



Mahatma Gandhi Vidyamandir's

**Loknete Vyankatrao Hiray Arts, Science and Commerce College,
Panchavati, Nashik-422003**

(Affiliated to SPPU, Pune, Reaccredited with 'A' grade, Recipient of Best College Award by SPPU)

**Programme Specific Outcomes,
&
Course Outcomes of B. Sc.**

Department of Electronic Science

Academic Year

2021-22

Programme Specific Outcomes: B.Sc. Electronic Science

Name of the Department : Electronic Science	
Program Specific Outcomes	
At the end of the programme, student will be able to	
1	Apply knowledge of mathematics and science in solving electronics related problems
2	Design and conduct electronics experiments, as well as to analyze and interpret data
3	Design and manage electronic systems or processes that conforms to a given specification within ethical and economic constraints
4	Identify, formulate, solve and analyze the problems in various disciplines of electronics
5	Communicate effectively in term of oral and written communication skills
6	Use techniques, skills and modern technological/scientific/ engineering software/tools for professional practices

Course Outcomes: B.Sc. Electronic Science

Class : F.Y.B.Sc		
Semester-I		
Paper	Course code & course title	At the end of the course, student will be able to
I	Basics of Applied Electronics (EL-111)	Learn and identify different parameters/functions/specifications of components used in electronic circuits
		Solve problems based on network theorems.
		Understand the basic terms concepts and definition of networks theorems and application to electronic systems.
		Understand need of Circuit and Network theorems.
		Understand and describe of Electronic Systems
		Identify proper electronic devices as per the need of application.
II	Electronic Devices and Circuits (EL-112)	Analyze performance parameters based on study of characteristics of electronic devices like diode, transistors etc
		Select proper electronic devices as per the need of application
		Understand need of different transistors BJT, FET and MOSFET and it's Applications & Learn importance of PN Junction diode, BJT, FET and MOSFET, Photo electric devices.
		Simulations for designing and analyzing diode/transistor circuits
		Learn build and test the circuits like street light controller using electronic devices.
		Learn basic concepts of LEDs , IR, ,Photo diode circuit , Photo transistors, LDR,Opto- Isolators
III	Electronics Lab- IA (EL-113)	Identify different components and devices as well as their types
		Understand basic parameters associated with each device
		Understand the operation of different instruments used in the laboratory
		Build the circuit and analyse the required performance.
		Compare the simulated and actual results of given particular experiment
		Learn basic electronic terms, concepts and definitions

Semester-II

I	Fundamentals of Digital Electronics (EL-121)	Solve problems based on interconversion of number systems.
		Solve the expression using Boolean theorems
		Solve the expressions using K maps in SOP and POS forms
		Understand need of Logic gates.
		Understand how to use flip flops to build modulus counter and familiarize with applications of counters like ring counter or event counter.
		Learn basic terms concepts and definitions
II	Analog and Digital Device applications (EL- 122)	Differentiate opamps as per specifications or performance parameters
		Understand opamp circuits and its usefulness in different applications
		Learn the operating principle of IC 555 in different configurations
		Understand different types of DAC and their performance parameters
		Classify the ADC and their performance parameters and to learn OPAMP Ics
		Learn basic terms concepts and definitions.
III	Electronics Lab IB (EL- 123)	Learn how to connect Opamp circuits and analyze the output
		Build application circuits of Opamp
		Design the output frequency of IC 555 as astable/ monostable multivibrator
		Compare simulated and actual results of given circuit
		Simulation of experiment using Pspice.
		Understand the basic terms concepts and definitions

Class : S.Y.B.Sc.

Semester-III

Paper	Course code & course title	At the end of the course, student will be able to
I		Understand different blocks in communication systems, types of noise in communication systems and its different parameters

	Communication Electronics (EL-231)	Understand need of modulation, modulation process and amplitude modulation and demodulation methods
		Analyze generation of FM Modulation and demodulation methods and comparison between amplitude and frequency modulation
		Solve problems based on AM and FM performance parameters
		Compare pulse modulation techniques such as PAM, PPM, PWM and compare TDM and FDM techniques used in communication
		Analyze difference between ASK, FSK, PSK as well as PCM and its applications and learn basic terms concepts and definitions.
II	Digital Circuit Design (EL-232)	Distinguish between different logic families based on their performance parameters
		Analyze basic combinational logic circuits for simple applications
		Design combinational logic circuits using K maps for identified applications
		Design Sequential logic circuits using state diagram, excitation table for identified applications
		Understand and compare different types of ADC and their performance parameters using data sheets/manuals
		Understand and compare different types of DAC and their performance parameters using data sheets/manuals and learn basic terms concepts and definitions
III	Practical Course (EL-233)	Describe and explain the techniques of generation of AM/ FM and demodulation and also TDM/ FDM generation technique
		Design FSK generation using standard IC XR 2206 referring data manuals
		Demonstrate PPM/PWM/PAM and PCM techniques using standard circuits in data manuals
		Design and build minimum complexity digital circuits using logic gates
		Design ADC/ DAC using data manuals and study its performance parameters

		Design and analyze different combinational and sequential logic circuits using standard ICs in data manuals
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Semester-IV		
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I	Analog Circuit Design (EL-241)	Design single/multistage amplifier using transistor and analyze their frequency response base on gain-bandwidth product due to coupling /bypass capacitors
		Understand, Classify and compare different power amplifiers and design push pull amplifier and need of heat sinks
		Distinguish between Opamp Feedback circuits based on their configurations and analyze the effect of negative and positive feedback on characteristics of Opamp
		Understand and analyze the need of positive feedback in oscillator circuits
		Design, develop and build circuits for identified applications
		Learn basic terms concepts and definitions

II	Microcontroller and Python Programming (EL-242)	Identify the features and architectural details of microcontroller (Arduino)
		Develop the program code using open source programming language(Arduino) for basic identified applications
		Understand basics of python programming language
		Understand special features of python programming language such as importing modules, directory, tuples
		Learn design, build and implement applications using arduino and python
		Learn basic terms concepts and definitions

III	Practical Course (EL-243)	Describe and explain the design procedure of different types of active filters and analyze its frequency response
		Demonstrate positive feedback for oscillator circuits using standard ICs
		Describe and explain design procedure for two stage amplifiers and also design practical circuits for identified applications

		Develop working setup and write programs using programming techniques of Arduino
		Demonstrate and explain interfacing hardware to Arduino microcontroller
		Solve problems using programming techniques of python and learn basic terms concepts and definitions.

Class : T.Y.B.Sc

Semester-V

Paper	Course code & course title	At the end of the course, student will be able to
I	EL-351: Digital Design using Verilog	To Know and understand structure of HDL and Verilog
		To Understand different modeling styles in Verilog.
		To use Verilog effectively for simulation, verification and synthesis of digital system.
		To Understand basics of programmable logic devices
		Understand the model, simulate, and verify the digital model with Verilog HDL.
		To Design, develop, simulate and analyse the program code for the various application such as: Traffic light controller, Stepper motor sequence generator, Vending machine, Tablet filling system
II	EL-352: Microcontroller Architecture and Programming	To understand the basics of microcontroller.
		To Understand the basic of C programming
		To acquire basic programming skills in C language.
		To Understand and acquire basic programming skills for AVR microcontroller
		To Understand and write program to Interfacing Peripherals to AVR microcontroller.

		To Interface the device :LCD, Keyboard, External Memory, Steeper Motor and write program to Interfacing these Peripherals to AVR microcontroller.
III	EL-353: Analog circuit Design and Applications	To understand basics of analog circuit design.
		To Understand Nonlinear analog circuit.
		To analyze waveform generators required for testing different circuits.
		To build application circuits using specialized ICs.
		To learn the specifications and selection criterion for linear ICs
		Design analog systems using available ICs
IV	EL-354: Nanoelectronics	To understand basic concepts of Nano electronic devices and Nano technology.
		To Understand the electron transport mechanism in nanostructures
		To understand techniques of characterization of nanostructures.
		To Understand different Materials used in Nano electronics and Devices.
		To understand different devices constructed using nanotechnology.
		To familiar with various crystal structure semiconductors and growth techniques of semiconductors.
V	EL-355: Signals and Systems	To know basics of electronic signals.
		To know different types of systems.
		Analyze systems using Laplace transformation analysis.
		Analyze systems using Fourier analysis.
		Understand the Analog to Digital Conversion of Signals.
		Understand digital signal processing system
VI	EL-356(A): Optics and Fiber Optic Communication	To acquire Knowledge of optical fiber communication system.
		To understand the Transmission Characteristics of Optical Fiber.
		To understand different parameters of optical fibers.
		To learn essential optical components of Fiber Optic Communication.
		To analyze and integrate fiber optical network components in variety of networking schemes.
		To learn different parameter of optical fibers.

VII	EL-357: Practical Course I	Analyze different design and test procedures for analog circuits and systems.
		Analyze different characteristics of Nano Devices using Simulation Software
		Synthesis Nano Material using Sol- Gel Method and Measure characteristics.
		Measure different parameters of optical fiber communication systems.
		Understand importance of product design and entrepreneurship.
		Develop electronic systems for given application.
VIII	EL-358: Practical Course II	Develop and simulate design digital systems using Verilog
		Design and develop AVR microcontroller based systems.
		Inculcate basic skills required for design and development of embedded systems.
		Acquire Basic Programming Skills in C language
		Develop the Different C programs
		To acquire basic programming skills in VERILOG
IX	EL-359: Practical Course III(Project)	Understand basic methodology of selection of topic for project.
		Understand how to do literature review for selected topic for project.
		Apply the knowledge for design and development of the selected project.
		Use different software and hardware for testing, validation and verification of circuits for successful outcome of project
		Understand documentation process in the form of presentation and project report
		Understand process of systematic development of electronic system and Development of skills for successful outcome
X	ELSEC-351: Electronic Design Automation Tools	Understand basic Basics of EDA Tools.
		Design the electronics circuits using EDA software tools.
		Simulate various analog and digital circuits using EDA software tools.
		Plot various waveforms of various electronics circuit.
		Simulate basic electronic system blocks using Multisim/CircuitMod
		Simulate basic electronic system blocks using Proteus/ OrCAD

XI	ELSEC-352: Internet of Things and Applications	Know and Understand the basic building blocks of IoT
		Know and Understand IoT protocols
		Understand how to Design and Develop IoT based system through case studies.
		Developed practical application of IOT
		To understand the characteristics and applications – Smart Healthcare, Smart City, Smart homes & Agriculture.
		Case studies

Semester-VI

Paper	Course code & course title	At the end of the course, student will be able to
I	EL 361-Modern Communication Systems	Understand the digital modulation techniques.
		Understand different types of pulse modulation techniques.
		Describe the evolution and importance of Mobile communication and cellular communication
		Know the basics of satellite communication systems.
		Comparative study of various concepts in mobile communication.
		Example- FDM satellite systems: Set-Top Box
II	EL 362- Embedded System Design using Microcontrollers	Understand the Basics of Embedded System.
		Understand the Different Microcontroller : PIC16F887 , ARM
		Understand how to Use 'C' language for programming the microcontrollers.
		Understand and learn to use Timers, Interrupts and Serial Communication in Microcontroller.
		Design and Develop the Application of Microcontroller.
		Apply the knowledge in real world applications
III	EL 363- Industrial Electronics	Understand basics of semiconductor power devices.
		Analyze basic power electronics circuits and demonstrate applications.
		Understand basics of motor control.

		Developed the Control Circuits for operating motors
		Understand basics of Electric Vehicle systems
		Comparative study - EV and Hybrid Vehicles
IV	EL 364 - Manufacturing Processes for Electronics	Understand basics of Passive Electronic Component Manufacturing Processes
		Understand process involved in PCB manufacture and Modern Circuit Assembly
		Know about the Modern Assembly Techniques for Electronic Systems.
		Know about the Semiconductor Device and IC Fabrication Process
		Understanding the fabrication Steps for Semiconductor Devices
		Understanding the Process Integration and IC Manufacturing
V	EL 365-Process Control Systems	Familiar with different types of sensors and related systems
		Know different types of measurement systems
		Understand control parameters in process automation
		Understand different types of process control systems and their characteristics.
		Understand different types of process control systems and their characteristics.
		Know about an Industrial Automation Systems
VI	EL 366(B) - Sensors and Systems	Understand basic principles and types of different sensors.
		Understand basic different sensors System.
		Understand basic principles and types of actuators.
		Know about signal conditioning systems for sensors
		Application of Sensors
		Understand the principle, construction and specifications of an actuators
VII	EL 367-Practical Course I	Demonstrate power electronic circuits
		Demonstrate different types of digital communication systems,
		Understand working principles of different power devices and their Characteristics
		Design, build and test Modern Communication System
		Comparative study of different systems

		Activity
VIII	EL 368 - Practical Course II	Design embedded systems using PIC microcontroller.
		Design embedded systems using ARM microcontroller.
		Demonstrate PLC SCADA using ladder programming.
		Design and develop sensor systems for different applications
		To understand an Embedded Systems using Microcontrollers
		Design, develop and test the sensor based systems
IX	EL 369- Practical Course III(Project)	Understand basic methodology of selection of topic for project.
		Understand how to do literature review for selected topic for project.
		Apply the knowledge for design and development of the selected project.
		Use different software and hardware for testing, validation and verification of circuits for successful outcome of project
		Understand documentation process in the form of presentation and project report
		Understand process of systematic development of electronic system and Development of skills for successful outcome
X	ELSEC 361- Design and Fabrication of PCB	Understand basics of PCB.
		Understand classification and Material of PCB
		Know about the PCB design technology.
		Know about different soldering techniques
		Know about different PCB Design Concepts
		Know about different PCB layout design
XI	ELSEC 362- Mobile Application Development	Understand basics of Mobile application development.
		Develop ability to work in android development environment
		Design and develop mobile applications
		Understand Location Access and Publish Android Application
		To know the concept of Android User Interface
		Practice Program: Develop an Android Application