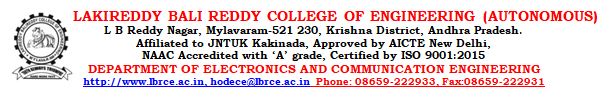
****

**R14-Course Articulation Matrix (Revised)**

**(B.Tech – R14- Regulation – 2014 Admitted Batch on wards)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **CO Statements** | **POs** | | | | | | | | | | | | **PSOs** | | |
| **I - Semester** | | | | | | | | | | | | | | | | |
| **S239** | **English – I** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO 1 | Read, write and aptly understand what ever is written and spoken in English | - | - | - | - | - | 2 | - | - | 3 | 3 | - | 2 | - | - | - |
| CO 2 | speak fluently with acceptable pronunciation and write using appropriate words, spellings, grammar and syntax | - | - | - | - | - | 2 | - | - | 3 | 3 | - | 2 | - | - | - |
| CO 3 | Read the lines, between lines and beyond lines excelling in comprehension skills | - | - | - | - | - | 2 | - | - | 3 | 3 | - | 2 | - | - | - |
| CO 4 | Draft Reports, memos, mails & letters as part of their work | - | - | - | - | - | 2 | - | - | 3 | 3 | - | 2 | - | - | - |
| CO 5 | Speak grammatically error free English | - | - | - | - | - | 2 | - | - | 3 | 3 | - | 2 | - | - | - |
| **S298** | **Mathematics - I** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Apply first order and first degree D.E to calculate orthogonal trajectories and temperature, quantity growth using Newton’s Laws | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | - | - | - |
| CO2 | Discriminate among the structure and procedures of solving a higher order D.E with constant coefficients and variable coefficients. | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | - | - | - |
| CO3 | Compute the Jacobians and Maxima and Minima ( with constraints and without constraints) for functions of severable variables. | 2 | 2 | 1 | - | - | - | - | - | - | - | - | 2 | - | - | - |
| CO4 | Apply concepts of PDE to solve wave equation in one dimension, heat equation and Laplace equation. | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | - | - | - |
| CO5 | Distinguish among the Pros and Cons between the Row operation methods and Iterative methods in solving system of linear equations and compute the Eigen values and Eigen vectors and powers, Inverse of a square matrix through Cayley –Hamilton theorem. | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | - | - | - |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S238** | **Engineering Physics** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Identify the nature of Interference, Diffraction and Polarization. | 3 | 3 | - | 2 | - | - | - | - | - | - | - | 3 | - | - | - |
| CO2 | Explain the dual nature of matter particle. | 3 | 3 | - | 2 | - | - | - | - | - | - | - | 3 | - | - | - |
| CO3 | Apply the Lasers and Optical fibers in different fields. | 3 | 3 | 2 | 2 | 2 | - | - | - | - | - | - | 3 | - | - | - |
| CO4 | Classify the different types of magnetic materials and their applications. | 3 | 3 | 3 | 2 | 2 | - | - | - | - | - | - | 3 | - | - | - |
| CO5 | Interpret the phenomenon of Super conductivity and their uses. | 3 | 3 | - | 2 | 1 | - | - | - | - | - | - | 3 | - | - | - |
| **S211** | **Electrical Circuits & Networks - I** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Apply network reduction techniques for analysis of circuits | 2 | 2 | 1 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO2 | Analyze the magnetic circuits and find network topology | 2 | 3 | 1 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO3 | Differentiate time and frequency domain analysis of AC circuits. | 2 | 2 | 1 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO4 | Apply resonance concept and network theorems to practical circuits. | 2 | 3 | 1 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO5 | Find transient response of different DC and AC network and apply SPICE for practical circuits. | 2 | 1 | 1 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| **S170** | **Computer Programming** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Identify basic elements of C programming structures like data types, expressions, control statements, various simple functions and in view of using them in problem solving. | 2 | 3 | - | - | - | - | - | - | - | 1 | - | 1 | - | - | - |
| CO2 | Apply various operations on derived data types like arrays and strings in problem solving. | 2 | 3 | 2 | 1 | - | - | - | - | - | 1 | - | 1 | - | - | - |
| CO3 | Design and Implement of modular Programming and memory management using pointers. | 2 | 3 | 2 | 1 | - | - | - | - | - | 1 | - | 1 | - | - | - |
| CO4 | Implement user defined data structures used in specific applications. | 2 | 3 | 2 | - | - | - | - | - | - | 1 | - | 1 | - | - | - |
| CO5 | Compare different file I/O operations on text and binary files. | 2 | 3 | 2 | - | - | - | - | - | - | 1 | - | 1 | - | - | - |
| **L142** | **Engineering Physics Lab** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Explain the concept of diffraction and find the wave length of light. | 3 | 3 | 2 | 2 | - | - | - | - | 3 | - | - | 3 | - | - | - |
| CO2 | Estimate the specific rotation of sugar solution. | 3 | 3 | 2 | 2 | - | - | - | - | 3 | - | - | 3 | - | - | - |
| CO3 | Determine the frequency of AC source. | 3 | 3 | - | - | - | - | - | - | 3 | - | - | 3 | - | - | - |
| CO4 | Describe resonance and formation of stationary waves by using melde's arrangement. | 3 | 3 | - | - | - | - | - | - | 3 | - | - | 3 | - | - | - |
| **L143** | **Engineering Workshop** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Design and model different prototypes in the carpentry trade such as Cross lap joint, Dove tail joint. | 3 | - | 2 | 3 | 3 | 3 | - | - | 3 | - | - | 2 | - | - | - |
| CO2 | Fabricate and model various basic prototypes in the trade of fitting such as Straight fit, V- fit. | 3 | - | 2 | 3 | 3 | 3 | - | - | 3 | - | - | 2 | - | - | - |
| CO3 | Produce various basic prototypes in the trade of Tin smithy such as rectangular tray, and open Cylinder. | 3 | - | 2 | 3 | 3 | 3 | - | - | 3 | - | - | 2 | - | - | - |
| CO4 | Perform various basic House Wiring techniques. | 3 | - | 2 | 3 | 3 | 3 | - | - | 3 | - | - | 2 | - | - | - |
| **L126** | **Computer Programming Lab** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Apply and practice logical formulations to solve some simple problems leading to specific applications. | 2 | 3 | 1 | - | - | - | - | - | 1 | 1 | - | 2 | - | - | - |
| CO2 | Demonstrate C programming development environment, compiling, debugging, linking and executing a program using the development environment. | 2 | 3 | 1 | - | - | - | - | - | 1 | 1 | - | 2 | - | - | - |
| CO3 | Design effectively the required programming components that efficiently solve computing problems in real world. | 2 | 3 | 1 | - | - | - | - | - | 1 | 1 | - | 2 | - | - | - |
| **L123** | **Computer Aided Engineering Drawing** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Apply Auto-CAD basics to solve practical problems used in industries where the speed and accuracy can be achieved. | **-** | **-** | **-** | **-** | **3** | **-** | **-** | **-** | **1** | **-** | **2** | **1** | **-** | **-** | - |
| CO2 | Apply the principle of Orthographic projections of points, lines, planes and solids. | **-** | **-** | **-** | **-** | **3** | **-** | **-** | **-** | **1** | **-** | **2** | **1** | **-** | **-** | - |
| CO3 | Evaluate their ability in applying various concepts to solve practical problems related to engineering drawing. | **-** | **-** | **-** | **-** | **3** | **-** | **-** | **-** | **1** | **-** | **2** | **1** | **-** | **-** | - |
| CO4 | Convert orthographic to isometric vice versa. |  |  |  |  | **3** | **-** | **-** | **-** | **1** | **-** | **2** | **1** | **-** | **-** | - |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **II - Semester** | | | | | | | | | | | | | | | | |
| **S240** | **English-II** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Use English language effectively in written and spoken English | - | - | - | - | - | 2 | - | - | 3 | 3 | - | 2 | - | - | - |
| CO2 | Express the right ideas in right context . | - | - | - | - | - | 2 | - | - | 3 | 3 | - | 2 | - | - | - |
| CO3 | Manage the situation and negotiate business with good English communication | - | - | - | - | - | 2 | - | - | 3 | 3 | - | 2 | - | - | - |
| CO4 | Think and analyze the situations and make good presentations of their work and decisions | - | - | - | - | - | 2 | - | - | 3 | 3 | - | 2 | - | - | - |
| CO5 | prepare oneself to face interviews and also to participate in group discussions. | - | - | - | - | - | 2 | - | - | 3 | 3 | - | 2 | - | - | - |
| **S299** | **Mathematics - II** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Estimate the best fit polynomial for the given tabulated data using the methods of Newton’s interpolation and Lagrange’s interpolation. | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | - | - | - |
| CO2 | Distinguish among the criteria of selection and procedures of various Numerical integration rules. | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | - | - | - |
| CO3 | Solve an initial value problem involving an ordinary differential equation by using various numerical methods and fit a curve to the given data point | 2 | 2 | 1 | - | - | - | - | - | - | - | - | 2 | - | - | - |
| CO4 | Apply the knowledge of Bessel's and Legendre's functions in engineering area | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | - | - | - |
| CO5 | Solve the mathematical models by using Probability | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | - | - | - |
| **S232** | **Engineering Chemistry** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Analyze the quality of water and its maintenance for industrial purposes. | 3 | 3 | 2 | - | - | 2 | 1 | - | - | - | - | 2 | - | - | - |
| CO2 | Categorizing the coal, differentiating the issues related to fuels and their synthesis and able to understand working of IC and Diesel engines. | 3 | 3 | 2 | - | - | 2 | 1 | - | - | - | - | 2 | - | - | - |
| CO3 | Interpret the type of corrosion present and make use of the principles for maintenance of various equipments more effectively. | 3 | 2 | 3 | - | - | 2 | 1 | - | - | - | - | 2 | - | - | - |
| CO4 | Get hands on experience in various processes like polymerization, preparation, properties and applications of plastics and rubbers. | 3 | 2 | 2 | - | - | 2 | 1 | - | - | - | - | 2 | - | - | - |
| CO5 | Interpret the importance of Green Chemistry in the prevention of pollution. | 3 | 2 | 2 | - | - | 3 | 2 | - | - | - | - | 2 | - | - | - |
| **S212** | **Electrical Circuits & Networks - II** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Analyze various parameters of two port networks | 2 | 3 | 1 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO2 | Synthesize different LC, RC, and RL networks by using Foster and Cauer methods | 2 | 3 | 3 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO3 | Design various types of passive filters. | 2 | 3 | 3 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO4 | Design symmetrical, asymmetrical attenuators & equalizers. | 2 | 3 | 3 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO5 | Understand principles and characteristics of electrical machines. | 1 | - | - | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| **S224** | **Electronic Devices & Circuits** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Analyze the behaviour of charge particles in semi conductors. | 3 | 2 | - | - | - | - | - | - | - | - | - | 2 | - | 2 | - |
| CO2 | Gain the knowledge of various Diode characteristics. | 3 | 2 | - | - | - | - | - | - | - | - | - | 2 | - | 2 | - |
| CO3 | Understand the operation of transistor | 3 | 1 | - | - | - | - | - | - | - | - | - | 2 | - | 2 | - |
| CO4 | Design the biasing techniques for BJT and FET. | 3 | 3 | 2 | - | - | - | - | - | - | - | - | 2 | - | 2 | - |
| CO5 | Apply the knowledge of diodes for design of rectifiers and regulators. | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | - | 2 | - |
| **L140** | **Engineering Chemistry Lab** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Determine the quality of water based on the procedures given. | 3 | 3 | - | 2 | - | 2 | 2 | - | - | - | - | - | - | - | - |
| CO2 | Distinguish different types of titrations in volumetric analysis after performing the experiments listed in the syllabus. | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| CO3 | Carrying out polymerization techniques in the preparation of polymers. | 3 | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| CO4 | Exhibit skills in performing experiments based on theoretical fundamentals. | 2 | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| **L144** | **English Communication Lab** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Withstand the global competition in the job market with proficiency in English communication. | - | - | - | 3 | - | - | - | - | 3 | 3 | - | 2 | - | - | - |
| CO2 | Articulate English with good pronunciation. | - | - | - | 3 | - | - | - | - | 3 | 3 | - | 2 | - | - | - |
| CO3 | Face competitive exams like GRE, TOEFL, IELTS etc. | - | - | - | 3 | - | - | - | - | 3 | 3 | - | 2 | - | - | - |
| CO4 | Face interviews and skill fully manage themselves in group discussions. | - | - | - | 3 | - | - | - | - | 3 | 3 | - | 2 | - | - | - |
| **L135** | **Electrical Circuits & Networks Lab** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Analyze the basic operation on electrical circuit. | 1 | 1 | - | 2 | 2 | - | - | - | - | - | - | - | - | 3 | - |
| CO2 | Evaluate two-port network parameters. | 1 | 2 | - | 3 | 3 | - | - | - | - | - | - | - | - | 3 | - |
| CO3 | Understand frequency response of passive filters. | 1 | 1 | - | 1 | 1 | - | - | - | - | - | - | - | - | 3 | - |
| **L139** | **Electronic Devices & Circuits Lab** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Analyze the operation of devices like diodes, transistors and FETs practically. | 2 | 2 | - | 3 | 2 | - | - | - | - | - | - | - | - | 3 | - |
| CO2 | Design electronic circuits using basic devices. | 2 | 2 | 1 | 3 | 2 | - | - | - | - | - | - | - | - | 3 | - |
| CO3 | Design rectifier circuits with and without filters. | 2 | 2 | 1 | 3 | 2 | - | - | - | - | - | - | - | - | 3 | - |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **III - Semester** | | | | | | | | | | | | | | | | |
| **S300** | **Mathematics - III** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Construct an analytic function by Milne Thomson’s method when the real or imaginary part is given. | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | - | - | - |
| CO2 | Apply Cauchy’s Integral theorem to integrals by separating elementary functions into real and imaginary parts. | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | - | - | - |
| CO3 | Apply Residue theorem for Real Definite Integrals. | 2 | 2 | 1 | - | - | - | - | - | - | - | - | 2 | - | - | - |
| CO4 | Evaluate the Directional derivative and the divergence and the angular velocity for a given vector and the line, surface and volume integrals with the support of vector integral theorems. | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | - | - | - |
| CO5 | Write MATLAB commands to find solution of linear equations, system of equations and interpolation problems | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | - | - | - |
| **S126** | **Analog Electronics Circuits** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Analyze different amplifier circuits using AC equivalent models. | 2 | 2 | - | - | - | - | - | - | - | - | - | 2 | - | 2 | - |
| CO2 | Analyze the effect of external and junction capacitors on frequency response of amplifiers. | 2 | 2 | 1 | - | - | - | - | - | - | - | - | 2 | - | 2 | - |
| CO3 | Calculate efficiency and figure of merit of power amplifiers. | 1 | 2 | - | - | - | - | - | - | - | - | - | 2 | - | 2 | - |
| CO4 | Identify the importance of negative feedback in amplifiers. | 1 | - | - | - | - | - | - | - | - | - | - | 2 | - | 2 | - |
| CO5 | Design Sinusoidal oscillators for different frequencies. | 2 | 2 | 3 | - | - | - | - | - | - | - | - | 2 | - | 2 | - |
| **S189** | **Digital Electronics Circuits** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Describe the numeric information indifferent bases, binary arithmetic’s, various codes. | 1 | 2 | - | - | - | - | - | - | - | - | - | 2 | - | 2 | - |
| CO2 | Analyze various logic gates and logic families for the design of digital system. | 2 | 2 | 3 | - | - | - | - | - | - | - | - | 2 | - | 2 | - |
| CO3 | Design combinational and sequential logic circuits. | 2 | 2 | 3 | - | - | - | - | - | - | - | - | 2 | - | 2 | - |
| CO4 | Synthesize the fundamental concepts of state machines. | 1 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | - | 2 | - |
| **S361** | **Pulse & Switching Circuits** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Analyze the output characteristics of linear circuits for different test signals. | 2 | 2 | 2 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO2 | Develop non linear circuits like clippers and clampers using active and passive elements. | 3 | 2 | 3 | - | - | - | - | - | - | - | - | 1 | 1 | 2 | - |
| CO3 | Examine the switching characteristics of nonlinear elements used in various digital circuits. | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 1 | 1 | 2 | - |
| CO4 | Design various multivibrator circuits. | 3 | 2 | 3 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO5 | Illustrate the operation of various time base generator circuits and sampling gates. | 1 | 1 | 1 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S428** | **Random Variables & Stochastic Process** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Analyze the Statistical Properties of random variables through understanding of distribution and density functions | 3 | 3 | - | 1 | - | - | - | - | - | - | - | 1 | 2 | - | 1 |
| CO2 | Evaluate the statistical parameters of Random Processes in temporal domain. | 2 | 2 | - | 1 | - | - | - | - | - | - | - | 1 | 2 | - | 1 |
| CO3 | Estimate the spectral characteristics of random processes | 2 | 2 | - | 1 | - | - | - | - | - | - | - | 1 | 2 | - | 1 |
| CO4 | Applythe concept of Random Processes for analysis of linear systems | 2 | 3 | - | 1 | - | - | - | - | - | - | - | 1 | 2 | - | 1 |
| **S378** | **Signals & Systems** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Examine the various properties of signals through representation, and approximation | 3 | 2 | 1 | 1 | - | - | - | - | - | - | - | 2 | - | - | 3 |
| CO2 | Explore the relationships among convolution, correlation and spectral densities. | 3 | 2 | 1 | 2 | - | - | - | - | - | - | - | 2 | - | - | 3 |
| CO3 | Solve many problems in communication through Fourier series and sampling theorem | 3 | 3 | 1 | 3 | - | - | - | - | - | - | - | 2 | - | - | 3 |
| CO4 | Analyze the systems through various properties | 3 | 2 | 1 | 1 | - | - | - | - | - | - | - | 2 | - | - | 3 |
| CO5 | Apply Fourier and Laplace Transforms to evaluate frequency domains for various types of signals and systems | 3 | 3 | 3 | 3 | - | - | - | - | - | - | - | 2 | - | - | 3 |
| **S355** | **Professional Ethics & Human Values** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Learns about dilemmas and moral issues and be able to apply these concepts to solve various professional problems | - | - | - | - | - | - | - | 3 | - | - | - | - | - | - | - |
| CO2 | Acquires and understanding of the basic concepts of Professional ethics and human values &also gain the practical implication of ethical theories. | - | - | 1 | - | - | - | - | 3 | - | - | - | - | - | - | - |
| CO3 | Knows the duties and responsibilities towards the society being in engineering profession. | - | 1 | 2 | - | - | - | - | 3 | 2 | - | - | - | - | - | - |
| CO4 | Students gain the practical implication of evacuation from risk and maintaining confidentiality. | - | - | - | 1 | - | 2 | - | 3 | 1 | - | - | - | - | - | - |
| CO5 | Meets the global challenges and develop the skills to sustaining in competitive environment. | - | - | - | - | - | 1 | 2 | 3 | - | - | - | 1 | - | - | - |
| **L107** | **Analog Electronics Circuits Lab** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Analyze the effect of capacitors on frequency response of amplifiers | 3 | 3 | - | 3 | 3 | - | - | - | - | - | - | - | - | 2 | - |
| CO2 | Know the effect of negative feedback in amplifiers. | 1 | 2 | - | 2 | 2 | - | - | - | - | - | - | - | - | 1 | - |
| CO3 | Calculate the efficiency of power amplifiers. | 1 | 1 | - | 2 | 2 | - | - | - | - | - | - | - | - | 1 | - |
| CO4 | Generate Sinusoidal signals with different frequencies. | 2 | 1 | 1 | 3 | 3 | - | - | - | - | - | - | - | - | 2 | - |
| CO5 | Adapt Effective Communication, Presentation and Report Writing Skills | - | - | - | - | - | - | - | 1 | 2 | 3 | - | 1 | - | - | - |
| **L174** | **Pulse and Digital Circuits Lab** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Analyze the response of Linear and Non-Linear wave shaping circuits | 3 | 3 | - | 3 | 3 | - | - | - | - | - | - | - | - | 2 | - |
| CO2 | Examine the Switching behaviour of a Transistor | 2 | 2 | - | 3 | 3 | - | - | - | - | - | - | - | - | 2 | - |
| CO3 | Synthesize numerous non-sinusoidal waveform generators | 3 | 1 | - | 3 | 3 | - | - | - | - | - | - | - | - | 2 | - |
| CO4 | Realize fundamental Digital Electronic Circuits. | 2 | 1 | 1 | 3 | 3 | - | - | - | - | - | - | - | - | 2 | - |
| CO5 | Adapt Effective Communication, Presentation and Report Writing Skills | - | - | - | - | - | - | - | 1 | 2 | 3 | - | 1 | - | - | - |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **IV - Semester** | | | | | | | | | | | | | | | | |
| **S125** | **Analog Communications** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Identify the areas of Amplitude Modulation Techniques in real time applications. | 2 | 2 | - | - | - | - | - | - | - | - | - | 2 | 3 | - | - |
| CO2 | Understand the benefits of angle modulation. | 1 | 1 | - | - | - | - | - | - | - | - | - | 2 | 3 | - | - |
| CO3 | Gain knowledge about noise parameters and remedial measures for improvement. | 1 | 3 | - | - | - | - | - | - | - | - | - | 2 | 3 | - | - |
| CO4 | Analyze and differentiate various classes of Transmitters and Receivers. | 2 | 2 | - | - | - | - | - | - | - | - | - | 2 | 3 | - | - |
| CO5 | Discriminate various pulse analog modulation techniques | 3 | 2 | - | - | - | - | - | - | - | - | - | 2 | 3 | - | - |
| **S128** | **Analog Integrated Circuits** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Analyze various Transistor Current Sources and Differential amplifiers | 2 | 3 | 1 | - | - | - | - | - | - | - | - | 2 | - | 2 | - |
| CO2 | Explore the Linear and Non Linear Applications of Op-Amp | 3 | 3 | 1 | - | - | - | - | - | - | - | - | 2 | - | 2 | - |
| CO3 | Design different types of Active filters and waveform generators | 1 | 2 | 3 | - | - | - | - | - | - | - | - | 2 | - | 2 | - |
| CO4 | Use the Timer circuits and Phase Locked Loop for various applications | 3 | 2 | 1 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO5 | Implement ADC and DAC Circuits in different applications | 2 | 2 | 3 | - | - | - | - | - | - | - | - | 2 | - | 2 | - |
| **S169** | **Computer Organisation** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Understand register transfer, micro-operations such as arithmetic logic and shift | 1 | 1 | 1 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO2 | Analyze the basic concepts and elements of a computer system | 1 | 2 | 1 | - | - | - | - | - | - | - | - | 2 | - | 2 | - |
| CO3 | Learn how to design a CPU | 1 | 2 | 3 | - | - | - | - | - | - | - | - | 2 | - | 2 | - |
| CO4 | Perform arithmetic operations | 2 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | - | 2 | - |
| CO5 | Study memory and I/O management | 1 | 1 | 1 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| **S174** | **Control Systems** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Identify basic elements of open loop and closed loop control systems and derive systems input output relations using differential equation BDR, Signal-flow graphs techniques. | 1 | 2 | 1 | - | - | - | - | - | - | - | - | 2 | - | - | 1 |
| CO2 | Analyze the Transient & Steady State Performance of a system. | 1 | 3 | 2 | - | - | - | - | - | - | - | - | 2 | - | - | 2 |
| CO3 | Analyze the response in frequency domain | 1 | 3 | 2 | - | - | - | - | - | - | - | - | 2 | - | - | 2 |
| CO4 | Analyze the stability of the system by RH criteria, Root locus techniques | 1 | 3 | 2 | - | - | - | - | - | - | - | - | 2 | - | - | 2 |
| CO5 | Construct the state-space model to test the performance of LTI systems | 1 | 3 | 3 | - | - | - | - | - | - | - | - | 2 | - | - | 2 |
| **S192** | **Digital Signal Processing** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Analyze the various types of signals and systems in time and frequency domain | 3 | 3 | 1 | 1 | - | - | - | - | - | - | - | 2 | - | - | 2 |
| CO2 | Apply the Z-Transform techniques on Discrete Time Signals to Evaluate the Z-domain, which is used in the Realization of Discrete Systems | 3 | 3 | 2 | - | - | - | - | - | - | - | - | 2 | - | - | 2 |
| CO3 | Develop FFT radix-2 DIT and DIF algorithms, which are used to compute DFT of a sequence with reduced number of calculations | 3 | 3 | 2 | - | - | - | - | - | - | - | - | 2 | - | - | 2 |
| CO4 | Design an IIR Digital Filters through Approximation Procedures | 3 | 3 | 3 | 2 | - | - | - | - | - | - | - | 2 | - | - | 3 |
| CO5 | Design a FIR Digital Filters through Window Techniques | 3 | 3 | 3 | 2 | - | - | - | - | - | - | - | 2 | - | - | 3 |
| **S223** | **Electromagnetic Fields & Waves** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Analyze the basic concepts of Electric fields in static and time varying conditions | 2 | 2 | 1 | - | - | 2 | - | - | - | - | - | 2 | 3 | - | - |
| CO2 | Analyze the basic concepts of Magnetic fields in static and time varying conditions | 2 | 2 | 1 | - | - | 2 | - | - | - | - | - | 2 | 3 | - | - |
| CO3 | Apply Maxwell's equations to solve the equations of EM fields | 3 | 3 | 1 | - | - | 2 | - | - | - | - | - | 2 | 3 | - | - |
| CO4 | Understand the characteristics of EM wave propagation in different mediums | 1 | 1 | 1 | - | - | 1 | 1 | - | - | - | - | 2 | 3 | - | - |
| CO5 | Gain the knowledge on the different Poynting vectors to obtain the power flow | 1 | 1 | 1 | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| **S243** | **Environmental Studies** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Evaluate local, regional and global environmental issues related to resource conservation and management. | 3 | 2 | 1 | 2 | - | - | - | - | - | - | - | 1 | - | - | - |
| CO2 | Understand the implications of the ecosystems and identify the threats to global biodiversity. | 3 | 2 | 1 | 2 | - | - | - | - | - | - | - | 1 | - | - | - |
| CO3 | Address and prevent the problems related to pollution of air, water and soil | 2 | 3 | 1 | 3 | - | - | - | - | - | - | - | 1 | - | - | - |
| CO4 | Investigate and solve the social issues of the environment. | 2 | 3 | 1 | 3 | - | - | - | - | - | - | - | 1 | - | - | - |
| CO5 | Create awareness on concept of sustainable population growth | 2 | 3 | 1 | 3 | - | - | - | - | - | - | - | 1 | - | - | - |
| **L108** | **Analog Integrated Circuits Lab** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Design different circuits using IC 741 op-amp for various applications. | 2 | 2 | 3 | 2 | 2 | - | - | - | - | - | - | - | - | 3 | - |
| CO2 | Use the IC 555 for constructing various circuits. | 2 | 1 | 2 | 1 | 1 | - | - | - | - | - | - | - | - | 3 | - |
| CO3 | Design the voltage regulator using IC 723. | 2 | 2 | 3 | 1 | 1 | - | - | - | - | - | - | - | - | 3 | - |
| CO4 | Adapt Effective Communication, Presentation and Report Writing Skills | - | - | - | - | - | - | - | 1 | 2 | 3 | - | 1 | - | - | - |
| **L180** | **Systems & Signal processing Lab** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Understand the basics of MATLAB and CCS | 1 | 1 | - | - | 3 | - | - | - | - | - | - | - | - | - | 3 |
| CO2 | Analyze systems in both time and frequency domains | 2 | 3 | - | 1 | 3 | - | - | - | - | - | - | - | - | - | 3 |
| CO3 | Design Filters and derive their frequency responses | 2 | 2 | 3 | 2 | 3 | - | - | - | - | - | - | - | - | - | 3 |
| CO4 | Adapt Effective Communication, Presentation and Report Writing Skills | - | - | - | - | - | - | - | 1 | 2 | 3 | - | 1 | - | - | - |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **V - Semester** | | | | | | | | | | | | | | | | |
| **S187** | **Digital Communications** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Comprehend various pulse digital modulation techniques | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| CO2 | Analyze the underlying concepts of digital modulation techniques | 1 | 2 | - | - | - | - | - | - | - | - | - | 2 | 2 | - | - |
| CO3 | Evaluate digital modulation techniques for optimal reception | 1 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | 3 | - | - |
| CO4 | Synthesize the source coding techniques based on the concept of information theory | 3 | 2 | 3 | - | - | - | - | - | - | - | - | 2 | 2 | - | - |
| CO5 | Apply linear block codes and convolution codes for the channel coding | 2 | 2 | 2 | - | - | - | - | - | - | - | - | 3 | 2 | - | - |
| **S195** | **Digital System Design Using VHDL** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Construct various logic gates using CMOS/TTL logic | 1 | - | 1 | - | - | - | - | - | - | - | - | 1 | - | 3 | - |
| CO2 | Demonstrate basic concepts of VHDL language. | 1 | - | 2 | - | 2 | - | - | - | - | - | - | 2 | - | 3 | - |
| CO3 | Design various combinational logic circuits using VHDL | 3 | 2 | 2 | - | 2 | - | - | - | - | - | - | 2 | - | 3 | - |
| CO4 | Design various sequential logic circuits using VHDL | 3 | 2 | 3 | - | 2 | - | - | - | - | - | - | 2 | - | 3 | - |
| CO5 | Implement digital system using CPLDs/FPGAs and memories | 2 | 2 | 3 | - | - | - | - | - | - | - | - | 2 | - | 3 | - |
| **S160** | **Electronic Measurements & Instrumentation** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Understand the concepts of measurements and construct different voltmeters. | 1 | 1 | 1 | - | - | - | - | - | - | - | - | - | - | 1 | - |
| CO2 | Design various meters and bridges for measurement of R,L,C, f, Q and I. | 1 | 1 | 3 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO3 | Analyze the working of different signal generators and wave analyzers. | 2 | 2 | - | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO4 | Demonstrate the concepts of various oscilloscopes. | 1 | - | - | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO5 | Choose appropriate passive or active transducers for measurement of physical phenomenon. | 2 | 2 | - | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| **S313** | **Microprocessors & Microcontrollers** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Describe the architecture and operation of 8086 microprocessor & 8051 microcontroller | 1 | - | - | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO2 | Develop Assembly Language Programs for various applications using the instruction set of 8086/8051 | 2 | 2 | 2 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO3 | Design a system by interfacing memory and peripherals to 8086/8051 | 2 | 2 | 2 | - | - | - | - | - | - | - | - | 1 | - | 3 | - |
| CO4 | Analyze the working of peripherals and devices for different applications. | 1 | 2 | - | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO5 | Build a system for real-time application by interfacing suitable devices. | 2 | 2 | 3 | - | - | - | - | - | - | - | - | 1 | - | 3 | - |
| **S398** | **Telecommunication Switching Systems & Networks** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Evaluate different types of switching systems in telecommunications | 2 | 2 | - | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| CO2 | Analyze numerous telephone network parameters | 2 | 3 | - | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| CO3 | Comprehend the underlying concepts of data communication networks | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| CO4 | Identify the components of ISDN | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | 1 | - | - |
| CO5 | Contrast various higher data rates telecommunication techniques | - | 2 | - | - | - | - | - | - | - | - | - | 2 | 3 | - | - |
| **S411** | **Transmission Lines & Wave Guides** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Design a transmission line for given specifications | 2 | 2 | 3 | - | - | - | - | - | - | - | - | 1 | 3 | - | - |
| CO2 | Use the Smith chart to find the reflection coefficient, VSWR and Impedance | - | 2 | 2 | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| CO3 | Evaluate the characteristics of various types of waveguides. | 1 | 3 | - | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| CO4 | Analyze the different types of cavity resonators | 1 | 3 | - | - | - | - | - | - | - | - | - | 1 | 3 | - | - |
| CO5 | Design a Microstrip line for given specifications | 2 | 2 | 3 | - | - | - | - | - | - | - | - | 1 | 3 | - | - |
| **L105** | **Analog & Digital Communications Lab** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Understand the practical aspects of various analog modulation schemes | 1 | 1 | - | 2 | 1 | - | - | - | - | - | - | - | 3 | - | - |
| CO2 | Gain knowledge about various measures that improve receiver performance | 1 | 1 | - | 1 | 2 | - | - | - | - | - | - | - | 3 | - | - |
| CO3 | Identify the role of message signal amplitude in changing a pulse waveform | 1 | 1 | - | 2 | 1 | - | - | - | - | - | - | - | 3 | - | - |
| CO4 | Learn various steps involves in digital transmission of message signal | 1 | 1 | - | 2 | 1 | - | - | - | - | - | - | - | 3 | - | - |
| CO5 | Adapt Effective Communication, Presentation and Report Writing Skills | - | - | - | - | - | - | - | - | 2 | 3 | - | - | - | - | - |
| **L161** | **Microprocessors & Microcontrollers Lab** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Analyze the operation of instructions of 8086 for solving given problem | 1 | 2 | 1 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | - |
| CO2 | Apply 8086 instructions to develop programs for real time applications like interfacing ADC, DAC, etc. to 8086 | 1 | 1 | 2 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | - |
| CO3 | Develop programming for 8051 applications. | 1 | 2 | 2 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | - |
| CO5 | Adapt Effective Communication, Presentation and Report Writing Skills | - | - | - | - | - | - | - | - | 2 | 3 | - | - | - | - | - |
| **L176** | **Seminar** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Review literature, analyze complex engineering problems relevant to the society and industry | 3 | 2 | 1 | - | 2 | 2 | - | - | 2 | - | - | 3 | 3 | 3 | 3 |
| CO2 | Analyze the insight into modern technologies, tools and systems in the field of Electronics & Communication Engineering | 1 | 2 | 2 | 2 | 3 | 2 | - | - | 2 | - | - | 3 | 3 | 3 | 3 |
| CO3 | Adapt communication & Presentation skills | - | - | - | - | - | - | - | - | - | 3 | - | 3 | - | - | - |
| CO4 | Develop Report writing skills. | - | - | - | - | - | - | - | - | - | 3 | - | 3 | - | - | - |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **VI - Semester** | | | | | | | | | | | | | | | | |
| **S131** | **Antennas and Wave Propagation** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Understand and elaborate the Antenna and Radiation fundamentals | 1 | - | - | - | - | - | - | - | - | - | - | 1 | 1 | - | - |
| CO2 | Analyze and synthesize various Antenna Arrays | 2 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | 2 | - | - |
| CO3 | Design different types of High frequency Antennas | 2 | 2 | 3 | - | - | - | - | - | - | - | - | 2 | 3 | - | - |
| CO4 | Measure various Antenna Parameters | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| CO5 | Understand the radio wave propagation in atmosphere | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| **S194** | **Digital System Design Using Verilog** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Summarize the Constructs and Conventions of Verilog HDL and its role in Standardized Digital Design Flow. | 1 | 1 | - | - | 1 | - | - | - | - | - | - | 1 | - | 2 | - |
| CO2 | Model Digital System at Gate Level and Behavioral Level. | 1 | 2 | 2 | - | 2 | - | - | - | - | - | - | 2 | - | 3 | - |
| CO3 | Design Digital System at Data flow level and switch level. | 2 | 2 | 3 | - | 2 | - | - | - | - | - | - | 2 | - | 3 | - |
| CO4 | Develop Verilog functions, tasks, UDP for digital modules. | 2 | 2 | 3 | - | 2 | - | - | - | - | - | - | 2 | - | 3 | - |
| CO5 | Implement Digital System using CPLDs and FPGAs. | 2 | 2 | 3 | - | - | - | - | - | - | - | - | 1 | - | 3 | - |
| **S179** | **Data Structures and Object Oriented Programming** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Differentiate various searching and sorting algorithms | 3 | 2 | - | - | 2 | - | - | - | - | - | - | 2 | 1 | - | - |
| CO2 | Use Linear Data Structures like stacks, queues and linked lists | 3 | 2 | - | - | 2 | - | - | - | - | - | - | 2 | 1 | - | - |
| CO3 | Employ OOP concepts in JAVA. | 3 | 2 | - | - | 2 | - | - | - | - | - | - | 2 | 1 | - | - |
| CO4 | Choose an engineering approach to solving problems | 3 | 2 | - | - | 2 | - | - | - | - | - | - | 2 | 1 | - | - |
| CO5 | Propose the use of certain java programming concepts to solve the given problems | 3 | 2 | - | - | 2 | - | - | - | - | - | - | 2 | 1 | - | - |
| **S419** | **VLSI Design** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Understand semiconductor technology and MOS fabrication process | 1 | 2 | - | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO2 | Apply layout design rules for NMOS,CMOS  logic circuit designs | 2 | 2 | 3 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO3 | Design sub systems used in digital logic systems | 2 | 2 | 3 | - | - | - | - | - | - | - | - | 2 | - | 3 | - |
| CO4 | Design VLSI circuits using Design tools and Design methods | 2 | 2 | 3 | - | - | - | - | - | - | - | - | 2 | - | 3 | - |
| CO5 | Apply CMOS testing techniques to test different digital designs | 2 | 2 | 2 | - | - | - | - | - | - | - | - | 1 | - | 3 | - |
| **S190** | **Digital Image Processing - PE - I** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Understand the basic concepts of 2D signal acquisition and Human visual system. | 1 | - | - | - | - | - | - | - | - | - | - | 1 | - | - | 1 |
| CO2 | Apply numerous transforms to images after gaining knowledge about their properties. | 2 | 2 | 1 | - | - | - | - | - | - | - | - | 1 | - | - | 2 |
| CO3 | Analyze image enhancement techniques in spatial and frequency domain | 2 | 3 | 3 | - | - | - | - | - | - | - | - | 2 | - | - | 3 |
| CO4 | Describe the concepts of restoration and color image processing techniques | 1 | 1 | 1 | - | - | - | - | - | - | - | - | 1 | - | - | 2 |
| CO5 | Summarize various segmentation and compression techniques. | 1 | 1 | 1 | - | - | - | - | - | - | - | - | 2 | - | - | 2 |
| **S400** | **Television and Video Engineering - PE-I** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Understand the basic concepts of video signals | 1 | 1 | - | - | - | - | - | - | - | - | - | - | 1 | - | - |
| CO2 | Gain the knowledge about various television equipments. | 1 | 2 | - | - | - | - | - | - | - | - | - | - | 1 | - | - |
| CO3 | Learn the TV receiver processing video signals. | - | 1 | - | - | - | - | - | - | - | - | - | - | 1 | - | - |
| CO4 | Get acquainted with various video systems. | 1 | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - |
| CO5 | Know the principles involved in the working of Latest Technologies. | 1 | 2 | - | - | - | - | - | - | - | - | - | - | 1 | - | - |
| **S307** | **Medical Electronics - PE-I** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Understand Human Physiology, working of electrodes, transducers, Monitoring systems and safety aspects | 1 | 1 | - | - | - | - | - | - | - | - | - | - | - | 1 | - |
| CO2 | Apply the transducer principles and safety measures in measuring and monitoring instruments. | 1 | 2 | - | - | - | - | - | - | - | - | - | - | - | 2 | - |
| CO3 | Analyse the working of parts of Human body, measuring and monitoring instruments and medical signals like ECG, EEG and EMG | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | 2 | 1 |
| **S311** | **Micro Electro Mechanical Systems - PE-I** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Understand the importance of miniaturization in the fabrication of electronic devices. | 1 | 1 | - | - | - | - | - | - | - | - | - | - | - | 1 | - |
| CO2 | Describe the Scale of MEMS design. | 1 | 1 | 1 | - | - | - | - | - | - | - | - | - | - | 1 | - |
| CO3 | Depict the techniques for building the microelectronic devices on silicon, polymer, metal and other materials | 1 | 1 | - | - | - | - | - | - | - | - | - | - | - | 1 | - |
| CO4 | Critically analyze Microsystems technology for technical feasibility as well as practicality. | 2 | 2 | 1 | - | - | - | - | - | - | - | - | - | - | 2 | - |
| CO5 | Analyze the limitations and current challenges in micro systems technology | 1 | 2 | 1 | - | - | - | - | - | - | - | - | - | - | 2 | - |
| **S229** | **Embedded System Design - PE - II** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Recognizethe differences between the general computing system and the Embedded system | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | - | 1 | - |
| CO2 | Classify the common memory types ROM and RAM. | 1 | - | 1 | - | - | - | - | - | - | - | - | 1 | - | 1 | - |
| CO3 | Interpret the Interrupt Service Routines and Device Drivers. | 1 | 2 | 2 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO4 | Understand the Inter process communication and role of the multiple Processes, Tasks and Threads. | 1 | 1 | 2 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO5 | Develop a Real - Time Embedded System using concepts of RTOS. | 2 | 2 | 3 | - | - | - | - | - | - | - | - | 1 | - | 3 | - |
| **S222** | **Electromagnetic Compatibility - PE - II** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Know the various types of Electromagnetic interference | 1 | 1 | - | - | - | - | - | - | - | - | - | - | 1 | - | - |
| CO2 | Understand the design process of electromagnetic interference. | 1 | 1 | - | - | - | 1 | 2 | - | - | - | - | - | 1 | - | - |
| CO3 | Gain the knowledge on radiated and conducted interference measurements | 1 | 2 | - | - | - | - | - | - | - | - | - | - | 1 | - | - |
| CO4 | Describe the principles of grounding, shielding and bonding | 1 | 1 | - | - | - | - | - | - | - | - | - | - | 1 | - | - |
| CO5 | Know the different EMC standards | 1 | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - |
| **S176** | **Data Communications - PE - II** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Distinguish various types of Network models used in data communications | 1 | 2 | - | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| CO2 | Utilize different protocols to handle the services required from the data link layer in relation to Network Layer | 2 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | 2 | - | - |
| CO3 | Analyze logical addressing and routing protocols used in the Network layer of TCP/IP protocol suite | 2 | 3 | - | - | - | - | - | - | - | - | - | 2 | 3 | - | - |
| CO4 | Illustrate various mechanisms and techniques to control the congestion in data networks | 1 | 2 | - | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| CO5 | Develop different security techniques and protocols to increase the network security | 2 | 2 | 3 | - | - | - | - | - | - | - | - | 2 | 3 | - | - |
| **S363** | **Radio Frequency Integrated Circuits - PE - II** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Design Passive and active RF components | 2 | 2 | 3 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO2 | Analyze high frequency amplifiers | 2 | 2 | 1 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO3 | Understand the RF power amplifier design procedure. | 1 | 1 | 2 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO4 | Analyze low noise amplifiers and mixers | 2 | 2 | 1 | - | - | - | - | - | - | - | - | 1 | 1 | 3 | - |
| CO5 | Design RF Oscillators and Phase locked loops | 2 | 2 | 3 | - | - | - | - | - | - | - | - | 1 | 2 | 2 | - |
| **L129** | **Data Structures and Object Oriented Programming Lab** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Differentiate various searching and sorting algorithms. | 3 | 2 | - | - | 2 | - | - | - | - | - | - | 2 | 1 | - | - |
| CO2 | Use Linear Data Structures like stacks, queues and linked lists | 3 | 2 | - | - | 2 | - | - | - | - | - | - | 2 | 1 | - | - |
| CO3 | Employ OOP concepts in JAVA. | 3 | 2 | - | - | 2 | - | - | - | - | - | - | 2 | 1 | - | - |
| CO4 | choose an engineering approach to solving problems | 3 | 2 | - | - | 2 | - | - | - | - | - | - | 2 | 1 | - | - |
| CO5 | propose the use of certain java programming concepts to solve the given problems | 3 | 2 | - | - | 2 | - | - | - | - | - | - | 2 | 1 | - | - |
| CO6 | Adapt Effective Communication, Presentation and Report Writing Skills | - | - | - | - | - | - | - | 1 | 2 | 3 | - | 1 | - | - | - |
| **L119** | **Communication & Presentation Skills Lab** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Make power point presentations and oral presentations. | - | 1 | - | 3 | - | 2 | - | - | 3 | - | - | 2 | - | - | - |
| CO2 | Articulate English with good pronunciation | - | 1 | - | 3 | - | 2 | - | - | 3 | - | - | 2 | - | - | - |
| CO3 | Face competitive exams like GRE, TOEFL, IELTS etc. | - | 1 | - | 3 | - | 2 | - | - | 3 | - | - | 2 | - | - | - |
| CO4 | Face interviews and skill fully manage themselves in group discussions. | - | 1 | - | 3 | - | 2 | - | - | 3 | - | - | 2 | - | - | - |
| CO5 | Negotiate skill fully for better placement | - | 1 | - | 3 | - | 2 | - | - | 3 | - | - | 2 | - | - | - |
| CO6 | Adapt Effective Communication, Presentation and Report Writing Skills | - | - | - | - | - | - | - | 1 | 2 | 3 | - | 1 | - | - | - |
| L164 | **Mini Project** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Identify the basic engineering problems relevant to the society and industry | 2 | 3 | - | - | - | 3 | - | - | - | - | - | 3 | 3 | 3 | 3 |
| CO2 | Apply modern technologies, tools and systems in the field of Electronics & Communication Engineering to analyse the identified problem | 2 | 3 | 3 | 3 | 3 | 3 | 2 | - | - | - | - | 3 | 3 | 3 | 3 |
| CO3 | Design and implement a viable solution to the problem. | 2 | 3 | 3 | 2 | 2 | 3 | 2 | - | - | - | 3 | 3 | 3 | 3 | 3 |
| CO4 | Adapt Communication & Presentation skills | - | - | - | - | - | - | - | - | - | 3 | - | 3 | - | - | - |
| CO5 | Develop the Individual & team work skills with professional and ethical values. | - | - | - | - | - | - | - | 3 | 3 | - | - | 3 | - | - | - |
| CO6 | Improve report writing skills | - | - | - | - | - | - | - | - | - | 3 | - | 3 | - | - | - |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **VII - Semester** | | | | | | | | | | | | | | | | |
| **S270** | **Industrial Management** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Apply management principles to the particle situations to be in a position to know which type of business organization structure suits | 2 | - | - | - | - | - | - | 2 | 1 | - | - | 2 | - | - | - |
| CO2 | Make decision making relating to the problems in operations and production activities there by improving the productivity by proper utilization input factors by designing the better working methods and with better work study techniques. | - | - | - | - | 2 | - | - | - | - | - | - | 2 | - | - | - |
| CO3 | Improve quality of working through SQC techniques and also in a position to reduce the investment in materials through better control of inventory | - | - | - | - | - | - | - | - | - | - | - | 2 | - | - | - |
| CO4 | Manage people in working environment with the practices of HRM across corporate businesses | - | - | - | - | - | - | - | 3 | 2 | - | - | 2 | - | - | - |
| CO5 | Use PERT & CPM techniques in effective project management to identify critical path and try to complete projects on time as well as reducing the project durations if need arises. | - | - | - | 2 | - | - | - | - | - | - | 1 | 2 | - | - | - |
| **S314** | **Microwave Engineering** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Know about the Microwave spectrum and applications of microwaves. | 1 | - | - | - | - | - | - | - | - | - | - | 1 | 1 | - | - |
| CO2 | Understand the operation and use of Microwave tubes. | 1 | 2 | - | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| CO3 | Understand the applications of semiconductor microwave devices. | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| CO4 | Derive the S-parameters of waveguide components | 2 | 2 | 2 | - | - | - | - | - | - | - | - | 1 | 3 | - | - |
| CO5 | Use a Microwave bench setup to measure the various microwave parameters. | 1 | 2 | - | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| **S330** | **Optical Communications** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Comprehend the fundamental concepts of optical fiber Communications. | 1 | - | - | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| CO2 | Estimate numerous types of losses in different fibers during optical signal transmission. | 1 | 2 | 1 | - | - | 1 | 1 | - | - | - | - | 1 | 2 | - | - |
| CO3 | Summarize the basics of power launching and coupling from optical sources to fiber. | 1 | 2 | 1 | - | - | 1 | 1 | - | - | - | - | 1 | 1 | - | - |
| CO4 | Interpret various optical receivers and their performance measures. | 2 | 3 | 2 | - | - | - | - | - | - | - | - | 1 | 3 | - | - |
| CO5 | Analyze the digital optical link, Wavelength division multiplexing and optical networks | 3 | 3 | 2 | - | - | 2 | 2 | - | - | - | - | 1 | 3 | - | - |
| **S155** | **Cellular & Mobile Communications** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Summarize the basic concepts related to different cellular systems and their operation. | 2 | 1 | 1 | - | - | - | - | - | - | - | - | 1 | **1** | **-** | **-** |
| CO2 | Analyze radio propagation losses at different cell site and mobile antennas. | 2 | 3 | 1 | - | - | - | - | - | - | - | - | 1 | **2** | **-** | **-** |
| CO3 | Design and differentiate the co-channel and adjacent channel interferences. | 1 | 2 | 3 | - | - | - | - | - | - | - | - | 1 | **3** | - | - |
| CO4 | Gain the knowledge on various handoffs and different channel assignments. | 1 | 1 | 1 | - | - | - | - | - | - | - | - | 1 | **2** | - | - |
| CO5 | Understand the different digital cellular systems and multiple access techniques. | 1 | 1 | 1 | - | - | - | - | - | - | - | - | 1 | **2** | - | - |
| **S193** | **Digital Signal Processors - PE - III** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Gain knowledge in basics of digital signal processor design issues. | 1 | 2 | - | - | - | - | - | - | - | - | - | 1 | - | - | 2 |
| CO2 | Analyze fixed and floating point digital signal processors. | 2 | 2 | 1 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO3 | Realize FIR and IIR algorithms using digital signal processors | 2 | 2 | 3 | - | - | - | - | - | - | - | - | 1 | - | 1 | 2 |
| CO4 | Implement FFT algorithms using digital signal processors. | 2 | 2 | 3 | - | - | - | - | - | - | - | - | 1 | - | 1 | 2 |
| CO5 | Understand interfacing and programming of digital signal processors. | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | - | 1 | - |
| **S318** | **Nano Electronics- PE - III** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Comprehend the integration of various fabrication techniques and their relevant technical issues | 1 | - | - | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO2 | Know the use of various logic devices used in Nano electronic field | 1 | - | - | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO3 | Understand the structures and applications of carbon Nano tubes | 1 | - | - | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO4 | Gain the knowledge of design of memory devices using Nano electronics | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO5 | Study of various data transmission displays and interface devices. | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| **S356** | **Programmable Logic Devices - PE - III** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Remember programmable logic devices | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | - | 1 | - |
| CO2 | Understand the FPGA programming logic blocks architecture and programming techniques. | 1 | 2 | 1 | - | - | - | - | - | - | - | - | 1 | - | 1 | - |
| CO3 | Evaluate the Programmable Logic Devices | 1 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | - | 3 | - |
| CO4 | Apply ASIC library cells to design different ASIC | 1 | 3 | 2 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO5 | Design programmable ASIC, ASIC logic cells, ASIC I/O cells for implementation of different applications. | 1 | 2 | 3 | - | - | - | - | - | - | - | - | 2 | - | 3 | - |
| **S389** | **Spread Spectrum Communications- PE - III** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Apply fundamental knowledge of Spread Spectrum communications and generate the code sequences. | 2 | 2 | 1 | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| CO2 | Analyze the Direct Sequence Spread Spectrum system modulation schemes. | 2 | 3 | 2 | - | - | - | - | - | - | - | - | 2 | 3 | - | - |
| CO3 | Estimate coherent and non-coherent frequency hopping techniques in jamming environments. | 1 | 2 | 2 | - | - | - | - | - | - | - | - | 1 | 3 | - | - |
| CO4 | Analyze the performance of synchronization of Spread Spectrum receivers. | 2 | 2 | 1 | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| CO5 | Evaluate the concepts of Spread spectrum in real time mobile and tracking applications. | 1 | 2 | 2 | - | - | - | - | - | - | - | - | 1 | 1 | - | - |
| **S168** | **Computer Networks - OE - I** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Analyze need of network hardware and software for different computer networks | 1 | 2 | - | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| CO2 | Solve design issues and implement protocols at data link layer | 2 | 2 | 3 | - | - | - | - | - | - | - | - | 2 | 3 | - | - |
| CO3 | Realize routing and congestion control algorithms at network layer | 2 | 2 | 3 | - | - | - | - | - | - | - | - | 2 | 3 | - | - |
| CO4 | Classify services and implement TCP/UDP protocols at transport layer | 1 | - | - | - | - | - | - | - | - | - | - | 1 | 1 | - | - |
| CO5 | Design secure computer network with various protocols | 2 | 2 | 3 | - | - | - | - | 1 | - | - | - | 1 | 3 | - | - |
| **S173** | **Consumer Electronics- OE - I** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Use loud speakers and Microphones for the Public addressing system | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 2 | - |
| CO2 | Record data in Audio Tape recorders in different environment. | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - |
| CO3 | Analyze the Television components and working principle | 2 | 2 | - | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO4 | Understand the working of Optical recording and video cassette recording circuitry | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | - | 1 | - |
| CO5 | Use different home and office appliances like Washing machines, Xerox machine. | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| **S322** | **Neural Networks and Fuzzy Logic- OE - I** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Understand the concepts of Neural Networks. | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | - | - | 1 |
| CO2 | Gain the knowledge about single layer feed forward and multi layered feed forward neural networks. | 1 | 2 | - | - | - | - | - | - | - | - | - | 1 | - | - | 1 |
| CO3 | Analyze various concepts and algorithms to design of associative memories | 1 | 2 | 1 | - | - | - | - | - | - | - | - | 1 | - | - | 2 |
| CO4 | Know the basics of fuzzy sets | 1 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 1 |
| CO5 | Identify the fuzzy logic system components. | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 |  | - | 2 |
| **S327** | **Operating Systems - OE - I** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Understand objects and functions of operating system structure | 3 | 2 | - | 1 | - | - | - | - | - | - | - | 3 | - | - | - |
| CO2 | Analyze process creation, termination, coordination, scheduling algorithms and threading | 3 | - | 2 | 1 | - | - | - | - | - | - | - | - | - | - | - |
| CO3 | Understand the importance of synchronization and study methods of handling deadlocks | - | - | - | 3 | 2 | 1 | - | - | - | - | - | 3 | - | - | - |
| CO4 | Study and evaluate management stratagies such as paging and segmentation, group the concepts of virtual memory, demand paging and page replacement algorithms | - | 3 | - | 2 | 1 | - | - | - | - | - | - | - | - | - | - |
| CO5 | Comprehend and analyze the importance of different life structures that are used in file storage system | - | 3 | 1 | - | 2 | - | - | - | - | - | - | 2 | - | - | - |
| **L132** | **Digital System Design Lab** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Design CMOS Logic gates using Pyxis Schematic Editor. | 2 | 2 | 3 | 3 | 3 | - | - | - | - | - | - | - | - | 3 | - |
| CO2 | Model digital modules using VHDL/Verilog and Simulate. | 1 | 2 | 3 | 3 | 3 | - | - | - | - | - | - | - | - | 2 | - |
| CO3 | Verify Implementation of Digital Design on FPGA Board. | 1 | 2 | - | 2 | 2 | - | - | - | - | - | - | - | - | 2 | - |
| CO4 | Adapt Effective Communication, Presentation and Report Writing Skills | - | - | - | - | - | - | - | 1 | 2 | 3 | - | 1 | - | - | - |
| **L153** | **Microwave & Optical Communications Lab** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Measure the wave guide parameters required for different applications | 1 | 1 | 1 | 1 | 1 | - | - | - | - | - | - | - | 2 | - | - |
| CO2 | Understand the operation of reflex klystron and Gunn diode from the characteristics. | 1 | 1 | - | 1 | 1 | - | - | - | - | - | - | - | 2 | - | - |
| CO3 | Analyze various characteristics of microwave junctions and design of microwave communication links | 2 | 2 | 1 | 2 | 2 | - | - | - | - | - | - | - | 3 | - | - |
| CO4 | Analyze various characteristics of LED ,Laser diode and optical fiber and design of fiber optical analog and digital link | 2 | 2 | 1 | 2 | 2 | - | - | - | - | - | - | - | 3 | - | - |
| CO5 | Understand the practical problems and their remedies due to losses in optical fiber | 1 | 1 | - | 1 | 1 | - | - | - | - | - | - | - | 1 | - | - |
| CO6 | Adapt Effective Communication, Presentation and Report Writing Skills | - | - | - | - | - | - | - | 1 | 2 | 3 | - | 1 | - | - | - |
| **L153** | **Internship** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Identify engineering processes relevant to the industry | 3 | 3 | 2 | 3 | - | 2 | 2 | - | 3 | - | - | 3 | 3 | 3 | 3 |
| CO2 | Understand the usage of modern technologies & tools in the field of Electronics & Communication Engineering | 3 | 3 | 3 | 3 | 3 | 2 | - | - | 3 | - | - | 3 | 3 | 3 | 3 |
| CO3 | Adapt communication & Presntation skills | - | - | - | - | - | - | - | - | 3 | 3 | - | 3 | - | - | - |
| CO4 | Improve report writing skills | - | - | - | - | 1 | - | - | 3 | 3 | 3 | - | 3 | - | - | - |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **VIII - Semester** | | | | | | | | | | | | | | | | |
| **S362** | **Radar Systems** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Discuss the basic concepts and applications of RADAR Systems. | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| CO2 | Differentiate the CW Radar and FM CW Radar for the measurement of Speed and distance | 1 | 2 | - | - | - | - | - | - | - | - | - | 1 | 1 | - | - |
| CO3 | Determine the role of MTI Radar and Pulse Doppler Radar for the removal of the Clutter. | 1 | 2 | - | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| CO4 | Identify different tracking mechanisms and techniques for detection of Radar signals in the presence of Noise | 1 | 2 | - | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| CO5 | Examine different radar subsystems. | 1 | 2 | - | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| **S375** | **Satellite Communications- PE - IV** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Comprehend the fundamental concepts related to orbital model and launching. | 1 | 2 | - | - | - | - | - | - | - | - | - | 1 | 1 | - | - |
| CO2 | Classify various subsystems of a satellite and satellite link design. | 1 | 2 | 1 | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| CO3 | Analyze the different multiple access methods. | 2 | 2 | 1 | - | - | - | - | - | - | - | - | 1 | 3 | - | - |
| CO4 | Examine various propagation losses affecting satellite signals and different types of earth stations. | 1 | 2 | - | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| CO5 | Identify various applications of satellites. | 1 | - | - | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| **S316** | **Mobile Computing- PE - IV** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Understand the concepts and features of mobile computing technologies and applications | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | 1 | - | - |
| CO2 | Understand the mobile network and transport layer protocols | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | 1 | - | - |
| CO3 | Understand the concepts of mobile adhoc network and adhoc wireless network protocols | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | 1 | - | - |
| CO4 | Analyze the android application develop environment | 2 | 2 | - | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| CO5 | Implementation of various protocols VOIP, WAP using android | 2 | 2 | 2 | - | - | - | - | - | - | - | - | 2 | 2 | - | - |
| **S366** | **Real Time Operating Systems - PE - IV** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Understand the basics set of commands and utilities in LINUX/UNIX systems | 1 | - | - | - | - | - | - | - | - | - | - | 1 | - | 1 | - |
| CO2 | Apply the fundamental concepts of real-time operating systems | 1 | 2 | 1 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO3 | Analyze real-time operating system objects, services and Input/output concepts | 1 | 2 | 1 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO4 | Evaluate various interrupts and timers | 1 | 2 | 2 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO5 | Create real time embedded systems using the concepts of RTOS | 1 | 2 | 3 | - | - | - | - | - | - | - | - | 1 | - | 3 | - |
| **S426** | **Wireless Sensor Networks - PE - IV** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Understand different applications of wireless sensor networks | 1 | - | - | - | - | - | - | - | - | - | - | 1 | 1 | - | - |
| CO2 | Gain the knowledge about working of individual sensor nodes can be connected into a wireless sensor network. | 1 | 2 | - | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| CO3 | Analyze different communication protocols of wireless sensor networks in real time applications | 2 | 3 | 2 | - | - | - | - | - | - | - | - | 1 | 3 | - | - |
| CO4 | Learn about the establishment of wireless sensor network | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | 1 | - | - |
| CO5 | Apply the knowledge of platforms and tools for the operation of wireless sensor network | 2 | 2 | 1 | - | - | - | - | - | - | - | - | 1 | 2 | - | - |
| **S140** | **Automobile Electronics - OE-II** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Use different batteries and lights for different applications. | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | - | 1 | - |
| CO2 | Know the maintenance of starting system | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO3 | Apply the regulators concept to real time applications | 1 | 2 | 1 | - | - | - | - | - | - | - | - | 1 | - | 2 | - |
| CO4 | Gain the knowledge of current trends in automotive electronics | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | - | 1 | - |
| CO5 | Know the various sensors and Activators | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | - | 1 | - |
| **S246** | **Evolutionary Computing Techniques - OE - II** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Solve the problems using the Genetic algorithm concepts | 3 | 3 | 3 | - | - | - | - | - | - | - | - | 2 | - | - | 3 |
| CO2 | Understand the Particle swarm optimization and Ant colony optimization algorithms. | 1 | 1 | 1 | - | - | - | - | - | - | - | - | 2 | - | - | 1 |
| CO3 | Know about the variations of BFO algorithm and importance of Artificial Immune System | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | - | - | 1 |
| CO4 | Identify the applications of Simulated annealing algorithm and Linear Classifier Systems | 2 | 2 | - | - | - | - | - | - | - | - | - | 1 | - | - | 2 |
| CO5 | Understand the importance of Harmony Search method and Tabu search method | 1 | 1 | - | - | - | - | - | - | - | - | - | 1 | - | - | 1 |
| **S371** | **Robot Engineering - OE -II** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Architecture and subsystems of Robot | 3 | 2 | 2 | 3 | 2 | - | - | - | - | - | - | - | - | - | - |
| CO2 | Importance of Kinematics and Dynamics of a Robot | 2 | **-** | 3 | **-** | **-** | 3 | - | - | - | - | - | - | - | - | - |
| CO3 | Robot control mechanism and different aspects of trajectory planning | 3 | 2 | - | 3 | 2 | - | - | - | - | - | - | - | - | - | - |
| CO4 | Robot vision system and the various mechanisms related to it. | 3 | 2 | - | 2 | 2 | - | - | - | - | - | - | - | - | - | - |
| CO5 | Features and applications of Mobile robots. | 3 | 2 | - | 2 | 2 | - | - | - | - | - | - | - | - | - | 2 |
| **S425** | **Web Technologies - OE - II** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Design web pages with HTML & DHTML | 2 | 2 | 2 | - | 3 | - | - | - | - | - | - | - | 3 | - | - |
| CO2 | Apply basic concepts of XML, DOM & SAX and Java Beans to solve real world problems. | 3 | 2 | 3 | - | 3 | - | - | - | - | - | - | - | 3 | 3 | - |
| CO3 | Design dynamic web pages using server side component Servlets. | 3 | 2 | 3 | - | 3 | - | - | - | - | - | - | - | 3 | 3 | - |
| CO4 | Create real world web applications using JSP. | 3 | 2 | 3 | - | 3 | - | - | - | - | - | - | - | 3 | 3 | - |
| CO5 | Apply Swings & Struts framework for application development. | 3 | 2 | 3 | - | 3 | - | - | - | - | - | - | - | 3 | 3 | - |
| **L157** | **Main Project** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Identify the complex engineering problems relevant to the society and industry | 2 | 3 | - | - | - | 3 | - | - | - | - | - | 3 | 3 | 3 | 3 |
| CO2 | Apply modern technologies, tools and systems in the field of Electronics & CommunicationEngineering to analyse the identified problem | 2 | 3 | 3 | 3 | 3 | 3 | 2 | - | - | - | - | 3 | 3 | 3 | 3 |
| CO3 | Design and implement a viable solution to the problem. | 2 | 3 | 3 | 2 | 2 | 3 | 2 | - | - | - | 3 | 3 | 3 | 3 | 3 |
| CO4 | Apply communication & Presntation skills | - | - | - | - | - | - | - | - | - | 3 | - | 3 | - | - | - |
| CO5 | Develop the team work and leadership skills with professional and ethical values. | - | - | - | - | - | - | - | 3 | 3 | - | - | 3 | - | - | - |
| CO6 | Make the use of report writing skills | - | - | - | - | - | - | - | - | - | 3 | - | 3 | - | - | - |
| **L121** | **Comprehensive Viva-Voce** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** | **PSO3** |
| CO1 | Analyse the concepts of various core subjects in Electronics & Communication Engineering | 3 | 3 | 3 | - | - | - | - | - | - | - | - | 2 | 3 | 3 | 3 |
| CO2 | Apply communication skills | - | - | - | - | - | - | - | - | 3 | 3 | - | 2 | - | - | - |

**HOD of ECE**