

Class: FYBSc

Course Title	Basics of Applied Electronics
CODE	EL- 111
CO No.	Course Outcomes
CO-1	To identify different parameters/functions/specifications of components used in electronic circuits
CO-2	To solve problems based on network theorems.
CO-3	To perform simulations using simulator for analyzing network performance

Course Title	Electronic Devices and Circuits
CODE	EL- 112
CO No.	Course Outcomes
CO-1	To analyze performance parameters based on study of characteristics of electronic devices like diode, transistors etc
CO-2	To choose proper electronic devices as per the need of application
CO-3	To perform simulations for designing and analyzing diode/transistor circuits
CO-4	To build and test the circuits like street light controller using electronic devices

Course Title	ELECTRONICS LAB IA
CODE	EL- 113
CO No.	Course Outcomes
CO-1	To identify different components and devices as well as their types
CO-2	To understand basic parameters associated with each device
CO-3	To know operation of different instruments used in the laboratory
CO-4	To connect circuit and do require performance analysis
CO-5	To compare simulated and actual results of given particular experiment

Course Title	Fundamentals of Digital Electronics
CODE	EL- 121
CO No.	Course Outcomes
CO-1	To solve problems based on interconversion of number systems
CO-2	To reduce the expression using Boolean theorems
CO-3	To reduce expressions using K maps in SOP and POS forms
CO-4	To understand how to use flip flops to build modulus counter
CO-5	To familiarize with applications of counters like ring counter or event counter

Course Title	Analog and Digital Device applications
CODE	EL- 122
CO No.	Course Outcomes
CO-1	To know basics of operational amplifier
CO-2	To compare performance parameters of opamp ICs available in market
CO-3	To understand basic application circuits of opamp
CO-4	To basics of timer IC 555 and its applications
CO-5	To understand data converters and their performance parameters.

Course Title	ELECTRONICS LAB IB
CODE	EL- 123
CO No.	Course Outcomes
CO-1	To connect opamp circuits and analyze the output
CO-2	To build application circuits of opamp
CO-3	To design the output frequency of IC 555 as a stable/monostable multivibrator
CO-4	To compare simulated and actual results of given circuit

Class: SYBSc

Course Title	Communication Electronics
CODE	EL- 231
CO No.	Course Outcomes
CO-1	Understand different blocks in communication systems, types of noise in communication systems and its different parameters
CO-2	Understand need of modulation, modulation process and amplitude modulation and demodulation methods
CO-3	Analyze generation of FM Modulation and demodulation methods and comparison between amplitude and frequency modulation
CO-4	Identify different radio receivers and their performance parameters.
CO-5	Solve problems based on AM and FM performance parameters
CO-6	Compare pulse modulation techniques such as PAM, PPM, PWM and compare TDM and FDM techniques used in communication
CO-7	Understand need of sampling and sampling theorem as well as know about performance parameters of digital communication
CO-8	Analyze difference between ASK, FSK , PSK as well as PCM and its applications

Course Title	Digital Circuit Design
CODE	EL- 232
CO No.	Course Outcomes
CO-1	Distinguish between different logic families based on their performance parameters
CO-2	Analyze basic combinational logic circuits for simple applications
CO-3	Design combinational logic circuits using K maps for identified applications
CO-4	Design Sequential logic circuits using state diagram, excitation table for identified applications
CO-5	Understand and compare different types of ADC and their performance parameters using data sheets/manuals
CO-6	Understand and compare different types of DAC and their performance parameters using data sheets/manuals

Course Title	Practical Course
CODE	EL- 233
CO No.	Course Outcomes
CO-1	Describe and explain the techniques of generation of AM/ FM and demodulation
CO-2	Design FSK generation using standard IC XR 2206 referring data manuals
CO-3	Describe and explain the TDM/ FDM generation technique
CO-4	Demonstrate PPM/PWM/PAM and PCM techniques using standard circuits in data manuals
CO-5	Demonstrate PPM/PWM/PAM and PCM techniques using standard circuits in data manuals

Course Title	Analog and Digital Device applications
CODE	EL- 241
CO No.	Course Outcomes
CO-1	Design single/multistage amplifier using transistor and analyze their frequency response base on gain-bandwidth product due to coupling /bypass capacitors
CO-2	Classify and compare different power amplifiers
CO-3	Understand and design push pull amplifier and need of heat sinks
CO-4	Distinguish between Opamp Feedback circuits based on their configurations
CO-5	Analyze the effect of negative and positive feedback on characteristics of Opamp.
CO-6	Understand and analyze the need of positive feedback in oscillator circuits
CO-7	Design, develop and build circuits for identified applications

Course Title	Microcontroller and Python Programming
CODE	EL- 242
CO No.	Course Outcomes
CO-1	Identify the features and architectural details of microcontroller(arduiono)
CO-2	Write code/program using open-source programming language(ardiuno) for basic identified applications
CO-3	Understand programming basics of python programming language
CO-4	Design, build and implement applications using arduino and python
CO-5	Understand special features of python programming language such as importing modules, directory, tupules

Course Title	ELECTRONICS LAB IB
CODE	EL- 243
CO No.	Course Outcomes
CO-1	Describe and explain the design procedure of different types of active filters and analyze its frequency response
CO-2	Demonstrate positive feedback for oscillator circuits using standard ICs
CO-3	Design practical circuits for identified applications
CO-4	Develop working setup and write programs using programming techniques of Arduino
CO-6	Demonstrate and explain interfacing hardware to arduino microcontroller
CO-7	Solve problems using programming techniques of python

Class: TYBSc

CourseTitle	Digital Design using VERILOG
CODE	EL 351
CO No.	Course Outcomes
CO-1	Know and understand structure of HDL and Verilog.
CO-2	Understand different modeling styles in Verilog.
CO-3	Use Verilog effectively for simulation, verification and synthesis of digital system
CO-4	Understand basics of programmable logic devices.

CourseTitle	Microcontroller Architecture and Programming
CODE	EL 352
CO No.	Course Outcomes
CO-1	Understand the basics of microcontroller.
CO-2	Acquire basic programming skills in C language.
CO-3	Understand and acquire basic programming skills for AVR microcontroller

CourseTitle	Analog circuit Design and Applications
CODE	EL 353
CO No.	Course Outcomes
CO-1	Understand basics of analog circuit design.
CO-2	Analyze waveform generators required for testing different circuits.
CO-3	Build application circuits using specialized ICs.
CO-4	Design analog systems using available ICs.

CourseTitle	Nanoelectronics
CODE	EL 354
CO No.	Course Outcomes
CO-1	Understand basic concepts of nano electronic devices and nano technology
CO-2	Understand the electron transport mechanism in nanostructures.
CO-3	Understand techniques of characterization of nanostructures.
CO-4	Understand different devices constructed using nanotechnology.

CourseTitle	Signals and Systems
CODE	EL 355
CO No.	Course Outcomes

CO-1	Know basics of electronic signals.
CO-2	Know different types of systems.
CO-3	Analyze systems using Laplace and Fourier analysis.
CO-4	Understand digital signal processing system

CourseTitle	Optics and Fiber Optic Communication
CODE	EL 356
CO No.	Course Outcomes
CO-1	To acquire Knowledge of optical fiber communication system.
CO-2	To understand different parameters of optical fibers.
CO-3	To learn essential optical components of Fiber Optic Communication.
CO-4	To analyze and integrate fiber optical network components in variety of networking schemes.

CourseTitle	Practical Course I
CODE	EL 357
CO No.	Course Outcomes
CO-1	Analyze different design and test procedures for analog circuits and systems
CO-2	Measure different parameters of optical fiber communication systems
CO-3	Understand importance of product design and entrepreneurship
CO-4	Develop electronic systems for given application.

CourseTitle	Practical Course II
CODE	EL 358
CO No.	Course Outcomes
CO-1	Develop and simulate design digital systems using Verilog.
CO-2	Design and develop AVR microcontroller-based systems.
CO-3	Understand different nanoelectronics devices.
CO-4	Inculcate basic skills required for design and development of embedded Systems.

CourseTitle	Practical Course III(Project)
CODE	EL 359
CO No.	Course Outcomes

CO-1	Understand basic methodology of selection of topic for project.
CO-2	Understand how to do literature review for selected topic for project.
CO-3	Apply the knowledge for design and development of the selected project.
CO-4	Use different software and hardware for testing, validation and verification of circuits for successful outcome of project.
CO-5	Understand documentation process in the form of presentation and project Report.
CO-6	Understand process of systematic development of electronic system and Development of skills for successful outcome

CourseTitle	SEC1: Electronic Design Automation Tools
CODE	ELSEC 351
CO No.	Course Outcomes
CO-1	Design the electronics circuits using EDA software tools.
CO-2	Simulate various analog and digital circuits using EDA software tools
CO-3	Plot various waveforms.
CO-4	Simulate basic electronic system blocks

CourseTitle	SEC2: Internet of Things and Applications
CODE	ELSEC 352
CO No.	Course Outcomes
CO-1	Know the basic building blocks of IoT
CO-2	Know IoT protocols
CO-3	Understand how to Design and Develop IoT based system through case studies.

CourseTitle	Modern Communication Systems
CODE	EL 361
CO No.	Course Outcomes
CO-1	Understand the digital modulation techniques.
CO-2	Understand different types of pulse modulation techniques.
CO-3	Describe the evolution and importance of Mobile communication and cellular communication.
CO-4	Know the basics of satellite communication systems

CourseTitle	Embedded System Design using Microcontrollers
CODE	EL 362
CO No.	Course Outcomes

CO-1	Understand features and architecture of PIC microcontroller
CO-2	Demonstrate how to interface PIC microcontroller with different peripherals
CO-3	Understand features and architecture of ARM microcontroller
CO-4	Demonstrate embedded system using given microcontroller

Course Title	Industrial Electronics
CODE	EL 363
CO No.	Course Outcomes
CO-1	Understand basics of semiconductor power devices.
CO-2	Analyze basic power electronics circuits and demonstrate applications.
CO-3	Understand basics of motor control
CO-4	Understand basics of Electric Vehicle systems

Course Title	Manufacturing Processes for Electronics
CODE	EL 364
CO No.	Course Outcomes
CO-1	Understand basics of Passive Electronic Component Manufacturing Processes
CO-2	Understand process involved in PCB manufacture and Modern Circuit Assembly
CO-3	Know about the Semiconductor Device and IC Fabrication Process.

Course Title	Process Control Systems
CODE	EL 365
CO No.	Course Outcomes
CO-1	Familiar with different types of sensors and related systems
CO-2	Know different types of measurement systems
CO-3	Understand control parameters in process automation
CO-4	Understand different types of process control systems and their characteristics.

Course Title	Sensors and Systems
CODE	EL 366
CO No.	Course Outcomes
CO-1	Understand basic principles and types of different sensors
CO-2	Understand basic principles and types of actuators
CO-3	Know about signal conditioning systems for sensors.

Course Title	Practical Course I
CODE	EL 367
CO No.	Course Outcomes

CO-1	Demonstrate power electronic circuits.
CO-2	Understand process involved in PCB manufacture and Modern Circuit Assembly
CO-3	Know about the Semiconductor Device and IC Fabrication Process.

Course Title	Practical Course II
CODE	EL 368
CO No.	Course Outcomes
CO-1	Design embedded systems using PIC microcontroller
CO-2	Design embedded systems using ARM microcontroller
CO-3	Demonstrate PLC SCADA using ladder programming
CO-4	Design and develop sensor systems for different applications

Course Title	Practical Course III
CODE	EL 369
CO No.	Course Outcomes
CO-1	Understand basic methodology of selection of topic for project.
CO-2	Understand how to do literature review for selected topic for project,
CO-3	Apply the knowledge for design and development of the selected project.
CO-4	Use different software and hardware for testing, validation and verification of circuits for successful outcome of project
CO-5	Understand documentation process in the form of presentation and project Report
CO-6	Understand process of systematic development of electronic system and Development of s skills for successful outcome

Course Title	Design of Printed Circuit Boards
CODE	ELSEC 361
CO No.	Course Outcomes
CO-1	Understand basics of PCB.
CO-2	Know about the PCB design technology.
CO-3	Know about different soldering techniques.

Course Title	Mobile Application Development
CODE	ELSEC 362
CO No.	Course Outcomes
CO-1	Understand basics of Mobile application development.
CO-2	Develop ability to work in android development environment.
CO-3	Know about the Semiconductor Device and IC Fabrication Process.