



# ESWAR COLLEGE OF ENGINEERING

(Approved by AICTE, & Affiliated to JNTUK, A.P.)

KESANUPALLI (V), NARASARAOPETA-522549, AP

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## Department of Electronics and Communication Engineering

Course Outcomes

Regulation R16/13

Year/Sem: II B.Tech I SEM

Course Name: <b>Electronic Devices and Circuits</b>	
Course Code: <b>EC2101</b>	
<b>EC2101.1</b>	Apply the basic concepts of semiconductor physics.
<b>EC2101.2</b>	Understand the formation of p-n junction and how it can be used as a p-n junction as diode in different modes of operation.
<b>EC2101.3</b>	Know the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons
<b>EC2101.4</b>	Understand the construction, principle of operation of transistors, BJT and FET with their V-I characteristics in different configurations.
<b>EC2101.5</b>	Know the need of transistor biasing, various biasing techniques for BJT and FET and stabilization concepts with necessary expressions.
<b>EC2101.6</b>	Perform the analysis of small signal low frequency transistor amplifier circuits using BJT and FET in different configurations

Course Name: <b>Switching Theory and Logic Design</b>	
Course Code: <b>EC2102</b>	
<b>EC2102.1</b>	Classify different number systems and apply to generate various codes
<b>EC2102.2</b>	Use the concept of Boolean algebra in minimization of switching functions
<b>EC2102.3</b>	Design different types of combinational logic circuits.
<b>EC2102.4</b>	Apply knowledge of flip-flops in designing of Registers and counters
<b>EC2102.5</b>	The operation and design methodology for synchronous sequential circuits and algorithmic state machines.
<b>EC2102.6</b>	Produce innovative designs by modifying the traditional design techniques.

Course Name: <b>Signals and Systems</b>	
Course Code: <b>EC2103</b>	
<b>EC2103.1</b>	Differentiate the classification of signals as well as systems operations on signals and signal approximation.
<b>EC2103.2</b>	Analyse the spectral characteristics of continuous-time periodic and a periodic signals using Fourier series
<b>EC2103.3</b>	Analyse the spectral characteristics of continuous-time periodic and a periodic signals Using Fourier transform.
<b>EC2103.4</b>	Able to learn sampling theorem to convert continuous-time signals to discrete-time signal and reconstruct back
<b>EC2103.5</b>	Define and evaluate the concept of convolution and filters such as LPF, HPF, BPF, correlation functions.
<b>EC2103.6</b>	Apply Laplace-transform to analyze continuous--time signals and systems and z-transform to analyze discrete-time signals and systems.



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<b>Course Name: Managerial Economics &amp; Financial Analysis</b>	
<b>Course Code: EC2106</b>	
<b>EC2106.1</b>	To adopt the Managerial Economic concepts for decision making and forward planning. Also know law of demand and its exceptions, to use different forecasting methods for predicting demand for various products and services.
<b>EC2106.2</b>	To assess the functional relationship between Production and factors of production and list out various costs associated with production and able to compute breakeven point to illustrate the various uses of breakeven analysis.
<b>EC2106.3</b>	To outline the different types of business organizations and provide a framework for analyzing money in its functions as a medium of exchange.
<b>EC2106.4</b>	To adopt the principles of accounting to record, classify and summarize various transactions in books of accounts for preparation of final accounts
<b>EC2106.5</b>	To implement various techniques for assessing the financial position of the business.
<b>EC2106.6</b>	To implement various techniques for assessing the financial grades of the business.

<b>Course Name: Random Variables and Stochastic Processes</b>	
<b>Course Code: EC2105</b>	
<b>EC2105.1</b>	Able to Identify random variables and Define and manipulate distribution and density functions.
<b>EC2105.2</b>	Able to Compute various operations like expectations, variances, etc. from probability density functions and probability distribution functions.
<b>EC2105.3</b>	Able to Characterize probability density and distribution function for multiple random variables
<b>EC2105.4</b>	Able to perform operations on Multiple random variables
<b>EC2105.5</b>	Explain the concept of random process, differentiate between stochastic and ergodic processes
<b>EC2105.6</b>	Illustrate the concept of random processes and determine covariance and spectral density of stationary random processes, Analyze the LTI systems with random inputs and understand the concept of noise

<b>Course Name: Network Analysis</b>	
<b>Course Code: EC2104</b>	
<b>EC1204.1</b>	Gain the knowledge on basic network elements.
<b>EC1204.2</b>	Will analyze the RLC circuit's behaviour in detailed.
<b>EC1204.3</b>	Analyze the performance of periodic waveforms
<b>EC1204.4</b>	Gain the knowledge in characteristics of two port network parameters (Z, Y, ABCD, h&g).
<b>EC1204.5</b>	Analyze the filter design concepts in real world applications
<b>EC1204.6</b>	Cascading of two port networks, series connection of two port networks,

<b>Course Name: Networks &amp; Electrical Technology Lab</b>
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<b>Course Code: EC1208</b>	
<b>EC1208.1</b>	Determine and predetermine the performance of DC machines and transformers
<b>EC1208.2</b>	Control the DC shunt machines.
<b>EC1208.3</b>	Compute the performance of 1-phase transformer
<b>EC1208.4</b>	Perform tests on 3-phase induction motor and alternator to determine their performance characteristics.
<b>EC1208.5</b>	predetermine the efficiency and regulation of transformers and assess their performance
<b>EC1208.6</b>	Understand the significance of regulation of an alternators

<b>Course Name: Electronic Devices and Circuits Lab</b>	
<b>Course Code: EC2107</b>	
<b>EC2107.1</b>	Ability to analyze PN junctions in semiconductor devices under various conditions.
<b>EC2107.2</b>	Ability to analyze Zener in semiconductor devices under various conditions.
<b>EC2107.3</b>	Ability to design and analyze simple rectifiers and voltage regulators using diodes
<b>EC2107.4</b>	Ability to design and analyze simple BJT and FET circuits.
<b>EC2107.5</b>	Know the CRO and CRO uses
<b>EC2107.6</b>	Ability to design and amplify the BJT and FET

**Year/Sem: II B.Tech II SEM**

<b>Course Name: Electronic Circuit Analysis</b>	
<b>Course Code: EC2201</b>	
<b>EC2201.1</b>	Design and analysis of small signal high frequency transistor amplifier using BJT and FET.
<b>EC2201.2</b>	Design and analysis of multistage amplifiers using BJT and FET and Differential amplifier using BJT.
<b>EC2201.3</b>	Know the feedback amplifiers and feedback amplifier topologies
<b>EC2201.4</b>	Derive the expressions for feedback amplifiers Gain and impedance of input and output
<b>EC2201.5</b>	Derive the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillators and their amplitude and frequency stability concept.
<b>EC2201.6</b>	Know the classification of the power and tuned amplifiers and their analysis with performance comparison.

<b>Course Name: Pulse and Digital Circuits</b>	
<b>Course Code: EC2205</b>	
<b>EC2205.1</b>	Understand and analyze the responses of first order RC low pass and high pass filters for standard inputs.



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<b>EC2205.2</b>	Understand the transfer characteristics of clipping circuits and the response of clamping circuits for sinusoidal and square wave signals.
<b>EC2205.3</b>	understand the operation, analysis and design of multivibrators using BJTs
<b>EC2205.4</b>	understand the operation of Miller and Bootstrap sweep circuits
<b>EC2205.5</b>	understand the operation of TTL, ECL, NMOS and CMOS logic families
<b>EC2205.6</b>	understand the operation of CMOS logic families

<b>Course Name: Analog Communications</b>	
Course Code: <b>EC2204</b>	
<b>EC2204.1</b>	Understand modulation and demodulation Techniques of Amplitude modulation.
<b>EC2204.2</b>	Applying modulation and demodulation Techniques to DSB & SS
<b>EC2204.3</b>	Learn the basic concepts of Frequency modulation and also modulation and demodulation Techniques.
<b>EC2204.4</b>	Able to explain the principles of Radio Transmitters and Receivers.
<b>EC2204.5</b>	Analyse the Noise performance of AM, DSB, SSB and FM and Understand the generation and demodulation of pulse analog modulation techniques.
<b>EC2204.6</b>	Analyse Understand the generation and demodulation of pulse analog modulation techniques.

<b>Course Name: Electromagnetic Waves and Transmission Lines</b>	
Course Code: <b>EC2203</b>	
<b>EC2203.1</b>	Acquire knowledge on various types of transmission lines, derive transmission-line equations from a circuit model in terms of primary and secondary constants
<b>EC2203.2</b>	Derive and Calculate the expressions for input impedance of transmission lines, reflection coefficient, VSWR etc. using smith chart
<b>EC2203.3</b>	Determine E and H using various laws and applications of electric & magnetic fields
<b>EC2203.4</b>	Apply the Maxwell equations to analyze the time varying behaviour of EM waves
<b>EC2203.5</b>	Gain the knowledge in uniform plane wave concept and characteristics of uniform plane wave in various media
<b>EC2203.6</b>	. Calculate Brewster angle, critical angle and total internal reflection

<b>Course Name: Control Systems</b>	
Course Code: <b>EC2202</b>	



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<b>EC2202.1</b>	Explain the concepts of feedback and its advantages to various control systems
<b>EC2202.2</b>	Analyze the performance metrics to design the control system in time-domain
<b>EC2202.3</b>	Find the stability analysis for control systems
<b>EC2202.4</b>	Draw the root locus for control systems
<b>EC2202.5</b>	Analyze the performance metrics to design the control system in frequency-domain
<b>EC2202.6</b>	Analyze the state space approach for the analysis of control systems

<b>Course Name: Management Science</b>	
Course Code: <b>EC2206</b>	
<b>EC2206.1</b>	After completion of the Course the student will acquire the knowledge on management, Functions, global leadership and organizational structure.
<b>EC2206.2</b>	Will familiarize with the concepts of functional management that is HRM and Marketing of new product developments
<b>EC2206.3</b>	The learner is able to think in strategically through contemporary management practices.
<b>EC2206.4</b>	The learner may also know about the contemporary practices in concept
<b>EC2206.5</b>	The learner can develop positive attitude through personality development and can equip with motivational theories.
<b>EC2206.6</b>	The student can attain the group performance and grievance handling in managing the organizational culture.

<b>Course Name: Electronic Circuit Analysis Lab</b>	
Course Code: <b>EC2207</b>	
<b>EC2207.1</b>	Determination of $f_T$ for transistor
<b>EC2207.2</b>	Design different types of Amplifier and Oscillator circuits
<b>EC2207.3</b>	Simulate different types of Amplifier and Oscillator circuits using software tool
<b>EC2207.4</b>	Test different types of Amplifiers and Oscillator circuits using hardware.
<b>EC2207.5</b>	Design the power amplifiers using software and hard ware to
<b>EC2207.6</b>	Design the Tuned amplifiers to find the factor using software and hard ware to

<b>Course Name: Analog Communications Lab</b>
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<b>Course Code: EC2208</b>	
<b>EC2208.1</b>	Analyze the concepts, write and simulate the concepts of AM and AM Demodulation process in Communication.
<b>EC2208.2</b>	Know the origin and simulation of FM and FM-Demodulation process in communication
<b>EC2208.3</b>	Acquaint with AM and FM basic functionalities
<b>EC2208.4</b>	Discriminate the AM and FM functionalities
<b>EC2208.5</b>	Interpret with various angle modulation and demodulation systems
<b>EC2208.6</b>	Create the writing and simulation environments in PWM, PPM, Mixer and ring modulation

**Year/Sem: III B.Tech I SEM**

<b>Course Name: Linear IC Applications</b>	
<b>Course Code</b>	<b>EC3102</b>
<b>EC3102.1</b>	Describe the characteristics of operational amplifiers.
<b>EC3102.2</b>	Design the various linear and non-linear applications of op-amp.
<b>EC3102.3</b>	Design the Active filters using Operational Amplifier
<b>EC3102.4</b>	Describe the Op-Amp and internal Circuitry: 555 Timer, PLL
<b>EC3102.5</b>	Discuss the Applications of Operational amplifier: 555 Timer, PLL
<b>EC3102.6</b>	Use the Op-Amp in A to D & D to A Converters

<b>Course Name: Digital Communications</b>	
<b>Course Code: EC3104</b>	
<b>EC3104.1</b>	Define and Determine the performance of pulse digital modulation techniques such as PCM,DPCM,DM,ADM.
<b>EC3104.2</b>	Elaborate the principles of digital modulation techniques like ASK, FSK, PSK, DPSK, and QPSK.
<b>EC3104.3</b>	Determine the probability of error for digital modulation schemes such as FSK,ASK, BPSK
<b>EC3104.4</b>	Determine the probability of error for digital modulation schemes such as BPSK, BFSK, and QPSK.
<b>EC3104.5</b>	Understand the concept of digital information over the channel, Analyze different source coding techniques Shanon-Fano coding, Huffman coding etc.
<b>EC3104.6</b>	Able to Compute and analyze different error control coding schemes along with different domain approaches.





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<b>Course Name: Digital IC Applications</b>	
<b>Course Code: EC3103</b>	
<b>EC3103.1</b>	Find the analytic functions using C-R equations, the image using conformal mapping and bi-linear transformation
<b>EC3103.2.</b>	Use Cauchy's theorem, Cauchy's integral formula and Cauchy's residues theorem to evaluate complex integration and expansion of complex function using Taylor's and Laurent's series.
<b>EC3103.3</b>	Define Laplace and inverse Laplace transforms of various functions and solve ordinary differential equations using Laplace transform
<b>EC3103.4</b>	A thorough understanding of operational amplifiers with linear integrated circuits
<b>EC3103.5</b>	Understanding of the different families of digital integrated circuits and their characteristics
<b>EC3103.6</b>	Also students will be able to design circuits using operational amplifiers for various applications

<b>Course Name: Linear IC Applications LAB</b>	
<b>Course Code: EC3107</b>	
<b>EC3107.1</b>	Design and analyse the various linear application of op-amp
<b>EC3107.2</b>	Design and analyse the various non-linear application of op-amp
<b>EC3107.3</b>	Design and analyse filter circuits using op-amp
<b>EC3107.4</b>	Design and analyse oscillators and multivibrator circuits using op-amp
<b>EC3107.5</b>	Design and analyse the various application of 555 timer
<b>EC3107.6</b>	Analyse the performance of oscillators and multivibrators using PSPICE.

<b>Course Name: Antenna and Wave Propagation</b>	
<b>Course Code: EC3105</b>	
<b>EC3105.1</b>	Understand the radiation of electromagnetic waves by antennas.
<b>EC3105.2</b>	Understand the antenna operation through the solution of antenna design and analysis problems.
<b>EC3105.3</b>	Analyze basic antennas to determine their performance characteristics.
<b>EC3105.4</b>	Interpret the antenna performance characteristics and understand their importance in antenna engineering design.
<b>EC3105.5</b>	understand of the Radio wave propagation
<b>EC3105.6</b>	Understanding of the Transmission Lines

<b>Course Name: Computer Architecture and Organization</b>	
<b>Course Code:</b>	<b>EC3101</b>



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<b>EC3101.1</b>	Understand the functional architecture of computing systems
<b>EC3101.2</b>	Identify compare and assess, issues related to bus,memory,Control and I/O functions
<b>EC3101.3</b>	Correlate and analyze the operations carried out in Processing Unit
<b>EC3101.4</b>	Design Solutions in the area of computer Architecture
<b>EC3101.5</b>	Design and verify memory organizations
<b>EC3101.6</b>	Correlate and analyze the operations carried out in Processing

Course Name: <b>Pulse and Digital Circuits Lab</b>	
Course Code: <b>EC3106</b>	
<b>EC3106.1</b>	will be able generate sinusoidal signals
<b>EC3106.2</b>	will be able generate non-sinusoidal signals
<b>EC3106.3</b>	will be able to understand basic logic gates
<b>EC3106.4</b>	will be able to understand basic logic gates and can design applications
<b>EC3106.5</b>	will be able to analyze various multi vibrator circuits
<b>EC3106.6</b>	will be able to design non sinusoidal oscillator

Course Name: <b>Digital IC Applications Lab</b>	
Course Code: <b>EC3108</b>	
<b>EC3108.1</b>	Design various applications using op-amp
<b>EC3108.2</b>	Design various applications with 555 timer IC
<b>EC3108.3</b>	Deign various sequential and combinational circuits using Verilog HDL.
<b>EC3108.4</b>	Describe Digital Logic families and their applications.
<b>EC3108.5</b>	Analyze various Combinational And Sequential Circuit Designs.
<b>EC3108.6</b>	Design various Combinational And Sequential Circuits .

**Year/Sem: III B.Tech II SEM**

Course Name: <b>VLSI Design</b>	
Course Code: <b>EC3203</b>	
<b>EC3203.1</b>	Demonstrate a clear understanding of CMOS fabrication flow and technology scaling.
<b>EC3203.2</b>	Apply the design Rules and draw layout of a given logic circuit





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<b>EC3203.3</b>	Design MOSFET based logic circuit. Design basic building blocks in Analog IC design.
<b>EC3203.4</b>	Analyze the behaviour of amplifier circuits with various loads
<b>EC3203.5</b>	Design various CMOS logic circuits for design of Combinational logic circuits.
<b>EC3203.6</b>	Design MOSFET based logic circuits using various logic styles like static and dynamic CMOS

Course Name: <b>Digital Signal Processing</b>	
Course Code: <b>EC3204</b>	
<b>EC3204.1</b>	Apply the difference equations concept in the analyzation of Discrete time systems
<b>EC3204.2</b>	Able to apply the FFT algorithm for solving the DFT of a given signal
<b>EC3204.3</b>	Student can able to design a Digital filter (IIR) from the given specifications and Realize the IIR Structures.
<b>EC3204.4</b>	Design a Digital filter (FIR) from the given specifications and Realize the FIR Structures.
<b>EC3204.5</b>	Use the Multirate Processing concepts in various applications Such as Design of phase shifters, Interfacing of digital systems.
<b>EC3204.6</b>	Able to learn the architecture of DSP Processor and addressing modes.

Course Name: <b>VLSI Lab</b>	
Course Code: <b>EC3207</b>	
<b>EC3207.1</b>	Understand the physical design process of Digital Integrated Circuits.
<b>EC3207.2</b>	Describe procedure for designing of programmable circuits.
<b>EC3207.3</b>	Demonstrate the ability to use various EDA tools for digital system design
<b>EC3207.4</b>	Demonstrate the ability to use various Mentor Graphics Software for digital system design
<b>EC3207.5</b>	Implement various combinational and sequential circuits using VHDL on FPGA.
<b>EC3207.6</b>	Implement schematic and layout of various digital CMOS logic circuits using EDA tools.

Course Name: <b>Digital Communications Lab</b>	
Course Code: <b>EC3208</b>	



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<b>EC3208.1</b>	Able to understand basic theories of Digital communication system in practical.
<b>EC3208.2</b>	Able to design and implement different modulation and demodulation techniques.
<b>EC3208.3</b>	Able to analyze digital modulation techniques
<b>EC3208.4</b>	Able to identify and describe different techniques in modern digital communications, in particular in source coding
<b>EC3208.5</b>	Able to perform channel coding.
<b>EC3208.6</b>	Able to detect and correct errors using LBC, Binary Cyclic codes & detect dual bit errors in Convolution codes

Course Name: <b>Bio-Medical Engineering</b>	
Course Code: <b>EC3205</b>	
<b>EC3205.1</b>	Understand various methods of acquiring bio signals.
<b>EC3205.2</b>	Understand and analyze different biomedical electrodes and sensors used for clinical observation.
<b>EC3205.3</b>	Analyze ECG signal with characteristic feature points.
<b>EC3205.4</b>	Measure heart rate, blood pressure and respiration rate. And also understand various sources of blood flow meters.
<b>EC3205.5</b>	Understand bio-telemetry & instrumentation used for Clinical Laboratory.
<b>EC3205.6</b>	Analyze EEG signal with characteristic feature points.

Course Name: <b>Micro Wave Engineering</b>	
Course Code:	<b>EC3202</b>
<b>EC3202.1</b>	Explain different types of waveguides and their respective modes of propagation.
<b>EC3202.2</b>	Analyze typical microwave networks using impedance, admittance, transmission and scattering matrix representations.
<b>EC3202.3</b>	Design microwave matching networks using L section, single and double stub and quarter wave transformer.
<b>EC3202.4</b>	. Explain working of microwave passive circuits such as isolator, circulator, Directional couplers, attenuators etc.
<b>EC3202.5</b>	Describe and explain working of microwave tubes and solid state devices.
<b>EC3202.6</b>	Perform measurements on microwave devices and networks using power meter and VNA.

Course Name: <b>Microprocessor and Microcontrollers</b>	
Course Code: <b>EC3201</b>	
<b>EC3201.1</b>	To be able to understand the microprocessor capability in general and explore the evaluation of microprocessors
<b>EC3201.2</b>	To be able to understand the addressing modes of microprocessors



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<b>EC3201.3</b>	To be able to understand the micro controller capability
<b>EC3201.4</b>	To be able to program MP&MC
<b>EC3201.5</b>	To be able to interface MP & MC with other electronic devices
<b>EC3201.6</b>	To be able to understand the ARM processor architecture

Course Name: <b>Microprocessor and Microcontrollers - Lab</b>	
Course Code: <b>EC3206</b>	
<b>EC3206.1</b>	The student will learn the internal organization of popular 8086/8051 microprocessors/microcontrollers
<b>EC3206.2</b>	Explain 80x86/80x51 instruction set and gain the knowledge how assembly language works
<b>EC3206.3</b>	The student will learn hardware and software interaction and integration.
<b>EC3206.4</b>	To apply the concepts in the design of microprocessor/microcontroller based systems in real time applications
<b>EC3206.5</b>	Make use of standard test and measurement equipment to evaluate digital interfaces.
<b>EC3206.6</b>	To understand the KEIL MDK software

## Year/Sem: IV B.Tech I SEM

Course Name: <b>VLSI Design</b>	
Course Code: <b>EC4102</b>	
<b>EC4102.1</b>	Demonstrate a clear understanding of CMOS fabrication flow and technology scaling.
<b>EC4102.2</b>	Apply the design Rules and draw layout of a given logic circuit
<b>EC4102.3</b>	Design MOSFET based logic circuit. Design basic building blocks in Analog IC design.
<b>EC4102.4</b>	Analyze the behaviour of amplifier circuits with various loads
<b>EC4102.5</b>	Design various CMOS logic circuits for design of Combinational logic circuits.
<b>EC4102.6</b>	Design MOSFET based logic circuits using various logic styles like static and dynamic CMOS

Course Name: <b>Computer Networks</b>	
Course Code: <b>EC4103</b>	



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<b>EC4103.1</b>	Apply the concepts of Computer Networks and Networks Models for Data Communication.
<b>EC4103.2.</b>	Analyze networking architecture and infrastructure for wired and wireless link
<b>EC4103.3.</b>	Design, calculate, and apply subnet masks and routing addresses to fulfill networking requirements
<b>EC4103.4</b>	Analyze issues of routing and congestion mechanism for independent and internetworking networks for wired and wireless link.
<b>EC4103.5</b>	Analyze internal workings of the Internet and of a number of common Internet applications
<b>EC4103.6</b>	Protocols (DNS, SMTP, FTP, HTTP, WWW, Security and Cryptography).

<b>Course Name: Digital Image Processing</b>	
<b>Course Code EC4103</b>	
<b>EC4103.1</b>	Know the fundamentals of a digital image processing; representation of digital images in transform domain; and various mathematical transforms necessary for image processing.
<b>EC4103.2</b>	Learn and implement various Intensity transformations and spatial filtering methods in image enhancement and image restoration process.
<b>EC4103.3</b>	To know Image Restoration and Reconstruction process by using different mathematical approaches.
<b>EC4103.4</b>	To understand compressing images by using different mathematical approaches.
<b>EC4103.5</b>	To know image segmentation by the detection of point, line and edges in images, edge linking through local/global processing.
<b>EC4103.6</b>	To Analyze pseudo and full color image processing techniques

<b>Course Name: Computer Architecture and Organization</b>	
<b>Course Code:</b>	<b>EC4104</b>
<b>EC4104.1</b>	Understand the functional architecture of computing systems
<b>EC4104.2</b>	Identify compare and assess, issues related to bus,memory,Control and I/O functions
<b>EC4104.3</b>	Correlate and analyze the operations carried out in Processing Unit
<b>EC4104.4</b>	Design Solutions in the area of computer Architecture
<b>EC4104.5</b>	Design and verify memory organizations
<b>EC4104.6</b>	Correlate and analyze the operations carried out in Processing

<b>Course Name: Radar Systems</b>	
<b>Course Code: EC4105</b>	
<b>EC4105.1</b>	Demonstrate and understanding of the factors affecting the radar performance using Radar Range Equation
<b>EC4105.2</b>	Analyze the principle of FM-CW radar and apply it in FM- CW Altimeter
<b>EC4105.3</b>	Distinguish between a MTI Radar and a Pulse Doppler Radar based on their



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	Working principle.
<b>EC4105.4</b>	List the different methods used for tracking targets.
<b>EC4105.5</b>	Demonstrate an understanding of the importance of Matched Filter Receivers in Radars
<b>EC4105.6</b>	List different types of Radar Receivers and their application in real time scenario

Course Name: <b>Optical Communications</b>	
Course Code: <b>EC4106</b>	
<b>EC4106.1</b>	Illustrate the structure and fabrication methods of Optical fibers
<b>EC4106.2</b>	Analyze the channel impairments: losses and dispersion
<b>EC4106.3</b>	Analyze the Optical sources (LED and LASER) and detectors (PIN and Avalanche Photo diode).
<b>EC4106.4</b>	Apply design considerations to analog and digital fiber optic systems
<b>EC4106.5</b>	Analyze the components of fiber optic networks: Couplers, multiplexers, switches and filters.
<b>EC4106.6</b>	Couplers, multiplexers, switches and filters.

Course Name: <b>VLSI Lab</b>	
Course Code: <b>EC4107</b>	
<b>EC4107.1</b>	Understand the physical design process of Digital Integrated Circuits.
<b>EC4107.2</b>	Describe procedure for designing of programmable circuits.
<b>EC4107.3</b>	Demonstrate the ability to use various EDA tools for digital system design
<b>EC4107.4</b>	Demonstrate the ability to use various Mentor Graphics Software for digital system design
<b>EC4107.5</b>	Implement various combinational and sequential circuits using VHDL on FPGA.
<b>EC4107.6</b>	Implement schematic and layout of various digital CMOS logic circuits using EDA tools.

Course Name: <b>Microwave Engineering Lab</b>	
Course Code: <b>EC4108</b>	
<b>EC4108.1</b>	Understand the significance of microwaves and microwave transmission lines
<b>EC4108.2</b>	Analyze the characteristics of microwave tubes and compare them
<b>EC4108.3</b>	Be able to list and explain the various microwave solid state devices
<b>EC4108.4</b>	Can set up a microwave bench for measuring microwave parameters
<b>EC4108.5</b>	Verify frequency range of Radar
<b>EC4108.6</b>	Verify Virtual Height of Light

**Year/Sem: IV B.Tech II SEM**



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Course Name: <b>Project and Seminar</b>	
Course Code: <b>EC4201</b>	
<b>EC4201.1</b>	Work on proposed engineering solution as per industry need
<b>EC4201.2</b>	Customize various tools and techniques needed for project development.
<b>EC4201.3</b>	Understand significance of safe and ethical practices during project.
<b>EC4201.4</b>	Work in a team with healthy working environment
<b>EC4201.5</b>	Develop skill to present project related activities effectively to peers and mentors.
<b>EC4201.6</b>	Develop skill to innovate the developed project and convert it in form of product for industrial / societal need.

Course Name: <b>Satellite Communications</b>	
Course Code: <b>EC4203</b>	
<b>EC4203.1</b>	Work on proposed engineering solution as per industry need
<b>EC4203.2</b>	Customize various tools and techniques needed for project development.
<b>EC4203.3</b>	Understand significance of safe and ethical practices during project.
<b>EC4203.4</b>	Work in a team with healthy working environment
<b>EC4203.5</b>	Develop skill to present project related activities effectively to peers and mentors.
<b>EC4203.6</b>	Develop skill to innovate the developed project and convert it in form of product for industrial / societal need.

Course Name: <b>Cellular and Mobile Communication</b>	
Course Code: <b>EC4201</b>	
<b>EC4201.1</b>	Introduction to Cellular Mobile System, Cellular Concepts
<b>EC4201.2</b>	Types of interferences, Co-channel Interference Reduction Factor, non-co-channel interference-different types.
<b>EC4201.3</b>	Frequency management And Channel Assignment, Numbering and grouping
<b>EC4201.4</b>	Cell Coverage For Signal , phase difference between direct and reflected paths
<b>EC4201.5</b>	TRAFFIC Concept of Handoff, types of handoff, soft and hard hand offs,
<b>EC4201.6</b>	Digital Cellular Networks, GSM architecture, TDMA, CDMA, OFDMA





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Course Name: <b>Electronic Measurements and Instrumentation</b>	
Course Code: <b>EC4202</b>	
<b>EC4202.1</b>	Select the instrument to be used based on the requirements.
<b>EC4202.2</b>	Understand and analyze different signal generators and analyzers.
<b>EC4202.3</b>	Understand the design of oscilloscopes for different applications
<b>EC4202.4</b>	Understand the design of Digital oscilloscopes for different applications
<b>EC4202.5</b>	Design and derive the different bridges
<b>EC4202.6</b>	Design different transducers for measurement of different parameters

Course Name: <b>Low Power IC Design</b>	
Course Code: <b>EC4204</b>	
<b>EC4204.1</b>	Capability to recognize advanced issues in VLSI systems, specific to the deep-submicron silicon technologies.
<b>EC4204.2</b>	Students able to understand deep submicron CMOS technology and digital CMOS design styles.
<b>EC4204.3</b>	To design chips used for battery-powered systems and high-performance circuits
<b>EC4204.4</b>	Sources of power dissipation – Physics of power dissipation in MOSFET devices: The MIS structure, long channel MOSFET,
<b>EC4204.5</b>	Transistor Network Restructuring, Transistor Network Partitioning and Reorganization - Special Latches and Flip-flops
<b>EC4204.6</b>	Reducing power in sense amplifier circuits, method for achieving low core voltages from a single supply.



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