**ST JOSEPH'S COLLEGE OF ENGINEEIRNG, CHENNAI**
**B.E. ELECTRONICS AND COMMUNICATION ENGINEERING**
**REGULATIONS – 2017**

## PROGRAM EDUCATIONAL OBJECTIVES

| | |
|---|---|
| PEO1 | To enable graduates to pursue research, or have a successful career in academia or industries associated with Electronics and Communication Engineering, or as entrepreneurs. |
| PEO2 | To provide students with strong foundational concepts and also advanced techniques and tools in order to enable them to build solutions or systems of varying complexity. |
| PEO3 | To prepare students to critically analyze existing literature in an area of specialization and ethically develop innovative and research oriented methodologies to solve the problems identified.. |

## PROGRAM OUTCOMES

| | |
|---|---|
| PO1 | **Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. |
| PO2 | **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. |
| PO3 | **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. |
| PO4 | **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. |
| PO5 | **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. |
| PO6 | **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice. |
| PO7 | **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. |
| PO8 | **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. |
| PO9 | **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. |
| PO10 | **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions. |
| PO11 | **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. |
| PO12 | **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. |

## PROGRAM SPECIFIC OUTCOMES

| | |
|---|---|
| PSO1 | To analyse, design and develop solutions by applying foundational concepts of electronics and communication engineering. |
| PSO2 | To apply design principles and best practices for developing quality products for scientific and business applications. |
| PSO3 | To adapt to emerging information and communication technologies (ICT) to innovate ideas and solutions to existing/novel problems. |

## HS8151 – COMMUNICATIVE ENGLISH

**Course Outcomes:**

| COs | STATEMENT |
|---|---|
| **C101.1** | Speak clearly, confidently, comprehensibly, and communicate with one or many listeners using appropriate communicative strategies. |
| **C101.2** | Write cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic. |
| **C101.3** | Read different genres of texts adopting various reading strategies. |
| **C101.4** | Listen/view and comprehend different spoken discourses/excerpts in      different accents |
| **C101.5** | Identify topics and formulate questions for productive inquiry |

## MA 8151 ENGINEERING MATHEMATICS I

**Course Outcomes:**

| Course Outcomes | STATEMENT |
|---|---|
| **C102.1** | Students will be able to understand the concept of function and limit of a function and apply the same to deal with continuity and derivative of a given function.  Apply differentiation to solve maxima and minima problems, which are related to real world problems. |
| **C102.2** | Students will have the idea of extension of a function of one variable to several variables. Multivariable functions of real variables arise inevitable in engineering. |
| **C102.3** | Students will be able to understand the concept of integration through Riemann sums and fundamental theorem of calculus. Also acquire skills to evaluate the integrals using the techniques of substitution, partial fraction and integration by parts along with the knowledge of improper integrals. |
| **C102.4** | The students will be exposed to double and triple integration so that they can handle integrals of higher order which are applied in engineering field. |
| **C102.5** | The students were imbibed with techniques in solving ordinary differential equations that arises in most of the engineering problems |

## PH8151/ENGINEERING PHYSICS

**Course Outcomes:**

| COs | STATEMENT |
|---|---|
| **C103.1** | Able to understand the concept of stress, strain, factors affecting elasticity, bending of beam, twisting couple, torsional pendulum, depression of a cantilever, young's modulus and I-shape girders. |
| **C103.2** | Able to understand the different type of oscillations and their equations, plane progressive waves. Able to understand the concept, properties of lasers, working of different types of semiconductor lasers. Apply the properties of lasers in industry for welding, heat treatment, for diagnosis and therapy in medicine. Able to understand the principle and propagation of light (Lasers) in optical fibres, the various types of optical fibres and the loss mechanisms in optical fibres. Apply the characteristics of laser and fibre in fibre optic communication system and sensors. |
| **C103.3** | To understand the concept of transfer of heat energy, thermal expansion, and thermal conduction. Able to understand the thermal conductivity, forbe's and lee's disc method, heat conduction through compound media, and thermal insulation. Apply the concept of thermal insulation in heat exchangers, refrigerators, ovens, and solar waterheaters. |
| **C103.4** | Able to understand the concept of wave nature and apply in electron microscope like STEM. |
| **C103.5** | Able to understand the different structures of crystalline solids like SC, BCC ,FCC,  HCP,  Diamond and the various types of defects in crystalline solids and growth of crystals. |

## CY8151 - ENGINEERING CHEMISTRY

**Course Outcomes:**

| COs | STATEMENT |
|---|---|
| C104.1 | Able to understand impurities in industrial water, boiler troubles, internal and external treatment methods of purifying water. |
| C104.2 | Able to understand concepts of absorption, adsorption and adsorption isotherms, application of adsorption for pollution abatement, catalysis and enzyme kinetics. |
| C104.3 | Able to recognize significance of alloying, functions of alloying elements and types of alloys, uses of alloys. They should be acquainted with phase rule and reduced phase and its applications in alloying |
| C104.4 | Able to identify various types of fuels, properties, uses and analysis of fuels. They should be able to understand combustion of fuels, method of preparation of bio-diesel, synthetic petrol. |
| C104.5 | Able to understand conventional, non-conventional energy sources. They should be aware of nuclear fission and fusion, power generation by nuclear reactor, wind, solar energy and preparation, uses of various batteries. |

## GE8151- PROBLEM SOLVING AND PYTHON PROGRAMMING

**Course Outcomes:**

| Course Outcomes | STATEMENT |
|---|---|
| C105.1 | Develop algorithmic solutions to simple computational problems |
| C105.2 | Read, write, execute by simple Python programs. |
| C105.3 | Structure simple Python programs for solving problems. Decompose a Python program into functions. |
| C105.4 | Represent compound data using Python lists, tuples and dictionaries. |
| C105.5 | Read and write data from/to files in Python Programs. |

## GE8152- ENGINEERING GRAPHICS

**Course Outcomes:**

| Course Outcomes | STATEMENT |
|---|---|
| C106.1 | To understand the fundamentals and standards of Engineering graphics |
| C106.2 | To perform freehand sketching of basic geometrical constructions and multiple views of objects |
| C106.3 | To understand the concept of orthographic projections of lines and plane surfaces |
| C106.4 | To draw the projections of section of solids and development of surfaces |
| C106.5 | To visualize and to project isometric and perspective sections of simple solids |

## GE8161 - PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY

**COURSE OUTCOMES:**

On completion of this lab course, the students will be able to

| | |
|---|---|
| C107.1 | Write, test, and debug simple Python programs. |
| C107.2 | Implement Python programs with conditionals and loops. |
| C107.3 | Develop Python programs step-wise by defining functions and calling them. |
| C107.4 | Use Python lists, tuples, dictionaries for representing compound data. |
| C107.5 | Read and write data from/to files in Python. |

## BS8161 - PHYSICS CHEMISTRY LABORATORY

### Course Outcomes:

| COs | STATEMENT |
|---|---|
| C108.1 | Able to understand the working principle of laser components and working of different laser system. Able to understand the phenomenon of light, applications of fibre optics. Able to understand the amount of dissolved oxygen present in the water . |
| C108.2 | Able to understand the concept about the basic properties of matter like stress, strain and types of modulii.Able to understand the concept about the amount of chloride present in the given sample of water. |
| C108.3 | Able to understand the concept of optics like reflection, refraction , diffraction by using spectrometer grating. Able to understand the concept about the measure the conductance of strong acid and strong base, mixture of acids by using conductivity meter. |
| C108.4 | Able to understand the thermal properties of solids, specific heat and some models for specific heat calculation. Able to understand the concept of determining the strength of given substance by precipitation titration  using conductivity meter. |
| C108.5 | Able to understand the concept about the basic properties of matter like stress, strain and types of moduli Able to understand the thin film interference and  diffraction types.Able to understand the concept of determining the pH, emf values by using pH  and potentiometer. |

## HS8251 TECHNICAL ENGLISH

### Course Outcomes:

After the course, students will be able to:

| CO | Course Outcomes(Cos) |
|---|---|
| C109.1 | Speak clearly, confidently, comprehensibly, and communicate with one or many listeners using appropriate communicative strategies. |
| C109.2 | Write cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic. |
| C109.3 | Read different genres of texts adopting various reading strategies. |
| C109.4 | Listen/view and comprehend different spoken discourses/excerpts in different accents |
| C109.5 | Identify topics and formulate questions for productive inquiry |

## MA8251 ENGINEERING MATHEMATICS II

### Course Outcomes:

| COs | STATEMENT |
|---|---|
| C110.1 | The students will have a clear idea of matrix algebra pertaining Eigen values and Eigen vectors in addition dealing with quadratic forms. |
| C110.2 | The student were acquainted with the concepts of vector calculus-like Gradient, Divergence, Curl, Directional derivative, Irrational vector and Solenoidal vector. The course gives an understanding of Vector integration, needed for problems in all engineering disciplines. |
| C110.3 | To develop an understanding of the standard techniques of complex variable and mapping so as to enable the student to apply them with confidence, in application areas such as heat conduction, elasticity, fluid dynamics and flow of electric current . |
| C110.4 | The student will be exposed to the concept of Cauchy's integral theorem, Taylor and Laurent expansions, Singular points, Application of residue theorem to evaluate complex integrals. |
| C110.5 | To make the students to appreciate the purpose of using transforms to create new domain in which it is easier to handle the problem that is being investigated. |

**PH8253 - PHYSICS FOR ELECTRONICS ENGINEERING**
**Enlistment of Course Outcomes:**

| COs | STATEMENT |
|---|---|
| C111.1 | Gain knowledge on classical and quantum electron theories. |
| C111.2 | Understand the concentration of charge carriers in intrinsic and extrinsic semiconductors and importance of Hall effect. |
| C111.3 | Acquire knowledge about the types of magnetic materials and its applications. Furthermore types of polarization, frequency and temperature variation of polarization and dielectric loss are taught to students. |
| C111.4 | Understand the basics of optoelectronic devices, its properties and applications. |
| C111.5 | Gain knowledge about the fundamentals of nanotechnology and its impact on Nano electronics. |

**BE8254 BASIC ELECTRICAL AND INSTRUMENTATION**

**COURSE OUTCOMES:**

After the course, the student should be able to:

| CO | Course Outcomes |
|---|---|
| C112.1 | To Understand the concept of three phase power circuits |
| C112.2 | Able to understand the working of Transformer and analyze the operation of transformer in different loading condition |
| C112.3 | Able to understand the construction and working of DC Generators and DC motors |
| C1124 | Able to understand the construction and working of induction motors and synchronous motors |
| C112.5 | Able to understand the relevance of digital instruments in measurements and understanding the working principles of different types of transducers |

**EC8251- CIRCUIT ANALYSIS**

**COURSE OUTCOMES**

| C113.1 | Develop the capacity to analyze electrical circuits, apply the circuit theorems in real time |
|---|---|
| C113.2 | To impart knowledge on solving circuits using network theorems |
| C113.3 | To introduce the phenomenon of resonance in coupled circuits |
| C113.4 | To educate on obtaining the transient response of circuits |
| C113.5 | Design and understand and evaluate the AC and DC circuits |

**EC8252: ELECTRONIC DEVICES**

**Course Outcomes**

On successful completion of this course, the student will be able to

| C114.1 | Explain the V-I characteristic of diode, UJT and SCR. |
|---|---|
| C114.2 | Describe the equivalence circuits of transistors. |
| C114.3 | Operate the basic electronic devices such as PN junction diode, Bipolar and Field effect Transistors, Power control devices, LED, LCD and other Opto-electronic devices. |
| C114.4 | To study and analyse the special semiconductor devices like MESFET,FINFET, PINFET, CNTFET, Zener diode, Schottky barrier diode , Varactor diode, Tunnel Diode, GAas Devices, LASER and LDR Diode. |

## EC8261 CIRCUITS AND DEVICES LABORATORY

**COURSE OUTCOMES:**

On completion of this lab course, the students will be able to

| | |
|---|---|
| C115.1 | Learn the characteristics of basic electronic devices like BJT, FET and SCR. |
| C115.2 | Verify KVL & KCL |
| C115.3 | Design RL and RC circuits |
| C115.4 | To verify the Performance of clipper, clamper and rectifier circuits |
| C115.5 | Verify basic theorems |

## GE8261 ENGINEERING PRACTICES LABORATORY

**COURSE OUTCOMES:**

| Course Outcomes | STATEMENT |
|---|---|
| C116.1 | fabricate carpentry components and pipe connections including plumbing works, use welding equipments to join the structures and carry out the basic machining operations |
| C116.2 | Make the models using sheet metal works |
| C116.3 | Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings |
| C116.4 | Carry out basic home electrical works and appliances and measure the electrical quantities |
| C116.5 | Elaborate on the components, gates, soldering practices |

## MA8352 LINEAR ALGEBRA & PARTIAL DIFFERENTIAL EQUATIONS

**COURSE OUTCOMES:**

| COs | STATEMENT |
|---|---|
| C201.1 | Able to get basic knowledge and idea about any entity involving both magnitude, direction and to solve linear algebra problems involving subspaces, linear dependence, span, basis or dimension. |
| C201.2 | Able to write proofs of basic linear algebra results and use the variety of methods to solve differential equations. |
| C201.3 | To describe the linear structure existence and uniqueness of solutions to differential equations and in modern treatments of geometry an analysis. |
| C201.4 | To understand the procedure to solve partial differential equations. |
| C201.5 | Able to solve boundary value problems using Fourier series. |

## EC8393- FUNDAMENTALS OF DATA STRUCTURES IN C

**Course Outcomes**

On successful completion of this course, the student will be able to

| | |
|---|---|
| C202.1 | Understand the fundamentals of C programming which includes data types, expression, I/O operations, branching, looping, array and string concepts |
| C202.2 | Understand the basic fundamentals of functions, pointer, structures and union in C, storage classes and preprocessor directives. |
| C202.3 | Obtain the basic Learning of linear data structures, and its applications. |
| C202.4 | Understand the ability of using tree concepts and graphs in various applications. |
| C202.5 | Understand the various types sorting and searching techniques. |

## EC8351 ELECTRONIC CRIRCUITS I

### COURSE OUTCOMES

| | |
|---|---|
| C203.1 | Acquire knowledge of working principles, characteristics, applications of BJT and FET |
| C203.2 | Analyze the performance of small signal BJT and FET amplifiers-Single stage and Multi stage amplifiers |
| C203.3 | Acquire knowledge of Frequency response characteristics of BJT and FET amplifiers |
| C203.4 | Apply the knowledge gained in the design of electronic circuits |

## EC8352 SIGNALS AND SYSTEMS

### COURSE OUTCOMES

| | |
|---|---|
| C204.1 | To understand the basic properties of signal & systems and the various methods of classification |
| C204.2 | To learn Laplace Transform &Fourier transform and their properties |
| C204.3 | To characterize LTI systems in the Time domain and various Transform domains |
| C204.4 | To know Z transform & DTFT and their properties |
| C204.5 | To characterize LTI systems in the Time domain and various Transform domains |

## EC8392: DIGITAL ELECTRONICS
### COURSE OUTCOMES
At the end of this course, the student will be able to

| | |
|---|---|
| **C205.1** | Analyze different methods to simplify Boolean Expressions to minimize the hardware complexity. |
| **C205.2** | Design and implement Combinational circuits using discrete gates and ICs. |
| **C205.3** | Design and analyze synchronous sequential circuits |
| **C205.4** | Design and analyze asynchronous sequential circuits |
| **C205.5** | Design and implement Combinational circuits using PLDs and understand semiconductor memory classification and operation |

## EC8391 – CONTROL SYSTEM ENGINEERING

### COURSE OUTCOMES

| | |
|---|---|
| **C206.1** | Able to identify the various control system components and their representations. |
| **C206.2** | Analyze the various time domain parameters |
| **C206.3** | Analyze the various frequency response plots and its system. |
| **C206.4** | Apply the concepts of various system stability criterions |
| **C206.5** | Design various transfer functions of digital control system using state variable models. |

## EC8381 - FUNDAMENTALS OF DATA STRUCTURES IN C LABORATORY

### COURSE OUTCOMES:

On completion of this lab course, the students will be able to

| | |
|---|---|
| **C207.1** | Able to understand and implement basic C programs, functions and recursive functions by means of data structures |
| **C207.2** | Able to apply linear and non-linear data structures in problem solving using C language. |
| **C207.3** | Able to implement searching, sorting and Hashing Techniques. |

## EC8361 – ANALOG AND DIGITAL CIRCUITS LABORATORY

### COURSE OUTCOMES (COS):

| EC8361 | Description |
|---|---|
| C208.1 | Design and Test BJT/JFET amplifiers,cascade and cascode amplifiers |
| C208.2 | Measure CMRR in differential Amplifiers |
| C208.3 | Design and Test rectifiers,filters and regulated power supplies |
| C208.4 | Simulate and analyze amplifiers circuits using Pspice |
| C208.5 | Design and Test the digital logic Circuits |

## HS8381   INTERPERSONAL SKILLS/LISTENING & SPEAKING

### COURSE  OUTCOMES:

On completion of this lab course, the students will be able to

| HS8381 | Description |
|---|---|
| C209.1 | Listen and respond appropriately. |
| C209.2 | Participate in group discussions. |
| C209.3 | Make effective presentations. |
| C209.4 | Participate confidently and appropriately in conversations both formal and informal. |

## MA8451 - PROBABILITY & RANDOM PROCESSES

### COURSE OUTCOMES

| Course Outcomes | STATEMENT |
|---|---|
| C210.1 | Able to get the exposure to random variable and well founded the knowledge of standard distributions which can be described real life phenomena. |
| C210.2 | Able to handle situations involving more than one random variable and functions. |
| C210.3 | Able to acquire skills and knowledge of applications of random phenomena with respect to time in probabilistic manner. |
| C210.4 | Able to find the relation between two or more random variables, the nature of relationship and degree of relationship. |

## EC8452   Electronic Circuits II
### COURSE OUTCOMES

On completion of this course, the students will be

| | |
|---|---|
| C211.1 | Analyze and understand the design of all types of negative feedback amplifiers and also analyze the stability of feedback amplifiers |
| C211.2 | Analyze sinusoidal oscillators (positive feedback)   and also investigate frequency stability of different oscillators |
| C211.3 | Understand and know the performance of tuned amplifiers with analysis of coil losses and also study the stability analysis of tuned amplifiers using different neutralization techniques |
| C211.4 | Understand the design and working of multi - vibrators (Non-sinusoidal oscillators) circuits with different types of triggering methods |
| C211.5 | Analyze the performance of power amplifiers and also investigate the performance of DC convertors. |

**EC8491: COMMUNICATION THEORY**

**COURSE OUTCOMES**

At the end of this course, the student will be able to:

| **C212.1** | Analyze methods of generation and detection of AM and design of AM Receiver |
|---|---|
| **C212.2** | Analyze methods of generation and detection of FM and design of FM Receiver |
| **C212.3** | Apply the concepts of random process in the design of Communication systems |
| **C212.4** | Analyze the noise performance of AM and FM systems. |
| **C212.5** | Apply information coding techniques in digital communication |

**EC8451 ELECTROMAGNETIC FIELDS**

**COURSE OUTCOMES**

On completion of this course, the student will be able to

| C213.1 | Understand the basics of vector algebra and its significance in coordinate systems |
|---|---|
| C213.2 | Analyze electric field, potentials and behaviour of conductors, dielectrics in static electric fields |
| C213.3 | Analyze magnetic field, potentials and effect of magnetic forces on materials due to static magnetic fields |
| C213.4 | Analyze the relation between the electric fields and magnetic fields under time varying situations using Maxwell's Equations |
| C213.5 | To understand the wave propagation in conductors and dielectrics |

**EC8453 LINEAR INTEGRATED CIRCUITS**

**COURSE OUTCOMES**

Upon Completion of the course, the students will be:

| C214.1 | Able to earn the basic building blocks of linear integrated circuits such as op-amps. |
|---|---|
| C214.2 | Design linear and non linear applications of OP – AMPS |
| C214.3 | Design applications using analog multiplier and PLL |
| C214.4 | Design ADC and DAC using OP – AMPS |
| C214.5 | Generate waveforms using OP – AMP Circuits & Analyze special function ICs |

**GE8291- ENVIRONMENTAL SCIENCE AND ENGINEERING**

**COURSE OUTCOMES**

Upon Completion of the course, the students will be:

| C215.1 | Able to know the nature and facts about environment |
|---|---|
| C215.2 | Able to appreciate the importance of environment by assessing its impact on the human world |
| C215.3 | Able to find the interrelationship between living organism and environment |
| C215.4 | Able to analyze the importance of social issues |
| C215.5 | Able to analyze the impact of human population |

**EC8461 CIRCUITS DESIGN AND SIMULATION LABORATORY**

**COURSE OUTCOMES**

On completion of this lab course, the students will be able to

| C216.1 | Analyze various types of feedback amplifiers |
|---|---|
| C216.2 | Design oscillators |
| C216.3 | Design tuned amplifier |
| C216.4 | Design wave-shaping circuits and multivibrators |
| C216.5 | Design and simulate feedback amplifiers, oscillators, tuned amplifiers, wave-shaping circuits and multivibrators using SPICE Tool. |

## EC8462 - LINEAR INTEGRATED CIRCUITS LAB

### COURSE OUTCOMES:

On completion of this lab course, the students will be able to

| | |
|---|---|
| C217.1 | Design amplifiers, oscillators, D-A converters using operational amplifiers. |
| C217.2 | Design filters using op-amp and performs an experiment on frequency response. |
| C217.3 | Analyze the working of PLL and describe its application as a frequency multiplier. |
| C217.4 | Design DC power supply using ICs. |
| C217.5 | Analyze the performance of filters, multivibrators, A/D converter and analog multiplier using SPICE. |

### EC8501 DIGITAL COMMUNICATION
### COURSE OUTCOMES:

On successful completion of this course, the student will be able to

| | |
|---|---|
| C301.1 | Design PCM systems |
| C301.2 | Design and implement base band transmission schemes |
| C301.3 | Design and implement band pass signaling schemes |
| C301.4 | Analyze the spectral characteristics of band pass signaling schemes and their noise performance |
| C301.5 | Design error control coding schemes |

### EC8553 Discrete Time Signal Processing

### COURSE OUTCOMES

Upon Completion of the course, the students will be:

| | |
|---|---|
| **C302.1** | To learn discrete Fourier transform, properties of DFT and its application to linear filtering |
| **C302.2** | To understand the characteristics of digital filters, design digital IIR filters and apply these filters to filter undesirable signals in various frequency bands |
| **C302.3** | To understand the characteristics of digital filters, design digital FIR filters and apply these filters to filter undesirable signals in various frequency bands |
| **C302.4** | To understand the effects of finite precision representation on digital filters |
| **C302.5** | To understand the Architecture and programming of DSP |

### EC8552 - COMPUTER ARCHITECTURE AND ORGANIZATION

### COURSE OUTCOMES

| | |
|---|---|
| C303.1 | Analyses the new trends and developments in computer architecture,computer performance measurements and the fundamentals of different instruction set architectures and their relationship to the CPU design. |
| C303.2 | Design and evaluate the implementation of computer arithmetic. |
| C303.3 | Design and analyses the basic and intermediate MIPS piplelines, data paths and ways of dealing with pipeline hazards |
| C303.4 | Understand the working principle of ILP techniques & parallelism in terms of a single processor and multiple processors and multithreading by using ILP. |
| C303.5 | Evaluate the performance of memory hierarchy design, identify the need of cache and virtual memory techniques and principles of I/O in computer systems. |

### EC8551 COMMUNICATION NETWORKS
### COURSE OUTCOMES

| | |
|---|---|
| **C304.1** | Identify the components required to build different types of networks |
| **C304.2** | Choose the required functionality at each layer for given application |
| **C304.3** | Identify solution for each functionality at each layer |
| **C304.4** | Trace the flow of information from one node to another node in the network |

## CS8392- OBJECT ORIENTED PROGRAMMING

### Course Outcomes

On successful completion of this course, the student will be able to

| | |
|---|---|
| C305.1 | To understand Object Oriented Programming concepts and basic characteristics of Java |
| C305.2 | To know the principles of packages, inheritance and interfaces |
| C305.3 | To define exceptions and use I/O streams |
| C305.4 | To develop a java application with threads and generics classes |
| C305.5 | To design and build simple Graphical User Interfaces |

## OMD 551 BASIC OF BIOMEDICAL INSTRUMENTATION

### COURSE OUTCOMES

On completion of this course, the students will be able to

| | |
|---|---|
| C306.1 | To study about the different bio potential and its propagation |
| C306.2 | To understand the different types of electrodes and its placement for various recording |
| C306.3 | To study the design of bio amplifier for various physiological recording. |
| C306.4 | To learn the different measurement techniques for non-physiological parameters. |
| C306.5 | To familiarize the different biochemical measurements. |

## EC8562 DIGITAL SIGNAL PROCESSING LABORATOR

### COURSE OUTCOMES:

On completion of this lab course, the students will be able to

| | |
|---|---|
| C307.1 | To perform basic signal processing operations such as Linear Convolution, Circular Convolution, Auto Correlation, Cross Correlation and Frequency analysis in MATLAB |
| C307.2 | To implement FIR and IIR filters in MATLAB |
| C307.3 | To study the architecture of DSP processor |
| C307.4 | To generate and analyse various signals and random noise using DSP processor |
| C307.5 | Understand and implement the signal processing concepts like FIR and IIR filter using DSP processor |

## EC8561 COMMUNICATION SYSTEMS LABORATORY

### COURSE OUT COMES

On completion of this lab course, the students will be able to

| | |
|---|---|
| **C308.1** | Simulate & validate the various functional modules of a communication system |
| **C308.2** | Demonstrate their knowledge in base band signaling schemes through implementation of digital modulation schemes |
| **C308.3** | Apply various channel coding schemes & demonstrate their capabilities towards the improvement of the noise performance of communication system |
| **C308.4** | Simulate end-to-end communication Link |

## EC8563 COMMUNICATION NETWORKS LAB

## COURSE OUTCOMES

| | |
|---|---|
| C309.1 | To communicate between two desktop computers |
| C309.2 | To implement the different protocols |
| C309.3 | To program using sockets. |
| C309.4 | To implement and compare the various routing algorithms |
| C309.5 | To use the simulation tool. |

## EC8691  MICROPROCESSORS AND MICROCONTROLLERS

## COURSE OUTCOMES

| | |
|---|---|
| **C310.1** | To explain about microprocessor architecture and write 8086 assembly language programs |
| **C310.2** | To learn about various configurations of 8086 microprocessor and system Bus structure |
| **C310.3** | To Illustrate the design aspects of I/O and memory interfacing circuits |
| **C310.4** | To learn  microcontroller architecture and write 8051 assembly language programs |
| **C310.5** | Develop simple applications using 8051 microcontroller based system |

## EC8095 - VLSI Design

## COURSE OUTCOMES

On completion of this course, the students will be

| | |
|---|---|
| C311.1 | Able to realize the concepts of digital building blocks using MOS transistor. |
| C311.2 | Able to design combinational MOS circuits and power strategies. |
| C311.3 | Able to design and construct Sequential Circuits and Timing systems. |
| C311.4 | Able to design arithmetic building blocks and memory subsystems. |
| C311.5 | Able to apply and implement FPGA design flow and testing. |

## EC8652: WIRELESS COMMUNICATION

| | |
|---|---|
| C312.1 | Able to characterize wireless channels |
| C312.2 | Able to understand various cellular architectures and design cellular systems |
| C312.3 | Able to design and implement various signalling schemes for fading channels |
| C312.4 | Able  to compare multipath mitigation techniques and analyse their performance |
| C312.5 | Able to design and implement systems with transmit/receive diversity and MIMO systems and analyse their performance |

## MG8591 – PRINCIPLES OF MANAGEMENT
## COURSE OUTCOMES

On completion of this course, the student will be able;

| | |
|---|---|
| **C313.1** | To understand about management , Roles of managers, environmental Factors for an organization , Strategies for international business |
| **C313.2** | To get an idea about the planning, MBO, Decision Making and Policies making. |
| **C313.3** | Gain the knowledge about organization structure, Formal and Informal groups, Line and staff authority, Span of control, Centralization and decentralization, Staffing, Recruitment, Career Development, Training and personal Appraisal |
| **C313.4** | To understand about the Creativity and Innovation, Motivation and satisfaction, Leadership theories, communication, Elements and types of Culture. |
| **C313.5** | Gain knowledge about the controlling process, types of control (Budgetary  and non-budgetary control, Cost control, purchase control, Maintenance control, quality control) |

## EC8651: TRANSMISSION LINES AND RF SYSTEMS

### Course Outcomes

On successful completion of this course, the student will be able to

| | |
|---|---|
| C314.1 | To understand the characteristics of transmission lines |
| C314.2 | To give thorough understanding about high frequency line, power and impedance measurements |
| C314.3 | To impart technical knowledge in impedance matching using smith chart |
| C314.4 | To introduce the various types of Waveguides and its characteristics |
| C314.5 | To get acquaintance with RF system transceiver design |

## EC8002: MULTIMEDIA COMPRESSION AND COMMUNICATION

### Course Outcomes

| | |
|---|---|
| C315.1 | Design audio compression techniques |
| C315.2 | Configure Text, image and video compression techniques |
| C315.3 | Select suitable service model for specific application |
| C315.4 | Configure multimedia communication network |

## EC8681  Microprocessors and Microcontrollers Lab

### COURSE OUTCOMES

| | |
|---|---|
| **C316.1** | To Write ALP for fixed and Floating Point and Arithmetic operations in 8086 microprocessor. |
| **C316.2** | To Interface different I/Os with processor |
| **C316.3** | To Generate waveforms using Microprocessors |
| **C316.4** | To Execute Programs in 8051 |
| **C316.5** | To Explain the difference between simulator and Emulator |

## EC8661 VLSI DESIGN LABORATORY

### COURSE  OUTCOMES:

On completion of this lab course, the students will be able to

| | |
|---|---|
| C317.1 | Able to write HDL code for basic digital integrated circuits. |
| C317.2 | Able to Write HDL code for advanced digital integrated circuits. |
| C317.3 | Able to Import the logic modules into FPGA Boards. |
| C317.4 | Able to Synthesize, Place and Route the digital IPs. |
| C317.5 | Able to Design, Simulate and Extract the layouts of Analog IC Blocks using EDA tools. |

## EC8611  Technical Seminar

### COURSE OUTCOMES

| | |
|---|---|
| **C318.1** | Selecting a subject, narrowing the subject into a topic and stating an objective. |
| **C318.2** | Collecting the relevant bibliography and preparing a working outline. |
| **C318.3** | Studying the papers and understanding the authors contributions and critically analyzing each paper. |
| **C318.4** | Linking the papers and preparing a draft of the paper; Preparing conclusions based on the reading of all the papers. |
| **C318.5** | Writing the Final Paper and giving final Presentation. |

## HS8581 PROFESSIONAL COMMUNICATION

### COURSE OUTCOMES:

On completion of this course, the students will be able to

| | |
|---|---|
| **C319.1** | Enhance the Employability and Career Skills of students |
| **C319.2** | Orient the students towards grooming as a professional. |
| **C319.3** | Attend job interviews and be successful in them and Make them into Employable Graduates. |
| **C319.4** | Develop their confidence and help them attend interviews successfully. |
| **C319.5** | Develop adequate Soft Skills required for the workplace. |

## EC8701- ANTENNAS AND MICROWAVE ENGINEERING

### COURSE OUTCOMES

Upon Completion of the course, the students will be able to

| | |
|---|---|
| C401.1 | Understand the basic principles in antenna and microwave system design. |
| C401.2 | Acquire the basic knowledge of various antenna designs such as Wire and loop antennas, Aperture antennas, Reflector antennas, Microstrip antennas and Frequency independent antennas |
| C401.3 | Understand and analyze the radiation characteristics of antenna arrays. |
| C401.4 | Understand and analyze the microwave components such as Power dividers and hybrid junctions and the operational concepts of microwave vacuum tubes-based oscillators and amplifiers. |
| C401.5 | Design a microwave system comprising of filter, LNA, power amplifier, oscillator and mixer for the given application specifications. |

## EC8751- OPTICAL COMMUNICATION

### COURSE OUTCOMES

Upon Completion of the course, the students will be able to

| | |
|---|---|
| C402.1 | Realize basic elements in optical fibers, different modes and configurations |
| C402.2 | Analyze the transmission characteristics associated with dispersion and polarization techniques |
| C402.3 | Design optical sources and detectors with their use in optical communication system |
| C402.4 | Construct fiber optic receiver systems, measurements and coupling techniques |
| C402.5 | Design optical communication systems and its networks. |

## EC8791 EMBEDDED AND REAL TIME SYSTEMS

### COURSE OUTCOMES:

On completion of this course, the students will be able to

| | |
|---|---|
| **C403.1** | Understand the concepts of embedded system design and analysis |
| **C403.2** | Learn the architecture and programming of ARM processor |
| **C403.3** | Be exposed to the basic concepts of embedded programming |
| **C403.4** | Learn the real time operating systems |
| **C403.5** | Differentiate between the general purpose operating system and the real time Operating system. Model real-time applications using embedded-system concepts. |

## EC8702  ADHOC  AND WIRELESS SENSOR NETWORKS
### COURSE OUTCOMES
Upon Completion of the course, the students will be able:

| | |
|---|---|
| **C404.1** | Know the basics of Ad hoc networks and Wireless Sensor Networks |
| **C404.2** | Apply this knowledge to identify the suitable routing algorithm based on the network and user requirement |
| **C404.3** | Apply the knowledge to identify appropriate physical and MAC layer protocols |
| **C404.4** | Understand the transport layer and security issues possible in Ad hoc and sensor networks. |
| **C404.5** | Be familiar with the OS used in Wireless Sensor Networks and build basic modules |

## EC8705 COURCOGNIITVE RADIO

## COURSE  OUTCOMES

| C405.1 | To understand the evolving software defined radio and cognitive radio techniques and their essential functionalities |
| --- | --- |
| C405.2 | To study the basic architecture and standard for cognitive radio |
| C405.3 | To design and implement algorithms for cognitive radio spectrum sensing and dynamic spectrum access |
| C405.4 | To understand the physical, MAC and Network layer design of cognitive radio |
| C405.5 | To expose the student to evolving applications and advanced features of cognitive radio |

## OTL751: TELECOMMUNICATION SYSTEM MODELING AND SIMULATION

## COURSE OUTCOMES

At the end of this course, the student will be able to:

| **C406.1** | Apply the constituents of a telecommunication systems. |
| --- | --- |
| **C406.2** | Analyze various modeling methodologies and simulation techniques. |
| **C406.3** | Estimate the performance measures of telecommunication systems. |
| **C406.4** | Apply system modeling in telecommunication. |
| **C406.5** | Demonstrate light wave communication and satellite communication systems. |

## EC8711 EMBEDDED LABORATORY

## COURSE  OUTCOMES:

On completion of this lab course, the students will be able to

| C407.1 | Able to write programs in ARM for a specific application |
| --- | --- |
| C407.2 | Able to interface memory, A/D and D/A convertors with ARM system |
| C407.3 | Able to analyze the performance of interrupt |
| C407.4 | Able to write program for interfacing keyboard, display, motor and sensor. |
| C407.5 | Able to formulate a mini project using embedded system |

## EC8761 ADVANCED COMMUNICATION LAB

## COURSE OUTCOMES

On completion of this lab course, the students will be able to

| C408. 1 | Understand the working principle of optical sources, detector, fibers and microwave components. |
| --- | --- |
| C408.2 | Develop understanding of simple optical communication link. |
| C408.3 | Understand the measurement of BER and Pulse broadening in optical fiber. |
| C408.4 | Understand and capture an experimental approach to digital wireless communication. |
| C408.5 | Understand actual communication waveforms that will be sent and received across wireless channel. |

## EC8072 – ELECTROMAGNETIC INTERFERENCE AND COMPATIBILITY
## COURSE OUTCOMES

Upon Completion of the course, the students will be able:

| | |
|---|---|
| C409.1 | To understand the basic concepts of interference and compatibility and its sources. |
| C409.2 | To study the different methods by which interference can occur. |
| C409.3 | To design and study the different methods used to prevent interference. |
| C409.4 | To learn the importance of Electromagnetic Compatible designs |
| C409.5 | To study the different test methods and instruments used to measure electromagnetic interference. |

## EC8094 SATELLITE COMMUNICATION

## COURSE OUTCOMES

At the end of this course, the student will be able to

| | |
|---|---|
| C410.1 | Understand the basics of satellite orbits. |
| C410.2 | Understand the satellite segment and earth segment |
| C410.3 | Analyze the various methods of satellite access. |
| C410.4 | Understand the applications of satellite |
| C410.5 | Under the basics of satellite networks. |

## EC8811 PROJECT WORK

## COURSE OUTCOMES

| | |
|---|---|
| C411.1 | To develop the ability to solve a specific problem right from its identification |
| C411.2 | Review on literatures and learn more about the problem and its solutions. |
| C411.3 | To develop the analytical skills, requirement analysis, design skills. |
| C411.4 | Learn the various system modules for implementing the project useful for the society; and testing with the experimental data. |
| C411.5 | To train the students in preparing project reports and to face reviews and viva voce examination. |