# ESWAR COLLEGE OF ENGINEERING

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**KESANUPALLI (V), NARASARAOPETA-522549, AP**
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## Department of Electronics and Communication Engineering

Course Outcomes
Regulation R20/19/16

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

| Course Name: **Electronic Devices and Circuits** | |
|---|---|
| Course Code: **EC2101** | |
| **EC2101.1** | Apply the basic concepts of semiconductor physics. |
| **EC2101.2** | 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. |
| **EC2101.3** | Know the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons |
| **EC2101.4** | Understand the construction, principle of operation of transistors, BJT and FET with their V-I characteristics in different configurations. |
| **EC2101.5** | Know the need of transistor biasing, various biasing techniques for BJT and FET and stabilization concepts with necessary expressions. |
| **EC2101.6** | Perform the analysis of small signal low frequency transistor amplifier circuits using BJT and FET in different configurations |

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

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

| | transform to analyze discrete-time signals and systems. |
|---|---|

| Course Name: **Mathematics-III (Transforms and Vector Calculus)** | |
|---|---|
| Course Code: **EC2104** | |
| **R2021011.1** | State and prove vector Line, Surface and volume integral Theorems.State and prove Stokes and Green's theorems. |
| **R2021011.2** | Derive Laplace transform standard functions. Deduce inverse Laplace transform functions. |
| **R2021011.3** | Explain about Periodic functions , even and odd functions.Explain about Half range sine and cosine series. Explain Fourier transforms.State and prove Fourier integral theorem and problems. |
| **R2021011.4** | Explain Fourier Transforms. State and prove Fourier integral theorem and problems. |
| **R2021011.5** | Explain By eliminating Orbitary constants and Orbitary functions. Derive Legrangies equation and problems. |
| **R2021011.6** | Derive solutions of linear P.D.E with constant coefficientsand problems. Explain method of separation of variables and wave & heat equations. |

| Course Name: **Random Variables and Stochastic Processes** | |
|---|---|
| Course Code: **EC2105** | |
| **EC2105.1** | Able to Identify random variables and Define and manipulate distribution and densityfunctions. |
| **EC2105.2** | Able to Compute various operations like expectations, variances, etc. from probability density functions and probability distribution functions. |
| **EC2105.3** | Able to Characterize probability density and distribution function for multiple random variables |
| **EC2105.4** | Able to perform operations on Multiple random variables |
| **EC2105.5** | Explain the concept of random process, differentiate between stochastic and ergodic processes |
| **EC2105.6** | 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 |

| Course Name: **OOPS through Java Lab** | |
|---|---|
| Course Code: **EC2106** | |
| **EC2106.1** | Identify classes, objects, members of a class and the relationship among them needed for as pacific problem |
| **EC2106.2** | Implement programs to distinguish different forms of inheritance |
| **EC2106.3** | Create packages and to reuse them |
| **EC2106.4** | Develop programs using Exception Handling mechanism |
| **EC2106.5** | Develop multithreaded application using synchronization concept |
| **EC2106.6** | Design GUI based applications using Swings and AWT. |

| Course Name: **Electronic Devices and Circuits Lab** |
|---|
| Course Code: **EC2107** |

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| | |
|---|---|
| **EC2107.1** | Ability to analyze PN junctions in semiconductor devices under various conditions. |
| **EC2107.2** | Ability to analyzeZener in semiconductor devices under various conditions. |
| **EC2107.3** | Ability to design and analyze simple rectifiers and voltage regulators using diodes |
| **EC2107.4** | Ability to design and analyze simple BJT and FET circuits. |
| **EC2107.5** | Know the CRO and CRO uses |
| **EC2107.6** | Ability to design and amplify the BJT and FET |

| | |
|---|---|
| **Course Name: Switching Theory and Logic Design–Lab** | |
| Course Code: **EC2108** | |
| **EC2108.1** | Test the operation of different logic gates using relevant IC's. |
| **EC2108.2** | Examine the operation of different combinational logic circuits. |
| **EC2108.3** | Apply the concept of Boolean algebra or k-maps to reduce and Construct logic circuit for given function |
| **EC2108.4** | Analyse the Truth tables of different Flip-Flops. |
| **EC2108.5** | Design of registers using sequential logic circuits. |
| **EC2108.6** | Design of Synchronous and Asynchronous counters using Flip-Flops |

| | |
|---|---|
| **Course Name:Python Programming** | |
| Course Code: **EC2109** | |
| **EC2109.1** | Know comprehensions in python |
| **EC2109.2** | Know generators in python |
| **EC2109.3** | Know exception handling in python |
| **EC2109.4** | Know file Input/output |
| **EC2109.5** | Understand various data types like lists, tuples, strings etc |
| **EC2109.6** | Know the usage of various pre-defined functions on the above data types |

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

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

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| **Course Name: Digital IC Design** | |
|---|---|
| Course Code: **EC2202** | |
| **EC2202.1** | Introduction of digital logic families and inter facing concepts for digital design is considered. |
| **EC2202.2** | VHDL fundamentals were discussed to modelling the digital system design blocks. |
| **EC2202.3** | Design and implementation of combinational and sequential digital logic circuits is explained. |
| **EC2202.4** | Model complex digital systems at several levels of abstractions, behavioural, structural, simulation, synthesis and rapid system prototyping. |
| **EC2202.5** | Analyze basic digital circuits with combinatorial circuits using VHDL. |
| **EC2202.6** | Analyze sequential logic circuits using VHDL Evaluate the basic design steps for Synchronous and Asynchronous Sequential Circuits. |

| **Course Name: Analog Communications** | |
|---|---|
| Course Code: **EC2203** | |
| **EC2203.1** | Understand modulation and demodulation Techniques of Amplitude modulation. |
| **EC2203.2** | Applying modulation and demodulation Techniques to DSB & SS |
| **EC2203.3** | Learn the basic concepts of Frequency modulation and also modulation and demodulation Techniques. |
| **EC2203.4** | Able to explain the principles of Radio Transmitters and Receivers. |
| **EC2203.5** | Analyse the Noise performance of AM, DSB, SSB and FM and Understand the generation and demodulation of pulse analog modulation techniques. |
| **EC2203.6** | Analyse Understand the generation and demodulation of pulse analog modulation techniques. |

| **Course Name: Linear control Systems** | |
|---|---|
| Course Code: **EC2204** | |
| **EC2204.1** | Explain the concepts of feedback and its advantages to various control systems |
| **EC2204.2** | Analyze the performance metrics to design the control system in time-domain |
| **EC2204.3** | Find the stability analysis for control systems |
| **EC2204.4** | Draw the root locus for control systems |
| **EC2204.5** | Analyze the performance metrics to design the control system in frequency-domain |
| **EC2204.6** | Analyze the state space approach for the analysis of control systems |

| **Course Name: Management and Organizational Behaviour** |
|---|

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| Course Code: **EC2205** | |
|---|---|
| **EC2205.1** | After completion of the Course the student will acquire the knowledge on management, Functions, global leadership and organizational structure. |
| **EC2205.2** | Will familiarize with the concepts of functional management that is HRM and Marketing of new product developments |
| **EC2205.3** | The learner is able to think in strategically through contemporary management practices. |
| **EC2205.4** | The learner may also know about the contemporary practices in concept |
| **EC2205.5** | The learner can develop positive attitude through personality development and can equip with motivational theories. |
| **EC2205.6** | The student can attain the group performance and grievance handling in managing the organizational culture. |

| Course Name: **Electronic Circuit Analysis Lab** | |
|---|---|
| Course Code: **EC2206** | |
| **EC2204.1** | Determination of fT for transistor |
| **EC2204.2** | Design different types of Amplifier and Oscillator circuits |
| **EC2204.3** | Simulate different types of Amplifier and Oscillator circuits using software tool |
| **EC2204.4** | Test different types of Amplifiers and Oscillator circuits using hardware. |
| **EC2204.5** | Design the power amplifiers using software and hard ware to |
| **EC2204.6** | Design the Tuned amplifiers to find the factor using software and hard ware to |

| Course Name: **Analog Communications Lab** | |
|---|---|
| Course Code: **EC2207** | |
| **EC2207.1** | Analyze the concepts, write and simulate the concepts of AM and AM Demodulation process in Communication. |
| **EC2207.2** | Know the origin and simulation of FM and FM-Demodulation process in communication |
| **EC2207.3** | Acquaint with AM and FM basic functionalities |
| **EC2207.4** | Discriminate the AM and FM functionalities |
| **EC2207.5** | Interpret with various angle modulation and demodulation systems |
| **EC2207.6** | Create the writing and simulation environments in PWM, PPM, Mixer and ring modulation |

| Course Name: **Digital IC Design Lab** | |
|---|---|
| Course Code: **EC2208** | |
| **EC2208.1** | Demonstrate a clear Understanding in hardware design language VHDL. |
| **EC2208.2** | Verify the logic behaviour of IC gates |
| **EC2208.3** | Model a Combinational circuit using VHDL and validate its functionality. |
| **EC2208.4** | Model a Sequential circuit using VHDL and validate its functionality |
| **EC2208.5** | Model a SHIFT REGISTERS using VHDL and validate its functionality |
| **EC2208.6** | Model MAC & ALU using VHDL and validate its functionality |

| Course Name:Soft Skills | |
|---|---|
| Course Code: **EC2209** | |
| **EC2209.1** | Use language fluently, accurately and appropriately in debates and group discussions |
| **EC2209.2** | Exhibit interview skills and develop soft skills |
| **EC2209.3** | Understand how to making meeting effective, Negotiation skills |
| **EC2209.4** | Use their skills of listening comprehension to communicate effectively in cross-cultural contexts |
| **EC2209.5** | Learn and use new vocabulary |
| **EC2209.6** | Write resumes, project reports and reviews. |

| Course Name: Constitution of India | |
|---|---|
| Course Code: **EC2210** | |
| **EC2210.1** | Understand historical background of the constitution making and its importance for building a democratic India. |
| **EC2210.2** | Understamd the function of Union Government and its Administration Secretariat, LokSabha, RajyaSabha, |
| **EC2210.3** | The Supreme Court and High Court: Powers and Functions; |
| **EC2210.4** | Understand the structure of state government & Central Government |
| **EC2210.5** | Analyze the decentralization of power between central, state and local self-government |
| **EC2210.6** | Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy. |

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

| Course Name: Linear IC Applications | |
|---|---|
| Course Code **EC3101** | |
| **EC3101.1** | Describe the characteristics of operational amplifiers. |
| **EC3101.2** | Design the various linear and non-linear applications of op-amp. |

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| | |
|---|---|
| EC3101.3 | Design the Active filters using Operational Amplifier |
| EC3101.4 | Describe the Op-Amp and internal Circuitry: 555 Timer, PLL |
| EC3101.5 | Design the OP-Amp Regulator Circuits |
| EC3101.6 | Design the Linear Applications of Op-Amp |

| Course Name: Digital Communications | |
|---|---|
| Course Code: EC3103 | |
| EC3103.1 | Define and Determine the performance of pulse digital modulation techniques such as PCM,DPCM,DM,ADM. |
| EC3103.2 | Elaborate the principles of digital modulation techniques like ASK, FSK, PSK, DPSK, and QPSK. |
| EC3103.3 | Determine the probability of error for digital modulation schemes such as FSK,ASK, BPSK |
| EC3103.4 | Determine the probability of error for digital modulation schemes such as BPSK, BFSK, and QPSK. |
| EC3103.5 | Understand the concept of digital information over the channel, Analyze different source coding techniques Shanon-Fano coding, Huffman coding etc. |
| EC3103.6 | Able to Compute and analyze different error control coding schemes along with different domain approaches. |

| Course Name: Electronic Measurements and Instrumentation | |
|---|---|
| Course Code: EC3105 | |
| EC3105.1 | Select the instrument to be used based on the requirements. |
| EC3105.2 | Understand and analyze different signal generators and analyzers. |
| EC3105.3 | Understand the design of oscilloscopes for different applications |
| EC3105.4 | Understand the design of Digital oscilloscopes for different applications |
| EC3105.5 | Design and derive the different bridges |
| EC3105.6 | Design different transducers for measurement of different parameters |

| Course Name: Linear IC and Applications LAB | |
|---|---|
| Course Code: EC3106 | |
| EC3106.1 | Design and analyse the various linear application of op-amp |
| EC3106.2 | Design and analyse the various non-linear application of op-amp |
| EC3106.3 | Design and analyse filter circuits using op-amp |
| EC3106.4 | Design and analyse oscillators and multivibrator circuits using op-amp |
| EC3106.5 | Design and analyse the various application of 555 timer |
| EC3106.6 | Analyse the performance of oscillators and multivibrators using PSPICE. |

| Course Name: **Digital Communications Lab** | |
|---|---|
| Course Code: **EC3107** | |
| **EC3107.1** | Able to understand basic theories of Digital communication system in practical. |
| **EC3107.2** | Able to design and implement different modulation and demodulation techniques. |
| **EC3107.3** | Able to analyze digital modulation techniques |
| **EC3107.4** | Able to identify and describe different techniques in modern digital communications, in particular in source coding |
| **EC3107.5** | Able to perform channel coding. |
| **EC3107.6** | Able to detect and correct errors using LBC,Binary Cyclic codes & detect dual bit errors in Convolution codes |

| Course Name: **Digital System Design Using HDL** | |
|---|---|
| **Course Code: EC3105** | |
| **EC3105.1** | Interpret the importance of EDA tools and its flow for VLSI designs |
| **EC3105.2** | Model logic gates ,half adder, full adder ,various digital blocks by using modern tools with HDL |
| **EC3105.3** | Construct verilog HDL models for combinational and sequential circuits using gate level, behavioural level and dataflow level |
| **EC3105.4** | Build CMOS circuits using Verilog switch level programming |
| **EC3105.5** | Apply design rule checks and timing parameters to digital circuits and model the state machines |
| **EC3105.6** | Construct verilog HDL models for combinational circuits using gate level, behavioural level and dataflow level |

| Course Name: **Mini Project** | |
|---|---|
| Course Code: **EC3109** | |
| **EC3109.1** | Work on proposed engineering solution as per industry need |
| **EC3109.2** | Customize various tools and techniques needed for project development. |
| **EC3109.3** | Understand significance of safe and ethical practices during project. |
| **EC3109.4** | Work in a team with healthy working environment |

| Course Name: **Microprocessor and Microcontrollers** | |
|---|---|
| Course Code: **EC3102** | |
| **EC3102.1** | To be able to understand the microprocessor capability in general and explore the evaluation of microprocessors |
| **EC3102.2** | To be able to understand the addressing modes of microprocessors |
| **EC3102.3** | To be able to understand the micro controller capability |
| **EC3102.4** | To be able to program MP&MC |
| **EC3102.5** | To be able to interface MP & MC with other electronic devices |
| **EC3102.6** | To be able to understand the micro controller working |

| Course Name: **Microprocessor and Microcontrollers - Lab** | |
|---|---|
| Course Code: **EC3108** | |
| **EC3108.1** | The student will learn the internal organization of popular 8086/8051 microprocessors/microcontrollers |
| **EC3108.2** | Explain 80x86/80x51instruction set and gain the knowledge how assembly language works |
| **EC3108.3** | The student will learn hardware and software interaction and integration. |
| **EC3108.4** | To apply the concepts in the design of microprocessor/microcontroller based systems in real time applications |
| **EC3108.5** | Make use of standard test and measurement equipment to evaluate digital interfaces. |
| **EC3108.6** | To apply the concepts in the design of microprocessor based systems in real time applications |

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

| Course Name: **VLSI Design** | |
|---|---|
| Course Code: **EC3202** | |
| **C3204.1** | Demonstrate a clear understanding of CMOS fabrication flow and technology scaling. |
| **C3204.2** | Apply the design Rules and draw layout of a given logic circuit |
| **C3204.3** | Design MOSFET based logic circuit. Design basic building blocks in Analog IC design. |
| **C3204.4** | Analyze the behaviour of amplifier circuits with various loads |
| **C3204.5** | Design various CMOS logic circuits for design of Combinational logic circuits. |
| **C3204.6** | Design MOSFET based logic circuits using various logic styles like static and dynamic CMOS |

| Course Name: **Digital Signal Processing** | |
|---|---|
| Course Code: **EC3203** | |
| **EC3203.1** | Apply the difference equations concept in the analyzation of Discrete time systems |
| **EC3203.2** | Able to apply the FFT algorithm for solving the DFT of a given signal |
| **EC3203.3** | Student can able to design a Digital filter (IIR) from the given specifications and Realize the IIR Structures. |

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| EC3203.4 | Design a Digital filter (FIR) from the given specifications and Realize the FIR Structures. |
|---|---|
| EC3203.5 | Use the Multiple Processing concepts in various applications Such as Design of phase shifters, Interfacing of digital systems. |
| EC3203.6 | Able to learn the architecture of DSP Processor and addressing modes. |

| Course Name: **Cellular and Mobile Communication** |
|---|
| Course Code: **EC3204** |

| EC3204.1 | Introduction to Cellular Mobile System, Cellular Concepts |
|---|---|
| EC3204.2 | Types of interferences, Co-channel Interference Reduction Factor, non-co-channel interference-different types. |
| EC3204.3 | Frequency management And Channel Assignment, Numbering and grouping |
| EC3204.4 | Cell Coverage For Signal , phase difference between direct and reflected paths |
| EC3204.5 | TRAFFIC Concept of Handof, types of handoff, soft and hard hand offs, |
| EC3204.6 | Digital Cellular Networks, GSM architecture, TDMA, CDMA, OFDMA |

| Course Name: **Data Mining** |
|---|
| Course Code: **EC3205** |

| EC3205.1 | Design a data warehouse system |
|---|---|
| EC3205.2 | Perform Design Analysis with OLAP Tools |
| EC3205.3 | Apply Suitable Pre-Processing and visualization Techniques for data analysis |
| EC3205.4 | Apply Frequent Pattern and association rule mining techniques for data analysis |
| EC3205.6 | Apply Suitable Pre-Processing and visualization Techniques for analysis |

| Course Name: **VLSI Lab** | |
|---|---|
| Course Code: **EC3207** | |
| EC3204.1 | Understand the physical design process of Digital Integrated Circuits. |
| EC3204.2 | Describe procedure for designing of programmable circuits. |
| EC3204.3 | Demonstrate the ability to use various EDA tools for digital system design |
| EC3204.4 | Demonstrate the ability to use various Mentor Graphics Software for digital system design |
| EC3204.5 | Implement various combinational and sequential circuits using VHDL on FPGA. |
| EC3204.6 | Implement schematic and layout of various digital CMOS logic circuits using EDA tools. |

| Course Name: Digital Signal Processing Lab | |
|---|---|
| Course Code: EC3208 | |
| EC3208.1 | Carryout basic signal processing operations |
| EC3208.2 | Design and Implement the FIR and IIR Filters using MATLAB |
| EC3208.3 | Demonstrate their abilities towards MATLAB based implementation of various DSP systems |
| EC3208.4 | Analyze the architecture of a DSP Processor |
| EC3208.5 | Design and Implement the FIR and IIR Filters in DSP Processor for |

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| | performing filtering operation over real-time signals |
|---|---|
| EC3208.6 | Design a DSP system for various applications of DSP |

| Course Name: **Internet of Things** | |
|---|---|
| Course Code: **EC3206** | |
| EC3206.1 | Explain in a concise manner how the general Internet as well as Internet of Things work |
| EC3206.2 | Understand constraints and opportunities of wireless and mobile networks for Internet of Things. |
| EC3206.3 | Use basic sensing and measurement and tools to determine the real-time performance of network of devices. |
| EC3206.4 | Apply knowledge of security aspects for data acquiring, and authentication. |
| EC3206.5 | Develop prototype models for various applications using IoT technology. |
| EC3206.6 | Use basic sensing and measurement and tools |

| Course Name: **Wired and Wireless Trasmission Devices** | |
|---|---|
| Course Code: **EC3201** | |
| EC3201.1 | Describe the principles of wireless communications networking and cellular system design concepts |
| EC3201.2 | Distinguish various multiple access schemes used in wireless communications |
| EC3201.3 | Explain wireless wide area network and their performance analysis |
| EC3201.4 | Define equalizer and classify the various diversity techniques |
| EC3201.5 | Compare existing and emerging wireless standards |
| EC3201.6 | Explain wireless wide area network |

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

| Course Name: **Digital Image Processing** | |
|---|---|
| Course Code **EC4102** | |
| EC4102.1 | Know the fundamentals of a digital image processing; representation of digital images in transform domain; and various mathematical transforms necessary for image processing. |
| EC4102.2 | Learn and implement various Intensity transformations and spatial filtering methods in image enhancement and image restoration process. |
| EC4102.3 | To know Image Restoration and Reconstruction process by using different mathematical approaches. |

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| EC4102.4 | To understand compressing images by using different mathematical approaches. |
|---|---|
| EC4102.5 | To know image segmentation by the detection of point, line and edges in images, edge linking through local/global processing. |
| EC4102.6 | To Analyze pseudo and full color image processing techniques |

| Course Name: **Embedded Systems** | |
|---|---|
| Course Code: **EC4106** | |
| EC4106.1 | Understand the design process of an embedded system |
| EC4106.2 | Understand typical embedded System & its components |
| EC4106.3 | Understand embedded firmware design approaches |
| EC4106.4 | Learn the basics of OS and RTOS |
| EC4106.5 | Learn the basics of  hardware design |
| EC4106.6 | Learn the basics of  software design |

| Course Name: **Radar Systems** | |
|---|---|
| Course Code: **EC4101** | |
| EC4101.1 | Demonstrate and understanding of the factors affecting the radar performance using Radar Range Equation |
| EC4101.2 | Analyze the principle of FM-CW radar and apply it in FM- CW Altimeter |
| EC4101.3 | Distinguish between a MTI Radar and a Pulse Doppler Radar based on their Working principle. |
| EC4101.4 | List the different methods used for tracking targets. |
| EC4101.5 | Demonstrate an understanding of the importance of Matched Filter Receivers in Radars |
| EC4101.6 | List different types of Radar Receivers and their application in real time scenario |

| Course Name: **TV Engineering** | |
|---|---|
| Course Code: **EC4105** | |
| EC4105.1 | Compare Digital TV transmission standards and performance parameters |
| EC4105.2 | Analyse channel coding, errors, interferences and modulation techniques for Digital TV |
| EC4105.3 | Make use of RF amplifiers |
| EC4105.4 | Identify Transmission lines for Digital TV |
| EC4105.5 | Test for a Digital TV Transmitter |
| EC4105.6 | modules and systems for Digital TV |

| Course Name: **Microwave Engineering & Optical Lab** | |
|---|---|
| Course Code: **EC4107** | |
| EC4107.1 | Understand the significance of microwaves and microwave transmission lines |

| | |
|---|---|
| **EC4107.2** | Analyze the characteristics of microwave tubes and compare them |
| **EC4107.3** | Be able to list and explain the various microwave solid state devices |
| **EC4107.4** | Can set up a microwave bench for measuring microwave parameters |
| **EC4107.5** | Verify frequency range of Radar |
| **EC4107.6** | Verify Virtual Height of Light |

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

| Course Name: **Optical Communications** | |
|---|---|
| Course Code: **EC4104** | |
| **EC4104.1** | Illustrate the structure and fabrication methods of Optical fibers |
| **EC4104.2** | Analyze the channel impairments: losses and dispersion |
| **EC4104.3** | Analyze the Optical sources (LED and LASER) and detectors (PIN and Avalanche Photo diode). |
| **EC4104.4** | Apply design considerations to analog and digital fiber optic systems |
| **EC4104.5** | Analyze the components of fiber optic networks: Couplers, multiplexers, switches and filters. |
| **EC4104.6** | Couplers, multiplexers, switches and filters. |

| Course Name: Digital Signal Processing Lab | |
|---|---|
| Course Code: EC4108 | |
| **EC4108.1** | Carryout basic signal processing operations |
| **EC4108.2** | Design and Implement the FIR and IIR Filters using MATLAB |
| **EC4108.3** | Demonstrate their abilities towards MATLAB based implementation of various DSP systems |

| EC4108.4 | Analyze the architecture of a DSP Processor |
|----------|---------------------------------------------|
| EC4108.5 | Design and Implement the FIR and IIR Filters in DSP Processor for performing filtering operation over real-time signals |
| EC4108.6 | Design a DSP system for various applications of DSP |

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

| Course Name: **Wireless Sensors and Networks** | |
|---|---|
| Course Code: **EC4204** | |
| **EC4204.1** | Adapt the basic concepts of wireless sensor networks, sensing, computing and communication tasks |
| **EC4204.2** | Explain the architectures, features, and performance for wireless sensor network systems and platforms |
| **EC4204.3** | Describe and explain radio standards and communication protocols adopted in wireless sensor networks |
| **EC4204.4** | Illustrate allocation of addresses and management |
| **EC4204.5** | Able to apply appropriate algorithms to improve existing or to develop new wireless sensor network applications |
| **EC4204.6** | Use of names in wireless sensor networks |

| Course Name: **Project** | |
|---|---|
| Course Code: **EC4206** | |
| **EC4206.1** | Work on proposed engineering solution as per industry need |
| **EC4206.2** | Customize various tools and techniques needed for project development. |
| **EC4206.3** | Understand significance of safe and ethical practices during project. |
| **EC4206.4** | Work in a team with healthy working environment |
| **EC4206.5** | Develop skill to present project related activities effectively to peers and mentors. |
| **EC4206.6** | Develop skill to innovate the developed project and convert it in form of product for industrial / societal need. |

| Course Name: **Seminar** | |
|---|---|
| Course Code: **EC4205** | |
| **EC4205.1** | Work on proposed engineering solution as per industry need |
| **EC4205.2** | Customize various tools and techniques needed for project development. |

| EC4205.3 | Understand significance of safe and ethical practices during project. |
|---|---|
| EC4205.4 | Work in a team with healthy working environment |
| EC4205.5 | Develop skill to present project related activities effectively to peers and mentors. |
| EC4205.6 | Develop skill to innovate the developed project and convert it in form of product for industrial / societal need. |

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

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

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