KEC-351)**

**Year of Study: 2021-22**

<b>CO1</b>	Understand working of basic electronics lab equipment.	K2
<b>CO2</b>	Understand working of PN junction diode and its applications.	K2
<b>CO3</b>	Understand characteristics of Zener diode	K2
<b>CO4</b>	Design a voltage regulator using Zener diode	K5
<b>CO5</b>	Understand working of BJT, FET, MOSFET and apply the concept in designing of amplifiers.	K3

### **DIGITAL SYSTEM DESIGN LAB (KEC-352)**

**Year of Study: 2021-22**

<b>CO1</b>	Design and analyze combinational logic circuits.	K5
<b>CO2</b>	Design & analyze modular combinational circuits with MUX/DEMUX, decoder, encoder.	K5
<b>CO3</b>	Design & analyze synchronous sequential logic circuits.	K5
<b>CO4</b>	Design & build mini project using digital ICs.	K5

### **NETWORK ANALYSIS &SYNTHESIS LAB (KEC-353)**

**Year of Study: 2021-22**

<b>CO1</b>	Understand basics of electrical circuits with nodal and mesh analysis.	K2
<b>CO2</b>	Appreciate electrical network theorems.	K3
<b>CO3</b>	Analyse RLC circuits.	K4
<b>CO4</b>	Determine the stability of an electrical circuit.	K3
<b>CO5</b>	Design network filters.	K5

### **MINI PROJECT OR INTERNSHIP ASSESSMENT (KEC-354)**

**Year of Study: 2021-22**

<b>CO1</b>	Student should be able to manage project as a member of team to use the technique, skill and modern engineering tools and to collect and disseminate information related to selected project	K3
<b>CO2</b>	Students should be able to create solutions to authentic (real world and ill-defined) problems.	K6
<b>CO3</b>	Students should be able to design a system, component or process to meet desired need within realistic constraints.	K5
<b>CO4</b>	Students should be able to develop an action plan to improve presentation skills and have the confidence to make more of an impact on their audience.	K3
<b>CO5</b>	Students will be able to write research-based documents, including journal and conference papers.	K5



## Department of Electronics & Communication Engineering

**Vision of the Department:** To be recognized as a Center of Excellence in Electronics and Communication Engineering by providing valuable resources to the students for the purpose of nurturing their knowledge and skills to serve the nation by solving the technological problems of modern society in the field of Electronics and Communication.

### **PYTHON PROGRAMMING (KNC-302)**

**Year of Study: 2021-22**

<b>CO1</b>	To read and write simple Python programs	K2
<b>CO2</b>	To develop Python programs with conditionals and loops	K5
<b>CO3</b>	To define Python functions and to use Python data structures – lists, tuples, dictionaries	K3
<b>CO4</b>	To do input/output with files in Python	K3
<b>CO5</b>	To do searching ,sorting and merging in Python	K4

### **MATHEMATICS IV (KAS-402)**

**Year of Study: 2021-22**

<b>CO1</b>	Remember the concept of partial differential equation and to solve partial differential equations.	K3
<b>CO2</b>	Analyze the concept of partial differential equations to evaluate the problems concerned with partial differential equations.	K4
<b>CO3</b>	Understand the concept of correlation, moments, skewness and kurtosis and curve fitting.	K2
<b>CO4</b>	Remember the concept of probability to evaluate probability distributions.	K5
<b>CO5</b>	Apply the concept of hypothesis testing and statistical quality control to create control charts.	K6

### **UNIVERSAL HUMAN VALUES & PROFESSIONAL ETHICS (RVE-401)**

**Year of Study: 2021-22**

<b>CO1</b>	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.	K2
<b>CO2</b>	Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body.	K3
<b>CO3</b>	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.	K2
<b>CO4</b>	Understand the harmony in nature and existence, and work out their mutually fulfilling participation in the nature.	K2
<b>CO5</b>	Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.	K3

### **COMMUNICATION ENGINEERING (KEC-401)**

**Year of Study: 2021-22**

<b>CO1</b>	Analyze and compare different analog modulation schemes for their efficiency and bandwidth.	K4
<b>CO2</b>	Analyze the behavior of a communication system in presence of noise.	K4
<b>CO3</b>	Investigate pulsed modulation system and analyze their system performance.	K4
<b>CO4</b>	Investigate various multiplexing techniques.	K3
<b>CO5</b>	Analyze different digital modulation schemes and compute the bit error performance	K4



## Department of Electronics & Communication Engineering

**Vision of the Department:** To be recognized as a Center of Excellence in Electronics and Communication Engineering by providing valuable resources to the students for the purpose of nurturing their knowledge and skills to serve the nation by solving the technological problems of modern society in the field of Electronics and Communication.

### **ANALOG CIRCUITS (KEC-402)**

**Year of Study: 2021-22**

<b>CO1</b>	Understand the characteristics of diodes and transistors.	K2
<b>CO2</b>	Design and analyze various rectifier and amplifier circuits.	K5
<b>CO3</b>	Design sinusoidal and non-sinusoidal oscillators.	K5
<b>CO4</b>	Understand the functioning of OP-AMP and design OP-AMP based circuits.	K5
<b>CO5</b>	Design LPF, HPF, BPF, BSF.	K5

### **SIGNAL SYSTEM (KEC-403)**

**Year of Study: 2021-22**

<b>CO1</b>	Analyze different types of signals.	K4
<b>CO2</b>	Analyze linear shift-invariant (LSI) systems.	K4
<b>CO3</b>	Represent continuous and discrete systems in time and frequency domain using Fourier series and transform.	K3
<b>CO4</b>	Analyze discrete time signals in z-domain.	K4
<b>CO5</b>	Study sampling and reconstruction of a signal.	K2

### **COMMUNICATION ENGINEERING LAB (KEC-451)**

**Year of Study: 2021-22**

<b>CO1</b>	Analyze and compare different analog modulation schemes for their modulation factor and power.	K4
<b>CO2</b>	Study pulse amplitude modulation.	K2
<b>CO3</b>	Analyze different digital modulation schemes and can compute the bit error performance.	K4
<b>CO4</b>	Study and simulate the Phase shift keying.	K3
<b>CO5</b>	Design a front end BPSK modulator and demodulator.	K5

### **ANALOG CIRCUITS LAB (KEC-452)**

**Year of Study: 2021-22**

<b>CO1</b>	Understand the characteristics of transistors.	K2
<b>CO2</b>	Design and analyze various configurations of amplifier circuits.	K5
<b>CO3</b>	Design sinusoidal and non-sinusoidal oscillators.	K5
<b>CO4</b>	Understand the functioning of OP-AMP and design OP-AMP based circuits.	K5
<b>CO5</b>	Design ADC and DAC.	K5

### **SIGNAL SYSTEM LAB (KEC-453)**

**Year of Study: 2021-22**

<b>CO1</b>	Understand the basics operation of MATLAB frequency response of the system.	K2
<b>CO2</b>	Analysis the time domain and frequency domain signals diagrams and bode diagram.	K4
<b>CO3</b>	Implement the concept of Fourier series and Fourier transforms.	K3
<b>CO4</b>	Find the stability of system using pole-zero	K4
<b>CO5</b>	Design frequency response of the system.	K5



## Department of Electronics & Communication Engineering

**Vision of the Department:** To be recognized as a Center of Excellence in Electronics and Communication Engineering by providing valuable resources to the students for the purpose of nurturing their knowledge and skills to serve the nation by solving the technological problems of modern society in the field of Electronics and Communication.

### **COMPUTER SYSTEM SECURITY (KNC-401)**

**Year of Study: 2021-22**

<b>CO1</b>	To discover software bugs that pose cyber security threats and to explain how to fix the bugs to mitigate such threats.	K4
<b>CO2</b>	To discover cyber-attack scenarios to web browsers and web servers and to explain how to mitigate such threats.	K4
<b>CO3</b>	To discover and explain mobile software bugs posing cyber security threats, explain and recreate exploits, and to explain mitigation techniques.	K4
<b>CO4</b>	To articulate the urgent need for cyber security in critical computer systems, networks, and world wide web, and to explain various threat scenarios.	K3
<b>CO5</b>	To articulate the well-known cyber-attack incidents, explain the attack scenarios, and explain mitigation techniques.	K3

### **INTEGRATED CIRCUITS (KEC-501)**

**Year of Study: 2021-22**

<b>CO1</b>	Explain complete internal analysis of Op-Amp 741-IC.	K2
<b>CO2</b>	Examine and design Op-Amp based circuits and basic components of ICs such as various types of filter.	K3
<b>CO3</b>	Implement the concept of Op-Amp to design Op-Amp based non-linear applications and wave shaping circuits.	K3
<b>CO4</b>	Analyse and design basic digital IC circuits using CMOS technology.	K3
<b>CO5</b>	Describe the functioning of application specific ICs such as 555 timer, VCO IC 566 and PLL.	K2

### **MICROPROCESSOR & MICROCONTROLLER (KEC-502)**

**Year of Study: 2021-22**

<b>CO1</b>	Demonstrate the basic architecture of 8085.	K2
<b>CO2</b>	Illustrate the programming model of microprocessors & write program using 8085 microprocessor.	K2
<b>CO3</b>	Demonstrate the basics of 8086 Microprocessor and interface different external Peripheral Devices like timer, USART etc. with Microprocessor (8085/8086).	K2
<b>CO4</b>	Compare Microprocessors & Microcontrollers, and comprehend the architecture of 8051 microcontroller	K2
<b>CO5</b>	Illustrate the programming model of 8051 and implement them to design projects on real time problems	K3

### **DIGITAL SIGNAL PROCESSING (KEC-503)**

**Year of Study: 2021-22**

<b>CO1</b>	Design and describe different types of realizations of digital systems (IIR and FIR) and their utilities.	K4
<b>CO2</b>	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.	K4
<b>CO3</b>	Design FIR filter using various types of window functions.	K4
<b>CO4</b>	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.	K3
<b>CO5</b>	Define the concept of decimation and interpolation. Also, they will be able to implement it in various practical applications.	K2



## Department of Electronics & Communication Engineering

**Vision of the Department:** To be recognized as a Center of Excellence in Electronics and Communication Engineering by providing valuable resources to the students for the purpose of nurturing their knowledge and skills to serve the nation by solving the technological problems of modern society in the field of Electronics and Communication.

### **VLSI TECHNOLOGY (KEC-053)**

**Year of Study: 2021-22**

<b>CO1</b>	Interpret the basics of crystal growth, wafer preparation and wafer cleaning.	K2
<b>CO2</b>	Evaluate the process of Epitaxy and oxidation.	K3
<b>CO3</b>	Differentiate the lithography, etching and deposition process.	K2
<b>CO4</b>	Analyze the process of diffusion and ion implantation.	K4
<b>CO5</b>	Express the basic process involved in metallization and packaging.	K2

### **ELECTRONIC INSTRUMENTATION AND MEASUREMENTS (KEC-057)**

**Year of Study: 2021-22**

<b>CO1</b>	Classify the Instrumentation and Measurement system and various measurement errors.	K2
<b>CO2</b>	Analyze and design voltmeter circuits, AC electronic voltmeter, digital frequency meter and current measurement with electronic instruments.	K4
<b>CO3</b>	Evaluate various resistance and impedance measuring methods using Bridges and Q-meter.	K5
<b>CO4</b>	Analyze fundamental operation of CRO and some special type of oscilloscopes like DSO, Sampling oscilloscope.	K4
<b>CO5</b>	Demonstrate calibration method to calibrate various instruments and classify transducers like for force, pressure, motion, temperature measurement etc.	K2

### **OPTICAL COMMUNICATION (KEC-058)**

**Year of Study: 2021-22**

<b>CO1</b>	Define and explain the basic concepts and theory of optical communication.	K2
<b>CO2</b>	Describe the signal losses with their computation and dispersion mechanism occurring inside the optical fiber cable.	K2
<b>CO3</b>	Differentiate the optical sources used in optical communication with their comparative study.	K2
<b>CO4</b>	Identify different optical components on receiver side; assemble them to solve real world problems related to optical communication systems.	K2
<b>CO5</b>	Evaluate the performance of an optical receiver to get idea about power budget and ultimately be an engineer with adequate knowledge in optical domain.	K5

### **INTEGRATED CIRCUITS LAB (KEC-551)**

**Year of Study: 2021-22**

<b>CO1</b>	Design different non-linear applications of operational amplifiers such as log, antilog amplifiers and voltage comparators.	K4
<b>CO2</b>	Explain and design different linear applications of operational amplifiers such as filters.	K4
<b>CO3</b>	Demonstrate the function of waveforms generator using op-Amp.	K2
<b>CO4</b>	Construct multivibrator and oscillator circuits using IC555 and IC566 and perform measurements of frequency and time.	K4
<b>CO5</b>	Design and practically demonstrate the applications based on IC555 and IC566	K4



## Department of Electronics & Communication Engineering

**Vision of the Department:** To be recognized as a Center of Excellence in Electronics and Communication Engineering by providing valuable resources to the students for the purpose of nurturing their knowledge and skills to serve the nation by solving the technological problems of modern society in the field of Electronics and Communication.

### **MICROPROCESSOR & MICROCONTROLLER LAB (KEC-552)**

**Year of Study: 2021-22**

<b>CO1</b>	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.	K2
<b>CO2</b>	Examine 8085 & 8086 microprocessor and its interfacing with peripheral devices.	K2
<b>CO3</b>	State various conversion techniques using 8085 & 8086 and generate waveforms using 8085.	K2
<b>CO4</b>	Implement programming concept of 8051 Microcontroller.	K3
<b>CO5</b>	Design concepts to Interface peripheral devices with Microcontroller so as to design Microcontroller based projects.	K4

### **DIGITAL SIGNAL PROCESSING LAB (KEC-553)**

**Year of Study: 2021-22**

<b>CO1</b>	Create and visualize various discrete/digital signals using MATLAB/Scilab.	K3
<b>CO2</b>	Implement and test the basic operations of Signal processing.	K3
<b>CO3</b>	Examine and analyse the spectral parameters of window functions.	K4
<b>CO4</b>	Design IIR and FIR filters for band pass, band stop, low pass and high pass filters.	K4
<b>CO5</b>	Design the signal processing algorithms using MATLAB/Scilab.	K4

### **DIGITAL COMMUNICATION (KEC-601)**

**Year of Study: 2021-22**

<b>CO1</b>	To formulate basic statistics involved in communication theory.	K2
<b>CO2</b>	To demonstrate the concepts involved in digital communication.	K2
<b>CO3</b>	To explain the concepts of digital modulation schemes.	K2
<b>CO4</b>	To analyze the performance of digital communication systems.	K4
<b>CO5</b>	To apply the concept of information theory in digital systems.	K3

### **CONTROL SYSTEM (KEC-602)**

**Year of Study: 2021-22**

<b>CO1</b>	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.	K2
<b>CO2</b>	Explain the concept of state variables for the representation of LTI system.	K2
<b>CO3</b>	Interpret the time domain response analysis for various types of inputs along with the time domain specifications.	K3
<b>CO4</b>	Distinguish the concepts of absolute and relative stability for continuous data systems along with different methods.	K2
<b>CO5</b>	Interpret the concept of frequency domain response analysis and their specifications.	K3



## Department of Electronics & Communication Engineering

**Vision of the Department:** To be recognized as a Center of Excellence in Electronics and Communication Engineering by providing valuable resources to the students for the purpose of nurturing their knowledge and skills to serve the nation by solving the technological problems of modern society in the field of Electronics and Communication.

### **ELECTROMAGNETIC FIELD THEORY AND ANTENNA (KEC-603)**

**Year of Study: 2021-22**

<b>CO1</b>	Identify different coordinate systems and their applications in electromagnetic field theory to establish a relation between any two systems using the vector calculus.	K2
<b>CO2</b>	Explain the concept of static electric field, current and properties of conductors.	K2
<b>CO3</b>	Express the basic concepts of ground, space, sky wave propagation mechanism.	K2
<b>CO4</b>	Demonstrate the knowledge of antenna fundamentals and radiation mechanism of the antenna.	K3
<b>CO5</b>	Analyze and design different types of basic antennas.	K4

### **MICROCONTROLLER & EMBEDDED SYSTEMS (KEC-061)**

**Year of Study: 2021-22**

<b>CO1</b>	Explain the advance concept of 8051 architectures and AVR family architecture and compare them for different applications.	K2
<b>CO2</b>	To demonstrate the basics of MSP430x5x Microcontroller.	K2
<b>CO3</b>	To execute the I/O interfacing and peripheral devices associated with Microcontroller SoC (system on chip).	K3
<b>CO4</b>	Evaluate the data transfer information through serial & parallel ports and implement its interfacing with MSP430.	K5
<b>CO5</b>	Demonstrate the basics of IoT, WSN and its application sectors and design IoT based projects using MSP430 microcontroller.	K4

### **DIGITAL COMMUNICATION LAB (KEC-651)**

**Year of Study: 2021-22**

<b>CO1</b>	To formulate basic concepts of pulse shaping in digital communication.	K2
<b>CO2</b>	To identify different line coding techniques and demonstrate the concepts.	K3
<b>CO3</b>	To design equipment related to digital modulation and demodulation schemes.	K4
<b>CO4</b>	To analyze the performance of various digital communication systems and evaluate the key parameters.	K4
<b>CO5</b>	To conceptualize error detection & correction using different coding schemes in digital communication.	K3

### **CONTROL SYSTEM LAB (KEC-652)**

**Year of Study: 2021-22**

<b>CO1</b>	Classify different tools in MATLAB along with the basic matrix operations used in MATLAB.	K2
<b>CO2</b>	Evaluate the poles and zeros on s-plane along with transfer function of a given system.	K3
<b>CO3</b>	Construct state space model of a linear continuous system.	K5
<b>CO4</b>	Evaluate the various specifications of time domain response of a given system.	K4
<b>CO5</b>	Appraise the steady state error of a given transfer function.	K3
<b>CO6</b>	Examine the relative stability of a given transfer function using various methods such as root locus, Bode plot and Nyquist plot.	K4





## Department of Electronics & Communication Engineering

**Vision of the Department:** To be recognized as a Center of Excellence in Electronics and Communication Engineering by providing valuable resources to the students for the purpose of nurturing their knowledge and skills to serve the nation by solving the technological problems of modern society in the field of Electronics and Communication.

### **CAD FOR ELECTRONICS LAB (KEC-653B)**

**Year of Study: 2021-22**

<b>CO1</b>	Design and analyze the performance of different type of inverters.	K4
<b>CO2</b>	Design and analyze the performance of the basic logic gates using CMOS inverter circuit.	K4
<b>CO3</b>	Design and analyze the performance of the memory based digital circuits using CMOS inverter circuit.	K4
<b>CO4</b>	Analyze the performance of the different configuration of MOS amplifier circuits.	K4

### **CLOUD COMPUTING (ROE-073)**

**Year of Study: 2021-22**

<b>CO1</b>	Articulate the main concepts, key technologies, strengths and limitations of cloud computing.	K2
<b>CO2</b>	Learn the key and enabling technologies that help in the development of cloud.	K2
<b>CO3</b>	Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models.	K3
<b>CO4</b>	Explain the core issues of cloud computing such as resource management and security.	K2
<b>CO5</b>	To appreciate the emergence of cloud as the next generation computing paradigm.	K2

### **UNDERSTANDING THE HUMAN BEING COMPREHENSIVELY – HUMAN ASPIRATIONS AND ITS FULFILLMENT (ROE-074)**

**Year of Study: 2021-22**

<b>CO1</b>	To discuss a holistic vision towards life through Self Exploration and to appreciate the essential complementarities between Values & Skills ensuring sustained happiness and prosperity, the core aspirations of all human beings.	K2
<b>CO2</b>	To understand human being as a co-existence of the sentient “I” and the material “Body” and the correct appraisal of Physical Needs and the meaning of prosperity in detail.	K2
<b>CO3</b>	To interpret 9 feelings (values) in relationship to ensure justice and to make programmes to achieve comprehensive human goals like- Education-Right Understanding, Health-Education, Justice-Preservation, Production-Work and Exchange-Storage, leading towards an Undivided Society (“Akhand Samaj”).	K3
<b>CO4</b>	To relate and visualize interconnectedness and mutual fulfillment among the four orders of nature, recyclability and self-regulation in nature.	K3
<b>CO5</b>	To acquire competence in professional ethics. Ability to identify and develop more people and eco-friendly appropriate technologies and management patterns.	K2

### **INFORMATION THEORY & CODING (REC-071)**

**Year of Study: 2021-22**

<b>CO1</b>	Model the Entropy, Joint Entropy and Conditional Entropy, Relative Entropy and Mutual Information, Relationship Between Entropy and Mutual Information.	K2
<b>CO2</b>	Design Data Compression, Examples of Codes, Kraft Inequality, Optimal Codes, Bounds on the Optimal Code Length.	K5
<b>CO3</b>	Identify the Examples of Channel Capacity, Symmetric Channels, Properties of Channel Capacity, Preview of the Channel Coding Theorem.	K4
<b>CO4</b>	Analyse Introduction to block codes, Single-parity-check codes, Product codes, Repetition codes, Hamming codes.	K4
<b>CO5</b>	Design Generator matrices for convolutional codes, Generator polynomials for convolutional codes.	K5



## Department of Electronics & Communication Engineering

**Vision of the Department:** To be recognized as a Center of Excellence in Electronics and Communication Engineering by providing valuable resources to the students for the purpose of nurturing their knowledge and skills to serve the nation by solving the technological problems of modern society in the field of Electronics and Communication.

### **OPTICAL COMMUNICATION (REC-075)**

**Year of Study: 2021-22**

<b>CO1</b>	Familiarize with basic concepts and theory of Optical Communication.	K2
<b>CO2</b>	Demonstrate OPCOMM components, assemble them and solve problems on Optical Communication system.	K5
<b>CO3</b>	Able to design, implements, analyse and maintains optical communication system.	K4
<b>CO4</b>	Gain knowledge of different source of light as well as receiver and their comparative study.	K4
<b>CO5</b>	To get idea about power budget and ultimately be an engineer with adequate knowledge in optical domain.	K5

### **DATA COMMUNICATION NETWORKS (REC-701)**

**Year of Study: 2021-22**

<b>CO1</b>	Identify the issues and challenges in the architecture of a network.	K2
<b>CO2</b>	Understand the ISO/OSI seven layers in a network.	K2
<b>CO3</b>	Realize protocols at different layers of a network hierarchy	K4
<b>CO4</b>	Recognize security issues in a network.	K4

### **VLSI DESIGN (REC-702)**

**Year of Study: 2021-22**

<b>CO1</b>	Model the behaviour of a MOS Transistor	K3
<b>CO2</b>	Design combinational and sequential circuits using CMOS gates	K5
<b>CO3</b>	Identify the sources of power dissipation in a CMOS circuit.	K4
<b>CO4</b>	Analyse SRAM cell and memory arrays	K4

### **OPTICAL COMMUNICATION LAB (REC-751)**

**Year of Study: 2021-22**

<b>CO1</b>	Ability to identify and study different types of types of cables, connectors and different commands in networking.	K2
<b>CO2</b>	Able to make subnet and configure router and DHCP servers.	K4
<b>CO3</b>	Able to configure VLAN.	K4
<b>CO4</b>	Able to setup fiber optic analog link & able to understand characteristic parameter in fiber and losses in optical fiber.	K4
<b>CO5</b>	Understanding of multiplexing, encoding technique.	K2

### **ELECTRONIC CIRCUIT DESIGN LAB (REC-752)**

**Year of Study: 2021-22**

<b>CO1</b>	Understand Universal op-amp based biquad.	K2
<b>CO2</b>	Identify amplitude control or stabilization applied to any sinusoidal oscillators and Op-amp/ OTA based function generator.	K3
<b>CO3</b>	Design log/antilog circuits and identify applications of analog multiplier/ divider.	K5
<b>CO4</b>	Understand digital system design and its hardware implementation using TTL/ CMOS ICs and any circuit idea (not studied in the course) using 555 Timer in conjunction with any other ICs.	K3
<b>CO5</b>	Design the circuit, Make hardware and measure various parameters and Simulation in Spice of the designed circuit.	K5



## Department of Electronics & Communication Engineering

**Vision of the Department:** To be recognized as a Center of Excellence in Electronics and Communication Engineering by providing valuable resources to the students for the purpose of nurturing their knowledge and skills to serve the nation by solving the technological problems of modern society in the field of Electronics and Communication.

### **INDUSTRIAL TRAINING VIVA-VOCE (REC-753)**

**Year of Study: 2021-22**

<b>CO1</b>	The Industrial interaction is to help students gain first hand information regarding functioning of the Industry Which presents the students with opportunities to plan, organize and engage in active learning experiences both inside and outside the classroom.	K2
<b>CO2</b>	It helps to bridge the gap between classroom and the real field world.	K3
<b>CO3</b>	Students are benefited to learn about “real life” examples of business and engineering management.	K2
<b>CO4</b>	Industrial interaction makes students understand the subject to its core and its deeper practical experiences in real field situation.	K3
<b>CO5</b>	Interaction to manufacturing firms are useful for students. to understand the nuances and realities of the shop floor, which in itself is a rare exposure. By visiting the shop floor they get to understand the risky conditions in which workers work, the people management challenges involved in managing workers apart from getting hands-on technical knowledge.	K4

### **PROJECT-I (REC-754)**

**Year of Study: 2021-22**

<b>CO1</b>	Student should be able to manage project as a member of team to use the technique, skill and modern engineering tools and to collect and disseminate information related to selected project	K4
<b>CO2</b>	Students should be able to create solutions to authentic (real world and ill-defined) problems.	K6
<b>CO3</b>	Students should be able to design a system, component or process to meet desired need within realistic constraints.	K5
<b>CO4</b>	Students should be able to develop an action plan to improve presentation skills and have the confidence to make more of an impact on their audience.	K4
<b>CO5</b>	Students will be able to write research-based documents, including journal and conference papers.	K4

### **ELECTRONICS SWITCHING (REC-080)**

**Year of Study: 2021-22**

<b>CO1</b>	Describe and apply fundamentals of telecommunication systems and associated technologies.	K3
<b>CO2</b>	Solve problems and design simple systems related to tele-traffic and trunking efficiency.	K5
<b>CO3</b>	Understand and explain the reasons for switching, and the relative merits of the possible switching modes, e.g. packet and circuit switching.	K4
<b>CO4</b>	Understand the principles of the internal design and operation of telecommunication switches, and the essence of the key signaling systems that are used in telecommunication networks.	K2

### **WIRELESS & MOBILE COMMUNICATION (REC-085)**

**Year of Study: 2021-22**

<b>CO1</b>	Familiarize with various generations of mobile communications.	K2
<b>CO2</b>	Understand the concept of cellular communication.	K2
<b>CO3</b>	Understand the basics of wireless communication	K2
<b>CO4</b>	Understand GSM mobile communication standard, its architecture, logical channels, advantages and limitations.	K4
<b>CO5</b>	Gain knowledge of IS-95 CDMA mobile communication standard, its architecture, logical channels, advantages and limitations	K4
<b>CO6</b>	Gain knowledge of 3G mobile standards and their comparison with 2G technologies.	K4



## Department of Electronics & Communication Engineering

**Vision of the Department:** To be recognized as a Center of Excellence in Electronics and Communication Engineering by providing valuable resources to the students for the purpose of nurturing their knowledge and skills to serve the nation by solving the technological problems of modern society in the field of Electronics and Communication.

### **GD & SEMINAR (REC-851)**

**Year of Study: 2021-22**

<b>CO1</b>	Able to identified important concepts from the readings and provided depth in coverage of the topic.	K2
<b>CO2</b>	Able to work in a group.	K2
<b>CO3</b>	Developed effective group communication and presentation skills.	K3
<b>CO4</b>	Developed self-management & reflection skills.	K3
<b>CO5</b>	Able to write technical documents and give oral presentation.	K4

### **MAJOR PROJECT (REC-852)**

**Year of Study: 2021-22**

<b>CO1</b>	Student should be able to manage project as a member of team to use the technique, skill and modern engineering tools and to collect and disseminate information related to selected project.	K4
<b>CO2</b>	Students should be able to create solutions to authentic (real world and ill-defined) problems.	K6
<b>CO3</b>	Students should be able to design a system, component or process to meet desired need within realistic constraints.	K5
<b>CO4</b>	Students should be able to develop an action plan to improve presentation skills and have the confidence to make more of an impact on their audience.	K4
<b>CO5</b>	Students will be able to write research-based documents, including journal and conference papers.	K4

# CO MAPPING PROCESS

**DIGITAL SYSTEM DESIGN (KEC-302)**

**Year of Study: 2021-22**

Course Code	Course Outcome	Knowledge Level
<b>C206.1</b>	Design and analyze combinational logic circuits.	K5
<b>C206.2</b>	Design and analyze modular combinational circuits with MUX / DEMUX, Decoder & Encoder	K5
<b>C206.3</b>	Design & analyze synchronous sequential logic circuits	K5
<b>C206.4</b>	Analyze various logic families.	K4
<b>C206.5</b>	Design ADC and DAC and implement in amplifier, integrator, etc.	K5

<b>DIGITAL SYSTEM DESIGN (KEC-302) C-206</b>							<b>Year of Study: 2021-22</b>					
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>CO206.1</b>	3	3										
<b>CO206.2</b>	3	3										
<b>CO206.3</b>	3	3										
<b>CO206.4</b>	3	3										
<b>CO206.5</b>	3	3										
<b>CO206</b>	<b>3</b>	<b>3</b>										

  

CO	PSO1	PSO2	PSO3
<b>CO206.1</b>	3		
<b>CO206.2</b>	3		
<b>CO206.3</b>	3		
<b>CO206.4</b>	3		
<b>CO206.5</b>	3		
<b>CO206</b>	<b>3</b>		

## PO & PSO MAPPING

S.No.	CO	SUBJECT CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	C202	KEC-303	3	3										
2	C203	KEC-301	2											
3	C204	KEC-403	3	2	2	2								
4	C206	KEC-302	3	3										
5	C207	KVE-401								3				3
6	C209	KEC-353	2									3	2	
7	C211	KEC-352	2									3	2	
8	C212	KEC-351	2									3	2	
9	C213	KAS-402	2	2										
10	C214	KEC-354	3	3	3	3	2					3	3	

S.No.	CO	SUBJECT CODE	PSO1	PSO2	PSO3
1	C202	KEC-303	3		
2	C203	KEC-301	2		
3	C204	KEC-403	3		
4	C206	KEC-302	3		
5	C207	KVE-401			3
6	C209	KEC-353	3		
7	C211	KEC-352	2	2	
8	C212	KEC-351	2	2	
9	C213	KAS-402	3		
10	C214	KEC-354	2		

# Program Outcomes & Course Outcomes

## PO & PSO Attainment (2021-2022)

CO	SUBJECT CODE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C202	KEC-303	1.67	1.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C203	KEC-301	1.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C204	KEC-403	1.67	1.11	1.11	1.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Original C206	KEC-302	1.33	1.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Weighted C 206 (80%)	KEC-302	1.064	1.064										
<b>AVERAGE</b>		<b>1.58</b>	<b>1.60</b>	<b>1.85</b>	<b>1.66</b>	<b>2.29</b>	<b>1.42</b>	<b>1.42</b>	<b>1.66</b>	<b>2.21</b>	<b>1.98</b>	<b>1.94</b>	<b>1.65</b>
<b>80% AVERAGE</b>		<b>1.26</b>	<b>1.28</b>	<b>1.48</b>	<b>1.33</b>	<b>1.83</b>	<b>1.14</b>	<b>1.14</b>	<b>1.32</b>	<b>1.76</b>	<b>1.59</b>	<b>1.55</b>	<b>1.32</b>

CO	SUBJECT CODE	PSO1	PSO2	PSO3
C202	KEC-303	1.67	0.00	
C203	KEC-301	1.11	0.00	
C204	KEC-403	0.00	0.00	0.00
Original C206	KEC-302	1.33	0.00	
Weighted C 206 (80%)	KEC-302	1.064		
<b>AVERAGE</b>		<b>0.83</b>	<b>0.39</b>	<b>0.04</b>
<b>80% AVERAGE</b>		<b>0.66</b>	<b>0.31</b>	<b>0.03</b>