SHREE DEVI INSTITUTE OF TECHNOLOGY

(Affiliated to Visvesvaraya Technological University & Recognized by AICTE)

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGG
2015 Scheme

Course Title : Engineering Mathematics -III

Course Code : 15MAT31

Course Index : C201

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C201.1	Develop the knowledge of the use of periodic signals and Fourier series to analyze circuits and system communications.
C201.2	Explain the general linear system theory for continuous-time signals and digital signal processing using the Fourier Transform and z-transform.
C201.3	Apply the principles of curve fitting and the most common methods for curve fitting such as linear regression. Outline properties of correlation and compute Karl-Pearson's coefficient of correlation.
C201.4	Employ appropriate numerical methods to solve algebraic and transcendental equations. Apply method of interpolation for prediction and apply numerical integration to calculate definite integrals of analytical functions or experimental data points
C201.5	Apply Green's Theorem, Divergence Theorem and Stokes' theorem in various applications in the field of electro-magnetic and gravitational fields and fluid flow problems. Determine the extremals of functionals and solve the simple problems of the calculus of variations.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C201.1	3	2										
C201.2	3	2										
C201.3	3	2										
C201.4	3	2										
C201.5	3	2										
Max	3	2										

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Course Title : Electronic Instrumentation

Course Code : 15EC35

Course Index : C202

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C202.1	Analyze the working principles of PMMC voltmeter, multimeters, multirange ammeters, True RMS voltmeters, and identify errors associated with measuring instruments.
C202.2	Analyze the operation of digital voltmeters and digital instruments used to measure voltage, frequency, time period, phase difference of signals, rpm of a rotating shaft, capacitance and pH of solutions and to describe microprocessor-based instrument.
C202.3	Describe operating principles of oscilloscopes such as simple CRO, DSOs and signal generators with fixed/variable AF oscillator.
C202.4	Analyze AC/DC Bridges in measurement of passive parameters and explain the operational concepts field Strength meter, megger, stroboscope, phase meter and Q meter.
C202.5	Describe functional concepts of passive and active transducers.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C202.1	2	1	2									
C202.2	2	1	2									
C202.3	2	1	2									
C202.4	2	1	2									
C202.5	2	1	2									
Max	2	1	2									

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Course Title : Analog Electronics

Course Code : 15EC32

Course Index : C203

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C203.1	Analyze the performance of BJT amplifier circuit using re-model, Hybrid Model and π-Model.
C203.2	Explain the working principle and characteristics of FET and Analyze the performance of JFET amplifiers.
C203.3	Evaluate the performance of BJT and FET amplifiers for low and high frequency applications.
C203.4	Apply concept of BJT operation in the design of transistorized Feedback amplifiers and Oscillator circuits.
C203.5	Evaluate the efficiency of power amplifier circuits and describe the operation of voltage regulators.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C203.1	3	2	2									
C203.2	3	2	2									
C203.3	3	2	2									
C203.4	3	2	2									
C203.5	3	2	2									
Max	3	2	2									

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Course Title : Digital Electronics

Course Code : 15EC33

Course Index : C204

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C204.1	Develop simplified switching equation using Karnaugh Maps and Quine-McClusky techniques.
C204.2	Design combinational circuits by understanding the operation of Decoders, Encoders, Multiplexers, Adders, Subtractors and Comparators.
C204.3	Understand the Latches, SR, JK, T and D Flipflops: Basic building block of sequential circuits.
C204.4	Design Synchronous/Asynchronous Counters and Shift registers using Flip Flops.
C204.5	Develop Mealy/Moore Models and state diagrams for the given clocked sequential circuits.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C204.1	2	1	2									
C204.2	2	1	2									
C204.3	2	1	2									
C204.4	2	1	2									
C204.5	2	1	2									
Max	2	1	2									

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Course Title : Network Analysis

Course Code : 15EC34

Course Index : C205

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C205.1	Simplify electrical network using star-delta transformation/source transformation/source shifting and solve electrical circuit using mesh/ nodal analysis.
C205.2	Solve electrical circuit by applying Superposition/ Reciprocity/ Thevenin 's/ Norton 's/ Maximum Power Transfer/ Millman 's theorems.
C205.3	Analyze the behavior of R, R-L, R-L-C electrical circuits by considering initial/final conditions and apply Laplace transform to solve an electrical network.
C205.4	Analyze the frequency response of series and parallel resonant circuits.
C205.5	Determine the Impedance (Z), Admittance(Y), Transmission (T) and Hybrid (h) parameters, their inter relationships for a two-port network.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C205.1	2	2	1									
C205.2	2	2	1									
C205.3	2	2	1									
C205.4	2	2	1									
C205.5	2	2	1									
Max	2	2	1									

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Course Title : Engineering Electromagnetics

Course Code : 15EC36

Course Index : C206

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C206.1	Understand the 3-dimentional coordinate systems, application of Coulomb's law and Evaluate the electric field due to 1-Dimensional charges.
C206.2	Apply Gauss law, derive the Maxwell's first equation in differential and integral form using vector operator and Evaluate potential and energy.
C206.3	Differentiate between magnetic and electric field, Apply Biot-savart's law, Ampere's circuital law to find the current, Stoke's theorem, Evaluation Curl for line, surface, volume distributions.
C206.4	Evaluate the force experienced by a charge in magnetic field and to infer the effects of magnetic forces in the medium and boundary.
C206.5	Apply Maxwell's equation for both static and dynamic charges in integral and differential form, Skin effect and Evaluate power associated with Electromagnetic waves by the application of Poynting's theorem.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C206.1	2	2										
C206.2	2	2										
C206.3	2	2										
C206.4	2	2										
C206.5	2	2										
Max	2	2										

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Course Title : Analog Electronics Lab

Course Code : 15ECL37

Course Index : C207

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C207.1	Design and Test rectifiers, Clippers & Clampers and zener voltage regulator.
C207.2	Test JFET and MOSFET characteristics and to compute the parameters from the characteristics.
C207.3	Design, Test and evaluate BJT and JFET amplifiers and oscillators.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C207.1	3	3							3			
C207.2	3	3							3			
C207.3	3	3							3			
Max	3	3							3			

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Course Title : Digital Electronics Lab

Course Code : 15ECL38

Course Index : C208

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C208.1	Demonstrate and realize the truth table of Logic gates and simplify Boolean expressions using logic gates.
C208.2	Design, and test adders, subtractors, comparators, multiplexers, demultiplexers and decoders.
C208.3	Construct flips-flops and Design synchronous and asynchronous counters, shift registers.
C208.4	Simulate full adder and up/down counters using any open source/licensed tool.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C208.1	2	2	2									
C208.2	2	2	2									
C208.3	2	2	2									
C208.4	2	2	2									
Max	2	2	2									

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Course Title : Engineering Mathematics -IV

Course Code : 15MAT41

Course Index : C210

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C210.1	Apply appropriate single step and multi step numerical methods to solve first and second order ordinary differential equations arising in flow problems.
C210.2	Make use of Bessel's function to solve problems of quantum mechanics, hydrodynamics and heat conduction relating to cylindrical polar coordinate systems and Legendre's polynomials relating to spherical polar coordinate systems.
C210.3	Explain the idea of analyticity, analyticity, potential fields, residues and poles of complex potentials in field theory and electromagnetic theory. Describe conformal and bilinear transformation arising in aerofoil theory, fluid flow visualization and image processing.
C210.4	Solve problems on probability distributions relating to digital signal processing, information theory and optimization concepts of stability of design and structural engineering and joint probability distributions connected with themultivariable correlation problems for feasible random events
C210.5	Illustrate the validity of the hypothesis proposed for the given sampling distribution in accepting or rejecting the hypothesis. Define stochastic matrix connected with the multivariable correlation problems for feasible random events and transition probability matrix of a Markov chain and solve problems related to discrete parameter random process

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C210.1	3	2										
C210.2	3	2										
C210.3	3	2										
C210.4	3	2										
C210.5	3	2										
Max	3	2										

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Course Title : Signals and Systems

Course Code : 15EC44

Course Index : C211

COURSE OUTCOMES (CO): At the end of the course, the students will be able to:

CO	Course Outcomes
C211.1	Understand the mathematical description and classification of continuous/discrete time signals and systems.
C211.2	Determine and analyze the response of Linear Time Invariant (LTI) systems using convolution sum/convolution integral.
C211.3	Represent the continuous/discrete time periodic signals in frequency domain using Fourier Series analysis.
C211.4	Represent the continuous/discrete time aperiodic signals in frequency domain using Fourier Transform analysis; understand the sampling theorem and reconstruction of signal.
C211.5	Compute Z-transforms, inverse Z- transforms and analyze the transfer functions of LTI systems in Z-domain.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C211.1	2	2	2									
C211.2	2	2	2									
C211.3	2	2	2									
C211.4	2	2	2									
C211.5	2	2	2									
Max	2	2	2									

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Course Title : Control Systems

Course Code : 15EC43

Course Index : C212

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C212.1	Define and explain different types of control system and its application. Formulate the mathematical model of a system using block diagram reduction techniques and signal flow graph method.
C212.2	Analyze the time domain response of first and second order systems. Define PD, PI and PID controllers.
C212.3	Analyze the stability of electrical, mechanical and electro-mechanical systems transfer function model using the Routh-Hurwitz and Root Locus technique.
C212.4	Infer the Correlation between time and frequency response. Analyze the stability of a system transfer function model using Bode, Nyquist and Polarplot. Explain lead, lag and lead-lag compensating networks.
C212.5	Identify and formulate system using state space model.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C212.1	2	2	2									
C212.2	2	2	2									
C212.3	2	2	2									
C212.4	2	2	2									
C212.5	2	2	2									
Max	2	2	2									

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Course Title : Principles of Communication Systems

Course Code : 15EC45

Course Index : C213

COURSE OUTCOMES (CO): At the end of the course, the students will be able to:

CO	Course Outcomes
C213.1	Describe principle generation, detection of AM, SSB, VSB modulation.
C213.2	Describe principle generation, detection and applications of angle modulation.
C213.3	Illustrate random process of analog signal in time domain and types of noise in channel.
C213.4	Analyze the performance of communication system in presence of noise.
C213.5	Represent analog signal in digital format and describe pulse modulation techniques.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C213.1	2	2										
C213.2	2	2										
C213.3	2	2										
C213.4	2	2										
C213.5	2	2										
Max	2	2										

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Course Title : Linear Integrated Circuits

Course Code : 15EC46

Course Index : C214

COURSE OUTCOMES (CO): At the end of the course, the students will be able to:

CO	Course Outcomes
C214.1	Understand the terminal characteristics, fundamental parameters of op- Amps and acquire the knowledge of op-amp DC amplifiers.
C214.2	Analyze the performance of op amp AC amplifiers.
C214.3	Evaluate the performance of Linear and Non-linear applications using op-amps.
C214.4	Analyze Active filters and IC voltage regulators.
C214.5	Analyze voltage-controlled oscillators, ADC, DAC and 555 timer based multi vibrators.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C214.1	2	2	2									
C214.2	2	2	2									
C214.3	2	2	2									
C214.4	2	2	2									
C214.5	2	2	2									
Max	2	2	2									

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Course Title : Microprocessor

Course Code : 15EC42

Course Index : C215

COURSE OUTCOMES (CO): At the end of the course the student will be able to:

CO	Course Outcomes
C215.1	Acquire knowledge on the emergence of Microprocessors, perceive architecture, define addressing modes and explain instruction set of 8086
C215.2	Write Assembly language programs using String Instructions, Flag Manipulation Instructions and Assembler Directives.
C215.3	Understand and describe Stack Structure, Interrupts of 8086 and Write Modular programs using Procedures and Macros
C215.4	Analyze timing diagrams of 8086,Interface SRAM/DRAM, Keyboard,7-Segment with 8255 and Describe Bus Configurations
C215.5	Interface 8086 with ADC/DAC,Stepper Motor; Understand the use of INT 21H DOS interrupt in handling keyboard, display unit and RISC,CISC,Von-Neumann,Harvard Architecture

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C215.1	3	1	2									
C215.2	3	1	2									
C215.3	3	1	2									
C215.4	3	1	2									
C215.5	3	1	2									
Max	3	1	2									

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Course Title : Microprocessor Lab

Course Code : 15ECL47

Course Index : C216

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C216.1	Program 8086 Microprocessor to perform arithmetic, logical and data transfer operations.
C216.2	Apply Assembler directives, DOS interrupts, and branch and loop instructions.
C216.3	Apply the concept of Procedures and Macros for modular programming
C216.4	Interface peripheral devices through PIO 8255 to 8086 Microprocessor for Simple Applications.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C216.1	3	2	2	1								
C216.2	3	2	2	1								
C216.3	3	2	2	1								
C216.4	3	2	2	1								
Max	3	2	2	1								

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Course Title : Linear IC's And Communication Lab

Course Code : 15ECL48

Course Index : C217

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C217.1	Design and illustrate the operation of instrumentation amplifier, filters, DAC, adder, differentiator and integrator circuits, using op-amp.
C217.2	Design, Demonstrate and Analyze multivibrators and oscillator circuits using Op-amp
C217.3	Demonstrate the working of AM, FM, frequency synthesis and Mixer.
C217.4	Illustrate the pulse and flat top sampling techniques using basic circuits.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C217.1	3	2	1									
C217.2	3	2	1									
C217.3	3	2	1									
C217.4	3	2	1									
Max	3	2	1									

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Course Title : Management & Entrepreneurship

Course Code : 15ES51

Course Index : C301

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C301.1	Understand functions of management involving planning and decision making process.
C301.2	Organize the Staffing and Structure for an Organization, Make use of Communication Methods, Leadership Styles for Building Effective control
C301.3	Describe the importance, characteristics of entrepreneurs and their social responsibilities
C301.4	Identify the institutions supporting the Small Scale Industries and their objectives.
C301.5	Apply the concepts of project Management and project design for managing the enterprise.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C301.1					2	2		3	3	2	3	2
C301.2					2	2		3	3	2	3	2
C301.3					2	2		3	3	2	3	2
C301.4					2	2		3	3	2	3	2
C301.5					2	2		3	3	2	3	2
Max					2	2		3	3	2	3	2

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Course Title : Digital Signal Processing

Course Code : 15EC52

Course Index : C302

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C302.1	Compute Discrete Fourier Transform (DFT)/Inverse DFT of discrete sequence using the definition and properties of DFT.
C302.2	Evaluate the DFT of real and complex discrete time signals and its response using linear filtering approach.
C302.3	Develop Fast Fourier Transform (FFT) algorithms to reduce the computation time of DFT.
C302.4	Design and analyze analog/digital Infinite Impulse Response (IIR) filters using Butterworth/Chebyshev approximations and to realize IIR filters using Direct form, cascade and parallel structures.
C302.5	Design Finite Impulse Response (FIR) filters using Rectangular, Hamming, Hanning and Bartlett windows and realize FIR filters using Direct form, Linear phase, Frequency sampling and Lattice structures.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C302.1	3	3	3									
C302.2	3	3	3									
C302.3	3	3	3									
C302.4	3	3	3									
C302.5	3	3	3									
Max	3	3	3									

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Course Title : Verilog HDL

Course Code : 15EC53

Course Index : C303

COURSE OUTCOMES (CO): At the end of the course the student will be able to:

CO	Course Outcomes
C303.1	Distinguish digital design methodologies, module and module instances. Analyze & apply simulation components to digital design.
C303.2	Design Verilog module with system task and compiler directives
C303.3	Design digital circuit using gate-level and data flow modeling.
C303.4	Design digital circuit using multiway branching, looping in behavioral modeling.
C303.5	Design basic gates in data flow, behavioral and gate level abstractions using VHDL attributes.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C303.1	3	2	2									
C303.2	3	2	2									
C303.3	3	2	2									
C303.4	3	2	2									
C303.5	3	2	2									
Max	3	2	2									

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Course Title : Information Theory and Coding

Course Code : 15EC54

Course Index : C304

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C304.1	Calculate entropy, efficiency of dependent and independent sources.
C304.2	Analyze the performance of Shannon encoding algorithm, Shannon fano encoding algorithm, Huffman coding, Arithmetic Coding, Lempel – Ziv Algorithm.
C304.3	Measure mutual information, channel capacity based on channel parameters.
C304.4	Design encoding, decoding procedure and detect correct errors of linear block codes, cyclic codes.
C304.5	Design encoding, decoding procedure for convolutional code and analyze error.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C304.1	2	2	2									
C304.2	2	2	2									
C304.3	2	2	2									
C304.4	2	2	2									
C304.5	2	2	2									
Max	2	2	2									

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Course Title : Operating System

Course Code : 15EC553

Course Index : C305

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C305.1	Identify the classes of an Operating System by interpreting Computational structure and Defining the Goals of Operating system.
C305.2	Analyze preemptive, non preemptive Scheduling policies. Illustrate processes & Threads.
C305.3	Describe the techniques of contiguous and non contiguous memory allocation, segmentation Technique, Virtual Memory and Organize FIFO, LRU page replacement.
C305.4	Describe the organization of file system and IOCS, Operation, organizations & interface file system and IOCS.
C305.5	Interpret message passing, mailbox, deadlock detection and prevention methods.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C305.1	2	2										
C305.2	2	2										
C305.3	2	2										
C305.4	2	2										
C305.5	2	2										
Max	2	2										

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Course Title : Automotive Electronics
Course Code : 15EC561

Subject: - AUTOMOTIVE ELECTRONICS													Subject Code: 17EC561
Course Outcomes													
CO1	Acquirean overview of automotive components, subsystems, and basics of Electronic Engine Control in today's automotive industry.												
CO2	Use available automotive sensors and actuators while interfacing with microcontrollers / microprocessors during automotive system design												
CO3	Understand the networking of various modules in automotive systems, communication protocols and diagnostics of the sub systems.												
CO4	Design and implement the electronics that attribute the reliability, safety, and smartness to the automobiles, providing add-on comforts and get fair idea on future Automotive Electronic Systems												
CO-PO-PSO Mapping													
COs	**POs**												
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
CO1	2	2											
CO2	2	2											
CO3	2	2											
CO4	2	2											
max	2	2											

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Course Title : DSP Lab

Course Code : 15ECL57

Course Index : C306

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C306.1	Determine the sampling frequency required for a multispectral signal and to solve given difference equation.
C306.2	Perform convolution, correlation of two given sequences. Further, verify the properties of the convolution and correlation
C306.3	Obtain the transform domain representation of a sequence using the DFT. Plot the magnitude and phase spectrum. Apply the DFT properties to obtain the transformed domain representation in an efficient way.
C306.4	Design the FIR and IIR filter for the given specifications

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C306.1	2	2	3									
C306.2	2	2	3									
C306.3	2	2	3									
C306.4	2	2	3									
Max	2	2	3									

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Course Title : HDL Lab

Course Code : 15ECL58

Course Title : C307

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C307.1	Write the Verilog/VHDL programs to simulate Combinational Circuits in Dataflow, Behavioral and Gate Level Abstractions
C307.2	Describe sequential circuits like flip flops and counters in Behavioral description and obtain simulation waveforms.
C307.3	Synthesize Combinational and Sequential circuits on Field Programmable IC's and test the hardware
C307.4	Interface the hardware to the Field programmable chips and obtain the required output.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C307.1	3	2	2	1	1							
C307.2	3	2	2	1	1							
C307.3	3	2	2	1	1							
C307.4	3	2	2	1	1							
Max	3	2	2	1	1							

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Course Title : Digital Communication

Course Code : 15EC61

Course Title : C308

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C308.1	Associate and apply the concepts of Bandpass sampling to well specified signals and channels.
C308.2	Compute performance parameters of system for lowpass and bandpass signals under ideal, corrupted and non band limited conditions.
C308.3	Test and validate symbol processing and performance parameters at the receiver under ideal and non ideal band limited channels.
C308.4	Analyse and demonstrate by simulation and emulation the transmission and reconstruction of band pass signals subjected to errors in a band limited channel.
C308.5	Understand the principle of spread spectrum communication techniques and evaluate the performance parameters.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C308.1	2	2	2									
C308.2	2	2	2									
C308.3	2	2	2									
C308.4	2	2	2									
C308.5	2	2	2									
Max	2	2	2									

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Course Title : ARM Microcontroller and Embedded System

Course Code : 15EC62

Course Index : C310

COURSE OUTCOMES (CO): At the end of the course the student will be able to:

CO	Course Outcomes
C310.1	Describe the architectural features of ARM Cortex M3, a 32 bit microcontroller including memory map, interrupts and exceptions.
C310.2	Write C and assembly language program for ARM cortex M3 using Bit-band operations, memory mapping
C310.3	Understand the basic hardware components in an embedded system and their application areas.
C310.4	Describe the hardware software co-design and firmware design approaches
C310.5	Explain the need of real time operating system for embedded system applications.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C310.1	2	2										
C310.2	2	2										
C310.3	2	2										
C310.4	2	2										
C310.5	2	2										
Max	2	2										

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Course Title : VLSI DESIGN

Course Code : 15EC63

Course Index : C309

COURSE OUTCOMES (CO): At the end of the course the student will be able to:

CO	Course Outcomes
C309.1	Demonstrate understanding of MOS transistor theory, nMOS and CMOS Fabrication flow
C309.2	Design the basic gates using the stick and layout diagrams with the knowledge of physical design aspects
C309.3	Describe technology scaling and illustrate subsystem Design Processes
C309.4	Analyze CMOS subsystems and architectural issues with the design constraints and Demonstrate knowledge of FPGA based system design
C309.5	Interpret Memory elements along with timing considerations and Testability issues in VLSI Design

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C309.1	2	2										
C309.2	2	2										
C309.3	2	2										
C309.4	2	2										
C309.5	2	2										
Max	2	2										

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Course Title : Computer Communication Networks

Course Code : 15EC64

Course Index : C310

COURSE OUTCOMES (CO): At the end of the course the student will be able to:

CO	Course Outcomes
C310.1	Understand the issues and challenges in Network Models & Data link layers.
C310.2	Identify the Media Access Control and Evolution of Ethernet.
C310.3	Describe Architecture of Wireless LAN- IEEE 802.11, connecting devices, Virtual LAN and Analyze IPV4 addressing.
C310.4	Comprehend the Network Layer Protocols and Apply the Unicast Routing Protocols.
C310.5	Recognize transport layer services in a computer communication network.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C310.1	2	2										
C310.2	2	2										
C310.3	2	2										
C310.4	2	2										
C310.5	2	2										
Max	2	2										

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Course Title : Digital Switching Systems

Course Code : 15EC654

Course Index : C311

COURSE OUTCOMES (CO): At the end of the course the student will be able to:

CO	Course Outcomes
C311.1	Understand the basics of telecommunication networks and digital transmission of data.
C311.2	Study about the evolution of switching systems and the digital switching.
C311.3	Study about the telecommunication traffic and its measurements.
C311.4	Learn the technologies associated with the data switching operations.
C311.5	Understand the use of software for the switching and its maintenance.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C311.1	2	2										
C311.2	2	2										
C311.3	2	2										
C311.4	2	2										
C311.5	2	2										
Max	2	2										

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Course Title : Digital System Design Using Verilog

Course Code : 15EC663

Subject: -	Digital System Design Using Verilog	**Subject Code:** 17EC663
	Course Outcomes	
CO1	Understand the embedded systems, using small microcontrollers, larger CPUs/DSPs, or hard or soft processor cores.	
CO2	Design & Construct the combinational circuits using discrete gates and programmable logic devices.	
CO3	Develop the Verilog model for sequential circuits and test pattern generation	
CO4	Explore the different types of semiconductor memories and their usage for specific chip design	
CO5	Analyse and synthesis of processor and I/O controllers that are used in embedded system design	

CO-PO-PSO Mapping

COs	**POs**											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	3	3	1									
CO2	3	2	3									
CO3	3	2	3	2								
CO4	2	3	2									
CO5	2	3	3									

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Course Title : Embedded Controller Lab

Course Code : 15ECL67

Course Index : C312

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C312.1	Understand the instruction set of 32 bit ARM Cortex M3 and the Keil IDE for programming in Assembly and Embedded C language.
C312.2	Develop Embedded C program to display message on LCD using UART & generate PWM, interface DAC.
C312.3	Develop Embedded C program to interface Cortex M3 to LED's, 7 segment display & to control DC, Stepper Motor.
C312.4	Develop Embedded C programs to interface temperature sensors (LM35) using SPI ADC, Hex keypad.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C312.1	2	2	2	2	3							
C312.2	2	2	2	2	3							
C312.3	2	2	2	2	3							
C312.4	2	2	2	2	3							
Max	2	2	2	2	3							

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Course Title : Computer Networks Lab

Course Code : 15ECL68

Course Index : C313

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C313.1	Design and Simulate the Network, protocols for given specification.
C313.2	Demonstrate the working of given protocol and algorithm using C/C++ programming.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C313.1	1	2	2									
C313.2	1	2	2									
Max	1	2	2									

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Course Title : Microwaves And Antennas

Course Code : 15EC71

Course Index : C401

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C401.1	Describe the use and advantages of microwave generation and transmission using reflex klystron oscillator and two cavity klystron amplifiers.
C401.2	Analyze and speculate the parameters related to microwave transmission lines and waveguides.
C401.3	Identify microwave devices for several applications. Understand and apply the parameters of antenna to determine directivity of radiation patterns in terms of beam width.
C401.4	Analyze isotropic point sources in an array system and design an array antenna for N isotropic sources. Derive the expression for radiation patterns of various antennae
C401.5	Distinguish the antennas (Wire, Aperture and Array Antennas) according to the applications.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C401.1	2	2										
C401.2	2	2										
C401.3	2	2										
C401.4	2	2										
C401.5	2	2										
Max	2	2										

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Course Title : Digital Image Processing

Course Code : 15EC72

Course Index : C402

COURSE OUTCOMES (CO): At the end of the course the student will be able to:

CO	Course Outcomes
C402.1	Comprehend DIP, fundamental steps, components, Image sensing, some basic concepts.
C402.2	Identify the need for image transforms and Apply image enhancement techniques in Spatial and Frequency domains.
C402.3	Understand the image restoration techniques and methods used in digital image processing.
C402.4	Realize the fundamentals of Color Image processing, Wavelets and Morphological Operations used in digital image processing.
C402.5	Select feature extraction techniques for image analysis using Segmentation, Representation and description.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C402.1	3	2										
C402.2	3	2										
C402.3	3	2										
C402.4	3	2										
C402.5	3	2										
Max	3	2										

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Course Title : Power Electronics

Course Code : 15EC73

Course Index : C403

COURSE OUTCOMES (CO): At the end of the course the student will be able to:

CO	Course Outcomes
C403.1	Illustrate the basic operation and characteristics of power semiconductor devices.
C403.2	Understand the working principle of Thyristor to realize its turn-on and turn-off mechanism.
C403.3	Analyze single-phase controlled rectifiers and AC voltage converters for R and RL load.
C403.4	Apply the knowledge of thyristor characteristics in analysis of DC- DC converter circuit for R and RL load.
C403.5	Analyze the characteristics of inverter circuits and static switches for domestic and industrial applications.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C403.1	2	2	2									
C403.2	2	2	2									
C403.3	2	2	2									
C403.4	2	2	2									
C403.5	2	2	2									
Max	2	2	2									

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Course Title : Multimedia Communication

Course Code : 15EC741

Course Index : C404

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C404.1	Gain fundamental knowledge in understanding the basics of different multimedia networks and applications.
C404.2	Understand digitization principle techniques required to analyze different media types.
C404.3	Analyze compression techniques required to compress text and image and gain knowledge of DMS.
C404.4	Analyze compression techniques required to compress audio and video.
C404.5	Gain fundamental knowledge about multimedia communication across different networks.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C404.1	3	2										
C404.2	3	2										
C404.3	3	2										
C404.4	3	2										
C404.5	3	2										
Max	3	2										

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Course Title : DSP Algorithms and Architecture

Course Code : 15EC751

Course Index : C405

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C405.1	Comprehend the knowledge and concepts of digital signal processing techniques.
C405.2	Apply the knowledge of DSP computational building blocks to achieve speed in DSP architecture or processor.
C405.3	Apply knowledge of various types of addressing modes, interrupts, peripherals and pipelining structure of TMS320C54xx processor.
C405.4	Develop basic DSP algorithms using DSP processors.
C405.5	Demonstrate the programming of CODEC interfacing.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C405.1	2	2										
C405.2	2	2										
C405.3	2	2										
C405.4	2	2										
C405.5	2	2										
Max	2	2										

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Course Title : Advanced Communication Lab

Course Code : 15ECL76

Course Index : C406

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C406.1	Design and test the digital modulation circuits/systems and display the waveforms.
C406.2	Determine the characteristics of microwave test bench/ microstrip antennas and compute
C406.3	Determine the characteristics and response of microwave devices and optical waveguide
C406.4	Simulate the digital modulation schemes with the display of waveforms and computation of performance parameters

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C406.1	3	3	3	2	2							
C406.2	3	3	3	2	2							
C406.3	3	3	3	2	2							
C406.4	3	3	3	2	2							
Max	3	3	3	2	2							

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Course Title : VLSI Lab

Course Code : 15ECL77

Course Index : C407

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C407.1	Design verilog module & Develop test bench to Simulate Logic Gates.
C407.2	Design verilog module & Develop test bench to Simulate sequential circuits.
C407.3	Design CMOS inverter, Common Source, Common Drain and Differential Amplifiers and Analyze the DC, ac and Transient Characteristics. Create Layout for designed amplifiers to verify DRC, LVS.
C407.4	Design Operational Amplifier and R2R based Digital to Analog Converterusing Library Components to Analyze DC, ac and Transient Characteristics.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C407.1	3	2	2		2							2
C407.2	3	2	2		2							2
C407.3	3	2	2		2							2
C407.4	3	2	2		2							2
Max	3	2	2		2							2

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Course Title : Wireless Cellular and LTE 4G Broadband

Course Code : 15EC81

Course Title : C409

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C409.1	Understand system architecture and wireless fundamentals of LTE 4G
C409.2	Identify the multicarrier modulation multiple access schemes and diversity techniques required to improve performance of mobile radio channel.
C409.3	Describe the LTE channel structure and processing of downlink physical channel
C409.4	Describe the uplink physical layer procedure
C409.5	Analyze the performance of resource management and mobility management.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C409.1	2	2										
C409.2	2	2										
C409.3	2	2										
C409.4	2	2										
C409.5	2	2										
Max	2	2										

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Course Title : Fiber Optics and Networks

Course Code : 15EC82

Course Index : C410

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C410.1	Describe building blocks of optical fiber communication system, optical networks & amplifiers, their merits and demerits along with light propagation properties
C410.2	Distinguish between fiber losses (attenuation) such as absorption, scattering losses, radiative losses as well as fiber alignment and joint loss.
C410.3	Illustrate and analyze the behavior of optical transmitters & receivers for analog & digital mode of operation
C410.4	Investigate and Integrate the Active and Passive components in a WDM system.
C410.5	Illustrate the networking aspects of optical fiber and describe the optical network standards.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C410.1	2	2										
C410.2	2	2										
C410.3	2	2										
C410.4	2	2										
C410.5	2	2										
Max	2	2										

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Course Title : Network and Cyber Security

Course Code : 15EC835

Course Index : C411

COURSE OUTCOMES (CO): At the end of the course the student will be able to:

CO	Course Outcomes
C411.1	Identify the threats in web and apply the counter measures available to enhance the security of web applications.
C411.2	Develop the skills for Email security by PGP, S/MIME, Domain keys identified mail.
C411.3	Illustrate the IP security policy, ESP, Combining security Associations Internet key exchange, Cryptographic suits.
C411.4	Understand the concepts and problems related to cyber security.
C411.5	Apply concept of cyber security and Enterprise security framework in computer system administration.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C411.1	2	2	1									
C411.2	2	2	1									
C411.3	2	2	1									
C411.4	2	2	1									
C411.5	2	2	1									
Max	2	2	1									

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Course Title : Internship/Professional Practice

Course Code : 15EC84

Course Index : C412

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C412.1	Enhance the existing engineering knowledge and gain practical experience.
C412.2	Understand through an intensive experience, the nature of workplaces and their associated values, routines and cultures.
C412.3	Integrate and demonstrate existing and new technical knowledge for industrial application
C412.4	Effectively present and write technical reports with professional ethics as an individual /Team on contemporary areas/trends/developments in Engineering fields.
C412.5	Recognize the need for lifelong learning processes with Management skills through critical reflection of internship experiences.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C412.1	3	2	2	3	2	2	2	2	2	2	2	2
C412.2	3	2	2	3	2	2	2	2	2	2	2	2
C412.3	3	2	2	3	2	2	2	2	2	2	2	2
C412.4	3	2	2	3	2	2	2	2	2	2	2	2
C412.5	3	2	2	3	2	2	2	2	2	2	2	2
Max	3	2	2	3	2	2	2	2	2	2	2	2

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Course Title : PROJECT WORK

Course Code : 15ECP85

Course Index: C413

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C413.1	Design and develop sustainable solution for the betterment of society
C413.2	Develop a feasible system with scope for future enhancements and continuous lifelong learning
C413.3	Effectively present the work with professional ethics as an individual or working as a team.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C413.1	3	3	3	3	3	3	3	2	3	3	2	2
C413.2	3	3	3	3	3	3	3	2	3	3	2	2
C413.3	3	3	3	3	3	3	3	2	3	3	2	2
Max	3	3	3	3	3	3	3	2	3	3	2	2

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Course Title : SEMINAR

Course Code : 15ECS86

Course Index : C414

COURSE OUTCOMES (CO): On completion of this course, students are able to:

CO	Course Outcomes
C414.1	Identify and review research literature and comprehend solutions that exist to ECE problems.
C414.2	Understand the techniques, skills and use applicable tools necessary for presenting the authorized work.
C414.3	Communicate effectively on contemporary areas/trends/developments in Engineering fields and develop technical reports.
C414.4	Effectively present the work with professional ethics as an individual.
C414.5	Understand the impact of authorized work in societal and environmental context.

COs	**CO-PO Mapping**											
	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
C414.1	2	2		2	1			2	2	3	1	1
C414.2	2	2		2	1			2	2	3	1	1
C414.3	2	2		2	1			2	2	3	1	1
C414.4	2	2		2	1			2	2	3	1	1
C414.5	2	2		2	1			2	2	3	1	1
Max	2	2		2	1			2	2	3	1	1

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