

**SE**  
**(Electronics & Telecommunications Engineering)**  
**SEM-I**

## **Signals and Systems**

### **Course Objectives:**

- To understand the mathematical description of continuous and discrete time signals and systems.
- To classify signals into different categories.
- To analyse Linear Time Invariant (LTI) systems in time and transform domains.
- To build basics for understanding of courses such as signal processing, control system and communication.
- To develop basis of probability and random variables.

### **Course Outcomes:**

#### **On completion of the course, student will be able to**

1. Understand mathematical description and representation of continuous and discrete time signals and systems.
2. Develop input output relationship for linear shift invariant system and understand the convolution operator for continuous and discrete time system.
3. Understand and resolve the signals in frequency domain using Fourier series and Fourier transforms.
4. Understand the limitations of Fourier transform and need for Laplace transform and develop the ability to analyze the system in s- domain.
5. Understand the basic concept of probability, random variables & random signals and develop the ability to find correlation, CDF, PDF and probability of a given event.

## **Electronic Devices and Circuits**

### **Course Objectives:**

- To introduce semiconductor devices FET and MOSFET, their characteristics, operations, circuits and applications.
- To introduce concepts of both positive and negative feedback in electronic circuits.
- To analyse and interpret FET and MOSFET circuits for small signal at low and high frequencies.
- To simulate electronics circuits using computer simulation software and verify desired results.
- To study the different types of voltage regulators.

### **Course Outcomes:**

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

1. Comply and verify parameters after exciting devices by any stated method.
2. Implement circuit and test the performance.
3. Analyze small signal model of FET and MOSFET.

4. Explain behavior of FET at low frequency.
5. Design an adjustable voltage regulator circuits.

## **Electrical Circuits and Machines**

### **Course Objectives:**

- To analyse AC and DC networks with network simplification techniques.
- To gain basic knowledge of transformers and their types.
- To conduct experimental procedures on different types of electrical machines.
- To understand the constructional details, characteristics, features and application areas of various types of electric motors.

### **Course Outcomes:**

On completion of the course, student will be able to

1. Analyze basic AC & DC circuit for voltage, current and power by using KVL, KCL, and network theorems.
2. Explain the working principle of different electrical machines.
3. Select proper electrical motor for given application.
4. Design and analyze transformers.

## **Data Structures and Algorithms**

### **Course Objectives:**

- To assess how the choice of data structures and algorithm design methods impacts the performance of programs.
- To choose the appropriate data structure and algorithm design method for a specified application.
- To study the systematic way of solving problems, various methods of organizing large amounts of data.
- To solve problems using data structures such as linear lists, stacks, queues, binary trees, binary search trees, and graphs and writing programs for these solutions.

To employ the different data structures to find the solutions for specific problems

### **Course Outcomes:**

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

1. Discuss the computational efficiency of the principal algorithms such as sorting & searching.
2. Write and understand the programs that use arrays & pointers in C
3. Describe how arrays, records, linked structures are represented in memory and use them in algorithms.
4. Implement stacks & queues for various applications.
5. Understand various terminologies and traversals of trees and use them for various applications.
6. Understand various terminologies and traversals of graphs and use them for various applications.

## **Digital Electronics**

### **Course Objectives:**

- To acquaint the students with the fundamental principles of two-valued logic and various devices used to implement logical operations on variables.
- To lay the foundation for further studies in areas such as communication, VLSI, computer, microprocessor.

### **Course Outcomes:**

On completion of the course, student will be able to

1. Use the basic logic gates and various reduction techniques of digital logic circuit in detail.
2. Design combinational and sequential circuits.
3. Design and implement hardware circuit to test performance and application.
4. Understand the architecture and use of microcontrollers for basic operations and Simulate using simulation software

## **Electronic Measuring Instruments and Tools**

### **Course Objective:**

- To make student competent for handling measuring instruments and to able to select right instrument for the purpose of measurement under different conditions.

### **Course Outcomes:**

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

1. Understand fundamental of various electrical measurements.
2. Understand and describe specifications, features and capabilities of electronic instruments.
3. Finalize the specifications of instrument and select an appropriate instrument for given measurement.
4. Carry out required measurement using various instruments under different setups.
5. Able to compare measuring instruments for performance parameters
6. Select appropriate instrument for the measurement of electrical parameter professionally.

## SEM-II

### Engineering Mathematics -III

#### Course Objectives:

After completion of the course, students will have adequate background, conceptual clarity and knowledge of appropriate solution techniques related to:

- Linear differential equations of higher order using analytical methods and numerical methods applicable to Control systems and Network analysis.
- Transforms such as Fourier transform, Z-transform and applications to Communication systems and Signal processing.
- Vector differentiation and integration required in Electro-Magnetics and Wave theory.
- Complex functions, conformal mappings, contour integration applicable to Electrostatics, Digital filters, Signal and Image processing.

#### Course Outcomes:

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

1. Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits.
2. Solve problems related to Fourier transform, Z-transform and applications to Communication systems and Signal processing.
3. Obtain Interpolating polynomials, numerically differentiate and integrate functions, numerical solutions of differential equations using single step and multi-step iterative methods used in modern scientific computing.
4. Perform vector differentiation and integration, analyze the vector fields and apply to Electro-Magnetic fields.
5. Analyze conformal mappings, transformations and perform contour integration of complex functions in the study of electrostatics and signal processing.

### Integrated Circuits

#### Course Objectives:

- To understand characteristics of IC and Op-Amp and identify the internal structure.
- To introduce various manufacturing techniques.
- To study various op-amp parameters and their significance for Op-Amp.
- To learn frequency response, transient response and frequency compensation techniques for Op-Amp.
- To analyse and identify linear and nonlinear applications of Op-Amp.
- To understand functionalities of PLL and its use in various applications in communication and control systems.

### **Course Outcomes:**

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

1. Understand the characteristics of IC and Op-Amp and identify the internal structure.
2. Understand and identify various manufacturing techniques.
3. Derive and determine various performances based parameters and their significance for Op-Amp.
4. Comply and verify parameters after exciting IC by any stated method.
5. Analyze and identify the closed loop stability considerations and I/O limitations.
6. Analyze and identify linear and nonlinear applications of Op-Amp.
7. Understand and verify results (levels of V & I) with hardware implementation.
8. Implement hardwired circuit to test performance and application for what it is being designed.
9. Understand and apply the functionalities of PLL to Frequency synthesizer, multiplier, FM, and AM demodulators

### **Control Systems**

#### **Course Objectives:**

- To introduce the elements of control system and their modelling using various Techniques.
- To introduce methods for analyzing the time response, the frequency response and the stability of systems.
- To introduce the concept of root locus, Bode plots, Nyquist plots.
- To introduce the state variable analysis method.
- To introduce concepts of PID controllers and digital and control systems.
- To introduce concepts programmable logic controller.

#### **Course Outcomes:**

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

1. Determine and use models of physical systems in forms suitable for use in the analysis and design of control systems.
2. Determine the (absolute) stability of a closed-loop control system.
3. Perform time domain and frequency domain analysis of control systems required for stability analysis.
4. Perform time domain and frequency domain correlation analysis.
5. Apply root-locus, Frequency Plots technique to analyze control systems.
6. Express and solve system equations in state variable form.

### **Analog Communications**

#### **Course Objectives:**

The students are expected to demonstrate the ability to:

- Describe and analyze the mathematical techniques of generation, transmission and reception of amplitude modulation (AM), frequency modulation (FM) and phase modulation (PM) signals.
- Evaluate the performance levels (Signal-to-Noise Ratio) of AM, FM and PM systems in the presence of additive white noise.
- Convert analog signals to digital format and describe Pulse and digital Modulation techniques.

**Course Outcomes:**

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

1. Understand and identify the fundamental concepts and various components of analog communication systems.
2. Explain signal to noise ratio, noise figure and noise temperature for single and cascaded stages in a communication system.
3. Describe analog pulse modulation techniques and digital modulation technique.
4. Develop the ability to compare and contrast the strengths and weaknesses of various communication systems.

**Object Oriented Programming****Course Objectives:**

- Make the students familiar with basic concepts and techniques of object oriented programming in C++ & Java.
- Develop an ability to write programs in C++ and Java for problem solving.

**Course Outcomes:**

Upon successful completion of this course, students should be able to:

1. Describe the principles of object oriented programming.
2. Apply the concepts of data encapsulation, inheritance in C++.
3. Understand basic program constructs in Java
4. Apply the concepts of classes, methods and inheritance to write programs Java.
5. Use arrays, vectors and strings concepts and interfaces to write programs in Java.
6. Describe and use the concepts in Java to develop user friendly program,

**EMPLOYABILITY SKILL DEVELOPMENT****Course Objectives:**

1. To develop analytical abilities
2. To develop communication skills
3. To introduce the students to skills necessary for getting, keeping and being successful in a profession.
4. To expose the students to leadership and team-building skills.

**Course Outcomes:** On completion of the course, student will be able to:

1. Have skills and preparedness for aptitude tests.
2. Be equipped with essential communication skills (writing, verbal and non-verbal)
3. Master the presentation skill and be ready for facing interviews.
4. Build team and lead it for problem solving.