



BVRIT HYDERABAD College of Engineering for Women

(Approved by AICTE | Affiliated to JNTUH)
(NBA Accredited B. Tech. (EEE, ECE, CSE and IT))
Bachupally, Hyderabad -500 090

Department of Electronics and Communication Engineering

Course Outcomes – R18 Regulations

II Year I Semester

| CO No. | Course Outcomes |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------|
| C211- Electronic Devices and Circuits – EC301PC | |
| C211.1 | Analyze the construction, principle of operation and characteristics of PN junction diode. |
| C211.2 | Differentiate various types of diodes and their applications. |
| C211.3 | Design biasing circuits to maintain a stable operating point based on given specifications. |
| C211.4 | Choose appropriate BJT configuration for a given application. |
| C211.5 | Evaluate the characteristics of BJT and FET devices. |
| C211.6 | Analyze the amplifier configurations of BJT and FET devices using h parameters. |

| C211- Electronic Devices and Circuits – EC301PC | | | | | | | | | | | | | | |
|--------------------------------------------------------|------------------------------------------------------------------|----------|----------|------------|-----|----------|----------|-----|-----|----------|------|----------|----------|----------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C211.1 | 3 | 3 | 2 | 1 | | 1 | 1 | | | 1 | | 1 | 1 | 1 |
| C211.2 | 3 | 3 | 2 | 2 | | 1 | 1 | | | 1 | | 1 | 1 | 1 |
| C211.3 | 3 | 3 | 3 | 1 | | 1 | 1 | | | 1 | | 1 | 1 | 1 |
| C211.4 | 3 | 3 | 2 | 2 | | 1 | 1 | | | 1 | | 1 | 1 | 1 |
| C211.5 | 3 | 3 | 1 | 1 | | 1 | 1 | | | 1 | | 1 | 1 | 1 |
| C211.6 | 3 | 3 | 2 | 2 | | 1 | 1 | | | 1 | | 1 | 1 | 1 |
| Average | 3 | 3 | 2 | 1.5 | | 1 | 1 | | | 1 | | 1 | 1 | 1 |

| CO No. | Course Outcomes |
|---------------------------------------------------------------|---------------------------------------------------------------------------|
| C212- Network Analysis and Transmission Lines- EC302PC | |
| C212.1 | Analyze the network topologies with electrical components |
| C212.2 | Analyze the steady state and transient response of RLC circuits |
| C212.3 | Illustrate the characteristics of two port network parameters |
| C212.4 | Design attenuators and impedance matching networks |
| C212.5 | Evaluate various transmission line parameters |
| C212.6 | Analyze Transmission line using Smith Chart with impedance considerations |

| C212- Network Analysis and Transmission Lines- EC302PC | | | | | | | | | | | | | | |
|--------------------------------------------------------|-----------------------------------------------------------|-----|------|------|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C212.1 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | | | | | 2 | 2 | 2 |
| C212.2 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | | | | | 1 | 1 | 1 |
| C212.3 | 3 | 3 | 3 | 1 | 1 | 1 | 1 | | | | | 2 | 1 | 1 |
| C212.4 | 3 | 3 | 3 | 1 | 1 | 1 | 1 | | | | | 1 | 1 | 1 |
| C212.5 | 3 | 3 | 3 | 3 | | 1 | 1 | | | | | 2 | 1 | 1 |
| C212.6 | 3 | 3 | 3 | 3 | | 1 | 1 | | | | | 1 | 1 | 1 |
| Average | 3 | 3 | 2.67 | 1.67 | 1 | 1 | 1 | | | | | 1.5 | 1.17 | 1.25 |

| CO No. | Course Outcomes |
|---------------------------------------|------------------------------------------------------------------------------------------------|
| C213- Digital System Design - EC303PC | |
| C213.1 | Apply the concepts of number systems, codes and Boolean algebra to simplify logic expressions. |
| C213.2 | Design simple combinational logic circuits. |
| C213.3 | Apply minimization techniques for optimizing combinational logic. |
| C213.4 | Design and analyze simple sequential circuits |
| C213.5 | Apply minimization techniques for sequential circuits |
| C213.6 | Realize logic gates using diodes and transistors |

| C213- Digital System Design - EC303PC | | | | | | | | | | | | | | |
|---------------------------------------|-----------------------------------------------------------|------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C213.1 | 3 | 2 | 2 | | | | | | 1 | | | 2 | 3 | 1 |
| C213.2 | 3 | 3 | 3 | 1 | | 1 | 1 | 1 | 1 | 1 | | 2 | 1 | 1 |
| C213.3 | 3 | 3 | 2 | 1 | | | | | 1 | | | 2 | 3 | |
| C213.4 | 3 | 3 | 3 | 1 | | 1 | 1 | 1 | 1 | 1 | | 2 | 1 | 1 |
| C213.5 | 3 | 3 | 2 | 1 | | | | | 1 | | | 2 | 3 | |
| C213.6 | 3 | 3 | 3 | 2 | | 1 | 1 | 1 | 1 | | | 1 | 3 | 3 |
| Average | 3 | 2.83 | 2.5 | 1.2 | | 1 | 1 | 1 | 1 | 1 | | 1.83 | 2.33 | 1.5 |

| CO No. | Course Outcomes |
|-------------------------------------|------------------------------------------------------------------------------------------------------|
| C214- Signals and Systems - EC304PC | |
| C214.1 | Analyze the orthogonality of signals |
| C214.2 | Analyze the Spectral characteristics of Periodic and aperiodic continuous signals |
| C214.3 | Apply sampling theorem in analog to digital signal conversion. |
| C214.4 | Analyze the signal transmission through linear time invariant systems. |
| C214.5 | Apply the concepts of convolution and correlation in signal and system analysis |
| C214.6 | Analyze continuous and discrete-time signals and systems using Laplace and Z Transforms respectively |

| C214- Signals and Systems - EC304PC | | | | | | | | | | | | | | |
|-------------------------------------|-----------------------------------------------------------|------|------|------|------|------|------|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C214.1 | 3 | 3 | 1 | 2 | 1 | 1 | 1 | | | | | 1 | 2 | |
| C214.2 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | | | | | 2 | 2 | |
| C214.3 | 3 | 3 | 3 | | | 1 | | | | | | | 2 | |
| C214.4 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | | | | | 2 | 2 | |
| C214.5 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | | | | | 1 | 2 | |
| C214.6 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | | | | | 2 | 2 | |
| Average | 3.00 | 3.00 | 2.67 | 2.80 | 1.80 | 1.67 | 1.80 | | | | | 1.60 | 2.00 | |

| CO No. | Course Outcomes |
|-------------------------------------------------------------|----------------------------------------------------------------------------|
| C215- Probability Theory and Stochastic Processes - EC305PC | |
| C215.1 | Apply the concepts of probability theory to solve probabilistic problems. |
| C215.2 | Analyze various distribution and density functions of a random variable. |
| C215.3 | Estimate various parameters of a random variable multiple random variables |
| C215.4 | Analyze the temporal and spectral characteristics of stochastic processes. |
| C215.5 | Analyze the characteristics and modelling of various noise sources |
| C215.6 | Analyze various Source coding techniques and related laws |

| C215- Probability Theory and Stochastic Processes - EC305PC | | | | | | | | | | | | | | |
|-------------------------------------------------------------|-----------------------------------------------------------|-----|------|------|------|------|------|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C215.1 | 3 | 3 | 1 | 2 | 1 | 1 | 1 | | | | | 1 | 1 | |
| C215.2 | 3 | 3 | 3 | 3 | 1 | 2 | 2 | | | | | 2 | 2 | |
| C215.3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | | | | | 2 | 2 | |
| C215.4 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | | | | | 2 | 2 | |
| C215.5 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | | | | | 2 | 2 | |
| C215.6 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | | | | | 2 | 2 | |
| Average | 3 | 3 | 2.67 | 2.83 | 1.67 | 1.83 | 1.83 | | | | | 1.83 | 1.83 | |

| CO No. | Course Outcomes |
|-----------------------------------------------------|----------------------------------------------------------------------|
| C216- ELECTRONIC DEVICES AND CIRCUITS LAB - EC306PC | |
| C216.1 | Analyze the characteristics of different practical diodes. |
| C216.2 | Construct electronic circuits for various applications using diodes. |
| C216.3 | Analyze the characteristics of different Transistor configurations. |
| C216.4 | Design amplifier circuits for a given specification. |

| C216- ELECTRONIC DEVICES AND CIRCUITS LAB - EC306PC | | | | | | | | | | | | | | |
|-----------------------------------------------------|-----------------------------------------------------------|------|------|------|-----|------|------|-----|------|------|------|------|------|------|
| CO/PO,PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C216.1 | 3 | 3 | 2 | 1 | | 1 | 1 | | 3 | 2 | | 1 | 1 | |
| C216.2 | 3 | 3 | 3 | 2 | | 1 | 1 | | 3 | 2 | | 1 | 1 | |
| C216.3 | 3 | 3 | 1 | 2 | | 1 | 1 | | 3 | 2 | | 1 | | |
| C216.4 | 3 | 3 | 3 | 2 | | 1 | 1 | | 3 | 2 | | 1 | 1 | |
| Average | 3.00 | 3.00 | 2.25 | 1.75 | | 1.00 | 1.00 | | 3.00 | 2.00 | | 1.00 | 1.00 | |

| CO No. | Course Outcomes |
|---------------------------------------------------|-----------------------------------------------------------|
| C217 – DIGITAL SYSTEM DESIGN LAB - EC307PC | |
| C217.1 | Implement Boolean Expressions using universal logic gates |
| C217.2 | Design and verify Combinational logic circuits using IC's |
| C217.3 | Design and verify Sequential logic circuits using IC's |
| C217.4 | Implement Counters & Shift registers using FF's |

| C217 – DIGITAL SYSTEM DESIGN LAB - EC307PC | | | | | | | | | | | | | | |
|---------------------------------------------------|-----------------------------------------------------------|-----|-----|------|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C217.1 | 3 | 3 | 3 | 1 | | | | | 3 | | | 2 | 1 | |
| C217.2 | 3 | 3 | 3 | 2 | | | | | 3 | | | 2 | 1 | |
| C217.3 | 3 | 3 | 3 | 3 | | | | | 3 | | | 2 | 1 | |
| C217.4 | 3 | 3 | 3 | 3 | | | | | 3 | | | 2 | 1 | |
| Average | 3 | 3 | 3 | 2.25 | | | | | 3 | | | 2 | 1 | |

| CO No. | Course Outcomes |
|---------------------------------------------|----------------------------------------------------------------------------|
| C218- BASIC SIMULATION LAB - EC308ES | |
| C218.1 | Perform various operations on signals |
| C218.2 | Verify the properties of LTI system and its response for different inputs. |
| C218.3 | Analyze the signals using various transforms |
| C218.4 | Analyze the characteristics of signals in noisy environment. |

| C218- BASIC SIMULATION LAB - EC308ES | | | | | | | | | | | | | | |
|---------------------------------------------|-----------------------------------------------------------|-----|-----|------|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO,PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C218.1 | 3 | 3 | 3 | 2 | 3 | 1 | 1 | | 2 | 2 | | 1 | 1 | |
| C218.2 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | | 2 | 2 | | 2 | 2 | |
| C218.3 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | | 2 | 2 | | 2 | 2 | |
| C218.4 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | | 2 | 2 | | 2 | 2 | |
| Average | 3 | 3 | 3 | 2.75 | 3 | 1 | 1 | | 2 | 2 | | 1.75 | 1.75 | |

| CO No. | Course Outcomes |
|--------------------------------------------|-----------------------------------------------------------------------------------------------|
| C219- Constitution of India – MC309 | |
| C219.1 | Understand the historical perspective of Constitution of India |
| C219.2 | Analyze the features and Characteristics of Constitution of India |
| C219.3 | Understand the concepts of Fundamental Rights and Duties of Indian Citizens. |
| C219.4 | Examine The Directive Principles of State Policy |
| C219.5 | Understand the Parliamentary form of Government in India |
| C219.6 | Examine the emergency provisions: National Emergency, President Rule and Financial Emergency. |

| C219- Constitution of India – MC309 | | | | | | | | | | | | | | |
|-------------------------------------|-----------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C219.1 | | | | | | | | 1 | | | | | | |
| C219.2 | | | | | | | | | | | | 1 | | |
| C219.3 | | | | | | 1 | | | | | | | | |
| C219.4 | | | | | | | | 1 | | | | | | |
| C219.5 | | | | | | 1 | | | | | | | | |
| C219.6 | | | | | | | | | | | | 1 | | |
| Average | | | | | | 1 | | 1 | | | | 1 | | |

II Year II Semester

| CO No. | Course Outcomes |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| C221- Laplace Transforms, Numerical Methods & Complex Variables - MA401BS | |
| C221.1 | Apply Laplace Transforms to solve ordinary differential equations |
| C221.2 | Estimate unknown values for a given data using Interpolation and method of least squares. |
| C221.3 | Apply numerical methods to solve algebraic and transcendental equations. |
| C221.4 | Apply numerical methods to evaluate definite integrals and solve initial value problems. |
| C221.5 | Analyze the complex functions with reference to their analyticity |
| C221.6 | Apply the knowledge of complex functions to evaluate various integrals. |

| C221- Laplace Transforms, Numerical Methods & Complex Variables - MA401BS | | | | | | | | | | | | | | |
|---------------------------------------------------------------------------|-----------------------------------------------------------|------|------|------|------|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C221.1 | 3 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | 1 | 2 | 1 |
| C221.2 | 3 | 3 | 2 | 1 | 1 | - | - | - | - | - | - | 1 | 1 | 1 |
| C221.3 | 3 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | 1 | 2 | 1 |
| C221.4 | 3 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | 1 | 2 | 1 |
| C221.5 | 3 | 3 | 2 | 3 | 2 | - | - | - | - | - | - | 1 | 3 | 2 |
| C221.6 | 3 | 3 | 2 | 3 | 2 | - | - | - | - | - | - | 1 | 3 | 2 |
| Average | 3.00 | 3.00 | 2.00 | 2.17 | 1.83 | - | - | - | - | - | - | 1.00 | 2.17 | 1.33 |

| CO No. | Course Outcomes |
|---------------------------------------------------------|-------------------------------------------------------------------------------------|
| C222- Electromagnetic Fields and Waves - EC402PC | |
| C222.1 | Apply the laws of electrostatics for different types of charge distributions |
| C222.2 | Apply the laws of magneto-statics for different types of current distributions |
| C222.3 | Analyze boundary conditions using Maxwell's equations at different media interfaces |
| C222.4 | Examine the propagation of EM waves in different media |
| C222.5 | Analyze the reflection and refraction of plane waves in dielectrics. |
| C222.6 | Compare various modes of microwave transmission lines. |

| C222- Electromagnetic Fields and Waves - EC402PC | | | | | | | | | | | | | | |
|--------------------------------------------------|-----------------------------------------------------------|------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C222.1 | 3 | 3 | 3 | 3 | | 1 | 1 | | | | | 1 | 1 | |
| C222.2 | 3 | 3 | 3 | 3 | | 1 | 1 | | | | | 1 | 1 | |
| C222.3 | 3 | 3 | 3 | 3 | | 1 | 1 | | | | | 1 | 1 | |
| C222.4 | 3 | 3 | 3 | 3 | | 1 | 1 | | | | | 2 | 1 | |
| C222.5 | 3 | 3 | 3 | 2 | | 1 | 1 | | | | | 2 | 1 | |
| C222.6 | 3 | 2 | 3 | 1 | | 1 | 1 | | | | | 1 | 1 | |
| Average | 3 | 2.83 | 3 | 2.5 | | 1 | 1 | | | | | 1.33 | 1 | |

| CO No. | Course Outcomes |
|--------------------------------------------------|------------------------------------------------------------------------------------------|
| C223- Analog and Digital Communications- EC403PC | |
| C223.1 | Analyze various modulation/demodulation techniques of amplitude modulation. |
| C223.2 | Explain various modulation / demodulation techniques of angle modulation. |
| C223.3 | Classify various types of transmitters and receivers used in AM and FM |
| C223.4 | Analyze different types of pulse modulation techniques and multiplexing schemes. |
| C223.5 | Demonstrate the error representation mechanism in various PCM techniques |
| C223.6 | Analyze different types of digital modulation techniques and optimal reception of signal |

| C223- Analog and Digital Communications- EC403PC | | | | | | | | | | | | | | |
|--------------------------------------------------|-----------------------------------------------------------|-----|------|-----|-----|------|------|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C223.1 | 3 | 3 | 2 | 2 | 1 | 2 | 2 | | | | | 1 | 2 | |
| C223.2 | 3 | 3 | 2 | 2 | 1 | 2 | 2 | | | | | 1 | 2 | |
| C223.3 | 3 | 3 | | | 1 | 1 | 1 | | | | | 1 | 1 | |
| C223.4 | 3 | 3 | | | 1 | 1 | 1 | | | | | 1 | 1 | |
| C223.5 | 3 | 3 | 2 | 1 | | 2 | 2 | | | | | 1 | 1 | |
| C223.6 | 3 | 3 | 3 | 3 | 1 | 2 | 2 | | | | | 2 | 2 | |
| Average | 3 | 3 | 2.25 | 2 | 1 | 1.67 | 1.67 | | | | | 1.17 | 1.5 | |

| CO No. | Course Outcomes |
|----------------------------------------|---------------------------------------------------------------|
| C224- Linear IC Applications - EC404PC | |
| C224.1 | Describe the fundamentals of integrated circuits and Op-Amp |
| C224.2 | Design Op-Amp circuits for basic applications. |
| C224.3 | Choose appropriate regulator based on the type of application |
| C224.4 | Design filters and oscillators using Op-Amp |
| C224.5 | Use IC 555 and IC 565 for different analog applications. |
| C224.6 | Differentiate between various types of data converters. |

| C224- Linear IC Applications - EC404PC | | | | | | | | | | | | | | |
|----------------------------------------|-----------------------------------------------------------|-----|------|------|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C224.1 | 3 | 3 | 3 | 2 | | 1 | 1 | | | 1 | | 1 | 2 | 2 |
| C224.2 | 3 | 3 | 1 | 1 | | 1 | 1 | | | 1 | | 1 | 1 | 2 |
| C224.3 | 3 | 3 | 3 | 2 | | 2 | 1 | | | 1 | | 1 | 3 | 3 |
| C224.4 | 3 | 3 | 1 | 2 | | 2 | 1 | | | 1 | | 1 | 3 | 2 |
| C224.5 | 3 | 3 | 2 | 1 | | 1 | 1 | | | 1 | | 1 | 1 | |
| C224.6 | 3 | 3 | 3 | 2 | | 2 | | | | 1 | | 1 | 3 | 3 |
| Average | 3 | 3 | 2.17 | 1.67 | | 1.5 | 1 | | | 1 | | 1 | 2.17 | 2.4 |

| CO No. | Course Outcomes |
|--------------------------------------------|------------------------------------------------------------------------------|
| C225- Electronic Circuit Analysis- EC405PC | |
| C225.1 | Build different types of multistage amplifiers. |
| C225.2 | Analyze high frequency response of BJT amplifiers |
| C225.3 | Categorize different feedback amplifier circuits |
| C225.4 | Design various types of power and tuned amplifiers for specific applications |
| C225.5 | Design multivibrators for various applications |
| C225.6 | Design time based generators using various techniques |

| C225- Electronic Circuit Analysis- EC405PC | | | | | | | | | | | | | | |
|--------------------------------------------|-----------------------------------------------------------|------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C225.1 | 3 | 3 | 2 | 1 | | | 1 | | | 1 | | 2 | 1 | 1 |
| C225.2 | 3 | 3 | 2 | 1 | | | 1 | | | 1 | | 2 | 1 | 1 |
| C225.3 | 3 | 3 | 3 | 1 | | 1 | 1 | | | 1 | | 1 | 1 | 1 |
| C225.4 | 3 | 3 | 3 | 1 | | 1 | 1 | | | 1 | | 2 | 1 | 1 |
| C225.5 | 3 | 3 | 3 | 1 | | 1 | 1 | | | 1 | | 1 | 1 | 1 |
| C225.6 | 2 | 2 | 2 | 1 | | 1 | - | | | 1 | | | 1 | - |
| Average | 2.83 | 2.83 | 2.5 | 1 | | 1 | 1 | | | 1 | | 1.6 | 1 | 1 |

| CO No. | Course Outcomes |
|------------------------------------------------------|---------------------------------------------------------------|
| C226- ANALOG AND DIGITAL COMMUNICATIONS LAB- EC406PC | |
| C226.1 | Analyze the spectrum of various analog modulation techniques |
| C226.2 | Design a multiplexing system using FDM |
| C226.3 | Examine various pulse modulation techniques |
| C226.4 | Analyze different digital modulation and demodulation schemes |

| C226- ANALOG AND DIGITAL COMMUNICATIONS LAB- EC406PC | | | | | | | | | | | | | | |
|------------------------------------------------------|-----------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO,PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C226.1 | 3 | 2 | 2 | 2 | 3 | 1 | | | 2 | 2 | | 1 | 1 | |
| C226.2 | 3 | 2 | 2 | 2 | 3 | 1 | | | 2 | 2 | | 1 | 1 | |
| C226.3 | 3 | 2 | 1 | 1 | 2 | 1 | | | 2 | 2 | | 1 | 1 | |
| C226.4 | 3 | 2 | 1 | 1 | 2 | 1 | | | 2 | 2 | | 1 | 1 | |
| Average | 3 | 2 | 1.5 | 1.5 | 2.5 | 1 | | | 2 | 2 | | 1 | 1 | |

| CO No. | Course Outcomes |
|---------------------------------------------|----------------------------------------------------------------------------|
| C227 – IC APPLICATIONS LAB - EC407PC | |
| C227.1 | Design analog circuits for practical applications using Op Amp IC-741 |
| C227.2 | Design waveform generators and PLL circuits using ICs |
| C227.3 | Design multi vibrators using IC555 and Schmitt trigger using IC741 |
| C227.4 | Analyze the practical applications of Voltage Regulator using various ICs. |

| C227 – IC APPLICATIONS LAB - EC407PC | | | | | | | | | | | | | | |
|---------------------------------------------|-----------------------------------------------------------|-----|------|------|-----|------|------|-----|-----|----------|----------|----------|------|----------|
| CO/PO,PS O | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO1 0 | PO1 1 | PO1 2 | PSO1 | PSO 2 |
| C227.1 | 3 | 3 | 3 | 3 | | 2 | 1 | | 3 | 3 | | 1 | 2 | 2 |
| C227.2 | 3 | 3 | 3 | 3 | | 1 | 1 | | 3 | 3 | | 1 | 1 | 1 |
| C227.3 | 3 | 3 | 3 | 3 | | 2 | 1 | | 3 | 3 | | 1 | 2 | 2 |
| C227.4 | 3 | 3 | 2 | 2 | | 2 | 2 | | 3 | 3 | | 1 | 2 | 2 |
| Average | 3 | 3 | 2.75 | 2.75 | | 1.75 | 1.25 | | 3 | 3 | | 1 | 1.75 | 1.75 |

| CO No. | Course Outcomes |
|--------------------------------------------------------|------------------------------------------------------------------|
| C228- ELECTRONIC CIRCUIT ANALYSIS LAB - EC408PC | |
| C228.1 | Design, simulate and verify basic amplifier circuits. |
| C228.2 | Design, simulate and verify feedback amplifiers and oscillators. |
| C228.3 | Design, simulate and verify power amplifier circuits. |
| C228.4 | Design, simulate and verify Multivibrators and Sweep Circuits. |

| C228- ELECTRONIC CIRCUIT ANALYSIS LAB - EC408PC | | | | | | | | | | | | | | |
|--------------------------------------------------------|-----------------------------------------------------------|-----|-----|------|-----|-----|-----|-----|-----|----------|------|----------|------|----------|
| CO/PO,PS O | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO1 0 | PO11 | PO1 2 | PSO1 | PSO 2 |
| C228.1 | 3 | 3 | 3 | 3 | 3 | | 1 | | 3 | | | 1 | 2 | 1 |
| C228.2 | 3 | 3 | 3 | 3 | 3 | | 1 | | 3 | | | 1 | 2 | 1 |
| C228.3 | 3 | 3 | 3 | 3 | 3 | | 1 | | 3 | | | 1 | 2 | 1 |
| C228.4 | 3 | 3 | 3 | 2 | 3 | 1 | 1 | | 3 | 1 | | 1 | 1 | 1 |
| Average | 3 | 3 | 3 | 2.75 | 3 | 1 | 1 | | 3 | 1 | | 1 | 1.75 | 1 |

| CO No. | Course Outcomes |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| C229-Gender Sensitization Lab- MC409 | |
| C229.1 | Develop a better understanding of important issues related to gender in contemporary India. |
| C229.2 | Analyze basic dimensions of the biological, sociological, psychological and legal aspects of gender. |
| C229.3 | Develop a sense of appreciation of women in all walks of life and will be equipped to work and live together as equals. |
| C229.4 | Examine the new laws for women protection and relief, and empower students to understand and respond to gender violence. |

| C229-Gender Sensitization Lab – MC409 | | | | | | | | | | | | | | |
|---------------------------------------|-----------------------------------------------------------|-----|-----|-----|-----|-----|-----|------|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C229.1 | - | - | - | - | - | 2 | - | - | - | - | | | | |
| C229.2 | - | - | - | - | - | 2 | - | 1 | - | - | | | | |
| C229.3 | - | - | - | - | - | 2 | - | 1 | 1 | 2 | | | | |
| C229.4 | - | - | - | - | - | 2 | - | 1 | 2 | 2 | | | | |
| Average | | | | | | 2 | | 0.75 | 1.5 | 2 | | | | |

III Year I Semester

| CO No. | Course Outcomes |
|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| C311 - Microprocessors & Microcontrollers - EC501PC | |
| C311.1 | Differentiate architectural features and modes of operation of 8086 microprocessor and 8051 microcontroller. |
| C311.2 | Summarize the addressing modes, instruction set and assembler directives of 8086 Microprocessor and 8051 Micro controller. |
| C311.3 | Write assembly language programs for 8086 Microprocessor and 8051 Microcontroller. |
| C311.4 | Interface various peripheral devices and memory with 8051 microcontroller. |
| C311.5 | Analyze the architectural features and instruction set of ARM processor |
| C311.6 | Explain the architectural feature of CORTEX and OMAP processors |

| C311 - Microprocessors & Microcontrollers - EC501PC | | | | | | | | | | | | | | |
|-----------------------------------------------------|-----------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C311.1 | 3 | 3 | 3 | 2 | 1 | | | | | | 1 | 3 | 3 | 3 |
| C311.2 | 3 | 3 | 2 | | | | | | 1 | | 2 | 2 | 3 | 3 |
| C311.3 | 3 | 3 | 2 | 2 | | | | | 2 | | | 3 | 3 | 3 |
| C311.4 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 |
| C311.5 | 3 | 3 | 2 | 2 | 2 | | | | | | | 2 | 2 | 2 |
| C311.6 | 3 | 3 | 2 | 2 | 2 | | | | | | | 2 | 2 | 2 |
| Average | 3.00 | 3.00 | 2.17 | 2.00 | 1.75 | 2.00 | 2.00 | 1.00 | 1.67 | 2.00 | 1.67 | 2.33 | 2.50 | 2.50 |

| CO No. | Course Outcomes |
|----------------------------------------------------------|------------------------------------------------------------------------------------|
| C312 - Data Communications and Networks - EC502PC | |
| C312.1 | Analyze the Categories and functions of various Data communication Networks |
| C312.2 | Design and analyze various error detection techniques. |
| C312.3 | Demonstrate the mechanism of routing the data in network layer |
| C312.4 | Analyze the significance of various Flow control and Congestion control Mechanisms |
| C312.5 | Analyze the Functioning of various Application layer Protocols. |
| C312.6 | Analyze the features and operations of various user interface protocols. |

| C312 - Data Communications and Networks - EC502PC | | | | | | | | | | | | | | |
|---------------------------------------------------|-----------------------------------------------------------|------|------|-----|-----|------|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C312.1 | 3 | 1 | 1 | 1 | 1 | 1 | | | | | | 2 | 2 | 3 |
| C312.2 | 3 | 1 | 1 | 1 | 1 | 1 | | | | | | 2 | 2 | 2 |
| C312.3 | 1 | 2 | 1 | 1 | 1 | 1 | | | | | | 2 | 1 | 2 |
| C312.4 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | | 1 | 1 | 2 | 3 | 3 | 3 |
| C312.5 | 3 | 1 | 1 | 1 | 1 | 1 | | | | | | 2 | 2 | 2 |
| C312.6 | 3 | 3 | 3 | 3 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 |
| Average | 2.67 | 1.83 | 1.67 | 1.5 | 1 | 1.17 | 1 | 1 | 1 | 1.5 | 2 | 2.33 | 2.16 | 2.5 |

| CO No. | Course Outcomes |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| C313 - Control Systems- EC503PC | |
| C313.1 | Evaluate the types of control systems for real time applications. |
| C313.2 | Compute transfer function of a system by different techniques. |
| C313.3 | Evaluate the time response of systems for standard input signals. |
| C313.4 | Probe the stability of a system using time and frequency domain approach |
| C313.5 | Examine the performance of systems with compensators and controllers |
| C313.6 | Construct state models for continuous & discrete time systems and Comment on controllability and observability of the system |

| C313 - Control Systems- EC503PC | | | | | | | | | | | | | | |
|---------------------------------|-----------------------------------------------------------|------|-----|------|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C313.1 | 2 | 1 | | | | | | | | | | 1 | 1 | 1 |
| C313.2 | 3 | 2 | 1 | 2 | | | | | | | | | | 1 |
| C313.3 | 3 | 3 | 1 | | | | | | | | | 1 | | 1 |
| C313.4 | 3 | 3 | 1 | 1 | | | | | | | | 1 | 1 | 1 |
| C313.5 | 3 | 3 | 1 | 1 | | | | | | | | 1 | 1 | 1 |
| C313.6 | 3 | 2 | | | | | | | | | | 1 | | |
| Average | 2.83 | 2.33 | 1 | 1.33 | | | | | | | | 1 | 1 | 1 |

| CO No. | Course Outcomes |
|---------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| C314 - Business Economics & Financial Analysis- SM504MS | |
| C314.1 | Understand the Economic Concepts in business decision making process. |
| C314.2 | Familiarize with the cost concepts, market structures. |
| C314.3 | Make use of breakeven analysis, CVP Analysis, pricing strategies. |
| C314.4 | Examine financial accounting and analyze various financial statements. |
| C314.5 | Interpret various financial statements by applying different types of ratios. |
| C314.6 | Examine the usefulness of funds flow statement and cash flow statement for better managerial decisions. |

| C314 - Business Economics & Financial Analysis- SM504MS | | | | | | | | | | | | | | |
|--------------------------------------------------------------------|------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C314.1 | 2 | | 1 | 1 | 1 | 1 | | 1 | 1 | 2 | | | 2 | |
| C314.2 | 1 | 1 | 2 | | 1 | | | | | | | | 1 | |
| C314.3 | 1 | 1 | 2 | 1 | 2 | | | | | | 1 | | | 1 |
| C314.4 | | 1 | | 1 | 1 | | | | 1 | | | 1 | 1 | |
| C314.5 | 1 | 1 | 1 | 1 | | | | | | 1 | | | 1 | |
| C314.6 | | 1 | | | 1 | | | 1 | | | 1 | | 1 | |
| Average | 1.25 | 1 | 1.5 | 1 | 1.2 | 1 | | 1 | 1 | 1.5 | 1 | 1 | 1.2 | 1 |

| CO No. | Course Outcomes |
|------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| (PE-1) C315 - Computer Organization & Operating Systems - EC511PE | |
| C315.1 | Examine the Basic structure of a digital computer and the organization of different blocks in a computer using Micro Operations |
| C315.2 | Use of micro-level operations to control different Units in a computer and analyze the concept of Memory system. |
| C315.3 | Examine the organization of the I/O peripheral devices. |
| C315.4 | Analyze the Operating system functions, types, system calls. |
| C315.5 | Demonstrate the memory management techniques impact on architecture of computer design and Principals of Deadlock. |
| C315.6 | Examine file system implementation and its interface. |

| (PE-1) C315 - Computer Organization & Operating Systems - EC511PE | | | | | | | | | | | | | | |
|------------------------------------------------------------------------------|------------------------------------------------------------------|-------------|------------|------------|------------|------------|----------|------------|------------|------------|------------|------------|-------------|-------------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C315.1 | 3 | 3 | 1 | 2 | 1 | 1 | - | 1 | 1 | 1 | 1 | 2 | 1 | 1 |
| C315.2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 |
| C315.3 | 1 | 3 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 |
| C315.4 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 2 |
| C315.5 | 3 | 1 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 1 |
| C315.6 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | - | 2 | 1 | 1 |
| Average | 2.0 | 2.16 | 1.3 | 1.5 | 1.3 | 1.3 | 1 | 1.0 | 1.3 | 1.0 | 1.2 | 1.6 | 1.16 | 1.16 |

| CO No. | Course Outcomes |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| (PE-1) C316 - Error Correcting Codes- EC512PE | |
| C316.1 | Calculate various information parameters and explain the types of errors and control strategies |
| C316.2 | Explain error detection and correction mechanism of linear block codes and its applications |
| C316.3 | Design cyclic codes for error detection |
| C316.4 | Implement encoding and decoding techniques of Convolution codes |
| C316.5 | Elucidate encoding and decoding process of Turbo codes and its applications |
| C316.6 | Describe the concepts of space time codes |

| (PE-1) C316 - Error Correcting Codes- EC512PE | | | | | | | | | | | | | | |
|------------------------------------------------------|-----------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C316.1 | 3 | 2 | 2 | 2 | | | | | | | | 2 | 1 | |
| C316.2 | 2 | 2 | 2 | 2 | | | | | | | | 2 | 2 | |
| C316.3 | 2 | 2 | 2 | 2 | | | | | | | | 2 | 2 | |
| C316.4 | 2 | 2 | 2 | 2 | | | | | | | | 2 | 2 | |
| C316.5 | 2 | 2 | 2 | 2 | | | | | | | | 2 | 2 | |
| C316.6 | 2 | 2 | 2 | 2 | | | | | | | | 3 | 2 | |
| Average | 2.17 | 2 | 2 | 2 | | | | | | | | 2.17 | 1.83 | |

| CO No. | Course Outcomes |
|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| (PE-1) C317 - Electronic Measurements and Instrumentation - EC513PE | |
| C317.1 | Illustrate the characteristics and operating principles of measuring systems. |
| C317.2 | Summarize the construction and operation of various Wave Analyzers and Signal generators. |
| C317.3 | Analyze the working principles and applications of different types of Oscilloscopes |
| C317.4 | Measure R, L and C values using different bridge circuits. |
| C317.5 | Utilise transducers to compute various electrical parameters. |
| C317.6 | Make use of measuring devices to measure different physical parameters |

| (PE-1) C317 - Electronic Measurements and Instrumentation - EC513PE | | | | | | | | | | | | | | |
|----------------------------------------------------------------------------|-----------------------------------------------------------|------|------|------|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C317.1 | 3 | 1 | 1 | | 1 | 1 | | | | | | 1 | 1 | |
| C317.2 | 3 | 3 | 2 | | | 1 | 1 | | | 1 | | 1 | 1 | |
| C317.3 | 3 | 2 | 2 | 2 | 1 | 1 | | | | 1 | | 1 | 1 | |
| C317.4 | 3 | 3 | 3 | 1 | | | | | | | | 1 | 1 | |
| C317.5 | 3 | 2 | 1 | 1 | | | 1 | | | | | 1 | 1 | 1 |
| C317.6 | 3 | 2 | 1 | 1 | | | 1 | | | | | 1 | 1 | 1 |
| Average | 3 | 2.17 | 1.67 | 1.25 | 1 | 1 | 1 | | | 1 | | 1 | 1 | 1 |

| CO No. | Course Outcomes |
|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| C318 - Microprocessors & Microcontrollers Lab - EC505PC | |
| C318.1 | Debug 8086 assembly language programs using macro assembler. |
| C318.2 | Write 8051 assembly language programs for simple arithmetic and logical operations and verify using Keil IDE. |
| C318.3 | Write 8051 assembly language programs to configure various peripheral devices and verify using Keil IDE. |
| C318.4 | Interface various input/output devices to 8051 microcontroller using development kit. |

| C318 - Microprocessors & Microcontrollers Lab - EC505PC | | | | | | | | | | | | | | |
|--------------------------------------------------------------------|-----------------------------------------------------------|------|------|------|------|------|------|-----|------|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C318.1 | 3 | 3 | 3 | 2 | 3 | 2 | 1 | | 2 | 2 | 2 | 2 | 3 | 3 |
| C318.2 | 3 | 3 | 3 | 2 | 3 | 2 | 1 | | 2 | 2 | 2 | 2 | 3 | 3 |
| C318.3 | 3 | 3 | 3 | 2 | 3 | 2 | 1 | | 2 | 2 | 2 | 2 | 3 | 3 |
| C318.4 | 3 | 3 | 3 | 2 | 3 | 2 | 1 | | 2 | 2 | 2 | 2 | 3 | 3 |
| Average | 3.00 | 3.00 | 3.00 | 2.00 | 3.00 | 2.00 | 1.00 | | 2.00 | 2.00 | 2.00 | 2.00 | 3 | 3 |

| CO No. | Course Outcomes |
|--------------------------------------------------------------|-----------------------------------------------------------------------------------|
| C319 - Data Communications and Networks Lab - EC506PC | |
| C319.1 | Create and evaluate the performance of various LAN topologies |
| C319.2 | Evaluate the performance of queue management, scheduling mechanisms and protocols |
| C319.3 | Evaluate the performance of routing protocols and IEEE 802.x standards. |
| C319.4 | Analyze various protocols using packet capture monitoring tools. |

| C319 - Data Communications and Networks Lab - EC506PC | | | | | | | | | | | | | | |
|--------------------------------------------------------------|-----------------------------------------------------------|------|------|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C319.1 | 3 | 1 | 3 | 3 | 1 | 2 | 2 | 1 | 2 | 2 | 1 | 2 | 3 | 2 |
| C319.2 | 3 | 2 | 2 | 3 | 3 | 3 | 1 | 1 | 2 | 2 | 1 | 2 | 3 | 3 |
| C319.3 | 3 | 2 | 3 | 3 | 3 | 2 | 2 | 1 | 3 | 3 | 3 | 3 | 3 | 3 |
| C319.4 | 3 | 2 | 3 | 3 | 3 | 3 | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 3 |
| Average | 3 | 1.75 | 2.75 | 3 | 2.5 | 2.5 | 1.5 | 1 | 2.5 | 2.5 | 2 | 2.5 | 3 | 2.75 |

| CO No. | Course Outcomes |
|----------------------------------------------------------|-----------------------------------------------------------------------------------------|
| C31A - Advanced Communication Skills Lab- EN508HS | |
| C31A.1 | Build sound vocabulary and use functional English effectively |
| C31A.2 | Analyze the given text and respond appropriately and develop efficacious writing skills |
| C31A.3 | Develop effective speaking skills and maximize job prospects |
| C31A.4 | Plan and make different forms of presentation using various techniques |

| C31A - Advanced Communication Skills Lab- EN508HS | | | | | | | | | | | | | | |
|----------------------------------------------------------|-----------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C31A.1 | - | - | - | - | - | - | - | - | - | 3 | 2 | 2 | | |
| C31A.2 | - | - | - | - | - | - | - | 2 | - | 3 | 2 | 1 | | |
| C31A.3 | - | - | - | - | - | - | - | 2 | 1 | 3 | 2 | 1 | | |
| C31A.4 | - | - | - | - | - | - | - | 2 | 1 | 3 | 2 | 1 | | |
| Average | - | - | - | - | - | - | - | 2 | 1 | 3 | 2 | 1.25 | - | - |

| CO No. | Course Outcomes |
|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| C31B- Intellectual Property Rights – MC510 | |
| C31B.1 | Understand the fundamental aspects of Intellectual property Rights who are going to plays a major role in development and management of innovative projects in industries. |
| C31B.2 | Examine Trademarks, Acquisition of Trade Mark Rights and its registration processes. |
| C31B.3 | Evaluate various aspects relating to copyrights and its procedure for registration processes. |
| C31B.4 | Evaluate with the Trade Secret Law, protection for submission, Unfair Competition. |
| C31B.5 | Evaluate on the International Developments in Intellectual Property Rights. |
| C31B.6 | Interpret about current trends in IPR and the steps taken by the Government of India in fostering IPR. |

| C31B-Intellectual Property Rights – MC510 | | | | | | | | | | | | | | |
|-------------------------------------------|-----------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C31B.1 | | | | | 1 | 1 | | | 1 | 1 | | 1 | | |
| C31B.2 | 1 | | | 1 | | | | | | | 1 | | 1 | |
| C31B.3 | | | 1 | | | | | | 1 | | | 1 | | |
| C31B.4 | | | | | 1 | 1 | | 1 | 1 | | | | | |
| C31B.5 | | | | | 1 | | | | | | | 1 | | |
| C31B.6 | | | 1 | | 1 | | | | | | 1 | | | |
| Average | 1 | | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | |

| CO No. | Course Outcomes |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| C31C- Cyber Security | |
| C31C.1 | Analyze and evaluate the cyber security needs of an organization |
| C31C.2 | Determine and analyze software vulnerabilities and security solutions to reduce the risk of exploitation |
| C31C.3 | Implement cyber security solutions and use of cyber security, information assurance, and cyber/computer forensics software/tools. |
| C31C.4 | Comprehend and execute risk management processes, risk treatment methods, and key risk and performance indicators |
| C31C.5 | Design and develop a security architecture for an organization. |
| C31C.6 | Design operational and strategic cyber security strategies and policies. |

| C31C- Cyber Security | | | | | | | | | | | | | | |
|----------------------|-----------------------------------------------------------|------|------|-----|-----|------|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C31C.1 | 1 | 2 | 3 | 2 | 3 | 2 | 1 | 1 | | 1 | 2 | 2 | 2 | 1 |
| C31C.2 | 1 | 3 | 3 | 3 | 3 | | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1 |
| C31C.3 | 1 | 3 | 2 | 3 | 3 | | | | 1 | 1 | 1 | 2 | 2 | 1 |
| C31C.4 | 1 | 3 | 3 | 3 | 3 | | 1 | | 1 | 1 | 1 | 2 | 2 | |
| C31C.5 | 1 | 3 | 3 | 2 | 2 | 2 | 1 | | 1 | 1 | 2 | 2 | 2 | |
| C31C.6 | 1 | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | |
| Average | 1 | 2.66 | 2.83 | 2.5 | 2.5 | 1.66 | 1 | 1 | 1 | 1 | 1.66 | 2 | 2 | 1 |

III Year II Semester

| CO No. | Course Outcomes |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| C321 - Antennas and Propagation - EC601PC | |
| C321.1 | Apply the basic concepts of various antenna parameters like antenna pattern, radiation intensity, directivity, etc in antenna design. |
| C321.2 | Analyze radiation pattern of linear wire antennas |
| C321.3 | Examine the geometry of various types of antennas. |
| C321.4 | Design different antenna arrays for improving the gain in desired direction. |
| C321.5 | Measure antenna parameters to assess antenna's performance. |
| C321.6 | Analyze the characteristics of wave propagation in different layers of atmosphere. |

| C321 - Antennas and Propagation - EC601PC | | | | | | | | | | | | | | |
|--------------------------------------------------|-----------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C321.1 | 3 | 3 | 3 | 3 | | 2 | 2 | | | | | 1 | 2 | |
| C321.2 | 3 | 3 | 3 | 3 | | 2 | 2 | | | | | 2 | 2 | |
| C321.3 | 3 | 3 | 3 | 3 | 1 | 2 | 2 | | | | | 2 | 2 | |
| C321.4 | 3 | 3 | 3 | 3 | 1 | 2 | 2 | | | | | 1 | 2 | |
| C321.5 | 3 | 3 | 3 | 3 | 1 | 2 | 2 | | | | | 2 | 2 | |
| C321.6 | 3 | 3 | 3 | 3 | | | 2 | | | | | 2 | 2 | |
| Average | 3 | 3 | 3 | 3 | 1 | 2 | 2 | | | | | 1.67 | 2 | |

| CO No. | Course Outcomes |
|---------------------------------------------------|----------------------------------------------------------------------|
| C322 - Digital Signal Processing – EC602PC | |
| C322.1 | Determine the behavior of LTI systems by solving difference equation |
| C322.2 | Understand the concepts of multi rate digital signal processing |
| C322.3 | Analyze digital signals in frequency domain using DFS and DFT |
| C322.4 | Compute DFT using FFT algorithms |
| C322.5 | Design and implement IIR and FIR digital filters |
| C322.6 | Analyze the effects of finite word length representation |

| C322 - Digital Signal Processing – EC602PC | | | | | | | | | | | | | | |
|---------------------------------------------------|-----------------------------------------------------------|------|------|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C322.1 | 3 | 3 | 2 | 3 | 2 | | | | | | | 1 | 1 | |
| C322.2 | 3 | 3 | 2 | 2 | 2 | | | | | | | 1 | 2 | |
| C322.3 | 3 | 3 | 1 | 2 | 2 | | | | | | | 1 | 1 | |
| C322.4 | 3 | 3 | 3 | 2 | 2 | | | | | | | 2 | 2 | |
| C322.5 | 3 | 3 | 3 | 2 | 2 | 1 | | | | | | 2 | 2 | |
| C322.6 | 2 | 2 | 2 | 2 | 2 | | | | | | | 2 | 2 | |
| Average | 2.83 | 2.83 | 2.17 | 2.2 | 2 | 1 | | | | | | 1.5 | 1.67 | |

| CO No. | Course Outcomes |
|-------------------------------------|-------------------------------------------------------------------------------|
| C323 - VLSI Design - EC603PC | |
| C323.1 | Summarize the steps in VLSI fabrication process of different MOS Technologies |
| C323.2 | Examine the electrical properties and models of CMOS circuits. |
| C323.3 | Construct layouts using stick diagrams in accordance with the design rules. |
| C323.4 | Implement complex digital logic circuits using switch logic and PLDs. |
| C323.5 | Build different VLSI subsystems using CMOS logic. |
| C323.6 | Explore the concept of testing and fault tolerant systems. |

| C323 - VLSI Design - EC603PC | | | | | | | | | | | | | | |
|-------------------------------------|-----------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C323.1 | 3 | | | | | | | | 1 | 1 | | 2 | 1 | |
| C323.2 | 3 | 3 | 1 | 2 | | | | | | | | 2 | 2 | 2 |
| C323.3 | 3 | 3 | 3 | 2 | | | | | 1 | 1 | | 2 | 2 | |
| C323.4 | 3 | 3 | 3 | 2 | | | | | | | | 2 | 3 | 2 |
| C323.5 | 3 | 3 | 3 | 2 | | | | | | | | 2 | 2 | 2 |
| C323.6 | 3 | 3 | | 2 | | | | | | | | 2 | 1 | 1 |
| Average | 3 | 3 | 2.5 | 2 | | | | | 1 | 1 | | 2 | 1.83 | 1.75 |

| CO No. | Course Outcomes |
|--------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| (PE-II) C324 - Object Oriented Programming through Java - EC611PE | |
| C324.1 | Develop programs using OOP concepts in Java |
| C324.2 | Choose use of Interfaces, Abstract classes and packages for Java applications |
| C324.3 | Choose I/O functionality to read from and write to text files |
| C324.4 | Analyze multithreading and exception handling mechanism for java applications |
| C324.5 | Employ Collections in Java Application to store and Manipulate the data |
| C324.6 | Construct GUI applications using Applet, AWT and Swings |

| (PE-II) C324 - Object Oriented Programming through Java - EC611PE | | | | | | | | | | | | | | |
|--------------------------------------------------------------------------|-----------------------------------------------------------|-----|-----|-----|-----|-----|------|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C324.1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 1 |
| C324.2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 |
| C324.3 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 1 |
| C324.4 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 |
| C324.5 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 1 |
| C324.6 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 1 |
| Average | 2 | 2 | 1.5 | 2 | 2 | 2 | 1.33 | 1 | 1.5 | 1 | 1 | 1 | 2 | 1 |

| CO No. | Course Outcomes |
|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| (PE-II) C325 - Mobile Communications and Networks - EC612PE | |
| C325.1 | Understand various techniques that improves the efficiency of cellular communication system |
| C325.2 | Design an effective cellular system considering the effects of co-channel and non co-channel interferences |
| C325.3 | Explore the factors that affect signal coverage in various contours |
| C325.4 | Understand the concepts of frequency management and effective channel assignment |
| C325.5 | Assimilate the concept of handoff mechanism and dropped call |
| C325.6 | Elucidate the concept of Adhoc networks and design goals of MAC layer |

| (PE-II) C325 - Mobile Communications and Networks - EC612PE | | | | | | | | | | | | | | |
|--------------------------------------------------------------------|-----------------------------------------------------------|-----|-----|------|-----|------|------|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C325.1 | 3 | 3 | 3 | 2 | | 2 | 2 | | | | | 3 | 2 | |
| C325.2 | 3 | 3 | 3 | 3 | | 2 | 2 | | | | | 3 | 2 | |
| C325.3 | 3 | 3 | 3 | 3 | | 2 | 2 | | | | | 3 | 2 | |
| C325.4 | 3 | 3 | 3 | 3 | | 1 | 1 | | | | | 3 | 2 | |
| C325.5 | 3 | 3 | 3 | 3 | | | | | | | | 3 | 2 | |
| C325.6 | 3 | 3 | 3 | 3 | | | | | | | | 3 | 2 | |
| Average | 3 | 3 | 3 | 2.83 | | 1.75 | 1.75 | | | | | 3 | 2 | |

| CO No. | Course Outcomes |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| (PE-II) C326 - Embedded System Design - EC613PE | |
| C326.1 | Distinguish the embedded systems from general purpose processing systems. |
| C326.2 | Recommend suitable hardware for different applications of embedded systems. |
| C326.3 | Select different types and amount of memory based on embedded system specifications. |
| C326.4 | Explain the Embedded firmware design approaches, development languages and device drivers |
| C326.5 | Analyze the issues and techniques of Task synchronization and communication in embedded firmware. |
| C326.6 | Differentiate between general purpose operating systems and RTOS. |

| (PE-II) C326 - Embedded System Design - EC613PE | | | | | | | | | | | | | | |
|--------------------------------------------------------|-----------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C326.1 | 3 | 3 | 3 | 2 | 2 | 1 | 2 | | 2 | | 2 | 2 | 2 | 3 |
| C326.2 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 1 | 3 | | 2 | 3 | 3 | 3 |
| C326.3 | 3 | 3 | 3 | 2 | 2 | | 2 | | 2 | | 2 | 3 | 2 | 3 |
| C326.4 | 3 | 2 | 3 | 2 | 2 | 1 | 2 | | 3 | 2 | 2 | 3 | 2 | 2 |
| C326.5 | 3 | 3 | 2 | 2 | 2 | | | | 2 | | 2 | 2 | 2 | 1 |
| C326.6 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | | 2 | | 1 | 2 | 2 | 1 |
| Average | 3.00 | 2.83 | 2.83 | 2.00 | 2.00 | 1.25 | 2.00 | 1.00 | 2.33 | 2.00 | 1.83 | 2.50 | 2.17 | 2.17 |

| CO No. | Course Outcomes |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Open Elective-1 C327- Entrepreneurship – | |
| C327.1 | Understand the ability to discern distinct entrepreneurial traits for entrepreneurial development. |
| C327.2 | Familiarize the concept of Establishing New Ventures. |
| C327.3 | Analyse the challenges of MSMEs and Rehabilitation of sick units. |
| C327.4 | Develop essential Marketing Strategies for Pricing, Service and Branding. |
| C327.5 | Evaluate the Strategic perspectives in Entrepreneurship. |
| C327.6 | Apply the Entrepreneurial mindset to become a successful Entrepreneur. |

| Open Elective-1 C327- Entrepreneurship – | | | | | | | | | | | | | | |
|------------------------------------------|-----------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C327.1 | 1 | | | | | | | | | | | 1 | | |
| C327.2 | | | | | 1 | | | | | 1 | | | | |
| C327.3 | | | | | | 1 | | | 1 | | | | | |
| C327.4 | | | 1 | | | | | | | | | 1 | | |
| C327.5 | | | | | | | 1 | | | | 1 | | | |
| C327.6 | | | 1 | | 2 | | | | | | | | | |
| Average | 1 | | 1 | | 1.5 | 1 | 1 | | 1 | 1 | 1 | 1 | | |

| CO No. | Course Outcomes |
|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Open Elective-1 C328 - Fundamentals of Management for Engineers - CS601OE | |
| C328.1 | Understand the concept of Management and its significance. |
| C328.2 | Analyse different Organizational Structures to meet contemporary challenges in Human Resource Management. |
| C328.3 | Analyse and Study different principles in Operations Management. |
| C328.4 | Evaluate and Understand Marketing Management and Supply Chain Strategies. |
| C328.5 | Develop Project Management Techniques to estimate the optimal cost of the project. |
| C328.6 | Understand and explore Contemporary Management Practices in their domain area of Engineering. |

| Open Elective-1 C328 - Fundamentals of Management for Engineers - CS601OE | | | | | | | | | | | | | | |
|---------------------------------------------------------------------------|-----------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C328.1 | | 1 | | | 1 | | | | | | | | | |
| C328.2 | | | | | | 1 | | | | | | 1 | | |
| C328.3 | | 1 | | 1 | | | | | | | | | | |
| C328.4 | | | | | 1 | | | | 1 | | | | | |
| C328.5 | | | 1 | | | | | | | | 1 | | | |
| C328.6 | | | | 2 | | | | | | | | 1 | | |
| Average | | 1 | 1 | 1.5 | 1 | 1 | | | 1 | | 1 | 1 | | |

| CO No. | Course Outcomes |
|------------------------------------------------------|---------------------------------------------------------------------|
| C329 - Digital Signal Processing Lab- EC604PC | |
| C329.1 | Generate sinusoidal and noise waveforms using different approaches. |
| C329.2 | Analyze Impulse and frequency response of various digital filters. |
| C329.3 | Verify different algorithms of DSP through simulation. |
| C329.4 | Implement various DSP algorithms in hardware. |

| C329- Digital Signal Processing Lab- EC604PC | | | | | | | | | | | | | | |
|-----------------------------------------------------|-----------------------------------------------------------|-----|-----|------|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C329.1 | 2 | 1 | | | 3 | | | | 2 | 2 | | 1 | 1 | |
| C329.2 | 2 | 3 | 2 | 2 | 3 | | | | 2 | 2 | | 1 | 2 | |
| C329.3 | 2 | 2 | 2 | 1 | 3 | | | | 2 | 2 | | 1 | 2 | |
| C329.4 | 3 | 2 | 2 | 2 | 3 | | | | 2 | 2 | | 1 | 2 | |
| Average | 2.25 | 2 | 2 | 1.67 | 3 | | | | 2 | 2 | | 1 | 1.75 | |

| CO No. | Course Outcomes |
|------------------------------------|--------------------------------------------------------------------------|
| C32A- e – CAD Lab - EC605PC | |
| C32A.1 | Verify the functionality of digital circuits using Xilinx ISIM simulator |
| C32A.2 | Implement digital circuits on various FPGA boards using Xilinx tools |
| C32A.3 | Design layout for digital circuits and perform physical verification |
| C32A.4 | Analyze static timing, IR drop and crosstalk in digital circuit layouts |

| C32A - e – CAD Lab - EC605PC | | | | | | | | | | | | | | |
|-------------------------------------|-----------------------------------------------------------|-----|------|------|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C32A.1 | 3 | 3 | 2 | 1 | 3 | | | 2 | 2 | 2 | | 3 | 3 | 1 |
| C32A.2 | 3 | 3 | 3 | 2 | 3 | | | 2 | 2 | 2 | | 2 | 2 | 1 |
| C32A.3 | 3 | 3 | 3 | 1 | 3 | | | 2 | 2 | 2 | | 3 | 2 | |
| C32A.4 | 3 | 3 | 3 | 3 | 3 | | | 2 | 2 | 2 | | 2 | 3 | |
| Average | 3 | 3 | 2.75 | 1.75 | 3 | | | 2 | 2 | 2 | | 2.5 | 2.5 | 1 |

| CO No. | Course Outcomes |
|-------------------------------------------------|---------------------------------------------------------|
| C32B - Scripting Languages Lab - EC606PC | |
| C32B.1 | Design and test programs to solve mathematical problems |
| C32B.2 | Develop programs Using Ruby Script |
| C32B.3 | Develop Programs Using TCL Script |
| C32B.4 | Develop Programs Using Perl Script |

| C32B - Scripting Languages Lab - EC606PC | | | | | | | | | | | | | | |
|-------------------------------------------------|-----------------------------------------------------------|------|------|-----|-----|-----|-----|------|------|-------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C32B.1 | 3 | 3 | 2 | 1 | 2 | 1 | | 2 | 2 | 2 | 1 | 2 | 1 | 2 |
| C32B.2 | 2 | 2 | 1 | 1 | 2 | | | 1 | 1 | 1 | | 2 | | 1 |
| C32B.3 | 2 | 2 | 1 | 1 | 2 | | | 1 | 1 | 1 | | 2 | | 1 |
| C32B.4 | 2 | 2 | 1 | 1 | 2 | | | 1 | 1 | 1 | | 2 | | 1 |
| Average | 2.25 | 2.25 | 1.25 | 1 | 2 | 1 | | 1.25 | 1.25 | 1.125 | 1 | 2 | 1 | 1.25 |

| CO No. | Course Outcomes |
|--------------------------------------------|----------------------------------------------------------------------------------|
| C32C- Environmental Science – MC609 | |
| C32C.1 | Discover knowledge regarding environment and its components. |
| C32C.2 | Understand the classification, importance and conservation of natural resources. |
| C32C.3 | Perceive the knowledge regarding different Bio -Geo classification of India. |
| C32C.4 | Examine impacts of pollution on the environment and their control measures. |
| C32C.5 | Analyze Environmental laws and Environmental Impact Assessments. |
| C32C.6 | Determine sustainable development that aims to meet raising human needs. |

| C32C- Environmental Science – MC609 | | | | | | | | | | | | | | |
|-------------------------------------|-----------------------------------------------------------|-----|------|-----|-----|-----|-----|------|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C32C.1 | 1 | - | 2 | - | - | - | 2 | - | - | - | - | 1 | | |
| C32C.2 | - | 2 | 2 | - | - | - | 2 | 1 | - | 2 | - | 2 | | |
| C32C.3 | - | 1 | 1 | 1 | - | 1 | 2 | 2 | - | - | - | 1 | | |
| C32C.4 | 1 | 2 | 2 | - | | 1 | | - | - | - | - | 1 | | |
| C32C.5 | | 1 | 1 | - | - | - | 2 | 1 | 1 | - | 1 | - | | |
| C32C.6 | - | 1 | 2 | - | - | - | 2 | - | - | 1 | | 2 | | |
| Average | 1 | 1.4 | 1.66 | 1 | | 1 | 2 | 1.33 | 1 | 1.5 | 1 | 1.4 | | |

IV Year I Semester

| CO No. | Course Outcomes |
|------------------------------------------------------------|------------------------------------------------------------------|
| C411- MICROWAVE AND OPTICAL COMMUNICATIONS– EC701PC | |
| C411.1 | Analyze the characteristics of O-type and M-type microwave tubes |
| C411.2 | Illustrate the operation of various solid state devices |
| C411.3 | Examine various waveguide components and their applications. |
| C411.4 | Estimate S-parameters of multiport junction devices |
| C411.5 | Measure various parameters using microwave bench |
| C411.6 | Understand an optical fiber communication system |

| C411- MICROWAVE AND OPTICAL COMMUNICATIONS– EC701PC | | | | | | | | | | | | | | |
|-----------------------------------------------------|-----------------------------------------------------------|-------------|----------|----------|-----|----------|-------------|-----|-----|------|------|----------|-------------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C411.1 | 3 | 2 | 1 | | | 1 | 1 | | | | | 1 | 1 | |
| C411.2 | 3 | 2 | 2 | | | 1 | 1 | | | | | 2 | 2 | |
| C411.3 | 3 | 3 | 3 | 1 | | 1 | 1 | | | | | 2 | 2 | |
| C411.4 | 3 | 3 | 2 | 1 | | 1 | 1 | | | | | 2 | 2 | |
| C411.5 | 3 | 3 | 2 | 1 | | 1 | 1 | | | | | 1 | 2 | |
| C411.6 | 3 | 3 | 2 | 1 | | 1 | 2 | | | | | 2 | 2 | |
| Average | 3 | 2.67 | 2 | 1 | | 1 | 1.17 | | | | | 2 | 1.83 | |

| CO No. | Course Outcomes |
|-----------------------------------------------------------|-----------------------------------------------------------------------|
| PE-III - C412- ARTIFICIAL NEURAL NETWORKS- EC711PE | |
| C412.1 | Infer the similarity of Biological networks and Neural networks |
| C412.2 | understand the architecture and learning algorithms |
| C412.3 | Perform the training of neural networks using various learning rules. |
| C412.4 | Analyze the concepts of backward propagations. |
| C412.5 | Applying SOM for computer simulation. |
| C412.6 | Analyze and construct the Hopfield models. |

| PE-III - C412- ARTIFICIAL NEURAL NETWORKS- EC711PE | | | | | | | | | | | | | | |
|----------------------------------------------------|-----------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C412.1 | 2 | 2 | | | | | | | | | | | 1 | |
| C412.2 | 3 | 2 | 1 | | | | | 2 | | | | | 2 | |
| C412.3 | | 1 | 2 | | | | | 2 | | 1 | | | | 1 |
| C412.4 | 1 | 1 | 1 | | | | | 1 | | | | | | |
| C412.5 | 1 | 2 | 2 | | 2 | | 2 | 2 | 2 | | | 3 | 2 | 3 |
| C412.6 | 1 | 1 | 2 | | | | | 2 | | 1 | | 3 | 2 | 2 |
| Average | 1.6 | 1.5 | 1.6 | | 2 | | 2 | 1.5 | 2 | 1 | | 3 | 1.75 | 2 |

| CO No. | Course Outcomes |
|---------------------------------------------|---------------------------------------------------------------------------------------|
| PE-III - C413- SCRIPTING LANGUAGES- EC712PE | |
| C413.1 | Make use of resources to gain some fluency programming in Linux, Perl, TCL/TK, Python |
| C413.2 | Elaborate about Known about basics of Linux and Linux Networking. |
| C413.3 | Understanding the Perl by utilizing the features |
| C413.4 | Explain various features of TCL Scripting |
| C413.5 | Examine the TK by embedding in different ways |
| C413.6 | Elaborate features of Python |

| PE-III - C413- SCRIPTING LANGUAGES - EC712PE | | | | | | | | | | | | | | |
|----------------------------------------------|-----------------------------------------------------------|-----|-----|-----|-----|-----|------|-----|------|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C413.1 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 2 |
| C413.2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| C413.3 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| C413.4 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| C413.5 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| C413.6 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| Average | 2 | 2 | 2 | 2 | 2 | 1.5 | 1.16 | 1 | 1.16 | 1 | 1 | 1 | 2 | 2 |

| CO No. | Course Outcomes |
|--------------------------------------------------|----------------------------------------------------------------------------------------------|
| PE-III - C414- DIGITAL IMAGE PROCESSING- EC713PE | |
| C414.1 | Explain the fundamentals of digital image processing |
| C414.2 | Analyze the digital image using different image transforms |
| C414.3 | Apply spatial and frequency domain filtering techniques for image enhancement |
| C414.4 | Estimate the original image from a noisy one using different approaches in image restoration |
| C414.5 | Examine different types of discontinuities using image segmentation algorithms |
| C414.6 | Apply Morphological operations and compression techniques on different images |

| PE-III - C414- DIGITAL IMAGE PROCESSING- EC713PE | | | | | | | | | | | | | | |
|--------------------------------------------------|-----------------------------------------------------------|------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C414.1 | 2 | 1 | | | 1 | | | | | | | 1 | | |
| C414.2 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | | | | | 2 | 2 | |
| C414.3 | 3 | 3 | 3 | 2 | 1 | 2 | 2 | | | | | 2 | 2 | |
| C414.4 | 3 | 3 | 3 | 2 | 1 | 2 | 2 | | | | | 2 | 2 | |
| C414.5 | 3 | 3 | 3 | 2 | 1 | 2 | 2 | | | | | 2 | 2 | |
| C414.6 | 3 | 3 | 3 | 2 | 1 | 2 | 2 | | | | | 2 | 2 | |
| Average | 2.83 | 2.67 | 2.8 | 2 | 1 | 1.8 | 1.8 | | | | | 1.83 | 2 | |

| CO No. | Course Outcomes |
|----------------------------------------------------|----------------------------------------------------------------------------------|
| PE-IV - C415 - BIOMEDICAL INSTRUMENTATION- EC721PE | |
| C415.1 | Characterize bio potential signals. |
| C415.2 | Analyse the biomedical signal sources and related equipment |
| C415.3 | Illustrate cardiovascular system and its measurements. |
| C415.4 | Distinguish Neurological measuring Instruments. |
| C415.5 | Evaluate different Therapeutic equipment and Respiratory Instrumentation systems |
| C415.6 | Describe the different medical principles for medical imaging. |

| PE-IV - C415 - BIOMEDICAL INSTRUMENTATION- EC721PE | | | | | | | | | | | | | | |
|----------------------------------------------------|-----------------------------------------------------------|------|-----|------|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO,PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C415.1 | 3 | 3 | 3 | 2 | | 3 | 1 | | | 1 | | 1 | 2 | 2 |
| C415.2 | 3 | 3 | 3 | 2 | | 3 | 1 | | | 1 | | 1 | 3 | 2 |
| C415.3 | 3 | 2 | 2 | 2 | | | 1 | | | 1 | | | 1 | 2 |
| C415.4 | 3 | 3 | 1 | 1 | | 2 | 1 | | | 1 | | 1 | 3 | 3 |
| C415.5 | 3 | 3 | 3 | 3 | 1 | 2 | 1 | | | 1 | | 1 | 1 | 2 |
| C415.6 | 3 | 3 | 3 | 3 | 2 | 1 | | | | | | 1 | 2 | 3 |
| Average | 3 | 2.83 | 2.5 | 2.17 | 1.5 | 2.2 | 1 | | | 1 | | 1 | 2 | 2.33 |

| CO No. | Course Outcomes |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| PE-IV - C416- DATABASE MANAGEMENT SYSTEMS- EC722PE | |
| C416.1 | Demonstrate the basic elements of a database management system and the conceptual design of databases with the help of Entity-Relationship model. |
| C416.2 | Construct Relational Model by converting Entity-Relationship Model |
| C416.3 | Apply SQL queries for database management |
| C416.4 | Apply normalization on schema to reduce data redundancy and increase data consistency. |
| C416.5 | Test transaction, concurrency control models and recovery mechanisms on database. |
| C416.6 | Classify different storage devices and indexing methods. |

| PE-IV - C416- DATABASE MANAGEMENT SYSTEMS - EC722PE | | | | | | | | | | | | | | |
|-----------------------------------------------------|-----------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C416.1 | 1 | 2 | 2 | 3 | 2 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 1 |
| C416.2 | 2 | 2 | 2 | 3 | 2 | 1 | - | - | - | 1 | 1 | 1 | - | - |
| C416.3 | 2 | 3 | 3 | 3 | 3 | 1 | 1 | 2 | 2 | 2 | 3 | 2 | 1 | - |
| C416.4 | 2 | 2 | 3 | 3 | 1 | 1 | - | 1 | 1 | 1 | 3 | 2 | - | - |
| C416.5 | 1 | 3 | 2 | 3 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 1 |
| C416.6 | 2 | 2 | 2 | 2 | 1 | 1 | - | - | - | - | 1 | 1 | 2 | 2 |
| Average | 1.67 | 2.33 | 2.33 | 2.83 | 1.67 | 1.17 | 1.00 | 1.25 | 1.50 | 1.20 | 2 | 2.33 | 1.5 | 1.33 |

| CO No. | Course Outcomes |
|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| PE-IV - C417- NETWORK SECURITY AND CRYPTOGRAPHY- EC723PE | |
| C417.1 | Illustrate the concepts and principles of security Attacks, Services and Mechanisms. |
| C417.2 | Evaluate applications of Cryptographic algorithms in real time scenarios. |
| C417.3 | Apply various public key cryptography techniques |
| C417.4 | Demonstrate the techniques like Message authentication, Hash function and Authentication applications. |
| C417.5 | Assess different key management techniques and solutions for web security. |
| C417.6 | Analyze various case studies to identify the security vulnerabilities and prevention techniques. |

| PE-IV - C417- NETWORK SECURITY AND CRYPTOGRAPHY- EC723PE | | | | | | | | | | | | | | |
|----------------------------------------------------------|-----------------------------------------------------------|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C417.1 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 2 | 2 | 3 | 1 | - |
| C417.2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | - |
| C417.3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | - |
| C417.4 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 1 | - |
| C417.5 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 1 | - |
| C417.6 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 2 | 1 | - |
| Average | 2.83 | 3 | 3 | 3 | 2.66 | 2.33 | 1.83 | 1.66 | 1.33 | 1.66 | 1.66 | 2.16 | 1 | - |

| CO No. | Course Outcomes |
|------------------------------------------|--------------------------------------------------------------------------------------|
| C418 - Open Elective II- Data Structures | |
| C418.1 | Implement various operations on linear data structures to solve real world problems. |
| C418.2 | Design solutions using Dictionaries and Hash Tables. |
| C418.3 | Implement various kinds of trees and their operations. |
| C418.4 | Represent graphs and traverse them. |
| C418.5 | Choose appropriate sorting algorithm. |
| C418.6 | Examine Pattern matching algorithms and Tries. |

| C418 - Open Elective II- Data Structures | | | | | | | | | | | | | | |
|------------------------------------------|-----------------------------------------------------------|-----|------|-----|------|-----|-----|------|-----|------|------|------|----------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO 1 | PSO2 |
| C418.1 | 2 | 3 | 3 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | |
| C418.2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | | 2 | 1 | 1 | 1 | - | |
| C418.3 | 2 | 3 | 3 | | 2 | 1 | 2 | | | | | 2 | - | |
| C418.4 | 1 | 2 | 2 | 2 | 1 | | | 1 | | | 1 | 2 | 1 | |
| C418.5 | 2 | 3 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 2 | - | |
| C418.6 | 2 | 2 | 2 | 2 | 1 | 2 | | | | | | 1 | 1 | |
| Average | 1.83 | 2.5 | 2.33 | 1.8 | 1.17 | 1.6 | 1.5 | 1.33 | 2 | 1.67 | 1 | 1.67 | 1 | |

| CO No. | Course Outcomes |
|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| C419- Professional Practice, Law and Ethics- SM702MS | |
| C419.1 | Understand the Professional Practice and Ethics needed for Engineering Professionals. |
| C419.2 | Familiarize the various concepts in Law of Contract. |
| C419.3 | Analyse the challenges of Law and its judicial interventions. |
| C419.4 | Develop essential Strategies for protection of Labour and Labour related Laws. |
| C419.5 | Evaluate the Law relating to different types of Intellectual Property. |
| C419.6 | Apply the various issues relating to the professional practice, law and ethics aimed for overall development for a citizen, society. |

| C419- Professional Practice, Law and Ethics- SM702MS | | | | | | | | | | | | | | |
|------------------------------------------------------|-----------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C419.1 | 1 | - | - | - | - | - | - | - | - | 1 | - | 1 | 1 | - |
| C419.2 | - | - | 1 | - | 1 | - | - | - | - | 1 | - | - | - | - |
| C419.3 | - | - | - | - | - | 1 | - | - | 2 | - | - | - | - | - |
| C419.4 | - | - | 1 | - | - | - | - | - | - | 1 | - | 1 | - | - |
| C419.5 | - | - | - | - | - | - | 1 | - | - | - | 1 | - | - | - |
| C419.6 | - | - | - | 1 | 1 | - | - | - | - | - | - | - | - | - |
| Average | 1 | | 1 | 1 | 1 | 1 | 1 | | 2 | 1 | 1 | 1 | 1 | |

| CO No. | Course Outcomes |
|-----------------------------------------------------------------|--------------------------------------------------------------------|
| C41A- MICROWAVE AND OPTICAL COMMUNICATIONS LAB - EC703PC | |
| C41A.1 | Analyse the characterises of microwave sources |
| C41A.2 | Measure the parameters of the various microwave components |
| C41A.3 | Analyse the characterises of optical sources |
| C41A.4 | Measure the various parameters of the optical communication system |

| C41A- MICROWAVE AND OPTICAL COMMUNICATIONS LAB - EC703PC | | | | | | | | | | | | | | |
|----------------------------------------------------------|-----------------------------------------------------------|-----|-----|------|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C41A.1 | 3 | 3 | 1 | 1 | | 1 | | | | | | 1 | 1 | |
| C41A.2 | 3 | 3 | 2 | 2 | | 1 | | | | | | 2 | 2 | |
| C41A.3 | 3 | 3 | 1 | 1 | | 1 | | | | | | 1 | 1 | |
| C41A.4 | 3 | 3 | 2 | 3 | | 1 | | | | | | 3 | 2 | |
| Average | 3 | 3 | 1.5 | 1.75 | | 1 | | | | | | 1.75 | 1.5 | |

| CO No. | Course Outcomes |
|-------------------------|---------------------------------------------------------------------------------------------------------|
| C41B - Seminar- EC705PC | |
| C41B.1 | Identify emerging topic specific to the programme. |
| C41B.2 | Extract the information relevant to the chosen topic. |
| C41B.3 | Deliver the knowledge using multimedia. |
| C41B.4 | Answer the queries with appropriate explanation and elaboration. |
| C41B.5 | Compile an effective technical report, providing conclusions and proposing an appropriate future scope. |

| C41B - Seminar- EC705PC | | | | | | | | | | | | | | |
|-------------------------|-----------------------------------------------------------|-----|-----|-----|-----|------|-----|-----|-----|------|------|------|------|------|
| CO/PO,PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C41B.1 | 3 | 1 | | 2 | 1 | 2 | 1 | 1 | 2 | 3 | 2 | 2 | 2 | 1 |
| C41B.2 | 3 | 2 | 1 | 2 | 1 | 2 | 1 | 1 | 2 | 3 | 1 | 1 | 2 | 1 |
| C41B.3 | 3 | 1 | | 1 | 2 | 1 | 1 | 3 | 2 | 3 | 1 | 1 | 1 | |
| C41B.4 | 3 | 2 | | 1 | 1 | | | 2 | 2 | 3 | 1 | 1 | 2 | |
| C41B.5 | 3 | 2 | 2 | 2 | 2 | | | 2 | 2 | 3 | 1 | 1 | 2 | 1 |
| Average | 3 | 1.6 | 1.5 | 1.6 | 1.4 | 1.67 | 1 | 1.8 | 2 | 3 | 1.2 | 1.2 | 1.8 | 1 |

| CO No. | Course Outcomes |
|---------------------------------|---------------------------------------------------------------------------------------------|
| C41C- Project Stage-1 – EC706PC | |
| C41C.1 | Identify the problem, conduct literature survey and formalize it. |
| C41C.2 | Analyze the problem & propose cost-effective and eco-friendly solution using relevant tools |
| C41C.3 | Prepare the design plan with appropriate time lines. |
| C41C.4 | Demonstrate effective communication and report writing Skills. |
| C41C.5 | Recognise the need for team work and demonstrate professional ethics. |

| C41C- Project Stage-1 – EC706PC | | | | | | | | | | | | | | |
|---------------------------------|-----------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO,PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C41C.1 | 3 | 3 | 1 | 3 | 1 | 1 | | | 1 | 3 | 3 | 1 | 3 | 3 |
| C41C.2 | 3 | 3 | 3 | 3 | 3 | 1 | | | 1 | 1 | 3 | 3 | 3 | 3 |
| C41C.3 | 3 | 3 | 3 | 3 | 3 | 1 | | | 2 | 1 | 3 | 3 | 3 | 3 |
| C41C.4 | 3 | 3 | 1 | 2 | 1 | | | 2 | 3 | 3 | 2 | 2 | 2 | 1 |
| C41C.5 | 3 | 3 | 1 | 1 | 1 | | | 2 | 3 | 3 | 2 | 3 | 1 | 1 |
| Average | 3 | 3 | 1.8 | 2.4 | 1.8 | 1 | | 2 | 2 | 2.2 | 2.6 | 2.4 | 2.4 | 2.2 |

IV Year II Semester

| CO No. | Course Outcomes |
|--------------------------------------------------------|---------------------------------------------------------------------------|
| PE V - C421- SATELLITE COMMUNICATIONS - EC811PE | |
| C421.1 | Demonstrate the principles of satellite communication systems |
| C421.2 | Design a satellite link for specified C/N ratio |
| C421.3 | Analyze the effects of propagation on satellite signals. |
| C421.4 | Analyze the performance efficiency of various multiple access techniques. |
| C421.5 | Explain Earth station technology and GPS. |
| C421.6 | Analyze the satellite packet communications |

| PE V -C421- SATELLITE COMMUNICATIONS - EC811PE | | | | | | | | | | | | | | |
|-------------------------------------------------------|------------------------------------------------------------------|------|------|------|------|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C421.1 | 3 | 2 | 2 | | 1 | | | | | | | 2 | 1 | |
| C421.2 | 3 | 2 | 2 | 1 | | | | | | | | 3 | 2 | |
| C421.3 | 2 | 2 | 1 | 2 | | | | | | | | 1 | 1 | |
| C421.4 | 2 | 3 | 2 | 1 | 2 | | | | | | | 2 | 1 | |
| C421.5 | 2 | 2 | 2 | 1 | 2 | | | | | | | 2 | 1 | |
| C421.6 | 2 | 2 | 2 | | | | | | | | | | | |
| Average | 2.33 | 2.17 | 1.83 | 1.25 | 1.67 | | | | | | | 2 | 1.2 | |

| CO No. | Course Outcomes |
|---------------------------------------------|-------------------------------------------------------------------|
| PE V -C422 – Radar Systems – EC812PE | |
| C422.1 | Analyze the performance of Radar System and its parameters. |
| C422.2 | Analyze the functionality of CW and FMCW radar. |
| C422.3 | Classify the mechanism of detecting stationary and moving targets |
| C422.4 | Compare the working mechanism of various tracking radars. |
| C422.5 | Analyze the radar signal in noisy environment. |
| C422.6 | Assess various components and parameters of Radar receivers |

| PE V -C422 – Radar Systems – EC812PE | | | | | | | | | | | | | | |
|---------------------------------------------|------------------------------------------------------------------|------|------|------|-----|------|------|-----|-----|------|------|------|------|------|
| CO/PO,PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C422.1 | 3 | 3 | 1 | 1 | | 1 | 1 | | | | | 2 | 2 | |
| C422.2 | 3 | 2 | 1 | | | 1 | 1 | | | | | 1 | 1 | |
| C422.3 | 3 | 2 | 1 | 1 | | 1 | 1 | | | | | 2 | 1 | |
| C422.4 | 3 | 2 | 1 | 1 | | 1 | 1 | | | | | 2 | 1 | |
| C422.5 | 3 | 2 | 2 | 2 | | 1 | 1 | | | | | 1 | 1 | |
| C422.6 | 3 | 3 | 2 | 1 | | 1 | 1 | | | | | 2 | 1 | |
| Average | 3.00 | 2.33 | 1.33 | 1.20 | | 1.00 | 1.00 | | | | | 1.67 | 1.17 | |

| CO No. | Course Outcomes |
|-------------------------------------------------------|----------------------------------------------------------------------------|
| PE V - C423-WIRELESS SENSOR NETWORKS - EC813PE | |
| C423.1 | Acquire knowledge about sensor networks, its types and applications |
| C423.2 | Understand issues, challenges and technologies of wireless sensor networks |
| C423.3 | Understand the various routing and MAC protocols |
| C423.4 | Apply various data dissemination methods for sensor networks |
| C423.5 | Understand the design principles of WSN and communication strategies |
| C423.6 | Understand the requirement of hardware and software to implement WSN |

| PE V - C423-WIRELESS SENSOR NETWORKS - EC813PE | | | | | | | | | | | | | | |
|-------------------------------------------------------|------------------------------------------------------------------|------|------|------|-----|------|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C423.1 | 2 | 1 | | 1 | | | | | | | | 1 | 2 | |
| C423.2 | 3 | 3 | | 1 | | 1 | | | | | | 2 | 1 | |
| C423.3 | 3 | 2 | | 1 | | 1 | | | | | | 2 | | |
| C423.4 | 3 | 3 | 2 | 2 | | | | | | | | 2 | 1 | |
| C423.5 | 3 | 2 | 2 | 2 | | 1 | | | | | | 3 | 1 | |
| C423.6 | 3 | 3 | 3 | 3 | 3 | 2 | | | | | | 3 | 1 | |
| Average | 2.83 | 2.33 | 2.33 | 1.67 | 3 | 1.25 | | | | | | 2.17 | 1.2 | |

| CO No. | Course Outcomes |
|-----------------------------------------------------------|-------------------------------------------------------------------------|
| PE VI - C424-System On Chip Architecture - EC821PE | |
| C424.1 | Illustrate the Features and Components of System Architecture |
| C424.2 | Choose the suitable processor for SoC design |
| C424.3 | Examine different memory organization and interfacing techniques in SoC |
| C424.4 | Interpret the Cache organization in SoC Memory Design |
| C424.5 | Investigate the methods of interconnection and SoC customization |
| C424.6 | Analyze reconfiguration strategies used in SoC design |

| PE VI - C424-System On Chip Architecture - EC821PE | | | | | | | | | | | | | | |
|-----------------------------------------------------------|------------------------------------------------------------------|------|------|------|------|------|------|-----|------|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C424.1 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | | 2 | 1 | 1 | 3 | 3 | 3 |
| C424.2 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | | 2 | 1 | 1 | 3 | 3 | 3 |
| C424.3 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | | 2 | 1 | 1 | 3 | 3 | 3 |
| C424.4 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | | 2 | 1 | 1 | 3 | 3 | 3 |
| C424.5 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | | 2 | 1 | 1 | 3 | 3 | 3 |
| C424.6 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | | 2 | 1 | 1 | 3 | 3 | 3 |
| Average | 3.00 | 3.00 | 3.00 | 3.00 | 1.00 | 1.00 | 1.00 | | 2.00 | 1.00 | 1.00 | 3.00 | 3.00 | 3.00 |

| CO No. | Course Outcomes |
|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| PE VI - C425 - Test and Testability – EC822PE | |
| C425.1 | Identify the need for testing and categorize the different problems involved in testing |
| C425.2 | Summarize types of faults and choose appropriate fault models. |
| C425.3 | Illustrate the methods for test generation in combinational circuits |
| C425.4 | Analyze the pseudo random test pattern generation techniques using Linear Feedback Shift Registers and Cellular Automata. |
| C425.5 | Categorize DFT techniques for combinational circuits |
| C425.6 | Illustrate the methods for test generation in sequential circuits |

| PE VI - C425-Test and Testability – EC822PE | | | | | | | | | | | | | | |
|----------------------------------------------------|------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C425.1 | 3 | 3 | - | 3 | - | - | - | - | - | - | - | 1 | - | - |
| C425.2 | 3 | 3 | - | 3 | - | - | - | - | - | - | - | 1 | - | - |
| C425.3 | 3 | 3 | 3 | 3 | - | - | - | - | - | - | - | 2 | - | - |
| C425.4 | 3 | 3 | 3 | 3 | - | - | - | - | - | - | - | 2 | - | - |
| C425.5 | 3 | 3 | 3 | 3 | - | - | - | - | - | - | - | 2 | - | - |
| C425.6 | 3 | 3 | 3 | 3 | - | - | - | - | - | - | - | 2 | - | - |
| Average | 3 | 3 | 3 | 3 | - | - | - | - | - | - | - | 1.67 | - | - |

| CO No. | Course Outcomes |
|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| PE VI - C426 - Low Power VLSI Design – EC823PE | |
| C426.1 | Summarize various sources of power dissipation in low power circuits |
| C426.2 | Illustrate the need for low power circuit design and analyze the effects of short channel |
| C426.3 | Categorize the special techniques to mitigate the power consumption in VLSI circuits |
| C426.4 | Analyze the architectural approaches to design low power, low voltage adder and multiplier circuits |
| C426.5 | Interpret the performance of low power, low voltage memory architectures |
| C426.6 | Compare different technology trends for low voltage low power logic styles |

| PE VI - C426- Low Power VLSI Design – EC823PE | | | | | | | | | | | | | | |
|------------------------------------------------------|------------------------------------------------------------------|-----|------|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C426.1 | 3 | 1 | 1 | - | - | - | - | - | - | - | - | - | - | - |
| C426.2 | 3 | 3 | 3 | 3 | 2 | - | - | - | - | - | - | 1 | - | - |
| C426.3 | 3 | 3 | 3 | 3 | 2 | - | - | - | - | 1 | - | 1 | 2 | - |
| C426.4 | 3 | 2 | 3 | 1 | 1 | - | - | - | - | - | - | 1 | 2 | - |
| C426.5 | 3 | 2 | 3 | 1 | 1 | - | - | - | - | - | - | 1 | 2 | - |
| C426.6 | 3 | 1 | 1 | - | - | - | - | - | - | - | - | 2 | - | - |
| Average | 3 | 2 | 2.33 | 2 | 1.5 | - | - | - | - | 1 | - | 1.2 | 2 | - |

| CO No. | Course Outcomes |
|----------------------------------|-------------------------------------------------------------------------------|
| C427 - Open Elective III- | |
| C427.1 | Explore the Basic Knowledge of R and able to do in the programming language R |
| C427.2 | Develop Programs using Control Structures and vectors |
| C427.3 | Make Use of the concepts of Lists and Data Frames for programming |
| C427.4 | Experiment with factors and tables |
| C427.5 | Make use of R to solve statistical problems |
| C427.6 | Interpret different Object-Oriented Programming Concepts |

| C427 - Open Elective III- | | | | | | | | | | | | | | |
|----------------------------------|------------------------------------------------------------------|------|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C427.1 | 1 | 2 | 2 | 2 | 2 | 1 | | 1 | 2 | 2 | 2 | 1 | 1 | 2 |
| C427.2 | 1 | 2 | 2 | 2 | 2 | | | 1 | 1 | 1 | 2 | | | 1 |
| C427.3 | 1 | 2 | 2 | 2 | 2 | | | 1 | 1 | 1 | 2 | | | 1 |
| C427.4 | 1 | 1 | 1 | 1 | 1 | | | | | 1 | | | | 1 |
| C427.5 | 2 | 2 | 2 | 2 | 2 | | | | | 1 | | 1 | | 1 |
| C427.6 | 1 | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | 1 | 1 | | 1 |
| Average | 1.17 | 1.67 | 2 | 2 | 2 | 1 | - | 1 | 1.25 | 1.17 | 1.75 | 1 | 1 | 1.16 |

| CO No. | Course Outcomes |
|-----------------------------------------|-----------------------------------------------------------------------------------------|
| C428- Project Stage-II – EC801PC | |
| C428.1 | Implement the project plan complying with deadlines |
| C428.2 | Validate the design to meet the specifications |
| C428.3 | Evaluate the results to derive the conclusion and provide scope for future enhancement. |
| C428.4 | Integrate Information from multiple sources and write a comprehensive report |
| C428.5 | Demonstrate technical, interpersonal and leadership skills in a team |

| C428- Project Stage-II – EC801PC | | | | | | | | | | | | | | |
|-----------------------------------------|------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO/PO, PSO | Program Outcomes (PO) and Program Specific Outcomes (PSO) | | | | | | | | | | | | | |
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| C428.1 | 3 | 3 | 3 | 3 | 3 | 1 | | | 1 | 3 | | 3 | 3 | 3 |
| C428.2 | 3 | 3 | 3 | 3 | 3 | 1 | | | 1 | 1 | 1 | 3 | 3 | 3 |
| C428.3 | 3 | 3 | 3 | 3 | 3 | 1 | | | 2 | 1 | 1 | 3 | 3 | 3 |
| C428.4 | 3 | 3 | 3 | 2 | 2 | | | 2 | 3 | 3 | | 2 | 2 | 2 |
| C428.5 | 3 | 3 | 2 | 1 | 2 | | | 2 | 3 | 3 | 3 | 2 | 1 | 1 |
| Average | 3 | 3 | 2.8 | 2.4 | 2.6 | 1 | | 2 | 2 | 2.2 | 1.6 | 2.6 | 2.4 | 2.4 |