

COURSE OUTCOMES - 2018 SCHEME

3rd SEMESTER

Subject:	Transform Calculus, Fourier Series and Numerical Techniques		
Subject Code:	18MAT31	NBA Code:	E201
CO1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering		
CO2	Demonstrate Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory		
CO3	Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems.		
CO4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.		
CO5	Determine the externals of functional using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.		

Subject:	Network Theory		
Subject Code:	18EC32	NBA Code:	E202
CO1	Determine currents and voltages using source transformation/ source shifting/ mesh/ nodal analysis and reduce given network using star-delta transformation/source transformation/ source shifting		
CO2	Solve network problems by applying Superposition/ Reciprocity/ Thevenin's/ Norton's/ Maximum Power Transfer/ Millman's Network Theorems and electrical laws to reduce circuit complexities and to arrive at feasible solutions		
CO3	Calculate current and voltages for the given circuit under transient conditions and apply Laplace transform to solve the given network		
CO4	Solve the given network using specified two port network parameter like Z or Y or Tor h		
CO5	Understand the concept of resonance and determine the parameters that characterize series/parallel circuits		

Subject:	Electronic Devices		
Subject Code:	18EC33	NBA Code:	E203
CO1	Understand the principles of semiconductor Physics		
CO2	Understand the principles and characteristics of different types of semiconductor devices		
CO3	Understand the fabrication process of semiconductor devices.		
CO4	Utilize the mathematical models of semiconductor junctions and MOS transistors for circuits and systems.		
CO5	Identify the mathematical models of MOS transistors for circuits and systems		

Subject:	Digital System Design		
Subject Code:	18EC34	NBA Code:	E204
CO1	Explain the concept of combinational and sequential logic circuits.		
CO2	Analyze and Design the combinational logic circuits		
CO3	Describe and characterize flip-flops and its applications		
CO4	Design the sequential circuits using SR, JK, D, T flip-flops and Mealy & Moore machines		
CO5	Design applications of Combinational & Sequential Circuits.		

Subject:	Computer Organization And Architecture		
Subject Code:	18EC35	NBA Code:	E205
CO1	Explain the basic organization of a computer system		
CO2	Describe the addressing modes, instruction formats and program control statements		
CO3	Explain different ways of accessing an input / output device including interrupts.		
CO4	Illustrate the organization of different types of semiconductor and other secondary storage memories.		
CO5	Illustrate simple processor organization based on hardwired control and micro programmed control.		

Subject:	Power Electronics And Instrumentation		
Subject Code:	18EC36	NBA Code:	E206
CO1	Build and test circuits using power electronic devices.		
CO2	Analyze and design-controlled rectifier, DC to DC converters, DC to AC inverters and SMPS		
CO3	Analyze instrumental characteristics and errors.		
CO4	Develop circuits for multirange Ammeters, Voltmeters and Bridges to measure passive component values and frequency.		
CO5	Explain the principle, design and analyze the transducers for measuring physical parameters.		

Subject:	Electronic Devices And Instrumentation Laboratory		
Subject Code:	18ECL37	NBA Code:	E207
CO1	Understand the characteristics of various electronic devices and measurement of parameters		
CO2	Design and test simple electronic circuits		
CO3	Use of circuit simulation software for the implementation and characterization of electronic circuits and devices		

Subject:	Digital System Design Laboratory		
Subject Code:	18ECL38	NBA Code:	E208
CO1	Design, realize and verify De Morgan's theorem, SOP, POS forms		
CO1	Demonstrate the truth table of various expressions and combinational circuits using logic gates.		
CO2	Design various combinational circuits such as adders, subtractors, comparators, multiplexers and demultiplexers		
CO3	Construct flips-flops, counters and shift registers		
CO4	Simulate Serial adder and Binary Multiplier		

Subject:	Constitution of India, professional ethics and cyber law (CIP)		
Subject Code:	18CPC39	NBA Code:	E209
CO1	Have constitutional knowledge and legal literacy		
CO2	Understand engineering and professional ethics and responsibilities of engineers		
CO3	Understand the cybercrimes and cyber laws for cyber safety measures		

COURSE OUTCOMES - 2018 SCHEME

4th SEMESTER

Subject:	Complex Analysis, Probability and Statistical Methods		
Subject Code:	18MAT41	NBA Code:	E210
CO1	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory.		
CO2	Utilize conformal transformation and complex integral arising in aero foil theory, fluid flow visualization and image processing.		
CO3	Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field		
CO4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data.		
CO5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis		

Subject:	Analog Circuits		
Subject Code:	18EC42	NBA Code:	E211
CO1	Understand the characteristics of BJTs and FETs.		
CO2	Design and analyze BJT and FET amplifier circuits		
CO3	Design sinusoidal and non-sinusoidal oscillators		
CO4	Understand the functioning of linear ICs.		
CO5	Design of Linear IC based circuits		

Subject:	Control Systems		
Subject Code:	18EC43	NBA Code:	E212
CO1	Develop the mathematical model of mechanical and electrical systems.		
CO2	Develop transfer function for a given control system using block diagram reduction techniques and signal flow graph method		
CO3	Determine the time domain specifications for first and second order systems.		
CO4	Determine the stability of a system in the time domain using Routh-Hurwitz criterion and Root-locus technique.		
CO5	Determine the stability of a system in the frequency domain using Nyquist and bode plots		

Subject:	Engineering Statistics And Linear Algebra		
Subject Code:	18EC44	NBA Code:	E213
CO1	Analyze and verify single and multiple random variables		
CO1	Identify and associate Random Variables and Random Processes in Communication events.		
CO2	Analyze and model the Random events in typical communication events to extract quantitative statistical parameters		
CO3	Analyze and model typical signal sets in terms of a basis function set of Amplitude, phase and frequency		
CO4	Demonstrate by way of simulation or emulation the ease of analysis employing basis functions, statistical representation and Eigen values.		

Subject:	Signals And Systems		
Subject Code:	18EC45	NBA Code:	E214
CO1	Analyze the different types of signals and systems.		
CO2	Determine the linearity, causality, time-invariance and stability properties of continuous and discrete time systems		
CO3	Represent continuous and discrete systems in time and frequency domain using different transforms Test whether the system is stable		

Subject:	Microcontroller		
Subject Code:	18EC46	NBA Code:	E215
CO1	Explain the difference between Microprocessors & Microcontrollers, Architecture of 8051 Microcontroller, Interfacing of 8051 to external memory and Instruction set of 8051.		
CO2	Write 8051 Assembly level programs using 8051 instruction set		
CO3	Explain the Interrupt system, operation of Timers/Counters and Serial port of 8051		
CO4	Write 8051 Assembly language programs to generate square wave on 8051 I/O port pin using interrupt and C Programme to send & receive serial data using 8051 serial port		
CO5	Interface simple switches, simple LEDs, ADC 0804, LCD and Stepper Motor to 8051 using 8051 I/O ports		

Subject:	Microcontroller Laboratory		
Subject Code:	18ECL47	NBA Code:	E216
CO1	Enhance Programming skills using Assembly language and C		
CO2	Write Assembly language programs in 8051 for solving simple problems that manipulate input data using different instructions of 8051.		
CO3	Interface different input and output devices to 8051 and control them using Assembly language programs.		
CO4	Interface the serial devices to 8051 and do the serial transfer using C programming.		
CO5	Develop Applications based on microcontroller 8051		

Subject:	Analog Circuits Laboratory		
Subject Code:	18ECL48	NBA Code:	E217
CO1	Design analog circuits using BJT/FETs and evaluate their performance characteristics.		
CO2	Design analog circuits using OPAMPs for different applications		
CO3	Simulate and analyze analog circuits that uses ICs for different electronic applications.		

COURSE OUTCOMES - 2018 SCHEME

5th SEMESTER

Subject:	Technological Innovation Management And Entrepreneurship		
Subject Code:	18ES51	NBA Code:	E301
CO1	Understand the fundamental concepts of Management and Entrepreneurship and opportunities in order to setup a business		
CO2	Identify the various organizations' architecture		
CO3	Describe the functions of Managers, Entrepreneurs and their social responsibilities		
CO4	Understand the components in developing a business plan		
CO5	Recognize the various sources of funding and institutions supporting entrepreneurs.		

Subject:	Digital Signal Processing		
Subject Code:	18EC52	NBA Code:	E302
CO1	Determine response of LTI systems using time domain and DFT techniques.		
CO2	Compute DFT of real and complex discrete time signals		
CO3	Computation of DFT using FFT algorithms and linear filtering approach		
CO4	Design and realize FIR and IIR digital filters		
CO5	Understand the DSP processor architecture		

Subject:	Principles Of Communication Systems		
Subject Code:	18EC53	NBA Code:	E303
CO1	Analyze and compute performance of AM and FM modulation in the presence of noise at the receiver.		
CO2	Analyze and compute performance of digital formatting processes with quantization noise		
CO3	Multiplex digitally formatted signals at Transmitter, Demultiplex the signals and reconstruct digitally formatted signals at the receiver.		
CO4	Design/Demonstrate the use of digital formatting in Multiplexers, Vocoders and Video transmission		

Subject:	Information Theory And Coding		
Subject Code:	18EC54	NBA Code:	E304
CO1	Explain concept of Dependent & Independent Source, measure of information, Entropy, Rate of Information and Order of a source		
CO2	Represent the information using Shannon Encoding, Shannon Fano, Prefix and Huffman Encoding Algorithms		
CO3	Model the continuous and discrete communication channels using input, output and joint probabilities		
CO4	Determine a codeword comprising of the check bits computed using Linear Block codes, cyclic codes & convolutional codes		
CO5	Design the encoding and decoding circuits for Linear Block codes, cyclic codes, convolutional codes, BCH and Golay codes		

Subject:	Electromagnetic Waves		
Subject Code:	18EC55	NBA Code:	E305
CO1	Evaluate problems on electrostatic force, electric field due to point, linear, volume charges by applying conventional methods and charge in a volume.		
CO2	Apply Gauss law to evaluate Electric fields due to different charge distributions and Volume Charge distribution by using Divergence Theorem		
CO3	Determine potential and energy with respect to point charge and capacitance using Laplace equation and Apply Biot-Savart's and Ampere's laws for evaluating Magnetic field for different current configurations		
CO4	Calculate magnetic force, potential energy and Magnetization with respect to magnetic materials and voltage induced in electric circuits		
CO5	Apply Maxwell's equations for time varying fields, EM waves in free space and conductors and Evaluate power associated with EM waves using Poynting theorem		

Subject:	Verilog HDL		
Subject Code:	18EC56	NBA Code:	E306
CO1	Write Verilog programs in gate, dataflow (RTL), behavioral and switch modeling levels of Abstraction.		
CO2	Design and verify the functionality of digital circuit/system using test benches.		
CO3	Identify the suitable Abstraction level for a particular digital design		
CO4	Write the programs more effectively using Verilog tasks, functions and directives		
CO5	Perform timing and delay Simulation and Interpret the various constructs in logic synthesis		

Subject:	Digital Signal Processing Laboratory		
Subject Code:	18ECL57	NBA Code:	E307
CO1	Understand the concepts of analog to digital conversion of signals and frequency domain sampling of signals.		
CO2	Model the discrete time signals and systems and verify its properties and results.		
CO3	Implement discrete computations using DSP processor and verify the results.		
CO4	Realize the digital filters using a simulation tool and analyze the response of the filter for an audio signal.		

Subject:	HDL Laboratory		
Subject Code:	18ECL58	NBA Code:	E308
CO1	Write the Verilog/VHDL programs to simulate Combinational circuits in Dataflow, Behavioral and Gate Level Abstractions.		
CO2	Describe sequential circuits like flip flops and counters in Behavioral description and obtain simulation waveforms.		
CO3	Use FPGA/CPLD kits for downloading Verilog codes and check outputs		
CO4	Synthesize Combinational and Sequential circuits on programmable ICs and test the hardware		
CO5	Interface the hardware to the programmable chips and obtain the required output.		

Subject:	Environmental Studies		
Subject Code:	18CIV59	NBA Code:	E309
CO1	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale		
CO2	Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment		
CO3	Demonstrate ecology knowledge of a complex relationship between biotic and a biotic components		
CO4	Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues		
CO5	Relate to the latest developments in environmental pollution mitigation tools		

COURSE OUTCOMES - 2018 SCHEME

6th SEMESTER

Subject:	Digital Communication		
Subject Code:	18EC61	NBA Code:	E310
CO1	Associate and apply the concepts of Bandpass sampling to well specified signals and channels.		
CO2	Analyze and compute performance parameters and transfer rates for low pas and bandpass symbol under ideal and corrupted non-band limited channels.		
CO3	Test and validate symbol processing and performance parameters at the receiver under ideal and corrupted bandlimited channels		
CO4	Demonstrate that bandpass signals subjected to corruption and distortion in a bandlimited channel, can be processed at receiver to meet specified performance criteria.		

Subject:	Embedded Systems		
Subject Code:	18EC62	NBA Code:	E311
CO1	Describe the architectural features and instructions of 32-bit microcontroller ARM CortexM3.		
CO2	Apply the knowledge gained for Programming ARM Cortex M3 for different applications		
CO3	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.		
CO4	Develop the hardware software co-design and firmware design approaches.		
CO5	Explain the need of real time operating system for embedded system applications		

Subject:	Microwave Theory And Antennas		
Subject Code:	18EC63	NBA Code:	E312
CO1	Describe the use and advantages of microwave transmission		
CO2	Analyze various parameters related to microwave transmission lines and waveguides		
CO3	Identify microwave devices for several applications		
CO4	Analyze various antenna parameters necessary for building a RF system		
CO5	Recommend various antenna configurations according to the applications		

Subject:	Data structure using C+		
Subject Code:	18EC643	NBA Code:	E313
CO1	Relate to Dynamic memory allocation, Various types of data structures, operations and algorithms and Sparse matrices and Hashing		
CO2	Apply object-oriented approach to solve problems		
CO3	Understand non-Linear data structures trees and their applications		
CO4	Design appropriate data structures for solving computing problems		
CO5	Analyze the operations of Linear Data structures: Stack, Queue and Linked List and their applications		

Subject:	Occupational Health & Safety		
Subject Code:	18CV653	NBA Code:	E314
CO1	Identify hazards in the workplace that pose a danger or threat to their safety or health, or that of others.		
CO2	Control unsafe or unhealthy hazards and propose methods to eliminate the hazard.		
CO3	Present a coherent analysis of a potential safety or health hazard both verbally and in writing, citing the occupational Health and Safety Regulations as well as supported legislation.		
CO4	Discuss the role of health and safety in the workplace pertaining to the responsibilities of workers, managers, supervisors.		
CO5	Identify the decisions required to maintain protection of the environment, workplace as well as personal health and safety.		

Subject:	Embedded Systems Laboratory		
Subject Code:	18ECL66	NBA Code:	E315
CO1	Understand the instruction set of 32-bit microcontroller ARM Cortex M3, and the software tool required for programming in Assembly and C language.		
CO2	Develop assembly language programs using ARM Cortex M3 for different applications		
CO3	Interface external devices and I/O with ARM Cortex M3.		
CO4	Develop C language programs and library functions for embedded system applications.		
CO5	Analyze the functions of various peripherals, peripheral registers and power saving modes of ARM Cortex M3		

Subject:	Communication Laboratory		
Subject Code:	18ECL67	NBA Code:	E316
CO1	Determine the characteristics and response of microwave waveguide		
CO2	Determine characteristics of microstrip antennas and devices & compute the parameters associated with it.		
CO3	Design and test the digital and analog modulation circuits and display the waveforms		
CO4	Simulate the digital modulation systems and compare the error performance of basic digital modulation schemes.		

COURSE OUTCOMES - 2018 SCHEME

7th SEMESTER

Subject:	Computer Networks		
Subject Code:	18EC71	NBA Code:	E401
CO1	Understand the concepts of networking.		
CO2	Identify the protocols and services of different layers.		
CO3	Distinguish the basic network configurations and standards associated with each network.		
CO4	Analyze a simple network and measure its parameters.		

Subject:	VLSI Design		
Subject Code:	18EC72	NBA Code:	E402
CO1	Demonstrate understanding of MOS transistor theory, CMOS fabrication flow and technology scaling.		
CO2	Draw the basic gates using the stick and layout diagrams with the knowledge of physical design aspects.		
CO3	Demonstrate ability to design Combinational, sequential and dynamic logic circuits as per the requirements		
CO4	Interpret Memory elements along with timing considerations		
CO5	Interpret testing and testability issues in VLSI Design		

Subject:	Digital Image Processing		
Subject Code:	18EC733	NBA Code:	E403
CO1	Describe the fundamentals of digital image processing		
CO2	Understand image formation and the role human visual system plays in perception of gray and color image data.		
CO3	Apply image processing techniques in both the spatial and frequency (Fourier) domains.		
CO4	Design and evaluate image analysis techniques		
CO5	Conduct independent study and analysis of image Enhancement and restoration techniques.		

Subject:	Multimedia Communication		
Subject Code:	18EC743	NBA Code:	E404
CO1	Understand basics of different multimedia networks and applications.		
CO2	Understand different compression techniques to compress audio and video.		
CO3	Describe multimedia Communication across Networks		
CO4	Analyse different media types to represent them in digital form.		
CO5	Compress different types of text and images using different compression techniques		

Subject:	Computer Networks Laboratory		
Subject Code:	18ECL76	NBA Code:	E406
CO1	Choose suitable tools to model a network.		
CO2	Use the network simulator for learning and practice of networking algorithms.		
CO3	Illustrate the operations of network protocols and algorithms using C programming.		
CO4	Simulate the network with different configurations to measure the performance parameters		
CO5	Implement the data link and routing protocols using C programming.		

Subject:	VLSI Laboratory		
Subject Code:	18ECL77	NBA Code:	E407
CO1	Design and simulate combinational and sequential digital circuits using Verilog HDL		
CO2	Understand the Synthesis process of digital circuits using EDA tool.		
CO3	Perform ASIC design flow and understand the process of synthesis, synthesis constraints and evaluating the synthesis reports to obtain optimum gate level net list		
CO4	Design and simulate basic CMOS circuits like inverter, common source amplifier and differential amplifiers.		
CO5	Perform RTL-GDSII flow and understand the stages in ASIC design.		

Subject:	Introduction to artificial intelligence		
Subject Code:	18EC753	NBA Code:	E405
CO1	Identify the AI based problems		
CO2	Apply techniques to solve the AI problems		
CO3	Define learning and explain various learning techniques		
CO4	Discuss on expert systems		

COURSE OUTCOMES - 2018 SCHEME

8th SEMESTER

Subject:	Wireless and Cellular Communication		
Subject Code:	18EC81	NBA Code:	E409
CO1	Explain concepts of propagation mechanisms like Reflection, Diffraction, Scattering in wireless channels.		
CO2	Develop a scheme for idle mode, call set up, call progress handling and call tear down in a GSM cellular network		
CO3	Develop a scheme for idle mode, call set up, call progress handling and call tear down in a CDMA cellular network.		
CO4	Understand the Basic operations of Air interface in a LTE 4G system.		

Subject:	Optical Communication Networks		
Subject Code:	18EC824	NBA Code:	E412
CO1	Classify and describe working of optical fiber with different modes of signal propagation.		
CO2	Describe the transmission characteristics and losses in optical fiber communication.		
CO3	Describe the construction and working principle of optical connectors, multiplexers and amplifiers		
CO4	Describe the constructional features and the characteristics of optical Sources and detectors.		
CO5	illustrate the networking aspects of optical fiber and describe various standards associated with it.		

Subject:	Network security		
Subject Code:	18EC821	NBA Code:	E412
CO1	Explain network security services and mechanisms and explain security concepts		
CO2	Understand the concept of Transport Level Security and Secure Socket Layer		
CO3	Explain Security concerns in Internet Protocol security		
CO4	Explain Intruders, Intrusion detection and Malicious Software		
CO5	Describe Firewalls, Firewall Characteristics, Biasing and Configuration		