Subject: Signals and Systems

Course Outcomes:
- On completion of the course, student will be able to
- Understand mathematical description and representation of continuous and discrete time signals and systems.
- Develop input output relationship for linear shift invariant system and understand the convolution operator for continuous and discrete time system.
- Understand and resolve the signals in frequency domain using Fourier series and Fourier
transforms.
- Understand the limitations of Fourier transform and need for Laplace transform and develop
- the ability to analyze the system in s-domain.
- 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.

**Subject: Electronic Devices and Circuits**

**Course Outcomes:**
- On completion of the course, student will be able to:
  - Comply and verify parameters after exciting devices by any stated method.
  - Implement circuit and test the performance.
  - Analyze small signal model of FET and MOSFET.
  - Explain behavior of FET at low frequency.
  - Design an adjustable voltage regulator circuits.

**Subject: Electrical Circuits and Machines**

**Course Outcomes:**
On completion of the course, student will be able to
- Analyze basic AC & DC circuit for voltage, current and power by using KVL, KCL, and network theorems.
- Explain the working principle of different electrical machines.
- Select proper electrical motor for given application.
- Design and analyze transformers.

**Subject: Data Structures and Algorithms**

**Course Outcomes:**
On completion of the course, student will be able to :
- Discuss the computational efficiency of the principal algorithms such as sorting & searching.
- Write and understand the programs that use arrays & pointers in C
- Describe how arrays, records, linked structures are represented in memory and use them in algorithms.
- Implement stacks & queues for various applications.
- Understand various terminologies and traversals of trees and use them for various applications.
- Understand various terminologies and traversals of graphs and use them for various applications.
Subject: Digital Electronics

Course Outcomes:

- On completion of the course, student will be able to
- Use the basic logic gates and various reduction techniques of digital logic circuit in detail.
- Design combinational and sequential circuits.
- Design and implement hardware circuit to test performance and application.
- Understand the architecture and use of microcontrollers for basic operations and Simulate using simulation software.

Subject: Electronic Measuring Instruments and Tools

Course Outcomes:

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

- Understand fundamental of various electrical measurements.
- Understand and describe specifications, features and capabilities of electronic instruments.
- Finalize the specifications of instrument and select an appropriate instrument for given measurement.
- Carry out required measurement using various instruments under different setups.
- Able to compare measuring instruments for performance parameters
- Select appropriate instrument for the measurement of electrical parameter professionally.
Subject: Engineering Mathematics -III

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

- Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits.
- Solve problems related to Fourier transform, Z-transform and applications to Communication systems and Signal processing.
- 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.
- Perform vector differentiation and integration, analyze the vector fields and apply to ElectroMagnetic fields.
- Analyze conformal mappings, transformations and perform contour integration of complex functions in the study of electrostatics and signal processing.
Subject: Integrated Circuits

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

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

Subject: Control Systems

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

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

Subject: Analog Communications

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

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

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.

Subject: Employability Skill Development

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.
Subject: Digital Communication

Course Outcomes:
On completion of the course, student will be able to
1) Understand working of waveform coding techniques and analyse their performance.
2) Analyze the performance of a baseband and passband digital communication system in terms of error rate and spectral efficiency.
3) Perform the time and frequency domain analysis of the signals in a digital communication system.
4) Design of digital communication system.
5) Understand working of spread spectrum communication system and analyze its performance.
Subject: Digital Signal Processing

Course Outcomes:
On completion of the course, student will be able to
1) Analyze the discrete time signals and system using different transform domain techniques.
2) Design and implement LTI filters for filtering different real world signals.
3) Develop different signal processing applications using DSP processor.

Subject: Electromagnetics

Course Outcomes:
On completion of the course, student will be able to
1) Understand the basic mathematical concepts related to electromagnetic vector fields.
2) Apply the principles of electrostatics to the solutions of problems relating to electric field and electric potential, boundary conditions and electric energy density.
3) Apply the principles of magnetostatics to the solutions of problems relating to magnetic field and magnetic potential, boundary conditions and magnetic energy density.
4) Understand the concepts related to Faraday’s law, induced emf and Maxwell’s equations.
5) Apply Maxwell’s equations to solutions of problems relating to transmission lines and uniform plane wave propagation.

Subject: Microcontrollers

Course Outcomes:
On completion of the course, student will be able to
- Learn importance of microcontroller in designing embedded application.
- Learn use of hardware and software tools.
- Develop interfacing to real world devices.

Subject: Mechatronics

Course Outcomes:
On completion of the course, student will be able to
- Identification of key elements of mechatronics system and its representation in terms of block diagram
- Understanding basic principle of Sensors and Transducer.
- Able to prepare case study of the system given.

Subject: Electronic System Design

Course Outcomes:
On completion of the course, student will be able to
- Apply the fundamental concepts and working principles of electronics devices to design electronics systems.
- Shall be able to interpret datasheets and thus select appropriate components and devices
• Select appropriate transducer and signal conditioning circuit to design prototype of Data Acquisition system.
• Design an electronic system/sub-system and validate its performance by simulating the same.
• Shall be able to use an EDA tool for circuit schematic and simulation.
• Create, manage the database and query handling using suitable tools.
Subject: Power Electronics

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

- Design & implement a triggering / gate drive circuit for a power device
- Understand, perform and analyze different controlled converters.
- Evaluate battery backup time & design a battery charger.
- Design & implement over voltage / over current protection circuit.

**Subject: Information Theory, Coding Techniques and Communication Networks**

**Course Outcomes:**
On completion of the course, student will be able to
- Perform information theoretic analysis of communication system.
- Design a data compression scheme using suitable source coding technique.
- Design a channel coding scheme for a communication system.
- Understand and apply fundamental principles of data communication and networking.
- Apply flow and error control techniques in communication networks

**Subject: Business Management**

**Course Outcomes:**
On completion of the course, student will be able to
- Get overview of Management Science aspects useful in business.
- Get motivation for Entrepreneurship
- Get Quality Aspects for Systematically Running the Business
- To Develop Project Management aspect and Entrepreneurship Skills.

**Subject: Advanced Processors**

**Course Outcomes:**
On completion of the course, student will be able to
- Describe the ARM microprocessor architectures and its feature.
- Interface the advanced peripherals to ARM based microcontroller
- Design embedded system with available resources.
- Use of DSP Processors and resources for signal processing applications.

**Subject: System Programming and Operating System**

**Course Outcomes:**
On completion of the course, student will be able to
- Demonstrate the knowledge of Systems Programming and Operating Systems Formulate the Problem and develop the solution for same.
- Compare and analyse the different implementation approach of system programming operating system abstractions.
- Interpret various OS functions used in Linux / Ubuntu

**Subject: Employability Skills and Mini Project**

**Course Outcomes:**
On completion of the course, student will be able to
Understand, plan and execute a Mini Project with team.
- Implement electronic hardware by learning PCB artwork design, soldering techniques, testing and troubleshooting etc.
- Prepare a technical report based on the Mini project.
- Deliver technical seminar based on the Mini Project work carried out.

B.E.

**BE (E & TC) Structure**  
2012 Course w.e.f. June 2015

**Semester-I**

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Teaching Scheme</th>
<th>Examination Scheme</th>
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**Subject: VLSI Design & Technology**

**Course Outcomes:**
After successfully completing the course, students will be able to
- Model digital circuit with HDL, simulate, synthesis and prototype in PLDs.
- Understand chip level issues and need of testability.
- Design analog & digital CMOS circuits for specified applications.

**Subject: Computer Networks**

**Course Outcomes:**
After successfully completing the course students will be able to
• Understand fundamental underlying principles of computer networking
• Describe and analyze the hardware, software, components of a network and the interrelations.
• Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies
• Have a basic knowledge of the use of cryptography and network security
• Have a basic knowledge of installing and configuring networking applications.
• Specify and identify deficiencies in existing protocols, and then go onto select new and better protocols.

Subject: Microwave Engineering

Course Outcomes:
• After successfully completing the course students will be able to
• Formulate the wave equation in waveguide for analysis.
• Identify the use of microwave components and devices in microwave applications.
• Understand the working principles of all the microwave tubes
• Understand the working principles of all the solid state devices Choose a suitable microwave tube and solid state device for a particular application
• Carry out the microwave network analysis
• Choose a suitable microwave measurement instruments and carry out the required measurements.

Subject: Embedded Systems & RTOS

Course Outcomes:
After successfully completing the course students will be able to
• Get insight of design metrics of Embedded systems to design real time applications to match recent trends in technology.
• Understand Real time systems concepts.
• Understand Linux operating system and device drivers.
• Get to know the hardware – software co design issues and testing methodology for Embedded system.

Subject: Electronic Product Design

Course Outcomes:
After successfully completing the course students will be able to
• Understand various stages of hardware, software and PCB design.
• Importance of product test & test specifications.
• Special design considerations and importance of documentation.
### Subject: Mobile Communication

**Course Outcomes:**
After successfully completing the course students will be able to
- Explain and apply the concepts telecommunication switching, traffic and networks
  - Analyze the telecommunication traffic.
- Analyze radio channel and cellular capacity.
- Explain and apply concepts of GSM and CDMA system.

### Subject: Broadband Communication Systems

**Course Outcomes:**
After successfully completing the course students will be able to
- Carry out Link power budget and Rise Time Budget by proper selection of components and check its viability.
- Carry out Satellite Link design for Up Link and Down Link.

### Subject: Audio Video Engineering

**Course Outcomes:**
- To study the analysis and synthesis of TV Pictures, Composite Video Signal, Receiver, Picture Tubes and Television Camera Tubes.
- To study the various Colour Television systems with a greater emphasis on television standards.
- To study the advanced topics in Digital Television and High Definition Television.
To study audio recording systems such CD/DVD recording, Audio Standards, and Acoustics principles.

**Subject: Wireless Networks**

**Course Outcomes:**

After successfully completing the course student will be able to

- Keep himself updated on latest wireless technologies and trends in the communication field
- Understand the transmission of voice and data through various networks.