



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in the Light of NEP-2020
B.Tech. (EE/EX/EC)
(2021-2025)

COURSE CODE	CATE- GORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEE404	DCC	Electromagnetic Field Theory	60	20	20	0	0	3	1	0	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

The objective of this course is to-

1. Obtain an understanding of physical laws governing electromagnetic effects in the form of Maxwell's equations
2. Understand the concepts of static and time varying fields with an emphasis on wave propagation

Course Outcomes (COs):

After completion of this course students should be able to

1. Apply vector calculus to determine the electric and magnetic fields and energy stored due to specified charge and current distribution.
2. Apply Maxwell's equation in Differential and integral forms for the solution of appropriate problems involving static as well as time varying fields.
3. Discuss and analyze propagation of electromagnetic waves in free space, dielectric and conducting media

Syllabus

UNIT I

10 Hrs.

Electrostatics I: Introduction to various Co-ordinate systems and Co-ordinate transformations, Vector calculus, Divergence and Stokes theorem, Laplacian of a scalar and vector, Coulomb's law, Electric field intensity, Electric fields due to: point, line, surface and volume charge distributions, Electric flux density, Gauss's law and its application, Electric potential, Potential gradient, Electric dipole: dipole moment, potential & electric field intensity due to dipole, Energy stored in electrostatic fields, Method of images.

UNIT II

8 Hrs.

Electrostatics II: Poisson's and Laplace's equations, Solution of Laplace's equation, Uniqueness theorem, Capacitor and capacitance, Electric boundary conditions, Different electric currents and current densities, Behavior of different electrical materials in electric field, Equation of continuity and relaxation time, Ohms law in point form.

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UNIT III

8 Hrs.

Magnetostatics I: Magnetic field intensity, Magnetic flux, Magnetic flux density, Biot-Savart Law, Magnetic field due to: straight conductors, circular loop, infinite sheet of current, Ampere's circuital law and its application, Magnetic scalar and vector potential, Force on a moving charge and current elements, Force and torque on closed circuit, Magnetic dipole, Magnetic polarization, Self and mutual inductance, Energy stored in magnetic fields, Magnetic boundary conditions.

UNIT IV

9 Hrs.

Magnetostatics II: Faraday's Law, Induced EMF for time varying fields, Displacement current, Maxwell's equation in point form, Maxwell's equation in integral form, Concept of retarded potential, Poynting vector theorem, Complex poynting vector.

UNIT V

9 Hrs.

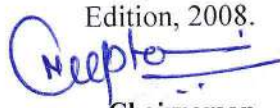
Electromagnetic Waves: Solution of wave equation, Propagation of plane EM wave in: perfect dielectric, lossy medium and good conductor, Media-attenuation, Phase velocity, Group velocity, Skin depth. Reflection and refraction of plane electromagnetic waves at boundaries for normal & oblique incidence, Snell's law of refraction, Brewster angle, Polarization of electromagnetic wave: linear, circular and elliptical polarization. Transmission Line parameters and equations,

Text Books:

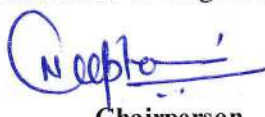
1. Matthew. N.O. Sadiku, "Elements of Electromagnetics", Oxford University Press, First Indian Edition, 2010.
2. Shankar Prasad Ghosh, Lipika Datta, "Electromagnetic Field Theory", McGraw Hill, 1st Edition, 2012
3. Gangadhar. K.A, "Field theory", Khanna Publishers, New Delhi, 15th Edition, 2004.
4. Umesh Sinha, "Transmission Lines and Networks", Satya Prakashan, 2003.

References:

1. William Hayt, "Engineering Electromagnetics", McGraw Hill, 7th Edition, 2011.
2. David K Cheng, "Field and Wave Electromagnetics", Pearson Education, 2nd Edition, 2013.
3. John D. Kraus, "Electromagnetics" McGraw Hill, 5th Edition, 1999.
4. Narayana Rao N, "Elements of Engineering Electro Magnetics", Prentice Hall of India, 6th Edition, 2008.



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(2021-2025)

(2021-2023)											
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BTEI401	DCC	Microprocessor and Microcontroller	60	20	20	30	20	3	1	2	5

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;

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Input-Output interfacing: Peripherals I/O, PPI 8255 Architecture and modes of operation, Interfacing to 16-bit microprocessor and programming, DMA controller (8257) Architecture, Programmable interval timer 8254, USART 8251.

UNIT III

8 Hrs.

Introduction to 8051 Microcontroller

Introduction, Difference between Microprocessors and Microcontrollers. Overview of 8051 Microcontroller family, Architecture of 8051 Microcontroller, The program counter and ROM space in the 8051, registers, 8051 register banks.

UNIT IV

10Hrs.

8051 Assembly Language Programming

Introduction to 8051 assembly programming, Structure of Assembly language, Assembling and running an 8051 program, 8051 data types and directives, interrupts

8051 Addressing Modes & Instruction set

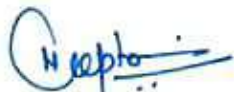
Addressing modes, Accessing memory using various Addressing modes, Bit addresses for I/O and RAM, Arithmetic instructions, Signed number concepts and arithmetic operations, Logic and compare instructions, Rotate instruction, Jump, Loop, And Call Instructions, Call instructions time delay for various 8051 chips.

UNIT V

10 Hrs.

8051 Programming in C

Data types and time delay in 8051 C, I/O programming in 8051 C, Logic operations in 8051 C, Data conversion programs in 8051 C, Accessing code ROM space in 8051 C, Interfacing with LEDs, LCDs ADCs, DACs.



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Text Books:

1. I.A.K. Ray & K.M. Bhurchandi, "Advanced Microprocessors and peripheral-Architecture, Programming and Interfacing", Tata McGraw –Hill, 2012.
2. Muhammad Ali Mazidi, Janice Gillispie Mazidi and Rolin McKinlay, "The 8051 Microcontroller and Embedded Systems Using Assembly and C, 2/e", Second Edition, Pearson Education 2008.
3. Kenneth J. Ayala, Dhananjay V. Gadre, "The 8051 Microcontroller & Embedded Systems using Assembly and C", Cengage Learning, India Edition, 2008.

References:

1. Douglas V. Hall, "Microprocessor and interfacing", Revised second edition, Macmillan, McGraw Hill 2006.
2. Han Way Huang, "Using the MCS-51 Microcontrollers", Oxford Uni Press, 2000.
3. Rajkamal, "Microcontrollers Architecture, programming, interfacing and system design" Pearson education, 2009.

List of Experiments:

1. Introduction to 8086 & 8051 kit, hardware features & modes of operation and Technique of programming & basic commands of kit.
2. Design programs for Arithmetic Operations.
3. Develop a program to find 1's complement and then 2's complement of a 16-bit numbers.
4. Develop a program to find larger of two numbers.
5. Write a program to shift an 8-bit number left by 2-bits.
6. Write a program to generate a square wave of 2 KHz Frequency on input pin.
7. Introduction to IDE and Assembler directives.
8. Develop 8051 Assembly language programs using Arithmetic/ Logical instructions.
9. 8051 Assembly language programming for block data transfer between internal and external memory including overlapping blocks.

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10. 8051 Assembly language programming for
- code conversions
 - Timers in different modes.
 - I/O port programming in embedded C.
 - Programming of LCD in embedded C.



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BTECIOT401	DCC	Sensors and Signal Conditioning	60	20	20	30	20	3	0	2	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

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Course Educational Objectives (CEOs):

This course deals with various types of sensors and different signal conditioning methods.

Course Outcomes (COs):

The students will be able to

1. Identify the different sensors available for specific engineering applications.
2. Understand the construction and working of different types of sensors.
3. Apply the various signal conditioning techniques on different sensors and analyze the effects.

Syllabus

UNIT I

10 Hrs.

Introduction to Sensor-Based Measurement Systems: Concepts and Terminology: Measurement systems, Transducers, sensors and actuators, Signal conditioning and display, Interfaces, data domains, and conversion, Sensor Classification, Interfering and modifying inputs, Compensation techniques.

UNIT II

9 Hrs.

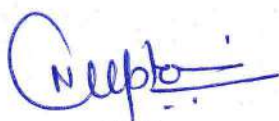
Primary Sensors: Temperature sensors, Bimetals, Pressure sensors, Flow velocity and Flow-rate sensors, Level sensors, Force and torque sensors, Acceleration and inclination sensors, Velocity sensors.

Materials for Sensor: Conductors, semiconductors, and dielectrics, Magnetic materials, Thick-Film technology, Thin-Film technology, Micromachining technologies.

UNIT III

10 Hrs.

Resistive Sensors: Potentiometers, Strain Gauges Fundamentals: Piezoresistive effect, types and applications. Resistive Temperature Detectors (RTDs), Thermistors: Models, Thermistor Types and Application, Magneto-resistors, Light-Dependent Resistors, Resistive Hygrometers, Resistive Gas Sensors, Liquid Conductivity Sensors.



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Signal Conditioning: Measurement of Resistance, Voltage Dividers, Wheatstone Bridge: Balance and Deflection Measurements, Sensitivity and linearity, linearization of resistive sensor bridges, Sensor bridge calibration and balance, Power supply of Wheatstone bridges, Detection methods of Wheatstone bridge, Differential and Instrumentation Amplifiers, Interference types and reduction.

UNIT IV

9 Hrs.

Reactance Variation Sensors: Capacitive Sensors: variable and differential capacitor. Inductive Sensors: Variable Inductance, eddy current sensor, LVDT, Electromagnetic Sensor.

Signal Conditioning: Problems and alternatives, AC Bridges: Sensitivity and linearity, Capacitive bridge analog linearization, ac amplifiers and power supply decoupling, Electrostatic shields and driven shields.

UNIT V

8 Hrs.

Self-Generating Sensors and its Signal Conditioning: Thermoelectric Sensors: Thermocouples, Piezoelectric Sensors, Pyroelectric Sensors, Photovoltaic Sensor, Electrochemical Sensors.

Signal Conditioning: Chopper and Low-Drift Amplifiers, Electrometer and Trans-impedance amplifiers, Charge Amplifiers.

Text Books:

1. Ramón Pallás-Areny, John G. Webster, "Sensors and Signal Conditioning", 2nd Edition, John Wiley & Sons, 2012.
2. Walt Kester, "Practical Design Techniques for Sensor Signal Conditioning", Analog Devices, 1999.

References:

1. E.O. Doebelin, D.N. Manik, "Measurement systems", 6th Edition, Tata McGraw Hill, 2012.
2. R. Pallas-Areny and J. G. Webster, "Analog Signal Processing", John Wiley & Sons, 1999.

List of Experiments:

1. To study various Primary sensor.
2. To study RTD for Temperature measurement.
3. To study Strain Gauge for pressure measurement.

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BTECIOT401	DCC	Sensors and Signal Conditioning	60	20	20	30	20	3	0	2	4

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4. To study LDR and Photodiode for sensing light intensity.
5. To study Thermocouple for Temperature measurement.
6. To study Photovoltaic for sensing light parameter.
7. Measuring the temperature using temperature sensor.
8. Measuring the light intensity using sensor.
9. Measuring the humidity using humidity sensor.
10. Measuring the distance using sensor.

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**Name of Program: Bachelor of Technology in Electronics & Communication with
Specialization in IOT w.e.f. 2021**

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
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BTECIOT501	EC	Communication Systems	60	20	20	30	20	3	0	2	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit.

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Course Objectives:

To provide the basic fundamentals, principles, concepts of communication systems and various modulation techniques of analog and digital communication systems.

Course Outcomes:

After completion of this course the students will be able to:

1. Analyze various analog modulation and demodulation techniques and apply suitable modulation techniques for various applications.
2. Analyze various digital modulation and demodulation techniques and apply suitable modulation techniques for various applications.
3. Understand different types of source and channel coding techniques.

Syllabus

UNIT I

9 Hrs.

Amplitude modulation Techniques

Need of modulation, Amplitude modulation: mathematical representation of AM, modulation index, frequency spectrum, single tone and multi tone AM, generation of AM (square law modulator, switching modulator), Detection of AM (Square law detector, envelope detector),

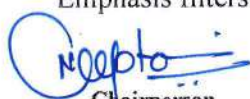
Power distribution, DSB-SC: generation and detection techniques, SSB: generation and detection techniques, VSB.

UNIT II

8 Hrs.

Angle modulation Techniques

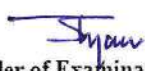
Frequency and phase modulation, spectrum and bandwidth, Narrowband FM, Wideband FM, FM Modulators: Direct and Indirect method of frequency modulation, FM Detectors: Slope Detector, Foster Seeley Discriminators, Ratio-Detectors and PLL detectors, AFC, Pre-Emphasis and De-Emphasis filters.


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UNIT III

9 Hrs.

Digital conversion of Analog Signals

Sampling theorem, types of sampling, signal reconstruction and reconstruction filters, Pulse Amplitude Modulation (PAM), Pulse Width Modulation (PWM), Pulse Position Modulation (PPM), Quantization, quantization error, Pulse Code Modulation (PCM), Companding, TDM-PCM, Differential PCM, Delta modulation, Adaptive Delta modulation.

UNIT IV

9 Hrs.

Digital Modulation Techniques

Phase shift Keying (PSK)- Binary PSK, differential PSK, differentially encoded PSK, Quadrature PSK, M-ary PSK and associated Prob. of Error. Frequency Shift Keying (FSK)- Binary FSK (orthogonal and nonorthogonal), M-ary FSK and associated Prob. of Error. Comparison of BPSK and BFSK, Quadrature Amplitude Shift Keying (QASK), Minimum Shift Keying (MSK).

UNIT V

8 Hrs.

Information Theory & Coding

Introduction to Information Theory, Channel Capacity, Source Coding, Entropy Codes: Huffman Coding & Shannon-Fano Coding, Linear Block Codes, Hamming Weight and Distance Properties, Syndrome Decoding, Cyclic Codes, Convolutional Codes.

Text Books:

1. B.P. Lathi and Zhi Ding, "Modern Digital and Analog Communication System"; 4th Edition, Oxford University Press, 2011.
2. Herbert Taub, Donald L Schilling, Gautam Saha, "Principles of Communication Systems, McGraw Hill Education; 4th Edition, 2013.

References:

1. Simon Haykin, Michael Moher, "Communication System", John Wiley, 5th Edition, 2010.
2. R.P. Singh and S.D. Sapre, "Communication Systems: Analog and Digital", McGraw Hill Education; 3rd Edition, 2012.
3. H P. Hsu: "Schaum's Outline Analog and Digital Communications", McGraw Hill Education, 3rd Edition, 2009.
4. John G. Proakis, Masoud Salehi, "Fundamental of Communication Systems", Pearson Edition, 2nd Edition, 2014.

List of Experiments:

1. To synthesize the Fourier series for periodic Signals.
2. To generate the Frequency Spectrum of various signals using Spectrum Analyzer.
3. To analyze characteristics of AM modulator & Demodulators and calculate the modulation Index.
4. To analyze characteristics of FM modulators & Demodulators.
5. To study signal reconstruction and aliasing and calculate sampling frequency for various signals.
6. To observe the waveforms of PAM, PPM and PWM.


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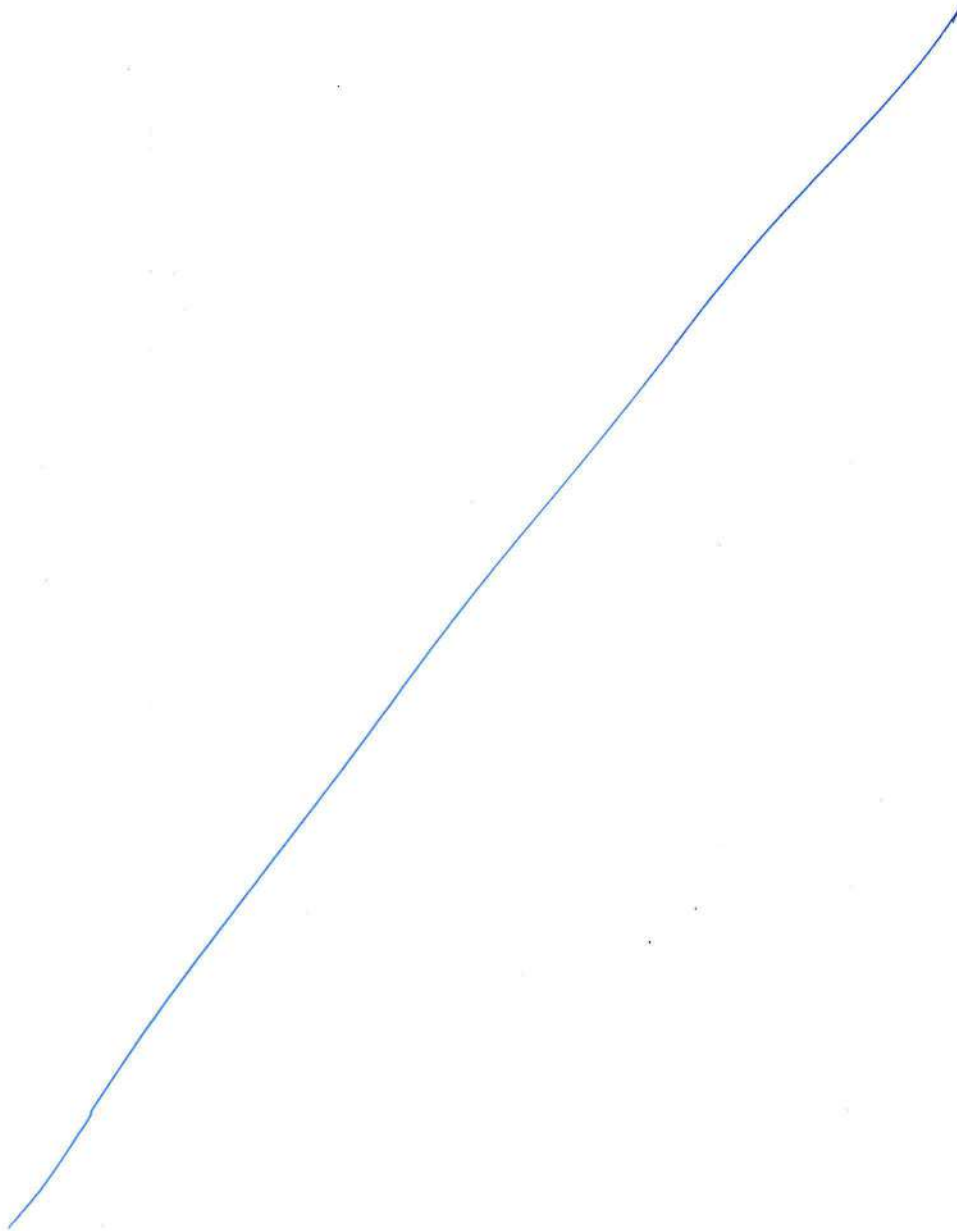

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7. To analyze the waveform of PCM signal and reconstruct the baseband signal by synchronizing the transmitter and receiver clock.
8. To analyze the Delta modulation waveform and observe the distortion.
9. To analyze Adaptive delta modulation waveform and compare the waveform with DM waveform.
10. To generate the ASK, PSK and FSK modulated signals and their reconstructed signals.




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Shri Vaishnav School of Management

Choice Based Credit System (CBCS) in Light of NEP-2020
BBA+MBA - II SEMESTER (2022-2026)

ML307 ENVIRONMENTAL MANAGEMENT AND SUSTAINABILITY

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						
			THEORY			PRACTICAL			CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*	L	
ML307	AECC	Environmental Management and Sustainability	60	20	20	0	0	4	4

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Course Objective

1. To create awareness towards various environmental problems.
2. To create awareness among students towards issues of sustainable development.
3. To expose students towards environment friendly practices of organizations.
4. To sensitize students to act responsibly towards environment.

Examination Scheme

The internal assessment of the students' performance will be done out of 40 Marks. The semester Examination will be worth 60 Marks. The question paper and semester exam will consist of two sections A and B. Section A will carry 36 Marks and consist of five questions, out of which student will be required to attempt any three questions. Section B will comprise of one or more cases / problems worth 24 marks.

Course Outcomes

1. The course will give students an overview of various environmental concerns and practical challenges in environmental management and sustainability.
2. Emphasis is given to make students practice environment friendly behavior in day-to-day activities.

COURSE CONTENT

UNIT I: Introduction to Environment Pollution and Control

1. Pollution and its types (Air, Water, and Soil): Causes, Effects and Control measures
2. Municipal Solid Waste: Definition, Composition, Effects
3. Electronic Waste: Definition, Composition, Effects
4. Plastic Pollution: Causes, Effects and Control Measures


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BBA+MBA - II SEMESTER (2022-2026)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
ML307	AECC	Environmental Management and Sustainability	60	20	20	0	0	4	0	0	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit; AECC- Ability Enhancement Compulsory Course

*Teacher Assessment shall be based on following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

UNIT II: Climate Change and Environmental Challenges

1. Global Warming and Green House Effect
2. Depletion of the Ozone Layer
3. Acid Rain
4. Nuclear Hazards

UNIT III: Environmental Management and Sustainable Development

1. Environmental Management and Sustainable Development: An overview
2. Sustainable Development Goals (17 SDGs)
3. Significance of Sustainable Development
4. Environment Friendly Practices At Workplace and Home (Three Rs' of Waste Management, Water Conservation, Energy Conservation)

UNIT IV: Environmental Acts

1. The Water (Prevention and Control of Pollution) Act, 1974: Objectives, Definition of Pollution under this act, Powers and Functions of Boards
2. The Air (Prevention and Control of Pollution) Act, 1981: Objectives, Definition of Pollution under this act, Powers and Functions of Boards
3. The Environment (Protection) Act, 1986: Objectives, Definition of important terms used in this Act, Details about the act.
4. Environmental Impact Assessment: Concept and Benefits


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UNIT V: Role of Individuals, Corporate and Society

1. Environmental Values
2. Positive and Adverse Impact of Technological Developments on Society and Environment
3. Role of an individual/ Corporate/ Society in environmental conservation
4. Case Studies: The Bhopal Gas Tragedy, New Delhi's Air Pollution, Arsenic Pollution in Ground Water (West Bengal), Narmada Valley Project, Cauvery Water Dispute, Fukushima Daiichi Disaster (Japan), Ozone Hole over Antarctica, Ganga Pollution, Deterioration of Taj Mahal, Uttarakhand flash floods

Suggested Readings:

1. Rogers, P.P., Jalal, K.F. , Boyd, J.A.(Latest Edition) . **An Introduction to Sustainable Development.** Earthscan
2. Kalam, A.P.J. (Latest Edition) . **Target 3 Billion: Innovative Solutions Towards Sustainable Development.** Penguin Books
3. Kaushik , A. and Kaushik (Latest Edition). **Perspectives in Environmental Studies.** New Delhi: New Age International Publishers.
4. Dhameja, S.K. (Latest Edition). **Environmental Studies.** S.K. Kataria and Sons.New Delhi
5. Bharucha, E. (Latest Edition). **Environmental Studies for Undergraduate Courses.** New Delhi: University Grants Commission.
6. Wright, R. T. (Latest Edition). **Environmental Science: towards a sustainable future** .New Delhi: PHL Learning Private Ltd.
7. Rajagopalan, R. (Latest Edition). **Environmental Studies.** New York: Oxford University Press.

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BTEC405	AEC	Programming with Arduino	0	0	0	30	20	0	0	4	2

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;

*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

The objective of this course is to-

1. Being one of the fundamental courses of Electronics stream its prime objective is to make the students capable of analyzing given electrical network composed by passive element and some active element.
2. To make the students learn how to synthesize an electrical network from a given impedance/admittance function

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes:

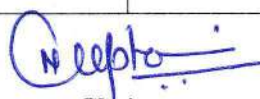
1. Apply the fundamental concepts in solving and analyzing different Electrical networks.
2. Select appropriate and relevant technique for solving the Electrical network in different conditions.
3. Apply mathematics in analyzing and synthesizing the networks in time and frequency domain.
4. Estimate the performance of a particular network from its analysis.

Syllabus

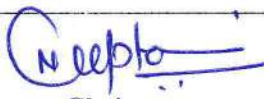
Study of Arduino and various programs based on Arduino.

Experiment List

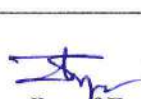
E.N.	Aim
1.	Understanding Arduino IDE and Arduino board family.
2.	Understanding I/O access on ATmega328p
3.	Interfacing LED and Seven Segment.
4.	Interfacing Switch and Keypad.



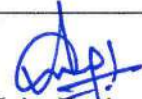
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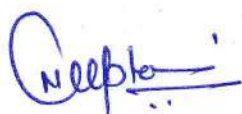
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5.	Program based on Timers.
6.	Experimenting data transfer using SPI Communication.
7.	Establishing i2c interface with ATmega328p
8.	Program based on Interrupts.
9.	Program based on Serial Communication.
10.	Interfacing GSM, RFID, Wi-Fi.



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