Department of Electronics & Communication Engineering

Year & Sem: I-I **Regulation:** R20

Course Name: LINEAR ALGEBRA & CALCULUS	**Course Code**: 20A54101
1	Develop the use of matrix algebra techniques that is needed by engineers for practical applications
2	Utilize mean value theorems to real life problems
3	Familiarize with functions of several variables which is useful in optimization
4	Also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems
5	Become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions

Course Name: APPLIED PHYSICS	**Course Code**: 20A56201T
1	Study the different realms of physics and their applications in both scientific and technological systems through physical optics
2	Identify the wave properties of light and the interaction of energy with the matter
3	Asses the electromagnetic wave propagation and its power in different media
4	Understands the response of dielectric and magnetic materials to the applied electric and magnetic fields
5	Study the quantum mechanical picture of subatomic world along with the discrepancies between the classical estimates and laboratory observations of electron transportation phenomena by free electron theory and band theory

Course Name: COMMUNICATIVE ENGLISH		**Course Code:** 20A52101T
1	Retrieve the knowledge of basic grammatical concepts	
2	Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English	
3	Apply grammatical structures to formulate sentences and correct word forms	
4	Analyze discourse markers to speak clearly on a specific topic in informal discussions	
5	Evaluate reading/listening texts and to write summaries based on global comprehension of these texts	

Course Name: FUNDAMENTALS OF ELECTRICAL CIRCUITS		**Course Code:** 20A02101T
1	Given a network, find the equivalent impedance by using network reduction techniques and determine the current through any element	
2	Given a network, find the equivalent impedance by using network reduction techniques and determine the voltage across and power through any element.	
3	Given a circuit and the excitation, determine the real power, reactive power, power factor etc,.	
4	Apply the network theorems suitably	
5	Determine the Dual of the Network, develop the Cut Set and Tie-set Matrices for a given Circuit. Alsounderstand various basic definitions and concepts	

Course Name: ENGINEERING DRAWING		**Course Code:** 20A03101T
1	Draw various curves applied in engineering	
2	Show projections of solids graphically	
3	Show projections sections graphically	
4	Draw the development of surfaces of solids	

Course Name: ENGINEERING GRAPHICS LAB		**Course Code:** 20A03101P
1	Use computers as a drafting tool	
2	Draw isometric drawings using CAD packages	
3	Draw orthographic drawings using CAD packages	

Course Name: APPLIED PHYSICS LAB		**Course Code:** 20A56201P
1	Operate optical instruments like microscope and spectrometer	
2	Determine thickness of a hair/paper with the concept of interference	
3	Estimate the wavelength of different colors using diffraction grating and resolving power	
4	Plot the intensity of the magnetic field of circular coil carrying current with distance	
5	Determine the resistivity of the given semiconductor using four probe method	

Course Name: COMMUNICATIVE ENGLISH LAB		**Course Code: 20A52101P**
1	Listening and repeating the sounds of English Language	
2	Understand the different aspects of the English language proficiency with emphasis on LSRW skills	
3	Apply communication skills through various language learning activities	
4	Analyze the English speech sounds, stress, rhythm, intonation and syllable	
5	Evaluate and exhibit acceptable etiquette essential in social and professional settings	

Course Name: FUNDAMENTALS OF ELECTRICAL CIRCUITS LAB		**Course Code: 20A02101P**
1	Remember various theorems and verify practically	
2	Understand various theorems and verify practically	
3	Apply various theorems and verify practically	
4	Understand and analyze active, reactive power measurements in three phase balanced circuits	
5	Understand and analyze active, reactive power measurements in three phase unbalanced circuits	

Year & Sem: II-I **Regulation:** R19

Course Name: Complex Variables and Transforms	**Course Code**: 19A54302
1	Understand the analyticity of complex functions and conformal mappings.
2	Apply Cauchy's integral formula and Cauchy's integral theorem to evaluate improper integrals along contours.
3	Understand the usage of Laplace Transforms, Fourier Transforms and Z transforms.
4	Evaluate the Fourier series expansion of periodic functions.

Course Name: SIGNALS AND SYSTEMS	**Course Code**: **19A04301**
1	Analyze the periodic signals by applying Fourier series.
2	Apply Fourier transform to solve problems.

3	Understand the properties of the discrete-time Fourier transform.
4	Analyse filter characteristics and physical realisation of LTI system.
5	Evaluate response of linear systems to known inputs by using Laplace transforms and Z transforms

Course Name: Electronic Devices and Circuits	**Course Code**:19A04302T
1	Study the characteristics and operation of p-n junction diode
2	Explain V-I Characteristics of Zener Diode and other special diodes such as Tunnel diode, Photo diode, SCR, UJT
3	Explain working of half wave, full wave Rectifiers and applications of Filters.
4	Describe basic transistor amplifier circuits and its biasing using BJT
5	Analyse the different configurations (CS,CG,CD) and biasing circuits

Course Name: Probability Theory and Stochastic Process	**Course Code**:19A04303
1	Understand the fundamental concepts of probability theory, random variables and conditional probability.

2	Evaluate the single and multiple random variables concepts to expectation, variance and moments
3	Apply the different operations to multiple random variables and understand the concepts of linear transformation of gaussian random variables.
4	Understand and analyze continuous and discrete-time random processes.
5	Describe the theory of stochastic processes to analyze linear systems and Apply the knowledge to linear systems; low pass and band pass noise models for random processes

Course Name : Digital Electronics & Logic Design		**Course Code: 19A04304**
1	Understand various number systems, error detecting, correcting binary codes, logic families, combinational and sequential circuits	
2	Apply Boolean laws, k-map and Q-M methods to minimize switching functions. Also describe the various performance metrics for logic families	
3	Utilize concepts of state and state transition for analysis and design of sequential circuits	

4	Design combinational and sequential logic circuits
5	Compare different types of Programmable logic devices and logic families

Course Name: ELECTRICAL TECHNOLOGY	**Course Code:** 19A02304T
1	Able to calculate the e.m.f. generated on DC Generator also able to control speed of different DC motors
2	Able to conduct open circuit and short circuit tests on single phase transformer for Knowing their characteristics.
3	To distinguish between phase voltages, currents, line values and phase values
4	Able to analyse three phase circuits, three induction motor operating principle and know their torque slip characteristics
5	Able to have knowledge on synchronous machine with which he/she can able to apply the above conceptual things to real-world problems and applications

Course Name: Electronic Devices and circuits LAB	**Course Code:**19A04302P
1	Illustrate voltage, current characteristics of PN junction diode and zener diode.
2	Compute the various parameters of Half wave, Full wave Rectifiers without and with Filters.
3	Estimate input and output V-I characteristics of BJT and FET in CE-Configuration and CS- Configuration

4	Implement V-I characteristics of UJT and SCR.
5	Describe the operation of CRO and transistor biasing techniques and estimate the frequency response of amplifiers.

Course Name: Basic simulation lab	**Course Code:**19A04305
1	Understand the basic concepts of programming in MATLAB and explain use of built-in functions to perform assigned task.
2	Generate signals and sequences, Input signals to the systems to perform various operations
3	Analyze signals using Fourier, Laplace and Z-transforms
4	Compute Fourier transform of a given signal and plot its magnitude and phase spectrum
5	Verify Sampling theorem, Determine Convolution and Correlation between signals and sequences

Course Name: Electrical technology lab	**Course Code:**19A02304P
1	To understand various characteristics of DC generators and DC motors
2	Understand electrical principle, laws, and working of DC machines
3	To predetermine the efficiency and regulation of a 1-ϕ transformer
4	To know power measurement in 3-ϕ circuits
5	To understand various characteristics of Induction motors, Synchronous machines

Course Name: BIOLOGY FOR ENGINEERS	**Course Code:** 19A99302
1	Explain about cells and their structure and function. Different types of cells and basics for classification of living Organisms.
2	Explain about biomolecules, their structure and function and their role in the living organisms. How biomolecules are useful in Industry.
3	Briefly about human physiology
4	Explain about genetic material, DNA, genes and RNA how they replicate, pass and preserve vital information in living Organisms.
5	Know about application of biological Principles in different technologies for the production of medicines and Pharmaceutical molecules through transgenic microbes, plants and animals

Year & Sem: III-I **Regulation:** R15

Course Name: Computer organization	**Course Code**: **15A05402**
1	Identify different types of computers its basic organization, performance measures of computer systems, different instruction formats and addressing modes.
2	Analyze the concept of register transfer language and differentiate the various types of Instructions.
3	Apply arithmetic operation algorithms including addition, subtraction, multiplication and division.
4	Illustrate different modes of data transfer and communication between CPU and I/O devices.
5	Understand the concepts of pipelining and explore Interconnection structures of multiprocessors and multicomputer.

Course Name: Antennas & wave propagation	**Course Code**: 15A04501
1	Understand the fundamental antenna parameters and its terminology, current distributions, field components.
2	Design and analyze the micro strip and reflector antennas in real world.
3	Evaluate the parameters of antennas under test to perform different measurements and draw the basic types of dipole and loop antennas
4	A Analyse antenna arrays their radiation patterns, field components and directivity.
5	Illustrate different modes of wave propagation including ground wave, space wave, sky wave at different frequencies at different atmospheric levels and their phenomenon in the existing free space environment.

Course Name: Digital communication systems	**Course Code**: 15A04502
1	Determine the source coding systems of PCM, DM and Adaptive DPCM
2	Describe and determine the performance of line codes and methods to mitigate inter symbol interference
3	Determine the Basic representation of signal space analysis and signal constellation diagram.
4	Categorize the performance of Pass band modulation schemes.
5	Describe and determine the performance of different error control coding schemes for the reliable transmission of digital representation of signals and information over the channel.

Course Name: Linear IC Applications	**Course Code**: 15A04503
1	Interpret different configurations of differential amplifiers including balanced, unbalanced output differential amplifiers, current mirror, level Translator and operational amplifiers.
2	
3	Implement different configurations like voltage series feedback, voltage shunt feedback and analyze the frequency response of an op-amp.
4	Mention the applications of an operational amplifier including voltage to current converter, current to voltage converter, integrator, differentiator, active filters.
5	Model the concepts of different oscillators and waveform generators like phase shift and wein bridge oscillators.
6	Infer the concepts of high speed sample-and-hold circuits, A/D Converters , Flash type, Successive Approximation, type Single Slope type, Dual Slope type, A/D Converter

Course Name: Digital System Design		**Course Code:** 15A04504
1	Summarize different types of logic families and their electrical characteristics.	
2	Implement HDL Based Digital Design and able to construct different design elements.	
3	Design a model, simulate, verify, analyze, and synthesize combinational circuits with hardware description languages.	
4	Apply the design procedure of HDL to different sequential circuits and write the VHDL code.	
5	Exemplify the concepts for designing combinational and sequential based circuits.	

Course Name: Micro Electro Mechanical system		**Course Code:** 15A04506
1	Describe new applications of MEMS and directions of modern engineering.	
2	Implement the techniques for building micro devices in silicon, polymer, metal and other materials.	
3	Illustrate the physical, chemical, biological, and engineering principles involved in the design and operation of current and future micro devices.	
4	Apply Microsystems technology for technical feasibility as well as practicality.	
5	Determine the MEMS applications including Polymer MEMS & Carbon Nano Tubes CNT, BioMEMS, Bio Nano Technology.	

Course Name: IC Applications Laboratory		**Course Code:** 15A04507
1	Design and analysis a unity gain, Non inverting& Inverting Amplifiers, Instrumentation Amplifier and Second order Butter Worth Band pass filter using IC741/TL082/ALSK Kit.	
2	Design and investigation Astable Multi vibrator, Integrator and Function Generator UsingIC741/TL082/ALSK Kit	
3	Design and Test a Notch filter and Self tuned filter Using IC741/TL082 & MPY 634/ALSK Kit	
4	Design and check voltage controlled oscillator and a phase locked loop using TL082/IC741/MPY634/ALSK Kit.	
5	Design and examination a Automatic Volume control and a Low Drop Output Regulator by TPS7250 IC /ALSK Kit.	
6	Design a switch mode power supply with TPS40200 IC/ALSK Kit.	

Course Name: Digital communication systems lab		**Course Code:** 15A04508
1	Carryout an experiment to transmit and receive a digital signal by using Time division multiplexing and Pulse code modulation.	
2	Carryout an experiment to transmit and receive a digital signal by using Differential Pulse code modulation and Delta modulation.	
3	Carryout an experiment to transmit and receive a digital signal by using Frequency shift keying, Differential phase shift keying and QPSK modulation & demodulation.	
4	Execute an experiment to verify Sampling Theorem and conduct Pulse code modulation using MATLAB tool.	
5	Use MATLAB tool to transmit and receive a digital signal by using Differential Pulse code modulation and Frequency shift keying	
6	Use MATLAB tool to transmit and receive a digital signal by using Phase shift keying, Differential phase shift keying and QPSK modulation and de-modulation	

Course Name: Social Values & Ethics	**Course Code:** 15A99501
1	understand the fundamental concepts of society, family and channels of youth moments for National Building
2	Illustrate the features of constitution of India, legal rights of consumer and RTI
3	Analyze the sociological, psychological factors influencing the youth crime, social harmony and national integration.
4	Recognize the environmental issues and objectives of Civil and Self defence
5	Interpret the gender sensitization and initiatives of Government schemes for prevention
6	Determine the importance and benefits of physical activities

Year & Sem: IV-I **Regulation:** R15

Course Name: Optical Fiber Communication	**Course Code:** 15A04701
1	Understand evolution of fiber optic system and mode theory of Circular Wave guides.
2	Distinguish between different optical fiber losses and waveguide dispersion schemes.
3	Compute attenuation, group delay, cut-off wavelength, noise for optical fibers
4	Determine Fiber Optical Source materials and Coupling schemes.
5	Differentiate between different fiber optic receiver configuration techniques
6	Estimate the analog system design and applications

Course Name: Embe dded Systems	**Course Code:** 15A04702
1	Summarize the basic concepts of embedded systems and different architectural considerations.
2	Interpret the functional diagram of ARM Cortex-M, TM4C family and its targeted applications.
3	Recognize the fundamentals of microcontroller based embedded systems.
4	Infer the concepts of timers, system clocks and exemplify the motion control peripherals.
5	List out the concepts of embedded communication protocols and internet of

	things.

Course Name: Microwave Engineering		**Course Code:** 15A04703
1	Understand the field components of waveguides by determining the TE/TM mode analysis	
2	Summarize microwave circuits incorporating transmission lines, waveguides, passive and active components.	
3	Interpret linear microwave tubes and helical travelling wave tubes.	
4	A Analyse and implement cross type tubes and their modes of operation gunn oscillation modes, LSA mode and also gain knowledge on various solid state devices.	
5	Formulate and measure the microwave components and circuits using standard bench setup and analyze scattering parameters.	

Course Name: Data Communications and Networking		**Course Code:** 15A04704
1	Understand the terminology and concepts of the OSI reference model and the TCP-IP reference model.	
2	Analyze the concept of switching networks and able to implement various error correction and detection methods.	
3	Interpret different multiple access methods including ALOHA, CSMA CDMA, CSMA/CD, CSMA/CA and IEEE standards.	
4	Analyze performance issues of network layer ,routing algorithms and IP Addressing	
5	Implement transport layer protocols and illustrate the reasons for implementing network security & cryptography.	

Course Name: Radar systems		**Course Code:** 15A04705
1	Understand the basic principles of how a radar system works.	
2	Describe the CW radar and FMCW radar.	
3	Determine the Basic principles of MTI & Pulse Doppler radars.	
4	Understand basic types of radar tracking techniques.	
5	Estimate the noise in radar systems & radar receiver types.	

Course Name: Cellular mobile communications	**Course Code :** 15A04709
1	Understand wireless communication and elements of cellular radio system designs.
2	Analaze the broad band wireless channel modeling and interference.
3	Discuss the concepts of Cellular Communication cell coverage and its traffic.
4	Generalize the concepts of cell site patterns and its frequency managements.
5	Discuss the concept of channel assignments and its techniques.
6	Discuss about 3G & 4G wireless standards and handoff procedures and types.

Course Name: Microwave and Optical Communication Lab	**Course Code :** 15A04711
1	Estimate the characteristics of reflex klystron and gunn diode.
2	Measure the attenuation ,VSWR and impedance factor.
3	Perform the scattering parameters of magic tee.
4	Determine the frequency, wavelength measurement using slotted section.
5	Execute the characteristics of LED and laser diode.
6	Measure the data rate for digital optical link, numerical aperture and losses for analog optical link.

Course Name: VLSI & Embedded Systems Lab	**Course Code :** 15A04712
1	Design multiple digital circuits and examine its simulation using VHDL source code in Xilinx ISE Design suite.
2	Design different types of combinational circuits Using VHDL source code, and simulate the obtained design using VHDL simulator and analyze the obtained results through timing waveforms.
3	Design different types of sequential circuits Using VHDL source code, and simulate the obtained design using VHDL simulator and analyze the obtained results through timing waveforms.
4	Determine a C file to learn how to configure EK-TM4C123GXL Launch pad digital I/O pins through an algorithm, the flow chart, and source code using CCS7.2 software.

5	Determine a binary file to learn how to interface potentiometer, DC motor, sensor hub Booster pack with TM4C123GH6PM microcontroller.
6	Determine the Embedded C code for generating PWM and send an echo of data to PC through UART.

Year & Sem: IV-II **Regulation:** R15

Course Name: Advanced Digital Signal Processing- Multirate & Wavlet	**Course Code :** 15A04801
1	Analyze multirate DSP systems.
2	Determine coefficients for perfect reproduction filter banks and wavelets.
3	Understand the Gaussian function and the continonus wavelet transform, condition of admissiability and its impilcations
4	Discritization of scale, translation,time or space. variants of wavelets and its implementation
5	Apply in mathematical approximation, computer graphics and computer vision

Course Name: LOW POWER VLSI CIRCUITS & SYSTEMS	**Course Code :** 15A04802
1	Acquire knowledge about the fabrication process of integrated circuit using MOS transistors.
2	Select an appropriate inverter depending on specifications required for circuit.
3	Sketch the layout of any logic gates which helps to understand, estimate parasitic of any gate.
4	Create dissimilar types of logic gates using CMOS and their transfer characteristics.
5	Design building blocks of data path using gates.
6	Design simple logic memories COMS, PAL,PLA,FPGA and CPLD.

Course Name: RF INTEGRATED CIRCUITS	**Course Code :** 15A04804
1	Interpret the design of RF systems including the circuits, blocks, and architectures
2	Summarize MOS device and estimate the bandwidth using amplifiers.
3	Implement the RF functional blocks (such as low-noise amplifiers, mixers and oscillators) for a wireless communications system.
4	Infer RF device models including power amplifiers and PLL models.
5	Illustrate different types of frequency synthesizers and architectures like GSM radio architectures, CDMA, UMTS in RF system.

HOD **PRINCIPAL**