

## II YEAR

### **MA301BS:Mathematics – IV**

1. Analyze the complex functions with reference to their analyticity, integration using Cauchy's integral theorem
2. Find the Taylor's and Laurent's series expansion of complex functions
3. the bilinear transformation
4. Express any periodic function in term of sines and cosines
5. Express a non-periodic function as integral representation
6. Analyze one dimensional wave and heat equation

### **EC302ES:Analog Electronics**

1. Design and analyze small signal amplifier circuits applying the biasing techniques learnt earlier.
2. Cascade different amplifier configurations to obtain the required overall specifications like Gain, Bandwidth, Input and Output interfacing Impedances.
3. Design and realize different classes of Power Amplifiers and tuned amplifiers useable for audio and Radio applications.
4. Utilize the Concepts of negative feedback to improve the stability of amplifiers and positive feedback to generate sustained oscillations

### **EC303ES:Electrical Technology**

1. To analyze the performance of dc generators and motors.
2. To analyze the performance of transformers.
3. To learn the in-depth knowledge on three phase induction motors.
4. To analyze the performance of special motors and electrical instruments in real time applications.

### **EC304ES:Signals and Stochastic Process**

1. Represent any arbitrary Analog or Digital time domain signal in frequency domain.
2. Understand the importance of sampling, sampling theorem and its effects.
3. Understand the characteristics of linear time invariant systems.
4. Determine the conditions for distortion less transmission through a system.
5. Understand the concepts of Random Process and its Characteristics.
6. Understand the response of linear time Invariant system for a Random Processes.

### **EC305ES:Network Analysis**

1. Gains the knowledge on Basic network elements.
2. Learns and analyze the RLC circuits' behaviour in detail.
3. Analyse the performance of periodic waveforms.
4. Learns and gain the knowledge in characteristics of two port network parameters (Z, Y, ABCD, h & g).
5. To analyse the filter design concepts in real world applications.

### **MC300ES: Environmental Science and Technology**

1. Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development

### **EC306ES: Electronic Devices and Circuits Lab**

1. After Completion of the course the student is able to Apply various devices to real time problems.
2. Compute frequency response of various amplifiers.

### **EC307ES: Basic Simulation LAB**

1. To understand various types of signals and operations on signals
2. To understand the importance of and Fourier transform, Laplace and z transforms in the analysis of signals and systems.
3. To understand the concepts of convolution, correlation and the importance of sampling.
4. Get the clear idea of the concepts of Linearity, Random Process, stationary of random process, Gibb's Phenomenon and Gaussian Function .
5. Understand the concepts of Power Spectral Density (PSD) , its properties and significance in Communications and also Wiener-kintchen relations .

### **EC308ES: Basic Electrical Engineering LAB**

1. To understand the concepts of Power Spectral Density (PSD) , its properties and significance in Communications and also Wiener-kintchen relations .
2. To verify the KVL, KCL & Network theorems with practical approach.
3. To verify the Two Port Network Parameters.
4. Ability to perform open circuit & short circuit test and load test for determining Efficiency and Regulation of Transformer.

### **EC401ES: Switching Theory and Logic Design**

1. Be able to manipulate numeric information in different forms, e.g. different bases, signed integers, various codes such as ASCII, Gray and BCD.
2. Be able to manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.

3. Be able to design and analyze small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits.
4. Be able to design and analyze small sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits.

#### **EC402ES:Pulse and Digital Circuits**

1. Understand the applications of diode as integrator, differentiator, clippers, clamper circuits.
2. Learn various switching devices such as diode, transistor, SCR. Difference between logic gates and sampling gates
3. Design multivibrators for various applications, synchronization techniques and sweep circuits.
4. Realizing logic gates using diodes and transistors.
5. Understanding of time and frequency domain aspects.
6. Importance of clock pulse and its generating techniques.

#### **SM405ES: Business Economics and Financial Analysis**

1. The students will understand the various Forms of Business and the impact of economic variables on the Business.
2. The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt. Students can study the firm's financial position by analysing the Financial Statements of a Company.

#### **EE404ES:Control Systems**

1. Improve the system performance by selecting a suitable controller and/or a compensator for a specific application
2. Apply various time domain and frequency domain techniques to assess the system performance
3. Apply various control strategies to different applications (example: Power systems, electrical drives etc..)
4. Test system Controllability and Observability using state space representation and applications of state space representation to various systems.

#### **EC405ES:Analog Communications**

1. Able to analyze and design various modulation and demodulation analog systems.
2. Understand the characteristics of noise present in analog systems.
3. Study of signal to Noise Ration (SNR) performance, of various Analog Communication systems.
4. Analyze and design the various Pulse Modulation Systems.
5. Understand the concepts of Multiplexing: Time Division Multiplexing (TDM) and Frequency Division Multiplexing (FDM).

### **EC406ES: Analog Communications Lab**

- 1.To understand the concepts of various modulation and demodulation methods in practice.
- 2.To design and test AM and FM transmitters for desired frequency
- 3.Verify characteristics of Sampling and multiplexing techniques
- 4.Practical experience of pulse modulation techniques.
- 5.To test AM, FM receives and Emphasis Techniques.

### **EC407ES: Pulse and Digital Circuits LAB**

- 1.To test AM , FM receives and Emphasis Techniques
- 2.To analyse, Design and extend and comprehend the concepts of circuit modelling to design linear & non-linear wave shaping
- 3.To design and implement analog electronic circuits using transistors (like BJT,SCR,UJT) and observed the application design multivibrators for various applications
- 4.To use design time base generators using BJTs
- 5.Realize logic gates and sampling gates using diodes and transistors.

### **EC408ES: Analog Electronics LAB**

- 1.Design and simulation of amplifiers such as CE,CB, CS and single tuned voltage amplifiers.
- 2.Design and simulation of multistage amplifier stages such as two stage RC coupled amplifier, cascode amplifier.
- 3.Design and simulation of feedback amplifiers such as current shunt and voltage series feedback amplifiers.
- 4.Design and simulation of oscillators such as Wien bridge,RC phase shift,Hartley,Colpitt's Oscillators.
- 5.Design and simulation of power amplifiers such as class-A and class-B power amplifiers.

### III YEAR

#### **EC501PC: Electromagnetic Theory and Transmission Lines**

1. Distinguish between the static and time-varying fields, establish the corresponding sets of Maxwell's Equations and Boundary Conditions, and use them for solving engineering problems.
2. Analyze the Wave Equations for good conductors and good dielectrics, and evaluate the UPW Characteristics for several practical media of interest.
3. Establish the proof and estimate the polarization features, reflection and transmission coefficients for UPW propagation, distinguish between Brewster and Critical Angles, and acquire knowledge of their applications.
4. Determine the Transmission Line parameters for different lines, characterize the distortions and estimate the characteristics for different lines.
5. Analyze the RF Line features and configure them as SC, OC Lines, QWTs and HWTs, and design the same for effective impedance transformation.
6. Study the Smith Chart profile and stub matching features, and gain ability to practically use the same for solving practical problems.

#### **EC502PC: Linear and Digital IC Applications**

1. A thorough understanding of operational amplifiers with linear integrated circuits.
2. Understanding of the different families of digital integrated circuits and their characteristics.
3. Also students will be able to design circuits using operational amplifiers for various applications.

#### **EC503PC: Digital Communications**

1. Understand basic components of Digital Communication Systems.
2. Design optimum receiver for Digital Modulation techniques.
3. Analyze the error performance of Digital Modulation Techniques.
4. Understand the redundancy present in Digital Communication by using various source coding techniques.
5. Know about different error detecting and error correction codes like block codes, cyclic codes and convolution codes.

#### **SM504MS: Fundamentals of Management**

1. The students understand the significance of Management in their Profession.
2. The various Management Functions like Planning, Organizing, Staffing, Leading, Motivation and Control aspects are learnt in this course.
3. The students can explore the Management Practices in their domain area

### **MC500HS:Professional Ethics**

The students will understand the importance of Values and Ethics in their personal lives and professional careers. The students will learn the rights and responsibilities as an employee, team member and a global citizen.

### **EC505PC:Linear IC Applications Lab**

- 1.Study amplifiers, adders, subtractors and comparators using Op Amp.
- 2.Study Integrator and differentiator circuits.
- 3.Study active filter applications and wave form generators.
- 4.Study multivibrators using IC's and Schmitt Trigger.
- 5.Study IC 565 -PLL applications and Voltage Regulators.

### **EC506PC :Digital IC Applications Lab**

- 1.To design and study digital combinational circuits.
- 2.To design and study Digital synchronous and asynchronous counter circuits.
- 3.To design and study digital binary code converters.
- 4.To design and study 7 segment display unit and study transform characteristics of digital IC's.
- 5.To design and study and shift registers and sequential circuits.

### **EC507PC :Digital Communications LAB**

- 1.To study and analyse PCM and DPCM systems.
- 2.To study DM and ADM systems.
- 3.To analyse TDM and OFDM.
- 4.To analyse spectral characteristics of PAM, PWM, and QAM.
- 5.To understand modulation and demodulation of digital modulation techniques such as ASK, FSK, PSK, DPSK, QPSK.

### **EC611PE:Computer Organization and Operating Systems**

1. Basic structure of a digital computer
2. Arithmetic operations of binary number system
3. The organization of the Control unit, Arithmetic and Logical unit, Memory unit and the I/O unit.
4. Operating system functions, types, system calls.
5. Memory management techniques and dead lock avoidance operating systems' file system implementation and its interface.

### **EC612PE :Digital Image Processing**

1. Exploration of the limitations of the computational methods on digital images.
2. Expected to implement the spatial and frequency domain image transforms on enhancement and restoration of images.
3. Elaborate understanding on image enhancement techniques.
4. Expected to define the need for compression and evaluate the basic compression algorithms.

### **EC613PE :Spread Spectrum Communications**

1. Generate various types of Spread spectrum sequences and can simulate CDMA system (Both Transmitter & Receiver).
2. Analyse the performance of Spread spectrum systems in Jamming environment and systems with Forward Error Correction.
3. Can provide detection and cancellation schemes for Multiusers in CDMA cellular radio.

### **EC614PE :Digital System Design**

1. To understands the minimization of Finite state machine.
2. To exposes the design approaches using ROM's, PAL's and PLA's.
3. To provide in depth understanding of Fault models.
4. To understands test pattern generation techniques for fault detection.
5. To design fault diagnosis in sequential circuits.

### **EC601PC :Antennas and Wave Propagation**

1. Explain the mechanism of radiation, distinguish between different antenna characteristic parameters, establish their mathematical relations, estimate them for different practical cases.
2. Distinguish between short dipoles, half-wave dipoles, quarter-wave monopoles and small loops, configure their current distributions, derive their far fields and radiation characteristics and sketch their patterns.
3. Characterize the antennas based on frequency, configure the geometry and establish the radiation patterns of folded dipole, Yagi-Uda Antenna, Helical Antennas, Horn Antennas, and to acquire the knowledge of their analysis, design and development.
4. Analyze a microstrip rectangular patch antenna and a parabolic reflector antenna, identify the requirements and relevant feed structure, carry out the design and establish their patterns.
5. Specify the requirements for microwave measurements and arrange a setup to carry out the antenna far zone pattern and gain measurements in the laboratory.
6. Carry out the Linear Array Analysis, estimate the array factor and characteristics and sketch the pattern for 2-element array, N-element BSA, EFA, modified EFA, Binomial Arrays.
7. Classify the different wave propagation mechanisms, identify their frequency ranges, determine the characteristic features of ground wave, ionospheric wave, space wave, duct and tropospheric propagations, and estimate the parameters involved.

### **EC602PC :Microprocessors and Microcontrollers**

1. Understands the internal architecture and organization of 8086, 8051 and ARM processors/controllers.
2. Understands the interfacing techniques to 8086 and 8051 and can develop assembly language programming to design microprocessor/ micro controller based systems

### **EC603PC :Digital Signal Processing**

1. Perform time, frequency, and Z -transform analysis on signals and systems.
2. Understand the inter-relationship between DFT and various transforms.
3. Understand the significance of various filter structures and effects of round off errors.
4. Design a digital filter for a given specification.
5. Understand the fast computation of DFT and appreciate the FFT processing.
6. Understand the trade-offs between normal and multi rate DSP techniques and finite length word effects.

### **EC604PC: Digital Signal Processing Lab**

- 1.To generate sinusoidal wave forms signal based recursive equations using MATLAB.
- 2.To design the frequency response for a given system
- 3.To implement DFT and FFT for a given Sequence
- 4.Implementation of low pass and high pass filters for a given sequence.
- 5.To implement Decimation and interpolation Process

### **EC605PC: Microprocessors and Microcontrollers Lab**

- 1.To design Arithmetic operations, sorting an array for 8086.
- 2.To design string manipulations, searching for a character in a string
3. Design interfacing ADC & DAC, digital clock design, parallel & serial communication
- 4.To program Arithmetic, logical, bit manipulation instructions of 8051
- 5.To program timer & counter, interrupt Handling in 8051

### **EN606HS : Advanced English Communication Skills Lab**

1. Acquire vocabulary and use it contextually
- 2.Listen and speak effectively
- 3.Develop proficiency in academic reading and writing
- 4.Increase possibilities of job prospects
- 5.Communicate confidently in formal and informal contexts

### IVYEAR

#### **EC701PC: Microwave Engineering**

1. To analyze completely the rectangular waveguides, their mode characteristics, and design waveguides for solving practical microwave transmission line problems.
2. To distinguish between the different types of waveguide and ferrite components, explain their functioning and select proper components for engineering applications.
3. To distinguish between the methods of power generation at microwave frequencies, derive the performance characteristics of 2-Cavity and Reflex Klystrons, Magnetrons, TWTs and estimate their efficiency levels, and solve related numerical problems
4. To realize the need for solid state microwave sources, understand the concepts of TEDs, RWH Theory and explain the salient features of Gunn Diodes and ATT Devices.
5. To establish the properties of Scattering Matrix, formulate the S-Matrix for various microwave junctions, and understand the utility of S-parameters in microwave component design.
6. To set up a microwave bench, establish the measurement procedure and conduct the experiments in microwave lab for measurement of various microwave parameters.

#### **ET702PC/EC721PE: Computer Networks**

1. Students should understand and explore the basics of Computer Networks and Various Protocols. He/ She will be in a position to understand the World Wide Web concepts.
2. Students will be in a position to administrate a network and flow of information further he/she can understand easily the concepts of network security, Mobile and ad hoc networks.

#### **EC723PE/ET732PE: Coding Theory and Techniques**

1. Obtain knowledge in designing various source codes and channel codes.
2. Design encoders and decoders for block and cyclic codes.
3. Understand the significance of codes in various applications.

#### **EC724PE: Soft Computing Techniques**

1. Identify and employ suitable soft computing techniques in classification and optimization problems
2. Design hybrid systems to suit a given real – life problem.

#### **EC731PE: Wireless Communications and Networks**

1. Identify and employ suitable soft computing techniques in classification and optimization problems.

2. Design hybrid systems to suit a given real – life problem.

### **CS724PE/EC732PE:Internet of Things**

- 1.To introduce the terminology, technology and its applications
- 2.To introduce the concept of M2M (machine to machine) with necessary protocols

### **EC733PE:Radar Systems**

- 1.Derive the complete radar range equation.
- 2.Understand the need and functioning of CW, FM-CW and MTI radars
- 3.Known various Tracking methods.
- 4.Derive the matched filter response characteristics for radar receivers.

### **EC734PE:Embedded System Design**

1. Expected to understand the selection procedure of Processors in the embedded domain.
2. Design Procedure for Embedded Firmware.
3. Expected to visualize the role of Real time Operating Systems in Embedded Systems.
4. Expected to evaluate the Correlation between task synchronization and latency issues

### **EC741PE:Optimization Techniques**

1. Explain the need of optimization of engineering systems
2. Understand optimization of electrical and electronics engineering problems
3. Apply classical optimization techniques, linear programming, simplex algorithm, transportation problem
4. Apply unconstrained optimization and constrained non-linear programming and dynamic programming
5. Formulate optimization problems.

### **EC742PE:Object Oriented Programming**

- Able to understand the use of abstract classes.
- Able to solve problems using java collection framework and I/o classes.
- Able to develop multithreaded applications with synchronization.
- Able to develop applets for web applications.
- Able to design GUI based applications

### **EC743PE:Electronic Measurements and Instrumentation**

1. Identify the various electronic instruments based on their specifications for carrying out a particular task of measurement.
2. Measure various physical parameters by appropriately selecting the transducers.
3. Use various types of signal generators, signal analysers for generating and analysing various real-time signals.

#### **EC744PE:Artificial Intelligence**

1. Ability to formulate an efficient problem space for a problem expressed in natural language.
2. Select a search algorithm for a problem and estimate its time and space complexities.
3. Possess the skill for representing knowledge using the appropriate technique for a given problem.
4. Possess the ability to apply AI techniques to solve problems of game playing, and machine learning.

#### **EC702PC:VLSI DESIGN**

1. Acquire qualitative knowledge about the fabrication process of integrated circuit using MOS transistors.
2. Choose an appropriate inverter depending on specifications required for a circuit
3. Draw the layout of any logic circuit which helps to understand and estimate parasitic of any logic circuit
4. Design different types of logic gates using CMOS inverter and analyze their transfer characteristics
5. Provide design concepts required to design building blocks of data path using gates.
6. Design simple memories using MOS transistors and can understand design of large memories.
7. Design simple logic circuit using PLA, PAL, FPGA and CPLD.
8. Understand different types of faults that can occur in a system and learn the concept of testing and adding extra hardware to improve testability of system

#### **EC851PE:Network Security and Cryptography**

1. Describe network security fundamental concepts and principles
2. Encrypt and decrypt messages using block ciphers and network security technology and protocols
3. Analyse key agreement algorithms to identify their weaknesses
4. Identify and assess different types of threats, malware, spyware, viruses, vulnerabilities

#### **EC853PE:Optical Communications**

1. Understand and analyze the constructional parameters of optical fibres.
2. Be able to design an optical system.
3. Estimate the losses due to attenuation, absorption, scattering and bending.

4. Compare various optical detectors and choose suitable one for different applications.

### **EC854PE:Machine Learning**

- 1.Understand the concepts of computational intelligence like machine learning
- 2.Ability to get the skill to apply machine learning techniques to address the real time problems in different areas
- 3.Understand the Neural Networks and its usage in machine learning application.

### **EC862PE:Analog CMOS IC Design**

1. Design basic building blocks of CMOS analog ICs.
2. Carry out the design of single and two stage operational amplifiers and voltage references.
3. Determine the device dimensions of each MOSFETs involved.
4. Design various amplifiers like differential, current and operational amplifiers.

### **EC864PE:COMPUTER VISION**

1. Implement fundamental image processing techniques required for computer vision.
2. Perform shape analysis.
3. Implement boundary tracking techniques.
4. Apply chain codes and other region descriptors.
5. Apply Hough Transform for line, circle, and ellipse detections.
6. Apply 3D vision techniques.
7. Implement motion related techniques.
8. Develop applications using computer vision techniques.

### **EC703PC:VLSI and ECAD LAB**

- 1.Verify the functionality of Different logic gates Using Verilog HDL
- 2.Verify different combinational Circuits using Verilog HDL.
- 3.Verify different sequential circuits Verilog HDL.
- 4.Layout, physical verification, timing analysis of Basic logic Gate using Backend tools
- 5.Layout, physical verification, timing analysis of combinational Circuits.

### **EC704PC:Microwave Engineering LAB**

- 1.Layout, physical verification, timing analysis of combinational Circuits.
- 2.Study the characteristics of various microwave Tubes.
- 3.Analyze the various parameters of microwave devices.
- 4.Distinguish between H plane, E plane and Magic Tee.
- 5.Examine Isolation, Coupling factor and Directivity of directional couplers.
- 6.Describe the characteristics of horn Antenna.

### **EC705PC:Industry Oriented MINI Project**

- 1.Review, research, formulate, and find solution for engineering projects in Analog and Digital Electronics.
- 2.Review, research, formulate, and find solution for Engineering projects in Analog, Digital Communications and Wireless Communication and Networking
- 3.Review, research, formulate, and find solution for Engineering projects in software based and Sensor based Embedded Systems.
- 4.Review, research, formulate, and find solution for Engineering projects in Analog or Digital Signal Processing and VLSI Technology.
- 5.Review, research, formulate, and find solution for Engineering projects in Artificial Intelligence, Robotics, Machine Learning, Deep Learning, Natural Language Processing and other advanced Programming based domains.

### **EC706PC:SEMINAR**

- 1.Exploring the technology in the field of Analog and Digital Electronics.
- 2.Exploring the technology in the field of Analog and Digital Communications.
- 3.Exploring the technology in the field of software based and Sensor based Embedded Systems.
- 4.Exploring the technology in the field of Analog or Digital Signal Processing and VLSI Technology.
5. Exploring the technology in the field of Artificial Intelligence, Robotics, Machine Learning, Deep Learning, and other advanced Programming based domains.

### **EC801PC:Major Project**

- 1.Review, research, formulate, and find solution for complex engineering projects in Analog and Digital Electronics.
- 2.Review, research, formulate, and find solution for complex engineering projects in Analog Digital Communications, Wireless Communications and Networking
- 3.Review, research, formulate, and find solution for complex engineering projects in Analog or Digital Signal Processing and VLSI Technology.
- 4.Review, research, formulate, and find solution for complex engineering projects in Artificial Intelligence, Robotics, Machine Learning, Deep Learning, Natural Language Processing and other advanced Programming based domains.