SHRI MADHWA VADIRAJA INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(A Unit of Shri Sode Vadiraja Mutt Education Trust®, Udupi)

Accredited by NAAC with 'A' grade | Affiliated to VTU, Belagavi

Approved by AICTE, New Delhi & Recognized by Govt. of Karnataka

Vishwothama Nagar, Bantakal - 574115, Udupi District, Karnataka.

SMVITM

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Course Outcome Statements of 2019-23 Batch

The below table represents the Course Outcome Statements of the courses offered from 1st semester to 8th semester of Electronics & Communication Engineering 2019-23 Batch.

		Course Outcome Statement
Course Code		18MAT11
Course Name		Calculus and Linear Algebra
C101.1		Apply the knowledge of calculus to solve problems related to polar curves and its applications in determining the bentness of a curve.
C101.2		Learn the notion of partial differentiation to calculate rates of change of multivariate functions and solve problems related to composite functions and Jacobians.
C101.3		Apply the concept of change of order of integration and variables to evaluate multiple integrals and their usage in computing the area and volumes.
C101.4		Solve first-order linear/nonlinear differential equations analytically using standard methods.
C101.5		Make use of matrix theory for solving system of linear equations and compute Eigen values and Eigen vectors required for matrix diagonalization process.
Course Code		18CHE12
Course Name		Engineering Chemistry
C102.1		Use of free energy in equilibria, rationalize bulk properties and processes using thermodynamic considerations, electrochemical energy systems.
C102.2		Causes & effects of corrosion of metals and control of corrosion. Modification of surface properties of metals to develop resistance to corrosion, wear, tear, impact etc. by electroplating and electroless plating
C102.3		Production and consumption of energy for industrialization of country and living standards of people. Electrochemical and concentration cells. Classical, modern batteries and fuel cells. Utilisation of solar energy for different useful forms of energy.
C102.4		Environmental pollution, waste management and water chemistry.
C102.5		Different techniques of instrumental methods of analysis. Fundamental principles of nanomaterials.
Course Code		18CPS13
Course Name		C Programming for Problem Solving
C103.1		Illustrate simple algorithms from different domains such as mathematics and physics, etc.
C103.2		Construct a programming solution to the given problem using C
C103.3		Modularize the given problem using arrays and identify syntax and logical errors in C program.
C103.4		Modularize the given problem using functions and structures
Course Code		18ELN14
Course Name		Basic Electronics
C104.1		Describe the operation of diodes, rectifiers and working principles of voltage regulators.

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C104.2	Explain the construction and working of FET, SCR, OP AMP applications.
C104.3	Understand BJT as amplifiers, feedback amplifiers, oscillators and IC 555.
C104.4	Explain the different number systems and their conversions, construct Combinational and sequential logic circuits using flip flops, basic principle of operation of communication systems.
Course Code	18ME15
Course Name	**Elements of Mechanical Engineering**
C105.1	Identify different sources of energy and their conversion process, understand the basic concepts of thermodynamics and thermodynamic properties of steam.
C105.2	Explain the working principle of boilers, hydraulic turbines and pumps.
C105.3	Explain the working principle of IC engines, refrigeration and air conditioning.
C105.4	Recognize various engineering materials and its applications, understand various metal joining processes and power transmission elements.
C105.5	Discuss the working of conventional machine tools, machining processes, tools and accessories,and describe the advanced manufacturing systems.
Course Code	18CHEL16
Course Name	**Engineering Chemistry Laboratory**
C106.1	Conduct different types of titrations for the estimation of total hardness and COD of waste water
C106.2	Conduct volumetric analysis for the estimation of percentage iron and copper, estimation of CaO in cement solution, Chlorine in bleaching powder
C106.3	Handling modern tools to estimate components in the acid mixture, determine ferrous ammonium sulphate content, strength of weak acids.
C106.4	Determine viscosity coefficient of organic liquids and colorimetric determination of copper.
Course Code	18CPL17
Course Name	**Computer Programming Laboratory**
C107.1	Identify the core hardware components of a computer, their working and associated software.
C107.2	Realize mathematical problems using algorithms, flowcharts and transforming it into simple C programs with suitable and relevant concepts.
C107.3	To write suitable C functions and using it efficiently to solve various types of mathematical problems.
C107.4	Suitably know the usage of C programming concepts like structures and pointers and implement the same.
Course Code	18EGH18
Course Name	**Technical English-I**
C108.1	Use grammatical English and essentials of language skills and identify the nuances of phonetics, intonation and flawless pronounciation.
C108.2	Implement English vocabulary at command and language proficiency.
C108.3	Identify common errors in spoken and written communication.
C108.4	Understand and improve the non verbal communication and kinesics.
C108.5	Perform well in campus recruitment, engineering and all other general competitive examinations.

Course Code	18MAT21
Course Name	**Advanced Calculus and Numerical Methods**
C109.1	Illustrate the applications of multivariate calculus to understand the solenoidal and irrotational vectors and also exhibit the inter dependence of line, surface and volume integrals
C109.2	Demonstrate various physical models through higher order differential equations and solve such linear ordinary differential equations
C109.3	Construct a variety of partial differential equations and solution by exact methods\methods of separation of variables
C109.4	Explain the applications of infinite series and obtain series solution of ordinary differential equations.
C109.5	Apply the knowledge of numerical methods in the modelling of various physical and engineering phenomena
Course Code	18PHY22
Course Name	**Engineering Physics**
C110.1	Understand various types of oscillations and their implications, the role of Shock waves in various fields and Recognize the elastic properties of materials for engineering applications
C110.2	Realize the interrelation between time varying electric field and magnetic field, the transverse nature of the EM waves and their role in optical fiber communication.
C110.3	Compute Eigen values, Eigen functions, momentum of Atomic and subatomic particles using Time independent 1-D Schrodinger's wave equation
C110.4	Apprehend theoretical background of laser, construction and working of different types of laser and its applications in different fields
C110.5	Understand various electrical and thermal properties of materials like conductors, semiconductors and dielectrics using different theoretical models.
Course Code	18EC43
Course Name	**Control Systems**
C111.1	Develop the mathematical and State model of electrical and mechanical systems.
C111.2	Develop transfer function for a given control system using Block diagram reduction method and Signal Flow Graph Method.
C111.3	Determine the time domain specifications for first and second order systems.
C111.4	Determine the stability of the system in the time domain using Routh-Hurwitz Criterion and Root locus Technique.
C111.5	Determine the stability of the system in the frequency domain using Nyquist and Bode plots.
Course Code	18ELE23
Course Name	**Basic Electrical Engineering**
C112.1	Understand different laws, rules involved to solve basic electrical DC circuits and fundamentals of A.C
C112.2	Analyze the behavior of Single phase AC circuits and Explain the concepts on three phase AC circuits.
C112.3	Understand the need and working principle of transformers and understand the working principle of different wiring systems, earthing, and circuit breakers.
C112.4	Understand the concepts of DC generator and DC motor.
C112.5	Understand the concepts of Three phase synchronous generators and Induction motors.
Course Code	18CIV24

Course Name	Elements of Civil Engineering and Mechanics
C113.1	Mention the applications of various fields of Civil Engineering.
C113.2	Compute the resultant of a given force system subjected to various loads.
C113.3	Comprehend the action of forces, moments and other loads on systems of rigid bodies and compute the reactive forces that develop as a result of the external loads.
C113.4	Locate the centroid and compute the moment of inertia of regular and built up sections.
C113.5	Express the relationship between the motion of bodies and analyze the bodies in motion.
Course Code	18EGDL25
Course Name	Engineering Graphics
C114.1	Students will be able to demonstrate the usage of CAD software.
C114.2	Students will be able to visualize and draw orthographic projection of points and lines.
C114.3	Students will be able to visualize and draw orthographic projection of planes.
C114.4	Students will be able to visualize and draw orthographic projection of Solids and Sections and Development of Lateral Surfaces of Solids.
C114.5	Develop isometric drawings of simple objects reading the orthographic projections of those objects.
Course Code	18PHYL26
Course Name	Physics Laboratory
C115.1	Apprehend the concepts of interference of light, diffraction of light, Fermi energy and magnetic effect of current
C115.2	Understand the principles of operations of optical fibers and semiconductor devices such as Photodiode, and NPN transistor using simple circuits
C115.3	Determine elastic moduli and moment of inertia of given materials with the help of suggested procedures
C115.4	Recognize the resonance concept and its practical applications. To study the oscillations and charging and discharging curve of RC circuits.
Course Code	18ELEL27
Course Name	Basic Electrical Engineering Laboratory
C116.1	Determine voltage and current using KVL and KCL and understand the concept of open and short circuit
C116.2	Compare power factor of lamps
C116.3	Determine impedance of an electrical circuit and power consumed in a three phase load
C116.4	Determine earth resistance and understand two way and three way control of lamps.
C116.5	Identify the common electrical components used for safety and understand the difference between AC and DC supply. Also understand the construction of DC Machines
Course Code	18EGH28
Course Name	Technical English-II
C117.1	Identify common errors in spoken and written communication.
C117.2	Get familiarized with English vocabulary and language proficiency.
C117.3	Improve nature and style of sensible writing and acquire employment and workplace communication skill.
C117.4	Improve their Technical Communication Skills through Technical Reading and Writing practices.

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C117.5	Perform well in campus recruitment, engineering and all other general competitive examinations.

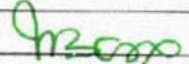|	
Course Code	**18MAT31**
Course Name	**Transform Calculus, Fourier Series and Numerical Techniques**
C201.1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equations arising in network analysis, control systems and other fields of engineering.
C201.2	Demonstrate Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing and field theory.
C201.3	Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems.
C201.4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.
C201.5	Determine the externals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.
Course Code	**18EC32**
Course Name	**Network Theory**
C202.1	Determine currents and voltages by applying source transformation/source shifting/mesh/nodal analysis and reduce given network using star-delta transformation/source transformation/source shifting
C202.2	Solve network problems by applying Superposition/Thevenin's/ Norton's/Maximum Power Transfer/ Millman's Theorems and electrical laws to reduce circuit complexities and arrive at feasible solutions.
C202.3	Calculate current and voltages for the given circuit under transient conditions and apply Laplace Transform to solve the given network.
C202.4	Solve the given network using specified two port network parameters-Z, Y, H and T
C202.5	Understand the concept of resonance and determine the parameters that characterize series/parallel resonant circuits.
Course Code	**18EC33**
Course Name	**Electronic Devices**
C203.1	Understand the principles of semiconductor Physics
C203.2	Understand the mathematical models of semiconductor junctions and optoelectronic devices.
C203.3	Understand the principles and characteristics of BJT, and analyze the coupled diode model.
C203.4	Understand the principles and characteristics of MOSFET, and analyze the small signal model.
C203.5	Understand the fabrication process of semiconductor devices and Integrated circuits.
Course Code	**18EC34**
Course Name	**Digital System Design**
C204.1	Illustrate the simplification of Boolean equations using Karnaugh Maps and Quine-McCluskey Techniques
C204.2	Design Decoders, Encoders, Multiplexers, Adders, Subtractors, Binary Comparators and other combinational logic circuits
C204.3	Describe the different types of Latches, Flip-flops and Registers, and design different Counters.

C204.4	Design and Analyze Mealy and Moore Models, and Develop state diagrams for Synchronous Sequential Circuits
Course Code	**18EC35**
Course Name	**Computer Organisation and Architecture**
C205.1	Explain the basic organization of a computer system and fundamentals of computers.
C205.2	Apply assembly language instructions for basic input, output operations and other related programs.
C205.3	Illustrate different ways of accessing an input / output device including interrupts
C205.4	Demonstrate the organization of different types of semiconductor and other secondary storage memories
C205.5	Illustrate simple processor organization based on hardwired control and micro programmed control.
Course Code	**18EC36**
Course Name	**Power Electronics and Instrumentation**
C206.1	Study the basics of power electronics and analysis of thyristor circuits with different triggering conditions.
C206.2	Analyze and design controlled rectifiers, DC to DC converters, DC to AC converters and SMPS.
C206.3	Study of electronic instrumental parameters and design of multi range Ammeters, Voltmeters.
C206.4	Study of digital voltmeters, frequency meters and the bridge circuits to measure passive component values and frequency
c206.5	Describe the principle of operation of different Transducers and Programmable Logic Controllers.
Course Code	**18ECL37**
Course Name	**Electronic Devices and Instrumentation Laboratory**
C207.1	Understand the characteristics of various electronic devices, and measure the parameters.
C207.2	Design and test simple electronic circuits.
C207.3	Use circuit simulation software for the implementation and characterization of electronic circuits and devices.
Course Code	**18ECL38**
Course Name	**Digital System Design Laboratory**
C208.1	Demonstrate the truth table of various expressions and combinational circuits using logic gates.
C208.2	Design various combinational circuits such as adders, Subtractor, comparators, multiplexers and demultiplexers.
C208.3	Construct flips-flops, counters and shift registers.
C208.4	Simulate Serial adder and Binary Multiplier.
C208.5	Demonstrate the ability to conduct experiments individually/ in group and write clear lab reports.
Course Code	**18MAT41**
Course Name	**Complex Analysis Probability and Statistical Methods**

C210.1	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory.
C210.2	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing.
C210.3	Apply discrete and continuous probability distributions in analyzing the probability models arising in the engineering field.
C210.4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data
C210.5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.
Course Code	18EC42
Course Name	Analog Circuits
C211.1	Design biasing circuits for BJT and MOSFET amplifiers, and perform DC and AC analysis.
C211.2	Analyze MOSFET amplifiers using small-signal model and high frequency model, and generate sine waves using different oscillator circuits.
C211.3	Understand the different types of feedback topologies in amplifiers, and design power amplifiers
C211.4	Design Op-Amp circuits for linear and nonlinear applications
C211.5	Design converters and filters using Op-Amp and multivibrators using 555 Timer
Course Code	18EC43
Course Name	Control Systems
C212.1	Develop the mathematical and State model of electrical and mechanical systems.
C212.2	Develop transfer function for a given control system using Block diagram reduction method and Signal Flow Graph Method.
C212.3	Determine the time domain specifications for first and second order systems.
C212.4	Determine the stability of the system in the time domain using Routh-Hurwitz Criterion and Root locus Technique.
C212.5	Determine the stability of the system in the frequency domain using Nyquist and Bode plots.
Course Code	18EC44
Course Name	Engineering Statistics and Linear Algebra
C213.1	Examine Single random variables, functions of single random variables and its applications.
C213.2	Compute the various statistical parameters for Multiple Random Variables.
C213.3	Analyze the quantitative parameters of Random Processes and its applications.
C213.4	Analyze a typical signal set in terms of the basis function set.
C213.5	Calculate the quantitative parameters for Matrices and Linear Transformations.
Course Code	18EC45
Course Name	Signals and Systems
C214.1	Analyze the different types of signals and systems.
C214.2	Determine the linearity, causality, time-invariance and stability properties of continuous and discrete time systems.
C214.3	Evaluate the convolution sum and integral.
C214.4	Represent continuous and discrete signals & systems in frequency domain using Fourier representations.
C214.5	Analyze discrete time signals & systems using Z-transforms.

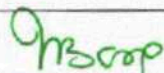| Course Code	18EC46
Course Name	**Microcontroller**
C215.1	Explain the difference between Microprocessors & Microcontrollers, Architecture of 8051
C215.2	Write 8051 Assembly level programs using the 8051 instruction set.
C215.3	Write stack related assembly level programs using 8051 instruction set and I/O Port Interfacing and Programming.
C215.4	Write 8051 Assembly language program to handle timers/counters, serial port and interrupts.
C215.5	Interface various peripheral devices to 8051 using I/O ports and related programming.
Course Code	**18ECL47**
Course Name	**Microcontroller Laboratory**
C216.1	Write Assembly level programs using 8051 instruction set.
C216.2	Write 8051 Assembly language program to handle timers/counters, serial port and interrupts.
C216.3	Interface various peripheral devices to 8051 using I/O ports.
Course Code	**18ECL48**
Course Name	**Analog Circuits Laboratory**
C217.1	Design analog circuits using BJT/MOSFET/555 Timer and evaluate their performance characteristics.
C217.2	Design analog circuits using OPAMPs for different applications.
C217.3	Simulate and analyze analog circuits for different electronic applications.
C217.4	Demonstrate the ability to work in groups and write clear lab reports.
Course Code	**18CPC49**
Course Name	**Constitution of India, Professional Ethics and Cyber Law**
C218.1	Have knowledge of the Indian Constitution and legal aspects.
C218.2	Understand Engineering and Professional ethics and responsibilities of Engineers.
C218.3	Understand the cybercrimes and cyber laws for cyber safety measures.
Course Code	**18ES51**
Course Name	**Technological Innovation Management and Entrepreneurship**
C301.1	Make use of the fundamental concepts of Management and functions of Management.
C301.2	Summarize the concepts related to Entrepreneurship and their social responsibilities.
C301.3	Choose a relevant business idea through market feasibility analysis study
C301.4	Develop a business plan and project report.
Course Code	**18EC52**
Course Name	**Digital Signal Processing**
C302.1	Analyze the DFT and IDFT of sequences to verify their properties.
C302.2	Validate the efficiency of DFT computation using FFT algorithms and linear filtering approach.
C302.3	Design and realize IIR and FIR filters
C302.4	Implement IIR and FIR filters in Digital Signal Processors.

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Course Code	18EC53
Course Name	**Principles of Communication Systems**
C303.1	Apply the mathematical techniques to represent amplitude modulation schemes such as DSBFC, DSBSC, SSB and VSB in time and frequency domains with the generation and detection methods.
C303.2	Apply the mathematical techniques and represent frequency modulation in time and frequency domains with the generation and detection methods.
C303.3	Compute the performance of AM and FM modulation in the presence of noise at the receiver.
C303.4	Illustrate the characteristics of pulse amplitude modulation, pulse position modulation systems
C303.5	Illustrate the PCM and delta modulation methods and the use of digital formatting in Multiplexers, Vocoders Video transmission.
Course Code	18EC54
Course Name	**Information Theory and Coding**
C304.1	Explain the concept of dependent and independent source, measure of information, entropy, rate of information and order of a source
C304.2	Interpret the information using Shannon Encoding, Shannon Fano, Prefix and Huffman Encoding Algorithm.
C304.3	Interpret the continuous and discrete communication channels using input, output and joint probabilities
C304.4	Determine the codeword comprising of check bits computed using linear block codes, cyclic codes and convolutional codes
Course Code	18EC55
Course Name	**Electromagnetic Waves**
C305.1	Solve problems on electrostatic force, electric field due to point, linear, volume charges by applying conventional methods and charge in a volume.
C305.2	Apply Gauss law, divergence theorem in electrostatics to evaluate electric fields.
C305.3	Apply Biot-Savart's and Ampere's laws for evaluating Magnetic fields of different current configurations.
C305.4	Calculate magnetic force, potential energy and magnetization with respect to magnetic materials and voltage induced in electric circuits.
C305.5	Make use of Maxwell's equations to inspect electromagnetic waves in different media.
Course Code	18EC56
Course Name	**Verilog HDL**
C306.1	Design abstract level programs on Verilog HDL.
C306.2	Comprehend the different lexical conventions, Verilog task, functions and directives.
C306.3	Design digital circuits using gate level, dataflow and behavioral modeling through engineering knowledge on different statements, looping, tasks and functions in Verilog HDL.
C306.4	Interpret the useful modeling techniques and the various constructs of logic synthesis.
C306.5	Program and verify the functionality of a given problem statement using EDA tools
Course Code	18ECL57
Course Name	**Digital Signal Processing Laboratory**
C307.1	Conduct the experiments on Sampling Theorem, DFT and interpret the data.

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C307.2	Verify the properties of discrete time signals and systems.
C307.3	Verify the result of discrete computations and generate the standard test signals using DSP processor.
C307.4	Realize the digital filters using a simulation tool and analyze the response of the filter for an audio signal.
Course Code	**18ECL58**
Course Name	**HDL Laboratory**
C308.1	Apply the knowledge of Verilog HDL for modeling and functional verification of combinational circuits in Dataflow, Behavioral and Gate level Abstractions.
C308.2	Apply the knowledge of Verilog HDL for modeling and functional verification of sequential circuits.
C308.3	Design and synthesize combinational and sequential circuits on programmable ICs and test the hardware.
C308.4	Program and verify the functionality of a given problem statement using EDA tools
Course Code	**18CIV59**
Course Name	**Environmental Studies**
C309.1	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale.
C309.2	Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment.
C309.3	Demonstrate ecology knowledge of a complex relationship between biotic and abiotic components.
C309.4	Apply the ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues.
Course Code	**18EC61**
Course Name	**Digital Communication**
C310.1	Understand and apply the concepts of representing Bandpass signals in complex low pass equivalent.
C310.2	Analyze the geometric representation and detection of signals and also understand different types of receivers used to detect signals.
C310.3	Analyze different digital modulation and demodulation techniques.
C310.4	Analyze communication through Band Limited Channels and understand the channel equalization techniques.
C310.5	Understand the principle of spread spectrum used in digital communication system
Course Code	**18EC62**
Course Name	**Embedded Systems**
C311.1	Explain the architecture of ARM Cortex M3 with block diagram.
C311.2	Write programs to solve desired task using ISA or embedded C language
C311.3	Infer firmware and system components with respect to embedded applications.
C311.4	Determine embedded firmware design and development using hardware software co-design and program modeling.
C311.5	Explain different types of OS and discuss embedded system (IDE) development environments.
Course Code	**18EC63**

Course Name	Microwave and Antenna
C312.1	Compute various parameters related to microwave transmission lines and waveguides.
C312.2	Study microwave network theory and network parameters.
C312.3	Identify microwave devices for various applications and explain the antenna basics.
C312.4	Analyze various parameters necessary for building an RF system.
C312.5	Understand various antenna configurations according to the applications.
Course Code	18EC646
Course Name	Python Application Programming
C313.1	Make use of the Syntax and Semantics to develop Functions in Python
C313.2	Experiment with Strings and Files in Python
C313.3	Apply Lists, Tuples, Dictionaries and Regular expressions in Python programming.
C313.4	Experiment with Object Oriented Programming concepts in Python
C313.5	Construct networked programs using Web Services, Database and SQL
Course Code	18CS653
Course Name	JAVA Programming
C314.1	Understanding the basic programming constructs of Java and application of Object Oriented Principles
C314.2	Understand the usage of operators and control statements and applying them in programming
C314.3	Develop programs using the concepts of Java classes and Inheritance
C314.4	Make use of the concepts of exception, packages and interfaces in problem solving
C314.5	Make use of Console IO and string handling operations in Java programs
Course Code	18CS654
Course Name	Operating Systems
C315.1	Understand the basic concept of Operating system and apply the same in Operating system design and implementation.
C315.2	Understand the concepts of process and threads and analyze the concept of inter-process communication
C315.3	Understand the concepts of scheduling and synchronization and apply them in designing scheduling algorithms along with finding solutions for critical section problems.
C315.4	Discuss the concept of deadlock and the different memory management strategies like paging, segmentation.
C315.5	Apply the concepts of virtual memory and perform page replacement and file handling in managing free space.
Course Code	18ECL66
Course Name	Embedded Systems Laboratory
C316.1	Understand the instruction set of 32 bit microcontroller ARM Cortex M3, and the software tool required for programming in Assembly and C language.
C316.2	Develop assembly language programs using ARM Cortex M3 for different applications.
C316.3	Interface external devices and I/O with ARM Cortex M3.
C316.4	Develop C language programs and library functions for embedded system applications.

Course Code	**18ECL67**
Course Name	**Communication Laboratory**
C317.1	Design and test the digital and analog modulation circuits and display the Waveforms.
C317.2	Determine the characteristics and response of microwave Waveguide.
C317.3	Determine the characteristics of micro strip antennas and devices and compute the parameters associated with it.
C317.4	Simulate the digital modulation systems and compare the error performance of basic digital modulation schemes.
Course Code	**18ECMP68**
Course Name	**Mini Project**
C318.1	Identify the requirements for the real-world problems.
C318.2	Conduct an investigation of several literature available in the chosen sector.
C318.3	Studying and improving the abilities of software and hardware.
C318.4	Successfully demonstrate and build the prototype through hardware needs, coding, emulation and testing.
C318.5	To record and present the results of the analysis carried out in the chosen region. Demonstrate a skill in working in teams to handle the analysis.
Course Code	**18EC71**
Course Name	**Computer Networks**
C401.1	Identify the functions in the layered architecture of OSI reference model & TCP/IP protocol suite.
C401.2	Apply the working of data link layers in networking.
C401.3	Make use of the routing operations of the network layer in packet forwarding.
C401.4	Apply the responsibilities of transport layer in networking.
C401.5	Utilize the activities of the application layer in networking.
Course Code	**18EC72**
Course Name	**VLSI Design**
C402.1	Explain the operation of MOS transistors, and design logic gates and circuits using MOS transistors
C402.2	Explain the CMOS fabrication processes, scaling methods, capacitances in MOSFETs, and design gate layouts using lambda based rules
C402.3	Analyze the performances of single-stage and multi-stage combinational logic circuits, and optimize the circuit for lowest delay
C402.4	Design dynamic and static sequential circuits using various techniques and understand their merits and demerits
C402.5	Explain the structures of semiconductor memories, and understand the testing and verification principles
Course Code	**18EC733**
Course Name	**Digital Image Processing**
C403.1	Understand the fundamentals of image processing and role of the human visual system in perception of gray and color image data.
C403.2	Apply image processing techniques in both the spatial and frequency domains

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C403.3	Study and analyze the image reconstruction model with various forms of degradations and additive noises
C403.4	Apply the fundamental transforms used in color image processing and morphological operations
Course Code	**18EC744**
Course Name	**Cryptography**
C404.1	Apply the basic cryptographic algorithms to encrypt and decrypt the data and to determine the GCD of two numbers using the Euclidean algorithm.
C404.2	Use symmetric cryptography algorithms to encrypt and decrypt the data.
C404.3	Use the concepts of abstract algebra and the mathematics associated with cryptography.
C404.4	Apply the public key cryptosystems to ensure confidentiality through key distribution and digital signatures for verifying user identities.
C404.5	Apply pseudo random sequence in stream cipher algorithms.
Course Code	**18ME751**
Course Name	**Energy and Environment**
C405.1	Understand energy scenarios, energy sources and their utilization.
C405.2	Understand various methods of energy storage, energy management and economic analysis.
C405.3	Analyze the awareness about the environment and ecosystem.
Course Code	**18CV753**
Course Name	**Environmental Protection and Management**
C406.1	Appreciate the elements of Corporate Environmental Management systems complying to international environmental management system standards.
C406.2	Lead pollution prevention assessment team and implement waste minimization options.
C406.3	Develop, Implement, maintain and Audit Environmental Management systems for Organizations
Course Code	**18ECL76**
Course Name	**Computer Networks Laboratory**
C407.1	Choose suitable tools to model a network.
C407.2	Use the network simulator for learning and practice of networking algorithms.
C407.3	Illustrate the operations of network protocols and algorithms using C programming.
C407.4	Simulate the network with different configurations to measure the performance parameters.
Course Code	**18ECL77**
Course Name	**VLSI Laboratory**
C408.1	Implement the data link and routing protocols using C programming.
C408.2	Design and simulate basic CMOS circuits.
C408.3	Design and simulate analog amplifiers.
C408.4	Design and simulate combinational and sequential digital circuits using Verilog HDL
C408.5	Perform ASIC design flow and understand the process of synthesis, synthesis constraints and evaluating the synthesis reports to obtain optimum gate level net list

Course Code	18EC81
Course Name	**Wireless and Cellular Communication**
C409.1	Understand the communication theory both Physical and networking associated with GSM, CDMA & LTE 4G systems and concepts of propagation mechanisms like Reflection, Diffraction, Scattering in Wireless channels.
C409.2	Develop a scheme for idle mode, call set up, call progress handling and call tear down in a GSM cellular network.
C409.3	Develop a scheme for idle mode, call set up, call progress handling and call tear down in a CDMA cellular network.
C409.4	Understand the Basic operations of Air interface in a LTE 4G system.
Course Code	18EC823
Course Name	**Radar Engineering**
C410.1	Understand the basics of the radar system and apply the radar range equation to find the maximum range.
C410.2	Examine the range parameters of Radar system which affect the system performance and also understand Radar Cross Section of Targets
C410.3	Explain the working and applications of different types of Radar.
C410.4	Describe the working of various radar antennas and receivers.
Course Code	18EC824
Course Name	**Optical Communication Network**
C411.1	Explain the working principle of optical fiber with different modes of signal propagation and fiber materials and apply the concepts of ray theory.
C411.2	Apply the concepts of losses and describe the transmission characteristics in optical fiber communication and the construction and working principle of optical connectors.
C411.3	Describe the constructional features and the characteristics of optical sources, Receivers, Photodetectors and use the idea to solve for rate equation & quantum efficiency.
C411.4	Understand the applications and types of optical amplifiers and describe the WDM concepts and Components.
C411.5	Discuss the networking aspects of optical fiber and describe various standards associated with it.
Course Code	18ECP78/83
Course Name	**Project Work**
C412.1	Recognise and define problems by understanding its background, set the objectives (time, cost and technical requirements) and deliverables of a project.
C412.2	Develop the strategies and methodologies by thorough literature review to achieve the project objectives within a given set of constraints.
C412.3	Select the most suitable method to achieve the objectives among the developed strategies and Conduct scientific and logical analysis using information or data generated to draw the conclusions
C412.4	Communicate effectively with stakeholders of the project and work independently to achieve the project objectives and produce the deliverables as well as prepare, present, and defend a clear, coherent and succinct project report in a technical platform
Course Code	18ECS84
Course Name	Seminar

C413.1	Identify and study the technological development in the respective domain through literature survey
C413.2	Perform thorough analysis of the work done by the experts in the field and draw conclusions
C413.3	Prepare , present a clear, coherent and succinct seminar report
Course Code	**18ECI85**
Course Name	**Internship**
C414.1	Identify and study the technological development in the respective domain and develop a technical artifact.
C414.2	Develop work habits and attitudes necessary for job success and build a record of work experience
C414.3	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms.