

Rayat Shikshan Sanstha's
**SHRI SADGURU GANGAGEER MAHARAJ SCIENCE, GAUTAM ARTS AND SANJIVANI
COMMERCE COLLEGE, KOPARGAON DIST-AHMADNAGAR**

DEPARTMENT OF ELECTRONIC SCIENCE

**Program Outcomes (POs) for
B.Sc. (Electronic Science) Program**

PO1	Disciplinary Knowledge: Demonstrate comprehensive knowledge of electronic science. Execute strong theoretical and practical knowledge generated from electronics graduate program in the area of work.
PO2	Communication: Effective Communication on complex electronic science activities with the relative community and with society at large.
PO3	Problem Analysis: Identify, formulate and analyze complex problems in electronics. Solve the Problems by observing the situation and design appropriate solutions.
PO4	Scientific temper: Develop the working knowledge and applications of instrumentation and laboratory Techniques. Make the students able to apply skills to design and conduct experiments independently.
PO5	Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and ICT tools for understanding of subject knowledge.
PO6	Environment and Sustainability: Understand the impact of the scientific solutions in societal and environmental contexts and demonstrate the knowledge and need for sustainable development.
PO7	Life-long learning: Acquire the ability to engage in life-long learning independently in the broadest context of socio-technological changes.

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DEPARTMENT OF ELECTRONIC SCIENCE

**Program Specific Outcomes (PSOs) for
B.Sc. (Electronic Science) Program**

PSO1	Ability to apply knowledge of mathematics and science in solving electronics related problems
PSO2	Ability to design and conduct electronics experiments, as well as to analyze and interpret data
PSO3	Ability to design and manage electronic systems or processes that conforms to a given specification within ethical and economic constraints
PSO4	Ability to identify, formulate, solve and analyze the problems in various disciplines of electronics
PSO5	Ability to function as a member of a multidisciplinary team with sense of ethics, integrity and social responsibility
PSO6	Ability to communicate effectively in term of oral and written communication skills
PSO7	Recognize the need for, and be able to engage in lifelong learning
PSO8	Ability to use techniques, skills and modern technological/scientific/engineering software/tools for professional practices

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KOPARGAON DIST-AHMADNAGAR
Department of Electronic Science
B.Sc.-I
Course Outcomes 2019-20

Paper No.	Paper/Course Name	Semester-I
I	Basics of Applied Electronics	After completion of this course student will be able: 1. To identify different parameters/functions/specifications of components used in electronic circuits 2. To solve problems based on network theorems. 3. To perform simulations using simulator for analyzing network performance
II	Electronic Devices and Circuits	After completion of this course student will be able: 1. To analyze performance parameters based on study of characteristics of electronic devices like diode, transistors etc 2. To choose proper electronic devices as per the need of application 3. To perform simulations for designing and analyzing diode/transistor circuits 4. To build and test the circuits like street light controller using electronic devices
Electronics Lab IA		After completion of this course student will be able 1. To identify different components and devices as well as their types 2. To understand basic parameters associated with each device 3. To know operation of different instruments used in the laboratory 4. To connect circuit and do required performance analysis 5. To compare simulated and actual results of given particular experiment
Paper No.	Paper/Course Name	Semester-II
I	Fundamentals of Digital Electronics	After completion of this course student will be able 1. To solve problems based on interconversion of number systems 2. To reduce the expression using Boolean theorems 3. To reduce expressions using K maps in SOP and POS forms 4. To understand how to use flip flops to build modulus counter 5. To familiarize with applications of counters like ring counter or event counter

II	Analog and Digital Device applications	<p>After completion of this course student will be able</p> <ol style="list-style-type: none"> 1. To compare different op-amps as per specifications or performance parameters 2. To understand op-amp circuits and its usefulness in different applications 3. To know operating principle of IC 555 in different configurations 4. To understand different types of DAC and their performance parameters 5. To study different types of ADC and their performance parameters
Electronics Lab IB		<p>After completion of this course student will be able</p> <ol style="list-style-type: none"> 1. To connect op-amp circuits and analyze the output 2. To build application circuits of op-amp 3. To design the output frequency of IC 555 as astable/monostable multivibrator 4. To compare simulated and actual results of given circuit

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Department of Electronic Science
B.Sc.-II
Course Outcomes 2020-21

Paper No.	Paper/Course Name	Semester-III
I	Communication Electronics	<p>After completion of this course student will be able</p> <ol style="list-style-type: none"> 1. Understand different blocks in communication systems, types of noise in communication systems and its different parameters 2. Understand need of modulation, modulation process and amplitude modulation and demodulation methods 3. Analyze generation of FM Modulation and demodulation methods and comparison between amplitude and frequency modulation 4. Identify different radio receivers and their performance parameters. 5. Solve problems based on AM and FM performance parameters 6. Compare pulse modulation techniques such as PAM, PPM, PWM and compare TDM and FDM techniques used in communication 7. Understand need of sampling and sampling theorem as well as know about performance parameters of digital communication 8. Analyze difference between ASK, FSK, PSK as well as PCM and its applications
II	Digital Circuit Design	<p>After completion of this course student will be able</p> <ol style="list-style-type: none"> 1. Distinguish between different logic families based on their performance parameters 2. Analyze basic combinational logic circuits for simple applications 3. Design combinational logic circuits using K maps for identified applications 4. Design Sequential logic circuits using state diagram, excitation table for identified applications 5. Understand and compare different types of ADC and their performance parameters using data sheets/manuals 6. Understand and compare different types of DAC and their performance parameters using data sheets/manuals
III	Practical Course	<p>After completion of this course student will be able</p> <ol style="list-style-type: none"> 1. Describe and explain the techniques of generation of AM/ FM and demodulation 2. Design FSK generation using standard IC XR 2206 referring data manuals 3. Describe and explain the TDM/ FDM generation technique

		<p>4. Demonstrate PPM/PWM/PAM and PCM techniques using standard circuits in data manuals</p> <p>5. Design and build minimum complexity digital circuits using logic gates</p> <p>6. Design and analyze different combinational and sequential logic circuits using standard ICs in data manuals</p> <p>7. Design ADC/ DAC using data manuals and study its performance parameters</p>
Paper No.	Paper/Course Name	Semester-IV
I	Analog Circuit Design	<p>After completion of this course student will be able</p> <ol style="list-style-type: none"> 1. Design single/multistage amplifier using transistor and analyze their frequency response based on gain-bandwidth product due to coupling /bypass capacitors 2. Classify and compare different power amplifiers 3. Understand and design push pull amplifier and need of heat sinks 4. Distinguish between Op-amp Feedback circuits based on their configurations 5. Analyze the effect of negative and positive feedback on characteristics of Op-amp 6. Understand and analyze the need of positive feedback in oscillator circuits 7. Design, develop and build circuits for identified applications
II	Microcontroller and Python Programming	<p>After completion of this course student will be able</p> <ol style="list-style-type: none"> 1. Identify the features and architectural details of microcontroller (ARDUINO) 2. Write code/program using open-source programming language (ARDUINO) for basic identified applications 3. Understand programming basics of python programming language 4. Understand special features of python programming language such as importing modules, directory, tuples 5. Design, build and implement applications using ARDUINO and python
III	Practical Course	<p>After completion of this course student will be able</p> <ol style="list-style-type: none"> 1. Describe and explain the design procedure of different types of active filters and analyze its frequency response 2. Demonstrate positive feedback for oscillator circuits using standard ICs 3. Describe and explain design procedure for two stage amplifiers and application circuits 4. Design practical circuits for identified applications 5. Develop working setup and write programs using programming techniques of ARDUINO 6. Demonstrate and explain interfacing hardware to ARDUINO microcontroller 7. Solve problems using programming techniques of python

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Department of Electronics
B.Sc.-III
Course Outcome 2021-22

Paper No.	Paper/Course Name	Semester-V
I	Digital Design using Verilog	<p>After completing the course, the students will be able to</p> <p>1: Know and understand structure of HDL and Verilog. 2: Understand different modelling styles in Verilog. 3: Use Verilog effectively for simulation, verification and synthesis of digital system. 4: Understand basics of programmable logic devices.</p>
II	Microcontroller Architecture and Programming	<p>After completing the course, the students will be able to</p> <p>1: Understand the basics of microcontroller. 2: Acquire basic programming skills in C language. 3: Understand and acquire basic programming skills for AVR microcontroller.</p>
III	Analog circuit Design and Applications	<p>After completing the course, the students will be able to</p> <p>1: Understand basics of analog circuit design. 2: Analyze waveform generators required for testing different circuits. 3: Build application circuits using specialized ICs. 4: Design analog systems using available ICs.</p>
IV	Nanoelectronics	<p>After completing the course, the students will be able to</p> <p>1: Understand basic concepts of nano electronic devices and nano technology. 2: Understand the electron transport mechanism in nanostructures. 3: Understand techniques of characterization of nanostructures. 4: Understand different devices constructed using nanotechnology.</p>
V	Signals and Systems	<p>After completing the course, the students will be able to</p> <p>1: Know basics of electronic signals. 2: Know different types of systems. 3: Analyze systems using Laplace and Fourier analysis. 4: Understand digital signal processing system.</p>
VI	Optics and Fiber Optic Communication	<p>After completing the course, the students will be able to</p> <p>1: To acquire Knowledge of optical fiber communication system. 2: To understand different parameters of optical fibers. 3: To learn essential optical components of Fiber Optic Communication.</p>

		<i>4: To analyze and integrate fiber optical network components in variety of networking schemes.</i>
VII	Practical Course I	<p>After completing the course, the students will be able to</p> <p><i>1: Analyze different design and test procedures for analog circuits and systems.</i></p> <p><i>2: Measure different parameters of optical fiber communication systems</i></p> <p><i>3: Understand importance of product design and entrepreneurship.</i></p> <p><i>4: Develop electronic systems for given application.</i></p>
VIII	Practical Course II	<p>After completing the course, the students will be able to</p> <p><i>1: Develop and simulate design digital systems using Verilog.</i></p> <p><i>2: Design and develop AVR microcontroller-based systems.</i></p> <p><i>3: Understand different nanoelectronic devices.</i></p> <p><i>4: inculcate basic skills required for design and development of embedded Systems.</i></p>
IX	Practical Course III (Project)	<p>After completing the course, the students will be able to</p> <p><i>1: Understand basic methodology of selection of topic for project.</i></p> <p><i>2: Understand how to do literature review for selected topic for project.</i></p> <p><i>3: Apply the knowledge for design and development of the selected project.</i></p> <p><i>4: Use different software and hardware for testing, validation and verification of circuits for successful outcome of project</i></p> <p><i>5: Understand documentation process in the form of presentation and project report</i></p> <p><i>6: Understand process of systematic development of electronic system and Development of skills for successful outcome</i></p>
X	Electronic Design Automation Tools	<p>After completing the course, the students will be able to</p> <p><i>1: Design the electronics circuits using EDA software tools</i></p> <p><i>2: Simulate various analog and digital circuits using EDA software tools</i></p> <p><i>3: Plot various waveforms.</i></p> <p><i>4: Simulate basic electronic system blocks</i></p>
XI	Internet of Things and Applications	<p>After completing the course, the students will be able to</p> <p><i>1: Know the basic building blocks of IoT</i></p> <p><i>2: Know IoT protocols</i></p> <p><i>3: Understand how to Design and Develop IoT based system through case studies.</i></p>
Paper No.	Paper/Course Name	Semester-VI
I	Modern Communication Systems	<p>After completing the course, the students will be able to</p> <p><i>1: Understand the digital modulation techniques.</i></p> <p><i>2: Understand different types of pulse modulation techniques.</i></p> <p><i>3: Describe the evolution and importance of Mobile communication and cellular</i></p>

		<p>communication</p> <p>4: Know the basics of satellite communication systems.</p>
II	Embedded System Design using Microcontrollers	<p>After completing the course, the students will be able to</p> <p>1: Understand features and architecture of PIC microcontroller.</p> <p>2: Demonstrate how to interface PIC microcontroller with different peripherals</p> <p>3: Understand features and architecture of ARM microcontroller.</p> <p>4: Demonstrate embedded system using given microcontroller.</p>
III	Industrial Electronics	<p>After completing the course, the students will be able to</p> <p>1: Understand basics of semiconductor power devices.</p> <p>2: Analyze basic power electronics circuits and demonstrate applications.</p> <p>3: Understand basics of motor control.</p> <p>4: Understand basics of Electric Vehicle systems</p>
IV	Manufacturing Processes for Electronics	<p>After completing the course, the students will be able to</p> <p>1: Understand basics of Passive Electronic Component Manufacturing Processes</p> <p>2: Understand process involved in PCB manufacture and Modern Circuit Assembly</p> <p>3: Know about the Semiconductor Device and IC Fabrication Process</p>
V	Process Control Systems	<p>After completing the course, the students will be able to</p> <p>1: Familiar with different types of sensors and related systems</p> <p>2: Know different types of measurement systems.</p> <p>3: Understand control parameters in process automation.</p> <p>4: Understand different types of process control systems and their characteristics.</p>
VI	Sensors and Systems	<p>After completing the course, the students will be able to</p> <p>1: Understand basic principles and types of different sensors.</p> <p>2: Understand basic principles and types of actuators.</p> <p>3: Know about signal conditioning systems for sensors.</p>
VII	Practical Course I	<p>After completing the course, the students will be able to</p> <p>1: Demonstrate power electronic circuits.</p> <p>2: Demonstrate different types of digital communication systems,</p> <p>3: Understand working principles of different power devices and their characteristics</p>
VIII	Practical Course II	<p>After completing the course, the students will be able to</p> <p>1: Design embedded systems using PIC microcontroller.</p> <p>2: Design embedded systems using ARM microcontroller.</p> <p>3: Demonstrate PLC SCADA using ladder programming.</p> <p>4: Design and develop sensor systems for different applications.</p>

IX	Practical Course III (Project)	<p>After completing the course, the students will be able to</p> <p><i>1: Understand basic methodology of selection of topic for project.</i></p> <p><i>2: Understand how to do literature review for selected topic for project.</i></p> <p><i>3: Apply the knowledge for design and development of the selected project.</i></p> <p><i>4: Use different software and hardware for testing, validation and verification of circuits for successful outcome of project</i></p> <p><i>5: Understand documentation process in the form of presentation and project report</i></p> <p><i>6: Understand process of systematic development of electronic system and Development of skills for successful outcome</i></p>
X	Design and Fabrication of PCB	<p>After completing the course, the students will be able to</p> <p><i>1: Understand basics of PCB.</i></p> <p><i>2: Know about the PCB design technology.</i></p> <p><i>3: Know about different soldering techniques.</i></p>
XI	Mobile Application Development	<p>After completing the course, the students will be able to</p> <p><i>1: Understand basics of Mobile application development.</i></p> <p><i>2: Develop ability to work in android development environment.</i></p> <p><i>3: Design and develop mobile applications.</i></p>