Department of Electronics

COs & PSOs with relevance to local/regional needs, national needs and global needs

Chart 1:

Sr. No.	Course Code	Course/SECs Titles (Proposed new)	Year of Introduction	COs & PSOs with relevance to local/regional needs	COs & PSOs with relevance to national needs	COs & PSOs with relevance to global needs
1	DSC-1005A1	Network Analysis	2018-19	CO1: Able to analyse and solve complex electrical circuits by applying fundamental laws CO2: Able to analyse and understand the behaviour of linear electrical circuits with two ports CO3: Understand diode operation, characteristics, and applications, enabling them to analyse and design basic electronic circuits involving diodes. CO4: Understanding principles of power supply design, calculating voltage and current requirements, and practical knowledge of rectification and voltage regulation techniques	CO1: Able to analyse and solve complex electrical circuits by applying fundamental laws CO2: Able to analyse and understand the behaviour of linear electrical circuits with two ports CO3: Understand diode operation, characteristics, and applications, enabling them to analyse and design basic electronic circuits involving diodes. CO4: Understanding principles of power supply design, calculating voltage and current requirements, and practical knowledge of rectification and voltage regulation techniques	CO1: Able to analyse and solve complex electrical circuits by applying fundamental laws CO2: Able to analyse and understand the behaviour of linear electrical circuits with two ports CO3: Understand diode operation, characteristics, and applications, enabling them to analyse and design basic electronic circuits involving diodes. CO4: Understanding principles of power supply design, calculating voltage and current requirements, and practical knowledge of rectification and voltage regulation techniques
2	DSC-1005A2	Analog Electronics-I	2018-19	CO1: Able to understand BJT structure, operation, biasing, and applications in amplification and switching circuits in electronic systems." CO2: Principles of operation, characteristics, and practical applications of unipolar devices, such as JFETs, for electronic circuit design and analysis. CO3: Understanding transistor structure, operation, different transistor amplifier configurations, and designing circuits for amplification. CO4: Understand the principles of feedback in amplifiers, different feedback circuits, and comprehend the operation of oscillators.	CO1: Able to understand BJT structure, operation, biasing, and applications in amplification and switching circuits in electronic systems." CO2: Principles of operation, characteristics, and practical applications of unipolar devices, such as JFETs, for electronic circuit design and analysis. CO3: Understanding transistor structure, operation, different transistor amplifier configurations, and designing circuits for amplification. CO4: Understand the principles of feedback in amplifiers, different feedback circuits, and comprehend the operation of oscillators.	CO1: Able to understand BJT structure, operation, biasing, and applications in amplification and switching circuits in electronic systems." CO2: Principles of operation, characteristics, and practical applications of unipolar devices, such as JFETs, for electronic circuit design and analysis. CO3: Understanding transistor structure, operation, different transistor amplifier configurations, and designing circuits for amplification. CO4: Understand the principles of feedback in amplifiers, different feedback circuits, and comprehend the operation of oscillators.

3	DSC-1005B1	Linear Integrated Circuits	2018-19	CO1: Fundamental principles, characteristics, and applications of operational amplifiers (op-amps) CO2: Understanding of the 555 timer IC, its internal block diagram, and operation as an astable, monostable and bistable multivibrator. CO3: Analyse, design, and optimize these circuits for various combinational circuits like, multiplexers, dumultiplexer, encoder and decoders for digital system design application. CO4: Understand the principles, types, and importance of resolution of digital-to-analog and analog-to-digital conversion.	CO1: Fundamental principles, characteristics, and applications of operational amplifiers (op-amps) CO2: Understanding of the 555 timer IC, its internal block diagram, and operation as an astable, monostable and bistable multivibrator. CO3: Analyse, design, and optimize these circuits for various combinational circuits like, multiplexers, dumultiplexer, encoder and decoders for digital system design application. CO4: Understand the principles, types, and importance of resolution of digital-to-analog and analog-to-digital conversion.	CO1: Fundamental principles, characteristics, and applications of operational amplifiers (op-amps) CO2: Understanding of the 555 timer IC, its internal block diagram, and operation as an astable, monostable and bistable multivibrator. CO3: Analyse, design, and optimize these circuits for various combinational circuits like, multiplexers, dumultiplexer, encoder and decoders for digital system design application. CO4: Understand the principles, types, and importance of resolution of digital-to-analog and analog-to-digital conversion.
4	DSC-1005B2	Digital Integrated Circuits VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous) ESTD JUNE 1964	2018-19	CO1: fundamental understanding of how numbers are represented and manipulated in different bases, as well as how to perform arithmetic operations using binary, octal, and hexadecimal numbering systems CO2: fundamental principles of logic gates and their applications in circuit design, demonstrate proficiency in Boolean algebra operations, simplifying and optimizing logical expressions CO3: fundamental principles of sequential logic, including the concepts of flip-flops, types of flip-flop, latches, clocking, and state machines. CO4: design and analyse of shift registers and counters, including various types such as parallel load operation and ring counter.	CO1: fundamental understanding of how numbers are represented and manipulated in different bases, as well as how to perform arithmetic operations using binary, octal, and hexadecimal numbering systems CO2: fundamental principles of logic gates and their applications in circuit design, demonstrate proficiency in Boolean algebra operations, simplifying and optimizing logical expressions CO3: fundamental principles of sequential logic, including the concepts of flip-flops, types of flip-flop, latches, clocking, and state machines. CO4: design and analyse of shift registers and counters, including various types such as parallel load operation and ring counter.	CO1: fundamental understanding of how numbers are represented and manipulated in different bases, as well as how to perform arithmetic operations using binary, octal, and hexadecimal numbering systems CO2: fundamental principles of logic gates and their applications in circuit design, demonstrate proficiency in Boolean algebra operations, simplifying and optimizing logical expressions CO3: fundamental principles of sequential logic, including the concepts of flip-flops, types of flip-flop, latches, clocking, and state machines. CO4: design and analyse of shift registers and counters, including various types such as parallel load operation and ring counter.
5	DSC 1005C1	Electronics Communication	2019-20	CO1: Understanding of principles and technologies related to electronic communication systems. CO2: Understand the principles of analog modulation techniques, such as AM and FM, and learn to demodulate	CO1: Understanding of principles and technologies related to electronic communication systems. CO2: Understand the principles of analog modulation techniques, such as AM and FM, and learn to demodulate	CO1: Understanding of principles and technologies related to electronic communication systems. CO2: Understand the principles of analog modulation techniques, such as AM and FM, and learn to demodulate

				signals. CO3: Understand the impact of modulation parameters (e.g. modulation index, deviation) on signal characteristics. CO4: Understand the principles of satellite communication, including orbit types, transponders, and satellite system design.	signals. CO3: Understand the impact of modulation parameters (e.g. modulation index, deviation) on signal characteristics. CO4: Understand the principles of satellite communication, including orbit types, transponders, and satellite system design.	signals. CO3: Understand the impact of modulation parameters (e.g. modulation index, deviation) on signal characteristics. CO4: Understand the principles of satellite communication, including orbit types, transponders, and satellite system design.
6	DSC 1005C2	Microprocessor 8085	2019-20	CO1: Fundamental principles of microcomputer organization, including CPU architecture, memory systems, input/output interfaces, and bus structures. CO2: Identify Architecture and operation of the 8085 microprocessor CO3: Demonstrate a comprehensive understanding of the various instructions in the 8085 Microprocessor instruction set. CO4: Proficient in writing 8085 assembly language programs to solve a variety of computational problems.	CO1: Fundamental principles of microcomputer organization, including CPU architecture, memory systems, input/output interfaces, and bus structures. CO2: Identify Architecture and operation of the 8085 microprocessor CO3: Demonstrate a comprehensive understanding of the various instructions in the 8085 Microprocessor instruction set. CO4: Proficient in writing 8085 assembly language programs to solve a variety of computational problems.	CO1: Fundamental principles of microcomputer organization, including CPU architecture, memory systems, input/output interfaces, and bus structures. CO2: Identify Architecture and operation of the 8085 microprocessor CO3: Demonstrate a comprehensive understanding of the various instructions in the 8085 Microprocessor instruction set. CO4: Proficient in writing 8085 assembly language programs to solve a variety of computational problems.
7	DSC 1005D1	Advance Communication	2019-20	CO1: Understanding of analog pulse modulation techniques such as Pulse Amplitude Modulation, Pulse Width Modulation, and Pulse Position Modulation. CO2: Identify the Principals of Digital Modulation and Data Communication techniques CO3: Understanding of the architecture, components, and operation of mobile telephony systems, including both cellular networks and mobile devices. CO4: Understand the mobile communication protocols and wireless technologies.	CO1: Understanding of analog pulse modulation techniques such as Pulse Amplitude Modulation, Pulse Width Modulation, and Pulse Position Modulation. CO2: Identify the Principals of Digital Modulation and Data Communication techniques CO3: Understanding of the architecture, components, and operation of mobile telephony systems, including both cellular networks and mobile devices. CO4: Understand the mobile communication protocols and wireless technologies.	CO1: Understanding of analog pulse modulation techniques such as Pulse Amplitude Modulation, Pulse Width Modulation, and Pulse Position Modulation. CO2: Identify the Principals of Digital Modulation and Data Communication techniques CO3: Understanding of the architecture, components, and operation of mobile telephony systems, including both cellular networks and mobile devices. CO4: Understand the mobile communication protocols and wireless technologies.
8	DSC 1005D2	Microcontroller 8051	2019-20	CO1: Identify the building blocks of 8051 microcontroller. CO2: Write assembly language program	CO1: Identify the building blocks of 8051 microcontroller. CO2: Write assembly language program	CO1: Identify the building blocks of 8051 microcontroller. CO2: Write assembly language program

				for 8051 microcontroller. CO3: Demonstrate Timer, Counter & Serial Port Programming with 8051 microcontroller. CO4: Develop the skills to interface and communicate with external devices.	for 8051 microcontroller. CO3: Demonstrate Timer, Counter & Serial Port Programming with 8051 microcontroller. CO4: Develop the skills to interface and communicate with external devices.	for 8051 microcontroller. CO3: Demonstrate Timer, Counter & Serial Port Programming with 8051 microcontroller. CO4: Develop the skills to interface and communicate with external devices.
9	DSE 1005E1	Section I- Linear Integrated Circuits,	2020-21	CO.1Understand the fundamentals of Operational Amplifier. CO.2 Design various linear and nonlinear circuits using Op-amp. CO.3 Understand the fundamentals of rectifiers and filters circuits using Op-amp. CO.4 Understand applications of Phase Locked Loops (PLL).	CO.1Understand the fundamentals of Operational Amplifier. CO.2 Design various linear and nonlinear circuits using Op-amp. CO.3 Understand the fundamentals of rectifiers and filters circuits using Op-amp. CO.4 Understand applications of Phase Locked Loops (PLL).	CO.1Understand the fundamentals of Operational Amplifier. CO.2 Design various linear and nonlinear circuits using Op-amp. CO.3 Understand the fundamentals of rectifiers and filters circuits using Op-amp. CO.4 Understand applications of Phase Locked Loops (PLL).
		Section II- 8051 Microcontroller Interfacing and Embedded C		CO.1 Understand the fundamentals and areas of applications for 8051 microcontroller. CO.2 Interface I/O devices to 8051. CO.3 Understand serial communication facility in 8051. CO.4 Design monitoring and control circuits with 8051.	CO.1 Understand the fundamentals and areas of applications for 8051 microcontroller. CO.2 Interface I/O devices to 8051. CO.3 Understand serial communication facility in 8051. CO.4 Design monitoring and control circuits with 8051.	CO.1 Understand the fundamentals and areas of applications for 8051 microcontroller. CO.2 Interface I/O devices to 8051. CO.3 Understand serial communication facility in 8051. CO.4 Design monitoring and control circuits with 8051.
10	DSE 1005E2	Section I - Instrumentation, Antenna	2020-21	CO.1 Classify and explain transducers with examples, including those for measurement of temperature, flow, motion, position and light. CO.2 Knowledge of sensor and Actuators CO.3Analyze the performance characteristics of each instrument CO.4 Illustrate basic Digital instruments such as Digital voltmeters and Multimeter, Bio- Medical Instrument	CO.1 Classify and explain transducers with examples, including those for measurement of temperature, flow, motion, position and light. CO.2 Knowledge of sensor and Actuators CO.3Analyze the performance characteristics of each instrument CO.4 Illustrate basic Digital instruments such as Digital voltmeters and Multimeter, Bio- Medical Instrument	CO.1 Classify and explain transducers with examples, including those for measurement of temperature, flow, motion, position and light. CO.2 Knowledge of sensor and Actuators CO.3Analyze the performance characteristics of each instrument CO.4 Illustrate basic Digital instruments such as Digital voltmeters and Multimeter, Bio- Medical Instrument
		Section II- Wave Propagation		CO.1 Apply the principles of electromagnetic to explain antenna characteristics such as radiation pattern and directivity. CO.2 Understand the structure and working of special antennas such as	CO.1 Apply the principles of electromagnetic to explain antenna characteristics such as radiation pattern and directivity. CO.2 Understand the structure and working of special antennas such as	CO.1 Apply the principles of electromagnetic to explain antenna characteristics such as radiation pattern and directivity. CO.2 Understand the structure and working of special antennas such as

				Dipole antenna, Yagi-Uda antenna and Microstrip patch antennas. CO.3 Identify the suitable antenna for a given communication system. CO.4 Be familiar with the basic propagations namely ground wave propagation, free space propagation and sky wave propagation.	Dipole antenna, Yagi-Uda antenna and Microstrip patch antennas. CO.3 Identify the suitable antenna for a given communication system. CO.4 Be familiar with the basic propagations namely ground wave propagation, free space propagation and sky wave propagation.	Dipole antenna, Yagi-Uda antenna and Microstrip patch antennas. CO.3 Identify the suitable antenna for a given communication system. CO.4 Be familiar with the basic propagations namely ground wave propagation, free space propagation and sky wave propagation.
11	SEC-3	Renewable energy	2020-21	CO.1 To understand the Need, importance and scope of non-conventional and alternate energy resources. CO.2 To understand role significance of solar energy & Wind Energy. CO.3 To understand the role of ocean energy in the Energy Generation. CO.4 To understand the concept of energy Conservation.	CO.1 To understand the Need, importance and scope of non-conventional and alternate energy resources. CO.2 To understand role significance of solar energy & Wind Energy. CO.3 To understand the role of ocean energy in the Energy Generation. CO.4 To understand the concept of energy Conservation.	CO.1 To understand the Need, importance and scope of non-conventional and alternate energy resources. CO.2 To understand role significance of solar energy & Wind Energy. CO.3 To understand the role of ocean energy in the Energy Generation. CO.4 To understand the concept of energy Conservation.
12	DSE 1005F1	Section I- Industrial Process Control, PLC Programming	2020-21	CO.1Describe typical concepts and components of a Programmable Logic Controller. CO.2 Use timer, counter, and other intermediate programming functions. CO.3 Design and program basic PLC circuits for entry-level PLC applications. CO.4 Explain and apply the concept of electrical ladder logic, its history, and its relationship to programmed PLC instruction.	CO.1Describe typical concepts and components of a Programmable Logic Controller. CO.2 Use timer, counter, and other intermediate programming functions. CO.3 Design and program basic PLC circuits for entry-level PLC applications. CO.4 Explain and apply the concept of electrical ladder logic, its history, and its relationship to programmed PLC instruction.	CO.1Describe typical concepts and components of a Programmable Logic Controller. CO.2 Use timer, counter, and other intermediate programming functions. CO.3 Design and program basic PLC circuits for entry-level PLC applications. CO.4 Explain and apply the concept of electrical ladder logic, its history, and its relationship to programmed PLC instruction.
		Section II- Advanced Microcontroller and Embedded System		CO.1 Understand the architecture and function of each pin of AVR 8-bit Microcontroller. CO.2 Write, debug and simulate embedded C language programs. CO.3 Understand Timer operation, Interrupt environment and Serial Communication. CO.4 Understand the interfacing of various systems with AVR microcontroller	CO.1 Understand the architecture and function of each pin of AVR 8-bit Microcontroller. CO.2 Write, debug and simulate embedded C language programs. CO.3 Understand Timer operation, Interrupt environment and Serial Communication. CO.4 Understand the interfacing of various systems with AVR microcontroller	CO.1 Understand the architecture and function of each pin of AVR 8-bit Microcontroller. CO.2 Write, debug and simulate embedded C language programs. CO.3 Understand Timer operation, Interrupt environment and Serial Communication. CO.4 Understand the interfacing of various systems with AVR microcontroller

13	DSE 1005F2	Section I- Power Electronics	2020-21	CO.1Understand the fundamentals of Power semiconductor devices CO.2Understand the types, characteristics, and applications of Thyristors CO.3Understand and analyse performance of controlled and uncontrolled converters. CO.4Familiarize with different applications of Power Electronics.	CO.1Understand the fundamentals of Power semiconductor devices CO.2Understand the types, characteristics, and applications of Thyristors CO.3Understand and analyse performance of controlled and uncontrolled converters. CO.4Familiarize with different applications of Power Electronics.	CO.1Understand the fundamentals of Power semiconductor devices CO.2Understand the types, characteristics, and applications of Thyristors CO.3Understand and analyse performance of controlled and uncontrolled converters. CO.4Familiarize with different applications of Power Electronics.
		Section II- FPGA & VHDL Programming		CO.1Understand the fundamentals of programmable logic devices. CO.2 Understand the syntax and behaviour of the VHDL language. CO.3 Use modern development tools to design complex digital circuits CO.4 Simulate and make a synthesis of extensive designs in so called "Field Programmable Gate Array" (FPGA).	CO.1Understand the fundamentals of programmable logic devices. CO.2 Understand the syntax and behaviour of the VHDL language. CO.3 Use modern development tools to design complex digital circuits CO.4 Simulate and make a synthesis of extensive designs in so called "Field Programmable Gate Array" (FPGA).	CO.1Understand the fundamentals of programmable logic devices. CO.2 Understand the syntax and behaviour of the VHDL language. CO.3 Use modern development tools to design complex digital circuits CO.4 Simulate and make a synthesis of extensive designs in so called "Field Programmable Gate Array" (FPGA).
14	SEC-4	Introduction to Arduino and IoT	2020-21	CO.1 Students will be familiarizing with Arduino Board & Accessories. CO.2 Students will be familiarizing with interfacing with display devices and sensors. CO.3 Students will be able design some IoT based prototypes CO.4 Understand the physical and logical design on IoT.	CO.1 Students will be familiarizing with Arduino Board & Accessories. CO.2 Students will be familiarizing with interfacing with display devices and sensors. CO.3 Students will be able design some IoT based prototypes CO.4 Understand the physical and logical design on IoT.	CO.1 Students will be familiarizing with Arduino Board & Accessories. CO.2 Students will be familiarizing with interfacing with display devices and sensors. CO.3 Students will be able design some IoT based prototypes CO.4 Understand the physical and logical design on IoT.
15	DSC-1005A1	Analog Electronics-I	2021-22	CO1: Identify and explain electrical components and determine the value of resistor, inductor and capacitor using color code method. CO2: Understand the basic properties of electrical elements, and solve DC circuit analysis problems, DC network theorems. CO3: Acquire the knowledge about the characteristics and working principles of PN junction diode, Zener diode, photo diode, LED and different diode applications.	CO1: Identify and explain electrical components and determine the value of resistor, inductor and capacitor using color code method. CO2: Understand the basic properties of electrical elements, and solve DC circuit analysis problems, DC network theorems. CO3: Acquire the knowledge about the characteristics and working principles of PN junction diode, Zener diode, photo diode, LED and different diode applications.	CO1: Identify and explain electrical components and determine the value of resistor, inductor and capacitor using color code method. CO2: Understand the basic properties of electrical elements, and solve DC circuit analysis problems, DC network theorems. CO3: Acquire the knowledge about the characteristics and working principles of PN junction diode, Zener diode, photo diode, LED and different diode applications.

				CO4: Understanding and study of rectifier, filter and voltage regulator circuits.	CO4: Understanding and study of rectifier, filter and voltage regulator circuits.	CO4: Understanding and study of rectifier, filter and voltage regulator circuits.
16	DSC-1005A2	Digital Electronics-I	2021-22	CO1: Understanding the basics of Digital Electronics, different number systems, Binary Codes and signed representation of binary number. Also understand the conversion between different number systems and solve the binary arithmetic problems. CO2: Design and construction of the basic and universal logic gates and studying the Boolean algebra and simplification of Boolean expression using different methods. CO3: Understanding and comparing different logic families according IC specifications and their circuit configurations. CO4: Understand, analyse and design various combinational circuits.	CO1: Understanding the basics of Digital Electronics, different number systems, Binary Codes and signed representation of binary number. Also understand the conversion between different number systems and solve the binary arithmetic problems. CO2: Design and construction of the basic and universal logic gates and studying the Boolean algebra and simplification of Boolean expression using different methods. CO3: Understanding and comparing different logic families according IC specifications and their circuit configurations. CO4: Understand, analyse and design various combinational circuits.	CO1: Understanding the basics of Digital Electronics, different number systems, Binary Codes and signed representation of binary number. Also understand the conversion between different number systems and solve the binary arithmetic problems. CO2: Design and construction of the basic and universal logic gates and studying the Boolean algebra and simplification of Boolean expression using different methods. CO3: Understanding and comparing different logic families according IC specifications and their circuit configurations. CO4: Understand, analyse and design various combinational circuits.
17	DSC-1005B1	Analog Electronics-II	2021-22	CO1: Analyse output in different operating modes of Bipolar Junction Transistor and Demonstrate the operating principle and output characteristics of Bipolar Junction Transistor CO2: Explain construction and characteristics of JFETs, MOSFETs and UJT. CO3: Design biasing circuits for BJT and study different coupling methods used in multistage amplifiers CO4: Analyse the importance of feedback in amplifiers. Apply the knowledge gained in the design of transistorized circuits and Oscillators.	CO1: Analyse output in different operating modes of Bipolar Junction Transistor and Demonstrate the operating principle and output characteristics of Bipolar Junction Transistor CO2: Explain construction and characteristics of JFETs, MOSFETs and UJT. CO3: Design biasing circuits for BJT and study different coupling methods used in multistage amplifiers CO4: Analyse the importance of feedback in amplifiers. Apply the knowledge gained in the design of transistorized circuits and Oscillators.	CO1: Analyse output in different operating modes of Bipolar Junction Transistor and Demonstrate the operating principle and output characteristics of Bipolar Junction Transistor CO2: Explain construction and characteristics of JFETs, MOSFETs and UJT. CO3: Design biasing circuits for BJT and study different coupling methods used in multistage amplifiers CO4: Analyse the importance of feedback in amplifiers. Apply the knowledge gained in the design of transistorized circuits and Oscillators.
18	DSC-1005B2	Digital Electronics-I	2021-22	CO1: Understand, analyse and design various sequential circuits. CO2: Understanding the working of different shift registers and counters.	CO1: Understand, analyse and design various sequential circuits. CO2: Understanding the working of different shift registers and counters.	CO1: Understand, analyse and design various sequential circuits. CO2: Understanding the working of different shift registers and counters.

				CO3: Became able to know various types of analog to digital converters and digital to analog converters. CO4: Explain and compare the working of multivibrators using special application IC 555. Understanding and designing of multivibrator circuits.	CO3: Became able to know various types of analog to digital converters and digital to analog converters. CO4: Explain and compare the working of multivibrators using special application IC 555. Understanding and designing of multivibrator circuits.	CO3: Became able to know various types of analog to digital converters and digital to analog converters. CO4: Explain and compare the working of multivibrators using special application IC 555. Understanding and designing of multivibrator circuits.
19	DSC 1005C1	Electronic Communication	2022-23	CO1: Identify the basic concepts of electronic communication CO2: Identity different Modulation & Demodulation schemes for analog communications (AM, FM, PM) CO3: Illustrate the various analog Pulse Modulation techniques CO4: Identify the principals of Digital Modulation & Data Communication techniques	CO1: Identify the basic concepts of electronic communication CO2: Identity different Modulation & Demodulation schemes for analog communications (AM, FM, PM) CO3: Illustrate the various analog Pulse Modulation techniques CO4: Identify the principals of Digital Modulation & Data Communication techniques	CO1: Identify the basic concepts of electronic communication CO2: Identity different Modulation & Demodulation schemes for analog communications (AM, FM, PM) CO3: Illustrate the various analog Pulse Modulation techniques CO4: Identify the principals of Digital Modulation & Data Communication techniques
20	DSC 1005C2	Microprocessor 8085	2022-23	CO1: Identify various components of Microcomputer system CO2: Identify Architecture of 8085 microprocessor CO3: Familiar with instructions set and addressing modes of 8085 microprocessor CO4:Write assembly language programs for 8085 microprocessor	CO1: Identify various components of Microcomputer system CO2: Identify Architecture of 8085 microprocessor CO3: Familiar with instructions set and addressing modes of 8085 microprocessor CO4:Write assembly language programs for 8085 microprocessor	CO1: Identify various components of Microcomputer system CO2: Identify Architecture of 8085 microprocessor CO3: Familiar with instructions set and addressing modes of 8085 microprocessor CO4:Write assembly language programs for 8085 microprocessor
21	DSC 1005D1	Operational Amplifier	2022-23	CO1: Discuss the op-amps basic construction, characteristics, parameters, various configurations CO2: Design various linear and non-linear circuits using op-amp CO3: Design various waveform generators CO4: Design comparators and rectifiers using Op-amp.	CO1: Discuss the op-amps basic construction, characteristics, parameters, various configurations CO2: Design various linear and non-linear circuits using op-amp CO3: Design various waveform generators CO4: Design comparators and rectifiers using Op-amp.	CO1: Discuss the op-amps basic construction, characteristics, parameters, various configurations CO2: Design various linear and non-linear circuits using op-amp CO3: Design various waveform generators CO4: Design comparators and rectifiers using Op-amp.
22	DSC 1005D2	Microcontroller 8051	2022-23	CO1: Identify the building blocks of 8051 microcontroller CO2: write assembly program for 8051 microcontroller CO3: Demonstrate Timer & Counter programming with 8051 microcontroller	CO1: Identify the building blocks of 8051 microcontroller CO2: write assembly program for 8051 microcontroller CO3: Demonstrate Timer & Counter programming with 8051 microcontroller	CO1: Identify the building blocks of 8051 microcontroller CO2: write assembly program for 8051 microcontroller CO3: Demonstrate Timer & Counter programming with 8051 microcontroller

				CO4: Demonstrate serial & Interrupt programming with 8051 microcontroller	CO4: Demonstrate serial & Interrupt programming with 8051 microcontroller	CO4: Demonstrate serial & Interrupt programming with 8051 microcontroller
23	SEC-1	Electronic Circuit design and Simulation using Proteus	2022-23	CO1: Familiar with Proteus Simulation software CO2: Design circuit schematics CO3: Simulate and analyze Analog circuits CO4: Simulate and analyze Digital circuits	CO1: Familiar with Proteus Simulation software CO2: Design circuit schematics CO3: Simulate and analyze Analog circuits CO4: Simulate and analyze Digital circuits	CO1: Familiar with Proteus Simulation software CO2: Design circuit schematics CO3: Simulate and analyze Analog circuits CO4: Simulate and analyze Digital circuits
24	SEC-2	PCB (Printed circuit board) Designing and fabrication	2022-23	CO1: Understand fundamentals of PCB CO2: Create and design PCB CO3: Develop PCB CO4: Etch the PCB and assemble the circuit	CO1: Understand fundamentals of PCB CO2: Create and design PCB CO3: Develop PCB CO4: Etch the PCB and assemble the circuit	CO1: Understand fundamentals of PCB CO2: Create and design PCB CO3: Develop PCB CO4: Etch the PCB and assemble the circuit
25	DSE 1005E1	Fundamentals of Instrumentation	2023-24	CO1: understand the fundamentals of measurement and performance characteristics of instruments CO2: apply fundamental knowledge of Instrument for electrical measurements CO3: understand the principles, types, and selection criteria of transducers in various engineering applications. CO4: understand the concepts, principles and types of actuators	CO1: understand the fundamentals of measurement and performance characteristics of instruments CO2: apply fundamental knowledge of Instrument for electrical measurements CO3: understand the principles, types, and selection criteria of transducers in various engineering applications. CO4: understand the concepts, principles and types of actuators	CO1: understand the fundamentals of measurement and performance characteristics of instruments CO2: apply fundamental knowledge of Instrument for electrical measurements CO3: understand the principles, types, and selection criteria of transducers in various engineering applications. CO4: understand the concepts, principles and types of actuators
26	DSE 1005E2	8051 Microcontroller Interfacing	2023-24	CO1: program 8051microcontroller using Embedded C CO2: interface and control various input and output devices using microcontrollers CO3: understand and implement ADC and DAC interfacing techniques effectively CO4: interface various sensors to 8051microcontroller	CO1: program 8051microcontroller using Embedded C CO2: interface and control various input and output devices using microcontrollers CO3: understand and implement ADC and DAC interfacing techniques effectively CO4: interface various sensors to 8051microcontroller	CO1: program 8051microcontroller using Embedded C CO2: interface and control various input and output devices using microcontrollers CO3: understand and implement ADC and DAC interfacing techniques effectively CO4: interface various sensors to 8051microcontroller
27	DSE 1005E3	Antenna and Wave Propagation	2023-24	CO1: understand the fundamentals of antenna theory CO2: get familiarize with different parameters of antenna CO3: get familiarize with application of antenna according to types of antenna	CO1: understand the fundamentals of antenna theory CO2: get familiarize with different parameters of antenna CO3: get familiarize with application of antenna according to types of antenna	CO1: understand the fundamentals of antenna theory CO2: get familiarize with different parameters of antenna CO3: get familiarize with application of antenna according to types of antenna

VIVEKANAND COLLEGE KOLHAPUR (Empo... ...omous) ESTD JUNE 1964

				CO4: create awareness about the different types of propagation of radio waves at different frequencies	CO4: create awareness about the different types of propagation of radio waves at different frequencies	CO4: create awareness about the different types of propagation of radio waves at different frequencies
28	DSE 1005E4	Industrial Process Control	2023-24	CO1: understand the basics of control system CO2: understand the different types of controllers CO3: describe typical concepts and components of a Programmable Logic Controller CO4: understand Ladder programming and design basic PLC circuits for entry-level PLC applications	CO1: understand the basics of control system CO2: understand the different types of controllers CO3: describe typical concepts and components of a Programmable Logic Controller CO4: understand Ladder programming and design basic PLC circuits for entry-level PLC applications	CO1: understand the basics of control system CO2: understand the different types of controllers CO3: describe typical concepts and components of a Programmable Logic Controller CO4: understand Ladder programming and design basic PLC circuits for entry-level PLC applications
29	SEC- 3	Computer Network	2023-24	CO1: know the fundamentals of computer networks CO2: get familiarize with different public switched telephone networks CO3: apply knowledge of transmission media, multiplexing and telephone networks CO4: design and analyse the computer network protocols	CO1: know the fundamentals of computer networks CO2: get familiarize with different public switched telephone networks CO3: apply knowledge of transmission media, multiplexing and telephone networks CO4: design and analyse the computer network protocols	CO1: know the fundamentals of computer networks CO2: get familiarize with different public switched telephone networks CO3: apply knowledge of transmission media, multiplexing and telephone networks CO4: design and analyse the computer network protocols
30	DSE 1005F1	Industrial Instrumentation	2023-24	CO1: design and study different OP-AMP circuits CO2: design and implement active filter circuits CO3: distinguish analog and digital instruments CO4: design and implement VCO, V to F and V to F converter using different ICs	CO1: design and study different OP-AMP circuits CO2: design and implement active filter circuits CO3: distinguish analog and digital instruments CO4: design and implement VCO, V to F and V to F converter using different ICs	CO1: design and study different OP-AMP circuits CO2: design and implement active filter circuits CO3: distinguish analog and digital instruments CO4: design and implement VCO, V to F and V to F converter using different ICs
31	DSE 1005F2	Advanced Microcontroller	2023-24	CO1: understand the architecture and function of each pin of AVR 8-bit Microcontroller CO2: write, debug and simulate embedded C language programs CO3: understand Timer operation, Interrupt environment and Serial Communication CO4: understand the interfacing of	CO1: understand the architecture and function of each pin of AVR 8-bit Microcontroller CO2: write, debug and simulate embedded C language programs CO3: understand Timer operation, Interrupt environment and Serial Communication CO4: understand the interfacing of	CO1: understand the architecture and function of each pin of AVR 8-bit Microcontroller CO2: write, debug and simulate embedded C language programs CO3: understand Timer operation, Interrupt environment and Serial Communication CO4: understand the interfacing of

				various systems with AVR microcontroller	various systems with AVR microcontroller	various systems with AVR microcontroller
32	DSE 1005F3	Power Electronics,	2023-24	CO1: understand basic power electronic devices and their role in power conversion CO2: understand the types, characteristics, and applications of Thyristors CO3: understand and analyse performance of controlled and uncontrolled converters. CO4: understand working principles of Power Systems	CO1: understand basic power electronic devices and their role in power conversion CO2: understand the types, characteristics, and applications of Thyristors CO3: understand and analyse performance of controlled and uncontrolled converters. CO4: understand working principles of Power Systems	CO1: understand basic power electronic devices and their role in power conversion CO2: understand the types, characteristics, and applications of Thyristors CO3: understand and analyse performance of controlled and uncontrolled converters. CO4: understand working principles o Power Systems
33	DSE 1005F4	Internet of Things(IoT)	2023-24	CO1: gain knowledge about the architecture of IoT systems CO2: study the working principle of various types of sensors and actuators used in IoT applications CO3: explore wireless technologies for IoT and gain an overview of different IoT protocols CO4: explore cloud platforms used in IoT, including IoT dashboards and various cloud service providers	CO1: gain knowledge about the architecture of IoT systems CO2: study the working principle of various types of sensors and actuators used in IoT applications CO3: explore wireless technologies for IoT and gain an overview of different IoT protocols CO4: explore cloud platforms used in IoT, including IoT dashboards and various cloud service providers	CO1: gain knowledge about the architecture of IoT systems CO2: study the working principle of various types of sensors and actuators used in IoT applications CO3: explore wireless technologies for IoT and gain an overview of different IoT protocols CO4: explore cloud platforms used in IoT, including IoT dashboards and various cloud service providers
34	SEC-4	Embedded System Design using Arduino	2023-24	CO1: familiarize with Arduino Board & Accessories CO2: familiarize with Arduino software development environment CO3: interface the output devices LED, LCD with Arduino CO4: interface the different types of sensors with Arduino	CO1: familiarize with Arduino Board & Accessories CO2: familiarize with Arduino software development environment CO3: interface the output devices LED, LCD with Arduino CO4: interface the different types of sensors with Arduino	CO1: familiarize with Arduino Board & Accessories CO2: familiarize with Arduino software development environment CO3: interface the output devices LED, LCD with Arduino CO4: interface the different types of sensors with Arduino
35	DSC03ELE 11	ANALOG ELECTRONICS -I	2023-24	CO1: Identify and explain electrical components and determine the value of resistor, inductor and capacitor using color code method. CO2: Understand the basic properties of electrical elements, and solve DC circuit analysis problems, DC network theorems.	CO1: Identify and explain electrical components and determine the value of resistor, inductor and capacitor using color code method. CO2: Understand the basic properties of electrical elements, and solve DC circuit analysis problems, DC network theorems.	CO1: Identify and explain electrical components and determine the value of resistor, inductor and capacitor using color code method. CO2: Understand the basic properties of electrical elements, and solve DC circuit analysis problems, DC network theorems.

				CO3: Acquire the knowledge about the characteristics and working principles of PN junction diode, Zener diode, photo diode, LED and different diode applications. CO4: Understanding and study of rectifier, filter and voltage regulator circuits.	CO3: Acquire the knowledge about the characteristics and working principles of PN junction diode, Zener diode, photo diode, LED and different diode applications. CO4: Understanding and study of rectifier, filter and voltage regulator circuits.	CO3: Acquire the knowledge about the characteristics and working principles of PN junction diode, Zener diode, photo diode, LED and different diode applications. CO4: Understanding and study of rectifier, filter and voltage regulator circuits.
36	DSC03ELE 12	DIGITAL ELECTRONICS -I	2023-24	CO1: Understanding the basics of Digital Electronics, different number systems, Binary Codes and signed representation of binary number. Also understand the conversion between different number systems and solve the binary arithmetic problems. CO2: Design and construction of the basic and universal logic gates and studying the Boolean algebra and simplification of Boolean expression using different methods. CO3: Understanding and comparing different logic families according IC specifications and their circuit configurations. CO4: Understand, analyze and design various combinational circuits.	CO1: Understanding the basics of Digital Electronics, different number systems, Binary Codes and signed representation of binary number. Also understand the conversion between different number systems and solve the binary arithmetic problems. CO2: Design and construction of the basic and universal logic gates and studying the Boolean algebra and simplification of Boolean expression using different methods. CO3: Understanding and comparing different logic families according IC specifications and their circuit configurations. CO4: Understand, analyze and design various combinational circuits.	CO1: Understanding the basics of Digital Electronics, different number systems, Binary Codes and signed representation of binary number. Also understand the conversion between different number systems and solve the binary arithmetic problems. CO2: Design and construction of the basic and universal logic gates and studying the Boolean algebra and simplification of Boolean expression using different methods. CO3: Understanding and comparing different logic families according IC specifications and their circuit configurations. CO4: Understand, analyze and design various combinational circuits.
37	DSC03ELE 21	ANALOG ELECTRONICS -II	2023-24	CO1: Analyze output in different operating modes of Bipolar Junction Transistor and Demonstrate the operating principle and output characteristics of Bipolar Junction Transistor CO2: Explain construction and characteristics of JFETs, MOSFETs and UJT. CO3: Design biasing circuits for BJT and study different coupling methods used in multistage amplifiers CO4: Analyze the importance of feedback in amplifiers. Apply the knowledge gained in the design of	CO1: Analyze output in different operating modes of Bipolar Junction Transistor and Demonstrate the operating principle and output characteristics of Bipolar Junction Transistor CO2: Explain construction and characteristics of JFETs, MOSFETs and UJT. CO3: Design biasing circuits for BJT and study different coupling methods used in multistage amplifiers CO4: Analyze the importance of feedback in amplifiers. Apply the knowledge gained in the design of	CO1: Analyze output in different operating modes of Bipolar Junction Transistor and Demonstrate the operating principle and output characteristics of Bipolar Junction Transistor CO2: Explain construction and characteristics of JFETs, MOSFETs and UJT. CO3: Design biasing circuits for BJT and study different coupling methods used in multistage amplifiers CO4: Analyze the importance of feedback in amplifiers. Apply the knowledge gained in the design of

				transistorized circuits and Oscillators.	transistorized circuits and Oscillators.	transistorized circuits and Oscillators.
38	DSC03ELE 22	DIGITAL ELECTRONICS -II	2023-24	CO1: Understand, analyze and design various sequential circuits. CO2: Understanding the working of different shift registers and counters. CO3: Became able to know various types of analog to digital converters and digital to analog converters. CO4: Explain and compare the working of multivibrators using special application IC 555. Understanding and designing of multivibrator circuits.	CO1: Understand, analyze and design various sequential circuits. CO2: Understanding the working of different shift registers and counters. CO3: Became able to know various types of analog to digital converters and digital to analog converters. CO4: Explain and compare the working of multivibrators using special application IC 555. Understanding and designing of multivibrator circuits.	CO1: Understand, analyze and design various sequential circuits. CO2: Understanding the working of different shift registers and counters. CO3: Became able to know various types of analog to digital converters and digital to analog converters. CO4: Explain and compare the working of multivibrators using special application IC 555. Understanding and designing of multivibrator circuits.
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VIVEKANAND COLLEGE KOLHAPUR ESTD JUNE 1964 (Empowered Autonomous)

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42	MIN03ELE 22	DIGITAL ELECTRONICS -II VIVEKANAND COLLEGE KOLHAPUR ESTD JUNE 1964 (Empowered Autonomous)	2023-24	CO1: Understand, analyze and design various sequential circuits. CO2: Understanding the working of different shift registers and counters. CO3: Became able to know various types of analog to digital converters and digital to analog converters. CO4: Explain and compare the working of multivibrators using special application IC 555. Understanding and designing of multivibrator circuits.	CO1: Understand, analyze and design various sequential circuits. CO2: Understanding the working of different shift registers and counters. CO3: Became able to know various types of analog to digital converters and digital to analog converters. CO4: Explain and compare the working of multivibrators using special application IC 555. Understanding and designing of multivibrator circuits.	CO1: Understand, analyze and design various sequential circuits. CO2: Understanding the working of different shift registers and counters. CO3: Became able to know various types of analog to digital converters and digital to analog converters. CO4: Explain and compare the working of multivibrators using special application IC 555. Understanding and designing of multivibrator circuits.
43	OEC03EL E11	CIRCUIT FUNDAMENT ALS-I	2023-24	CO1: Understand the fundamental concepts of electricity CO2: Analyze DC resistive circuits involving series and parallel combinations of resistances CO3: Understand Kirchhoff's laws,	CO1: Understand the fundamental concepts of electricity CO2: Analyze DC resistive circuits involving series and parallel combinations of resistances CO3: Understand Kirchhoff's laws,	CO1: Understand the fundamental concepts of electricity CO2: Analyze DC resistive circuits involving series and parallel combinations of resistances CO3: Understand Kirchhoff's laws,

				network theorems, CO4: Understand AC fundamentals	network theorems, CO4: Understand AC fundamentals	network theorems, CO4: Understand AC fundamentals
44	OEC03EL E12	SEMICONDUC TOR DEVICES-I	2023-24	CO1: Understand the principles of semiconductors, CO2: Understand the construction, characteristic and working of PN junction diodes, CO3: Understand the construction, working principles and IV characteristics of special purpose diodes CO4: Understand the construction, working principles and working of bipolar junction transistor (BJT)	CO1: Understand the principles of semiconductors, CO2: Understand the construction, characteristic and working of PN junction diodes, CO3: Understand the construction, working principles and IV characteristics of special purpose diodes CO4: Understand the construction, working principles and working of bipolar junction transistor (BJT)	CO1: Understand the principles of semiconductors, CO2: Understand the construction, characteristic and working of PN junction diodes, CO3: Understand the construction, working principles and IV characteristics of special purpose diodes CO4: Understand the construction, working principles and working of bipolar junction transistor (BJT)
45	OEC03EL E21	CIRCUIT FUNDAMENT ALS-II	2023-24	CO1: Understand the specifications, classification, construction, and applications of passive circuit elements CO2: Understand the concepts, construction, and types of passive circuit elements CO3: Understand the principles, types, and operation of circuit control and protective devices, including switches, fuses, circuit breakers, and relays. CO4: Understand the principles, types, and characteristics of voltage and current sources	CO1: Understand the specifications, classification, construction, and applications of passive circuit elements CO2: Understand the concepts, construction, and types of passive circuit elements CO3: Understand the principles, types, and operation of circuit control and protective devices, including switches, fuses, circuit breakers, and relays. CO4: Understand the principles, types, and characteristics of voltage and current sources	CO1: Understand the specifications, classification, construction, and applications of passive circuit elements CO2: Understand the concepts, construction, and types of passive circuit elements CO3: Understand the principles, types, and operation of circuit control and protective devices, including switches, fuses, circuit breakers, and relays. CO4: Understand the principles, types, and characteristics of voltage and current sources
46	OEC03EL E22	SEMICONDUC TOR DEVICES-II	2023-24	CO1: Understand the concept of transistor biasing and different methods of transistor biasing CO2: Study the construction, working principles, and I-V characteristics (output and transfer) of JFETs and MOSFETs. CO3: Explore the concept of Single stage and multistage amplifiers CO4: Understand feedback amplifiers and oscillators	CO1: Understand the concept of transistor biasing and different methods of transistor biasing CO2: Study the construction, working principles, and I-V characteristics (output and transfer) of JFETs and MOSFETs. CO3: Explore the concept of Single stage and multistage amplifiers CO4: Understand feedback amplifiers and oscillators	CO1: Understand the concept of transistor biasing and different methods of transistor biasing CO2: Study the construction, working principles, and I-V characteristics (output and transfer) JFETs and MOSFETs. CO3: Explore the concept of Single stage and multistage amplifiers CO4: Understand feedback amplifiers and oscillators

Dr. C. B. Patil
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