National Education Society (R.)

Jawaharlal Nehru New College of Engineering, Shivamogga

(Approved by AICTE, New Delhi, Certified by UGC 2f & 12B, Accredited by NAAC –'B', UG programs:CE,ME,EEE,ECE,CSE,ISE, ETE PG Programs: MBA, acredited by NBA:1.7.2022 to 30.6.2025, Recognized by Govt. of Karnataka and Affiliated to VTU, Belagavi)

INTERNAL QUALITY ASSURANCE CELL (IQAC)

2018 Scheme

Sl.No	Branch	Sem	Subject	CO,S
1	TCE	3	Transform Calculus, Fourier Series and Numerical Techniques Mathematics (18MAT31)	1. To remember the definition of Laplace transform, Fourier series, Fourier transform, Z-transform, formulae of numerical methods and calculus of variation.
				2. To understand the concept of Periodic function, Unit-Step function, Convolution theorem in Laplace transform, Fourier series of Period 2pi, arbitrary period 2l, half range series, Fourier series and Z-transform, numerical methods and calculus of variations.
				3. To apply the concept of Laplace transform in 2nd and higher order linear differential equations, Harmonic analysis in Fourier series, Z-transform in difference equation, numerical solution of O.D.E's by various numerical methods and Euler's equation, Geodesics in calculus of variation.
2		3	Network Theory (18EC32)	1. Apply suitable techniques and theorems to compute currents and voltages in electrical networks
				2. Apply Laplace transform to compute network parameters

				3. Analyse electrical networks under transient conditions
				4. Design the resonant circuits and two port network parameters using related parameters
3		3	Electronic Devices (18EC33)	1. CO1 • Understand the principles of semiconductor Physics •
				2. CO2. •Understand the principles and characteristics of different types of semiconductor devices •
				3. CO3 •.Understand the fabrication process of semiconductor devices.
				4. CO4 • Utilize the mathematical models of semiconductor junctions and MOS transistors for circuits and system.
4		3	Digital System Design (18EC34)	1. Use the basic logic gates and various reduction techniques of digital logic circuits.
				2. Design the combinational logic systems viz: decoders, encoders, multiplexers.
				3. Design sequential circuits using SR, JK, D and T flip flops.
				4. Design applications of Combinational & Sequential Circuits.
5		3	Computer Organization & Architecture (18EC35)	1. Describe the basic organization of a computer system.
				2. Describe the different ways of accessing I/O devices.
				3. Illustrate the organization of memory system.
				4. Analyse instruction execution in a processor.
6		3	Power Electronics & Instrumentation (18EC36)	1. Understand the principle of operation and characteristics of SCR and UJT
				2. Apply the basic principles of SCRs in designing converter/inverter circuits

				3. Apply the basic principles of measurement for various measuring instruments
				4. Apply the basic knowledge of instrumentation to understand transducers and PLCs
7		3	Electronic Devices & Instrumentation Laboratory (18ECL37)	1. Understand the characteristics of various electronic devices and measurement of parameters.
				2. Design and test simple electronic circuits.
				3. Analyse the characteristics of electronic circuits and devices using Simulation Software.
8		3	Digital System DesignLaboratory (18ECL38)	1. Demonstrate the TT of various expressions and combinational circuits using logic gates
				2. Design various combinational circuits
				3. Design flip flops counters and shift registers
				4. simulate serial adder and binary multiplier
9		4	Complex Analysis, Probability And Statistical Methods (18MAT41)	1. CO 1. Remember the concept of probability to solve the problems on probability distribution and joint probability distribution.
				2. CO 2. Understand the concept of correlation, regression and curve fitting.
				3. CO3. Demonstrate testing of hypothesis of sampling distribution.
				4. CO4. Apply the knowledge of complex differentiation and complex integration in diverse fields related to field theory and signal processing.
10		4	Additional Mathematics - 2 (18MATDIP41)	1. Solve rank of matrix by elementary row operations - Echelon form. Consistency of system of linear equations - Gauss elimination method

13			4		2. Demonstrate various physical models through 2nd and higher order linear differential equation and solve such equations.
					3. Construct a variety of Partial differential equation and solution by direct integration , method of separation of variables
					4. Apply the knowledge of numerical methods, infinite series and series solution of ordinary differential equation to explain various physical and engineering problems.
11			4	Analog Circuits (18EC42)	1. Understand the biasing of BJTs, FETs and functioning of linear ICs
					2. Apply the basics of semiconductor devices to obtain frequency response
					3. Analyze the applications of semiconductor devices
					4. Design applications using semiconductor devices
12			4	Control Systems (18EC43)	1. Develop the mathematical model of mechanical and electrical systems
					2. Develop transfer function for a given control system using block diagram reduction techniques and signal flow graph method.
					3. Determine the time domain specifications for first and second order systems
					4. Determine the stability of a system in the time domain using Routh- Hurwitz criterion and Root-locus technique
					5. Determine the s stability of a system in the frequency domain using Nyquist and bode plots
13			4	Engineering Statistics & Linear Algebra (18EC44)	1. Apply the concept of Random Variables and Random Processes in Communication System

					2. Model the Random events in typical communication events to extract quantitative statistical parameters.
					3. Analyze typical signal sets in terms of basis function of amplitude, phase and frequency.
					4. Demonstrate by way of simulation or emulation the ease of analysis employing basis functions, statistical representation and Eigen values.
14			4	Signals & Systems (18EC45)	1. Apply mathematical descriptions to continuous and discrete time signals and systems.
					2. Apply the properties of impulse response to determine output and characteristics of LTI systems.
					3. Analyse the spectral characteristics of signals using Fourier analysis.
					4. Analyze the signals in Z-domain and recover time domain signal using inverse transforms.
15			4	Microcontroller (18EC46)	1. Apply the basic knowledge of processor architecture in Embedded System design
					2. Design 8051 microcontroller based programs using assembly / high-level language
					3. Design programs based on timers and interrupts
					4. Design interfacing circuits to 8051 Microcontroller
16			4	Microcontroller Laboratory (18ECL47)	1. Apply the fundamentals of assembly level programming to demonstrate simple applications

				2. Develop assembly level programs to simulate code conversions and sorting operations
				3. Develop assembly level programs to simulate counters
				4. Interface 8051 microcontroller to peripheral devices.
17		4	Analog Circuits Laboratory (18ECL48)	1. Design analog circuits using BJT/FETs and evaluate their performance characteristics.
				2. Design analog circuits using OPAMPs for different applications.
				3. Analyse and simulate analog circuits using transistors and OP-AMPs.
18		4	Maths for Communication Engineers (21MAT41)	1. Use the concept of Analytic function and complex potential to solve the problems in electro magnetic theory and complex integration in airfoil and image processing.
				2. Obtain series solution ODEs
				3. Fit an appropriate mathematical model for the statistical data by using correlation and regression analysis.
				4. Apply discrete and continuous probability distribution in engg. field
				5. Construct joint probability distribution and testing the hypothesis
19		4	Digital Signal Processing (21EC42)	1. Understand the Discrete Fourier transform, digital filters and DSP architecture
				2. Apply Discrete Fourier Transform to determine the spectrum of real & complex signals and filtering of long data sequences.
				3. Apply divide & conquer approach to compute DFT.
				4. Develop FIR and IIR filters using different techniques

20		4	Circuits & Controls (21EC43)	1. Analyse and solve Electric circuit by applying , loop analysis, Nodal analysis and by applying network theorems
				2. Evaluate two port parameters of s network and Apply Laplace transform to solve electric network.
				3. Interpret different physical and mechanical systems in terms of electrical system to construct equivalent electrical models for analysis.
				4. Apply various control system concepts to analyze and find the stability of the system.
				5. Represent state model of the system and find the time response of the system.
21		4	Communication Theory (21EC44)	1. Compare the performance of different types of amplitude modulation schemes.
				2. Analyse angle modulation schemes and its effects in time and frequency domain.
				3. Analyse the effect of noise in analog modulation systems
				4. Apply the concepts of sampling process and waveform coding techniques on different types of signals
22		4	Universal Human Values (21UH49)	1. Understand and analyse the essentials of human values and skills, self-exploration, happiness and prosperity.
				2. Evaluate coexistence of the "I" with the body.
				3. Identify and evaluate the role of harmony in family, society and universal order.
				4. Understand and associate the holistic perception of harmony at all levels of existence.

					5. Develop appropriate technologies and management patterns to create harmony in professional and personal lives.
23		4		Octave / Scilab for signals (21EC483)	1. Demonstrate the signal generation and sampling.
					2. Develop a Scilab program to simulate signal processing operations.
					3. Design IIR and FIR filters.
					4. Design, demonstrate and visualize different real world signals
24		4		Communication Laboratory I (21ECL46)	1. Demonstrate the AM and FM modulation and demodulation by representing the signals in time and frequency domain
					2. Design and test the sampling, Multiplexing and PAM with relevant circuits
					3. Demonstrate the basic circuitry and operations used in AM and FM receivers.
					4. Illustrate the operation of PCM and delta modulations for different input conditions.
25		5		Technological Innovation Management And Entrepreneurship (18ES51)	1. Understand the fundamental concepts of Management and Entrepreneurship and opportunities in order to setup a business.
					2. Describe the functions of Managers, Entrepreneurs and their social responsibilities.
					3. Understand the components in developing a business plan.
					4. Awareness about various sources of funding and institutions supporting entrepreneurs.
26		5		Digital Signal Processing (18EC52)	1. Understand the Discrete Fourier transform, digital filters and DSP architecture
					2. Apply Discrete Fourier Transform to determine the spectrum of real & complex signals and filtering of long data sequences.

					3. Apply divide & conquer approach to compute DFT.
					4. Develop FIR and IIR filters using different techniques.
27		5		Principles of Communication Systems (18EC53)	1. Compare the performance of different types of amplitude modulation schemes.
					2. Analyze angle modulation schemes and its effects in time and frequency domain.
					3. Analyze the effect of noise in analog modulation systems.
					4. Apply the concepts of sampling process and waveform coding techniques on different types of signals.
28		5		Information Theory & Coding (18EC54)	1. Apply the basic concept of information theory to characterize Dependent & IndependentSources
					2. Apply Source Encoding Algorithms to encode the data
					3. Model the continuous and discrete communication channels using input, output, and jointprobabilities
					4. Determine a codeword comprising of the check bits computed using error control codingtechniques
					5. Design the encoding and decoding circuits in channel coding
29		5		Electromagnetic Waves (18EC55)	1. Understand the basic concepts of electric field and magnetic field
					2. Apply the concepts of electric field in solving numerical problems
					3. Apply the concepts of Magnetic field in solving numerical problems
					4. Apply Maxwell 's equation for time varying fields for EM waves in free space and conductors

30		5	Verilog HDL (18EC56)	1. Identify the suitable Abstraction level for a particular digital design.
				2. Interpret the various constructs in logic synthesis.
				3. Design and verify the functionality of digital circuits/systems in different abstractionlevels using test benches.
				4. Design digital circuits effectively using Verilog tasks, functions and directives.
31		5	Digital Signal Processing Laboratory (18ECL57)	1. Handle discrete/digital signals using MATLAB.
				2. Design the signal processing algorithm using MATLAB.
				3. Design IIR, and FIR filters for band pass, band stop, low pass and high pass filters.
				4. Implement DSP algorithms on DSP processor TMS320C6713 floating point Processor using C language
32		5	HDL Laboratory (18ECL58)	1. Write the Verilog/VHDL Programs to simulate Combinational circuits in Dataflow, Bihavioral and Gate level Abstractions.
				2. Describe Sequential circuits like flip flops and counters in Bihavioral Description and obtain simulation waveforms.
				3. Synthesize Combinational and Sequential circuits on programmable ICs and test the hardware.
				4. Interface the hardware to the programmable chips and obtain the required output.
33		6	Digital Communication (18EC61)	1. Explain the basic concepts of digital communication system.
				2. Apply the knowledge of signal representation and transmission over AWGN channels.

				3. Analyze the performance of a digital communication system in light of transmission over AWGN channels and band-limited channels.
				4. Design the transmitter and receiver for signaling over AWGN channels and band-limited channels.
				5. Design communication and signaling subsystem using open source tools.
34		6	Microwave Theory & Antennas (18TE62)	1. Know the Principle Of Operation Of Microwavetubes
				2. Understand the concepts of S- Parameters and various Microwave passive components
				3. Understand the basic basic parameters as applied to Antennas.
				4. Analyse Antennas and Array of Antennas.
35		6	Computer Communication Networks (18TE63)	1. Explain the basic concepts of data communications, networking and topology of wired / wireless networks.
				2. Apply the knowledge of data link and network layers in communication protocol design
				3. Apply the knowledge of transport layer and application layers in communication protocol design
				4. Simulate networking concepts and routing protocols using programming and open source tool
36		6	Operating System (18EC641)	1. Understand the basic terminologies and compare different classes of Operating Systems
				2. Apply the concepts of Processes, Threads and Memory Management in Real Time Scenarios

				3. Select a suitable Scheduling Algorithm for a given set of processes
				4. Apply the concept of Process communication in Message passing, File systems and Input Output Control System
37		6	CCN Laboratory (18TEL66)	1. Understand the services offered by different layers of layered network architecture.
				2. Model and Analyze packet /file transmission between nodes for wired/wireless local area network (LAN) (TCP/UDP) using NCTUNs.
				3. Simulate the networking concepts and protocols using C/C++ programming.
				4. Analyze the performance of various protocols and routing algorithms of layered network architecture.
38		6	Analog And Digital Communication Laboratory (18TEL67)	1. Demonstrate Time Division Multiplexing
				2. Design and test Analog and Digital Modulation and demodulation circuits.
				3. Design and Generate Line codes for Signal Transmission.
				4. Analyse the characteristics of an optical communication system.
				5. Simulate the Digital Communication concepts, Compute and Display various parameters along with Plots/Fi
39		6	Mini-project (18TEMP68)	1. Apply the knowledge of engineering fundamentals, Consolidate the literature survey to formulate the engineering problem.
				2. Identify the community that shall benefit through the solution to the identified engineering problem and also demonstrate concern for the environment and society.

				3. Implement the design solution(s) using identified tools.
				4. Analyze and interpret the results of experiments conducted on the designed solution(s) to arrive at a valid conclusion.
				5. Engage in effective oral and written communication through the presentation of the project work.
				6. Perform in the team, contribute to the team and mentor/lead the team and follow professional ethics.
40		7	Optical Communication (18TE71)	1. Classification and working of optical fiber with different modes of signal propagation
				2. Describe the transmission characteristics and losses in optical fiber communication
				3. Describe the construction and working principle of optical connectors, multiplexers and amplifiers
				4. Describe the constructional features and the characteristics of optical sources and detectors
				5. Illustrate the networking aspects of optical fiber and describe various standards associated with it
41		7	Wireless Communication (18TE72)	1. Understand the concepts of propagation mechanisms in wireless channels from a physics standpoint.
				2. Analyse propagation model for simple channels involving two paths only using concepts studied from physics.
				3. Develop a statistical model for practical channels involving multiplicity of propagation paths and its application in a cellular scenario.

				4. Application of Communication theory both Physical and networking to understand GSM and CDMA systems that handle mobile telephony
42		7	Real Time System (18EC731)	1. Understand the fundamentals of real Time systems and its classifications
				2. Understand the concepts of computer control and operating systems
				3. Understand the concepts of computer hardware requirements for real time applications
				4. Develop the software languages to meet real time application
				5. Apply suitable methodologies to design and develop real Time systems
43		7	Cryptography (18EC744)	1. Understand the basics of symmetric key and public key cryptography
				2. Explain classical cryptographic algorithms
				3. Acquire knowledge of mathematical concepts required for cryptography
				4. Describe psuedo random number generation technique
				5. Explain symmetric and asymmetric cryptographic algorithms
44		7	Arm Embedded Systems (18EC753)	1. Describe the architectural features and instructions of the ARM microcontroller
				2. Apply the knowledge gained for Programming ARM for different applications.
				3. Recognize the importance of the Thumb mode of operation of ARM processors
				4. Describe the techniques involved in writing C code for ARM processors and Exception &Interrupt handling in ARM Processors

				5. Describe the importance and use of Firmware, OS and cache in ARM Embedded systems
45		7	Wireless Communication Laboratory (18TEL76)	1. Use simulation tools to demonstrate various aspects of the communicationprocess.
				2. Demonstrate the modulation/demodulation based on BPSK/QPSK-OFDM,GMSK, TDM.
				3. Analyze the properties/performance of CDMA based codes.
				4. Model the Ti Carrier bit stream.
				5. Develop codes to characterize and compute the parameters of different channel models of wireless networks.
46		7	Microwave & Antennas Laboratory (18TEL77)	1. Explain the mode characteristics of reflex klystron oscillator
				2. Demonstrate the performance and extract s-parameters for various microwave components
				3. Plot the radiation pattern and find the intensity, polarization of an antenna/array, and prove reciprocity theorem as applied to antenna
				4. analyze and measure impedance of given microwave component
				5. Explain and find three point method of obtaining equivalent circuit parameters and find dilectric strength
47		7	Project Work Phase - 1 (18TEP78)	1. Consolidate the literature search to identify and formulate the engineering problem
				2. Identify the community that shall benefit through the solution to the identified engineering problem and also demonstrate concern for the environment and society

50			8		3. Arrive at a list of available engineering tools that may be used for solving the identified engineering problem
					4. Engage in effective oral and written communication of the project work
					5. Ability to perform with the team, contribute to the team and mentor/lead the team
48		8	Advanced Cellular Communication (18TE81)		1. Understand the basics of LTE standardization phases and specifications.
					2. Explain the system architecture of LTE and E-UTRAN, the layer of LTE, based on the use of OFDMA and SC-FDMA principles.
					3. Analyse the role of LTE radio interface protocols to set up, reconfigure and release the Radio Bearer, for transferring the EPS bearer.
					4. Interpret the main factors affecting LTE performance including mobile speed and transmission bandwidth.
49		8	Network Security (18EC821)		1. Explain network security services and mechanisms and explain security concepts
					2. Understand the concept of Transport Level Security and Secure Socket Layer.
					3. Explain Security concerns in Internet Protocol security
					4. Explain Intruders, Intrusion detection and Malicious Software
					5. Describe Firewalls, Firewall Characteristics, Biasing and Configuration
50		8	Internship (18TEI85)		1. Acquire fundamental knowledge about a specific technical domain
					2. Design the hardware/software related to the work undertaken

Sl.No	Branch	Sem	Subject	CO,S
51		8	Project Work Phase 2 (18TEP83)	3. Analyze the results of the work carried out
				4. Demonstrate the professional skill-sets
				1. Understand fundamental knowledge about a specific technical domain.
				2. Design the hardware/software related to work undertaken.
				3. Analyze and interpret results of experiments conducted on the designed solution(s) to arrive at a result-based conclusion.
				4. Demonstrate professional skill-sets.
				5. Work in a team and perform as a leader with ethical concerns.
52		8	Technical Seminar (18TES84)	1. Identify and Understand the Recent Advancements in the field of Electronics and Telecommunication
				2. Prepare the Effective presentations on the chosen topic of interest.
				3. Deliver the presentation effectively in front of the Audience
				4. Prepare the Technical Document on the Topic Chosen.

2021 Scheme

Sl.No	Branch	Sem	Subject	CO,S
1	TCE	3	Transform Calculus, Fourier Series and Numerical Techniques (21MAT31)	1. To solve ordinary differential equations using Laplace transform.
				2. Demonstrate the Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing and field theory.

					3. To use Fourier transforms to analyze problems involving continuous-time signals and to apply Z-Transform techniques to solve difference equations
					4. To solve mathematical models represented by initial or boundary value problems involving partial differential equations
					5. Determine the extremals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.
2	TCE		3	Digital System Design using Verilog (21EC32)	1. Simplify Boolean functions using K-map and Quine-McCluskey minimization technique
					2. Analyze and design for combinational logic circuits
					3. Analyze the concepts of Flip Flops (SR, D, T and JK) and to design the synchronous sequential circuits using Flip Flops.
					4. Model Combinational circuits (adders, subtractors, multiplexers) and sequential circuits using Verilog descriptions
3			3	Basic Signal Processing (21EC33)	1. Understand the basics of Linear Algebra
					2. Analyze different types of signals and systems
					3. Analyze the properties of discrete-time signals & systems
					4. Analyze discrete-time signals & systems using Z transforms
4			3	Analog Electronics Circuits (21EC34)	1. Understand the characteristics of BJTs and FETs for switching and amplifier circuits

				2. Design and analyze FET amplifiers and oscillators with different circuit configurations and biasing conditions
				3. Understand the feedback topologies and approximations in the design of amplifiers and oscillators
				4. Design of circuits using linear ICs for wide range applications such as ADC, DAC, filters and timers
				5. Understand the power electronic device components and its functions for basic power electronic circuits.
5		3	Constitution of India and Professional Ethics (21CIP37)	1. To know about the basic structure of Indian Constitution
				2. To know the Fundamental Rights (FR's), DPSP's and Fundamental Duties (FD's) of our constitution.
				3. To know about our Union Government, political structure & codes, procedures.
				4. To know the State Executive & Elections system of India.
				5. To learn the Amendments and Emergency Provisions, other important provisions given by the constitution
6		3	LIC Lab using Pspice / MultiSIM (21EC383)	1. Sketch/draw circuit schematics, construct circuits and troubleshoot circuits containing op-amps, resistors, diodes, capacitors and independent sources.
				2. Analyze and verify the operation of analog integrated circuits like Amplifiers, Precision Rectifiers, Comparators and Waveform generators.
				3. Design and implement analog integrated circuits like Oscillators, Active filters, Timer circuits, Data converters and

					compare the experimental results with theoretical values.
7		3		Analog & Digital Electronics Lab (21ECL35)	1. Design and analyse the BJT/FET amplifier and oscillator circuits
					2. Design and test Opamp circuits to realise the mathematical computations, DAC and precision rectifiers
					3. Design and test the combinational logic circuits for the given specifications
					4. Test the sequential logic circuits for the given functionality
					5. Demonstrate the basic electronic circuit experiments using SCR and 555 timer.
8		3		Social Connect and Responsibility (21SCR36)	1. Understand social responsibility
					2. Practice sustainability and creativity
					3. Showcase planning and organizational skills
9		4		Maths for Communication Engineers (21MAT41)	1. Use the concept of Analytic function and complex potential to solve the problems in electromagnetic theory and complex integration in airfoil and image processing.
					2. Obtain series solution ODEs
					3. Fit an appropriate mathematical model for the statistical data by using correlation and regression analysis.
					4. Apply discrete and continuous probability distribution in engg. field
					5. Construct joint probability distribution and testing the hypothesis
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					2. Apply Discrete Fourier Transform to determine the spectrum of real & complex signals and filtering of long data sequences.

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					2. Evaluate two port parameters of s network snd Apply Laplace transform to solve electric network.
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					4. Apply various control system concepts to analyze and find the stability of the system.
					5. Represent state model of the system and find the time response of the system.
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					4. Apply the concepts of sampling process and waveform coding techniques on different types of signals
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					2. Evaluate coexistence of the "I" with the body.
					3. Identify and evaluate the role of harmony in family, society and universal order.

				4. Understand and associate the holistic perception of harmony at all levels of existence.
				5. Develop appropriate technologies and management patterns to create harmony in professional and personal lives.
14		4	Octave / Scilab for signals (21EC483)	1. Demonstrate the signal generation and sampling.
				2. Develop a Scilab program to simulate signal processing operations.
				3. Design IIR and FIR filters.
				4. Design, demonstrate and visualize different real world signals
15		4	Communication Laboratory I (21ECL46)	1. Demonstrate the AM and FM modulation and demodulation by representing the signals in time and frequency domain
				2. Design and test the sampling, Multiplexing and PAM with relevant circuits
				3. Demonstrate the basic circuitry and operations used in AM and FM receivers.
				4. Illustrate the operation of PCM and delta modulations for different input conditions.