

MAHATMA GANDHI VIDYAMANDIR'S

M.S.G., ARTS, SCIENCE AND COMMERCE COLLEGE MALEGAON CAMP, NASHIK-5

Department of Electronic Science

Name: of Programme : Bachelor of Science (B. Sc.)

| PO. No. | Program Outcomes | Graduate Attributes |
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| | After successful completion of this program, a student will be able to | |
| PO1 | Demonstrate comprehensive knowledge and understanding of one or more disciplines which form a part of an undergraduate | Disciplinary knowledge |
| PO2 | Express thoughts and ideas effectively in writing and orally. | Communication Skills |
| PO3 | Evaluate practices, policies and theories by following scientific approach to knowledge development. | Critical thinking |
| PO4 | Apply one's learning to real life situations. | Problem solving |
| PO5 | Draw valid conclusions and support them with evidence and examples. | Analytical reasoning |
| PO6 | Plan, execute and report the results of an experiment or investigation. | Research-related skills |
| PO7 | Work effectively and respectfully with diverse teams. | Cooperation/Team work |
| PO8 | Critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective. | Scientific reasoning |
| PO9 | Work independently, identify appropriate resources required for a project, and manage a project through to completion. | Self-directed learning |
| PO10 | Effectively engage in a multicultural society and interact respectfully with diverse groups. | Multicultural competence |
| PO11 | Adopt objective, unbiased and truthful actions in all aspects of work. | Moral and ethical awareness/reasoning |
| PO12 | Have a capability for mapping out the tasks of a team or an organization. | Leadership readiness/qualities |
| PO13 | Acquire skills to learn how to learn. | Lifelong learning |
| PO14 | Develop social, cultural and national integrity. | Reflective thinking |

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Department of Electronic Science

Name of Program (with Specialization) - Bacher of Science in Electronic science

| PO. No. | Program Outcomes | Graduate Attributes |
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| | After successful completion of this program, a student will be able to | |
| PSO1 | To frame the syllabus with specific focus on technical learning areas. | Digital and technical literate |
| PSO2 | To cultivate students with necessary basic concepts and knowledge of electronics science and technology. | Critical thinking |
| PSO3 | To develop practical skills among students such as handling, using various electronics gadgets. | Lifelong learning |
| PSO4 | To train students to develop skills so that they can design, analyze, build and test various electronic gadgets. | Problem solving |
| PSO5 | To develop skills among the students to demonstrate the acquired knowledge | communication skill ,Reflective thinking & Cooperation/Team work |
| PSO6 | To encourage students to accept the challenges and threats of upcoming technological advancements. | Moral and ethical awareness/reasoning |

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Department of Electronic Science

Name of Program (with Specialization) - Bachelor of Science in Electronic science

| Title of Course | CO. No. | Course Outcomes |
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| | | After successful completion of this Course a student will be able to |
| Paper-I (EL-111): Basics of Applied Electronics | CO1 | To identify different parameters/functions/specifications of components used in electronic circuits. (Understanding) |
| | CO2 | To solve problems based on network theorems. (Analyzing) |
| | CO3 | To perform simulations using simulator for analyzing network performance. (Understanding, thinking,Applying and reasoning) |
| Paper-II (EL-112): Electronic Devices and Circuits | CO1 | To analyze performance parameters based on study of characteristics of electronic devices like diode, transistors etc.(Understanding) |
| | CO2 | To choose proper electronic devices as per the need of application (Remembering) |
| | CO3 | To perform simulations for designing and analyzing diode/transistor circuits. (Understanding,thinking,Applying, reasoning and Evaluating) |
| Practical Course-I (EL- 113): ELECTRONICS LAB Sem-I | CO4 | To build and test the circuits like street light controller using electronic devices.(Understanding, Applying and Evaluating) |
| | CO1 | To identify different components and devices as well as their types. (Remembering) |
| | CO2 | To understand basic parameters associated with each device. (Understanding) |
| | CO3 | To know operation of different instruments used in the laboratory. (Remembering) |
| | CO4 | To connect circuit and do required performance analysis.(Understanding) |
| Paper-I (EL-121): Fundamentals of Digital Electronics Sem-II | CO5 | To compare simulated and actual results of given particular experiment. (Understanding, thinking,Applying , reasoning and Evaluating) |
| | CO1 | To solve problems based on inter conversion of number systems. (Understanding) |
| | CO2 | To reduce the expression using Boolean theorems.(Analyzing) |
| | CO3 | To reduce expressions using K maps in SOP and POS forms(Understanding, Remembering) |
| | CO4 | To understand how to use flip flops to build modulus counter(Creating, analyzing) |
| | CO5 | To familiarize with applications of counters like ring counter or event counter.(Evaluating) |

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| Paper-II (EL-122): Analog and Digital Device applications | CO1 | To compare different op-amp as per specifications or performance parameters.(Remembering) |
| | CO2 | To understand op-amp circuits and its usefulness indifferent applications.(Understanding, Remembering) |
| | CO3 | To know operating principle of IC 555 indifferent configurations. |
| | CO4 | To understand different types of DAC and their performance parameters.(Analyzing) |
| | CO5 | To study different types of ADC and their performance parameters.(Analyzing) |
| Practical Course-II (EL-123): ELECTRONICS LAB | CO1 | To connect op-amp circuits and analyze the output.(creating, analyzig) |
| | CO2 | To build application circuits of op-amp.(creating, analyzig) |
| | CO3 | To design the output frequency of IC 555 as a astable/monostable multivibrator. |
| | CO4 | To compare simulated and actual results of given circuit.(Understanding, thinking,Applying and reasoning) |
| S. Y. B. Sc. (CBCS): Paper – I (EL-231): Communication Electronics | CO1 | Understand basics of communication electronics. |
| | CO2 | Understand techniques of communication. |
| | CO3 | Able to differentiate between different modulation techniques..(creating, analyzig) |
| | CO4 | Identify the application areas of each communication technique(remembering) |
| Paper – II (EL-232): Digital Circuit Design | CO1 | Able to compare different logic families.(remembering) |
| | CO2 | Understand design procedure of combination logic circuit.(Understanding) |
| | CO3 | Understand design procedure of sequential logic circuit.(Understanding) |
| | CO4 | Able to understand types of DAC and ADC.(thinking) |
| Practical Course-I (EL-233): ELECTRONICS LAB | CO1 | Understand basic skill development techniques.(applying) |
| | CO2 | Able to design and develop different analog and digital systems as per application.(Creating) |
| | CO3 | Familiarity with different communication systems and techniques of modulation and demodulation.(understanding) |
| | CO4 | Skill and logic development through different activities like project or PLE (Understanding, thinking,Applying , reasoning and Evaluating) |
| Paper-I (EL-241): Analog Circuit Design | CO1 | Develop an ability to design amplifier circuit with given specification.(Understanding, thinking,Applying , reasoning and Evaluating) |
| | CO2 | Understand and able to differentiate different types of power amplifier and their applications.(evaluation) |
| | CO3 | Able to design different application circuits using operational amplifier.(creating, analyzing) |
| | CO4 | Understand systematic approach of designing analogy systems.(Understanding) |

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| Paper-II (EL-242): Microcontroller and Python Programming | CO1 | Understand basics of Arduino board architecture.(Understanding) |
| | CO2 | Understand programming technique of Arduino.(Understanding) |
| | CO3 | Understand basics of python programming.(Understanding) |
| | CO4 | Able to develop an Arduino based applications using python programming.(Creating) |
| Practical Course-II(EL-243): ELECTRONICS LAB | CO1 | Understand basic skill development techniques.(Understanding) |
| | CO2 | Able to design and develop different analog and digital systems as per application.(Creating) |
| | CO3 | Familiarity with different communication systems and techniques of modulation and demodulation.(Understanding) |
| | CO4 | Skill and logic development through different activities like project or PLE.(critical thinking) |
| T.Y.B.Sc: EL 351: Paper I: Digital Design using VERILOG | CO1 | Know and understand structure of HDL and Verilog. (understanding) |
| | CO2 | Understand different modeling styles in Verilog (understanding) |
| | CO3 | Use Verilog effectively for simulation, verification and synthesis of digital system. .(critical thinking) |
| | CO4 | Understand basics of programmable logic devices. (understanding) |
| EL 352:Paper II: Microcontroller Architecture and Programming | CO1 | Understand the basics of microcontroller. (understanding) |
| | CO2 | Acquire basic programming skills in C language. (analysis) |
| | CO3 | Understand and acquire basic programming skills for AVR microcontroller. (Understanding, applying) |
| EL 353 Paper III: Analog circuit Design and Applications | CO1 | Understand basics of analog circuit design. (remembering) |
| | CO2 | Analyze waveform generators required for testing different circuits.(analysis) |
| | CO3 | Build application circuits using specialized ICs.(remembering) |
| | CO4 | Design analog systems using available ICs. (applying) |
| EL 354: Paper IV: Nanoelectronics | CO1 | Understand basic concepts of nano electronic devices and nano- technology.(understanding) |
| | CO2 | Understand the electron transport mechanism in nanostructures.(understanding) |
| | CO3 | Understand techniques of characterization of nanostructures.(remembering) |
| | CO4 | Understand different devices constructed using nanotechnology(understanding) |
| EL 355: Paper V: Signals and Systems | CO1 | Know basics of electronic signals.(understanding) |
| | CO2 | Know different types of systems.(understanding) |
| | CO3 | Analyze systems using Laplace and Fourier analysis.(analyzing) |
| | CO4 | Understand digital signal processing system. (understanding) |

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| EL 356(A): Paper VI(A): Optics and Fiber Optic Communication | CO1 | To acquire Knowledge of optical fiber communication system.(understanding, analysis) |
| | CO2 | To understand different parameters of optical fibers.(remembering) |
| | CO3 | To learn essential optical components of Fiber Optic Communication.(remembering) |
| | CO4 | To analyze and integrate fiber optical network components in variety of networking schemes(analyze) |
| EL 357: Paper VII: Practical Course I | CO1 | Analyze different design and test procedures for analog circuits and systems.(remembering) |
| | CO2 | Measure different parameters of optical fiber communication systems(understanding) |
| | CO3 | Understand importance of product design and entrepreneurship.(applying) |
| | CO4 | Develop electronic systems for given application. (applying) |
| EL 358: Paper VIII: Practical Course II | CO1 | Develop and simulate design digital systems using Verilog.(critical thinking) |
| | CO2 | Design and develop AVR microcontroller based systems.(critical thinking) |
| | CO3 | Understand different nanoelectronic devices.(remembering) |
| | CO4 | Inculcate basic skills required for design and development of embedded. (reasoning) |
| EL 359: Paper IX: Practical Course III (Project) | CO1 | Understand basic methodology of selection of topic for project.(critical thinking) |
| | CO2 | Understand how to do literature review for selected topic for project.(analyze) |
| | CO3 | Apply the knowledge for design and development of the selected project.(applying) |
| | CO4 | Use different software and hardware for testing, validation and verification of circuits for successful outcome of project(remembering, understanding) |
| | CO5 | Understand documentation process in the form of presentation and project report (understanding) |
| | CO6 | Understand process of systematic development of electronic system and Development of skills for successful outcome (applying) |
| ELSEC 351: Paper X: SEC1: Electronic Design Automation Tools | CO1 | Design the electronics circuits using EDA software tools(applying) |
| | CO2 | Simulate various analog and digital circuits using EDA software tools(applying) |
| | CO3 | Plot various waveforms.(analysis) |
| | CO4 | Simulate basic electronic system blocks(evaluating) |
| ELSEC 352: Paper XI: SEC2: Internet of Things and Applications | CO1 | Know the basic building blocks of IoT(understanding) |
| | CO2 | Know IoT protocols(remembering) |
| | CO3 | Understand how to Design and Develop IoT based system through case studies. (analysis) |

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| T.Y.B.Sc: EL 361: Paper I: Modern Communication Systems | CO1 | Understand the digital modulation techniques.(analysis) |
| | CO2 | Understand different types of pulse modulation techniques.(understanding) |
| | CO3 | Describe the evolution and importance of Mobile communication and cellular communication(evaluating) |
| | CO4 | Know the basics of satellite communication systems. (analyze) |
| T.Y.B.Sc: EL 362: Paper II: Embedded System Design using Microcontrollers | CO1 | Understand features and architecture of PIC microcontroller.(understanding) |
| | CO2 | Demonstrate how to interface PIC microcontroller with different peripherals.(evaluating) |
| | CO3 | Understand features and architecture of ARM microcontroller.(remembering) |
| | CO4 | Demonstrate embedded system using given microcontroller(reasoning) |
| T.Y.B.Sc: EL 363: Paper III: Industrial Electronics | CO1 | Understand basics of semiconductor power devices.(understanding) |
| | CO2 | Analyze basic power electronics circuits and demonstrate applications.(analyze) |
| | CO3 | Understand basics of motor control.(remembering) |
| | CO4 | Understand basics of Electric Vehicle systems.(understanding) |
| T.Y.B.Sc: EL 364: Paper IV: Manufacturing Processes for Electronics | CO1 | Understand basics of Passive Electronic Component Manufacturing Processes(remembering, analyzing) |
| | CO2 | Understand process involved in PCB manufacture and Modern Circuit Assembly(remembering) |
| | CO3 | Know about the Semiconductor Device and IC Fabrication Process(remembering) |
| T.Y.B.Sc: EL 365: Paper V: Process Control Systems | CO1 | Familiar with different types of sensors and related systems(understanding) |
| | CO2 | Know different types of measurement systems.(understanding) |
| | CO3 | Understand control parameters in process automation.(analyzing) |
| | CO4 | Understand different types of process control systems and their characteristics(analyzing) |
| EL 366(A): Paper VI (A): PLC and SCADA | CO1 | Know about the basics of programmable logic controllers and their components.(understanding) |
| | CO2 | Demonstrate PLC programming using ladder programming.(critical thinking) |
| | CO3 | Develop PLC based systems by programming different components in PLC(critical thinking) |
| EL 367: Paper VII: Practical Course I | CO1 | Demonstrate power electronic circuits.(remembering) |
| | CO2 | Demonstrate different types of digital communication systems.(remembering) |
| | CO3 | Understand working principles of different power devices and their characteristics(remembering) |
| EL 368: Paper VIII: Practical Course II | CO1 | Design embedded systems using PIC microcontroller.(evaluating) |
| | CO2 | Design embedded systems using ARM microcontroller.(analyze, evaluating) |
| | CO3 | Demonstrate PLC SCADA using ladder programming.(remembering, understand) |
| | CO4 | Design and develop sensor systems for different applications(evaluating, analyzing) |

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| EL 369: Paper IX: Practical Course III (Project) | CO1 | Understand basic methodology of selection of topic for project.(Understanding) |
| | CO2 | Understand how to do literature review for selected topic for project,(Understanding, remembering) |
| | CO3 | Apply the knowledge for design and development of the selected project.(applying) |
| | CO4 | Use different software and hardware for testing, validation and verification of (applying) |
| ELSEC 361: Paper X SEC1: Design of Printed Circuit Boards | CO1 | Understand basics of PCB.(understanding, remembering) |
| | CO2 | Know about the PCB design technology.(applying) |
| | CO3 | Know about different soldering techniques.(applying) |
| ELSEC 362: Paper XI: SEC2: Mobile Application Development | CO1 | Understand basics of Mobile application development.(remembering) |
| | CO2 | Develop ability to work in android development environment.(applying) |
| | CO3 | Design and develop mobile applications.(critical thinking) |